



# Project Manual

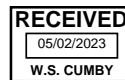
Presented to:

Acts Retirement-Life Communities  
Mid-Atlantic Region  
726 Loveville Road  
Suite 3000  
Hockessin, DE 19707

For:  
Acts Granite Farms Estates  
1343 W. Baltimore Pike  
Media, PA 19063

For:  
Acts Granite Farms Estates WBC – Phase 2

Date: **April 21, 2023 – Bid/Permit Set**



kramer

architecture ■ interior design ■ planning

marks



**DOCUMENT 000100  
TABLE OF CONTENTS**

**MISCELLANEOUS DOCUMENTS**

000000	COVER
000100	TABLE OF CONTENTS
000200	INVITATION TO BID
000210	BID PROPOSAL FORM
000220	INSTRUCTIONS TO BIDDER
000500	DRAWING LIST
006000	FORMS
007300	SUPPLEMENTARY GENERAL CONDITIONS

**DIVISION 1 - GENERAL REQUIREMENTS**

011000	SUMMARY OF WORK
012100	ALLOWANCES
012200	UNIT PRICES
012300	ALTERNATES
012500	SUBSTITUTION PROCEDURES
012600	CONTRACT MODIFICATION PROCEDURES
012900	PAYMENT PROCEDURES
015000	TEMPORARY FACILITIES AND CONTROLS
016000	PRODUCT REQUIREMENTS
017300	EXECUTION
017410	CONSTRUCTION WASTE MANAGEMENT & DISPOSAL
017700	CLOSEOUT PROCEDURES
017820	OPERATION & MAINTENANCE DATA
017830	PROJECT RECORD DOCUMENTS
017846	ATTIC STOCK
017900	DEMONSTRATION & TRAINING

**DIVISION 2 - SITE CONSTRUCTION**

023000	EARTHWORK
024119	SELECTIVE DEMOLITION

**DIVISION 3 - CONCRETE**

033000	CAST-IN-PLACE CONCRETE
035410	GYPSUM CEMENT UNDERLAYMENT

**DIVISION 4 - MASONRY**

040650	MASONRY MORTAR AND GROUT
042200	CONCRETE MASONRY UNIT
042610	MASONRY VENEER

**DIVISION 5 - METALS**

051200	STRUCTURAL STEEL FRAMING
053100	STEEL DECKING
054100	COLD FORMED METAL FRAMING
055000	METAL FABRICATIONS
055100	METAL STAIRS



**DIVISION 5 – METALS - CONTINUED**

- 055213 PIPING & TUBE RAILING
- 057300 DECORATIVE METAL RAILINGS

**DIVISION 6 - WOOD AND PLASTIC**

- 061000 ROUGH CARPENTRY
- 061600 SHEATHING
- 061750 SHOP-FABRICATED WOOD TRUSSES
- 062020 INTERIOR FINISH CARPENTRY
- 064023 INTERIOR ARCHITECTURAL WOODWORK
- 064113 WOOD VENEER CUSTOM CABINETS
- 064116 PLASTIC LAMINATE CLAD CABINETS
- 064300 WOOD STAIRS AND RAILINGS
- 066000 PLASTIC FABRICATIONS
- 066116 SOLID SURFACE WINDOW SILLS
- 066400 PLASTIC PANELING

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**

- 071416 DRYLOK-EXTREME-LATEX-COLD FLUID-APPLIED WATERPROOFING
- 071813 PEDESTRIAN TRAFFIC COATING
- 072100 BUILDING INSULATION
- 072500 HYDROGAP™ DRAINABLE HOUSEWRAP
- 072726 FLUID APPLIED MEMBRANE AIR BARRIER
- 073113 ASPHALT ROOFING -GAF TIMBERLINE HD SHINGLES
- 074646 FIBER-CEMENT SIDING
- 075050 ROOF REPAIRS
- 075323 ETHYLENE-PROLPLENE-DIENE-MONOMER
- 076200 SHEET METAL FLASHINGS AND TRIM
- 077100 MANUFACTURED GUTTERS AND DOWNSPOUTS
- 077113 MANUFACTURED COPINGS AND SCUPPERS
- 077253 S-5 COLORGARD SNOW-GUARD
- 078413 FIRESTOPPING
- 079000 JOINT SEALERS
- 079500 EXPANSION CONTROL

**DIVISION 8 - DOORS AND WINDOWS**

- 081113 HOLLOW METAL DOORS AND FRAMES
- 081416 FLUSH WOOD DOORS
- 083120 WOOD FRAME-ACRYLIC PANEL DOORS
- 084100 METAL-FRAMED STOREFRONTS
- 085110 ALUMINUM WINDOWS
- 085313 PREMIUM VINYL WINDOW
- 088000 GLAZING

**DIVISION 9 - FINISHES**

- 091110 NON-LOAD BEARING STEEL FRAMING
- 092600 GYPSUM BOARD ASSEMBLIES
- 093000 SHEET MEMBRANE WATERPROOFING & CRACK ISOLATION
- 093113 TILING AT INTERIOR WALLS
- 093116 TILING AT INTERIOR FLOORS OVER CONCRETE
- 093413 TILING AT SHOWER RECEPTORS
- 095123 ACOUSTICAL CEILING TILE

**DIVISION 9 – FINISHES - CONTINUED**

096113	TILING AT INTERIOR WALLS
096116	TILING INTERIOR FLOORS CONCRETE
093413	TILING SHOWER RECEPTOLRS
095123	ACCOUSTICAL TILE CEILINGS
096113	FLOOR PREPARATION LVT
096116	FLOOR PREPLARATION VCT
096119	FLOOR PREPARATION CARPET
096513	RESILIENT BASE AND ACCESSORIES
096519	RESILIENT TILE FLOORING
096723	RESINOUS FLOORING
096813	TILE CARPET
096816	SHEET CARPET
097200	WALL COVERING
097720	HOMASOTE
099123	PAINTING
099323	STAINING AND TRANSPARENT FINISHING

**DIVISION 10 - SPECIALTIES**

101900	CUBICLE CURTAIN
102600	WALL AND DOOR PROTECTION
102800	TOILET AND BATH ACCESSORIES
103000	MANUFACTURED ELECTRIC FIREPLACE
105126	SOLID PLASTIC LOCKERS
105230	FIRE EXTINGUISHERS AND CABINETS

**DIVISION 11 – EQUIPMENT**

114000	FOOD SERVICE EQUIPMENT
--------	------------------------

**DIVISION 12 - FURNISHINGS**

122113	HORIZONTAL LOUVER BLINDS
122413	ROLLER WINDOW SHADES
123530	RESIDENTIAL CASEWORK
123661.13	CULTURED MARBLE COUNTERTOPS
123661.16	SOLID SURFACE COUNTERTOPS
123661.19	QUARTZ SURFACING
124813	ENTRANCE FLOOR MATS

**DIVISION 14 – CONVEYING SYSTEMS (NOT USED)**

**DIVISION 21 - FIRE SUPPRESSION**

210500	STANDARD CONDITIONS FOR FIRE SUPPRESSION
210517	SLEEVES AND SLEEVE SEALS FOR FIRE SUPPRESSION PIPING
210518	ESCUTCHEONS FOR FIRE SUPPRESSION PIPING
210523	GENERAL DUTY VALVES FOR FIRE PROTECTION PIPING
210553	IDENTIFICATIONS FOR FIRE SUPPRESSION PIPING AND EQUIPMENT
211313	WET PIPE SPRINKLER SYSTEMS

**DIVISION 22 - PLUMBING**

220500	STANDARD CONDITIONS FOR PLUMBING
2205 7	SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
220518	ESCUTCHEONS FOR PLUMBING PIPING

**DIVISION 22 - PLUMBING - CONTINUED**

220523.12	BALL VALVES FOR PLUMBING PIPING
220523.14	CHECK VALVES FOR PLUMBING PIPING
220529	HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
220553	IDENTIFICATIONS FOR PLUMBING PIPING AND EQUIPMENT
220719	PLUMBING PIPING INSULATION
221116	DOMESTIC WATER PIPING
221119	DOMESTIC WATER PIPING SPECIALTIES
221300	DRAINAGE SYSTEMS
221316	SANITARY WASTE AND VENT PIPING
2213 9	SANITARY WASTE PIPING SPECIALTIES
221319 .13	SANITARY DRAINS
224000	PLUMBING FIXTURES AND EQUIPMENT

**DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)**

230500	STANDARD CONDITIONS FOR HVAC WORK
2305 48.13	VIBRATION CONTROLS FOR HVAC
230550	FIRE STOPPING
230593	TESTING, BALANCING, AND ADJUSTING
230713	DUCT INSULATION
230719	HVAC PIPING INSULATION
230933	AUTOMATIC TEMPERATURE CONTROL
233113	METAL DUCTS
233300	AIR DUCT ACCESSORIES
233346	FLEXIBLE DUCTS
233423	HVAC POWER VENTILATIONS (FANS)
233713 .13	AIR DIFFUSERS
233713. 23	REGISTERS AND GRILLES
238127	SPLIT SYSTEM HEAT PUMP
238219	FAN COIL UNITS (IEC)
238333	ELECTRIC HEATERS

**DIVISION 26 - ELECTRICAL**

26 00 00	STANDARD CONDITIONS FOR ELECTRICAL WORK
26 24 16	PANELBOARDS
26 27 00	BASIC MATERIALS AND EQUIPMENT
26 28 16	SAFETY SWITCHES - GENERAL DUTY
26 50 00	LED LIGHTING

**END OF DOCUMENT**

**SECTION 000210**

**BID PROPOSAL FORM**

FOR BIDS DUE May 26, 2020

**Acts Granite Farms Estate  
1343 West Baltimore Pike  
Media, PA 19063**

For

ACTS Retirement-Life Communities  
726 Loveville Road  
Suite 3000  
Hockessin, DE 19707

Name of Contractor \_\_\_\_\_

Address \_\_\_\_\_

Telephone Number \_\_\_\_\_

**By Email to:** Elena Kim – [ekim@kramermarks.com](mailto:ekim@kramermarks.com)  
and  
Jason Guss – [Jason.Guss@actslife.org](mailto:Jason.Guss@actslife.org)

**By Delivery:**

**Kramer+Marks Architects  
27 S. Main Street  
Ambler, PA 19002**

ACTS Mid-Atlantic Regional Office  
726 Loveville Road  
Suite 3000  
Hockessin, DE 19707

**1. Bidders:**

Having carefully examined the Drawings and Specifications and all Addenda thereto, if issued, as well as having made myself familiar with the site and all conditions effecting my work, I (we) agree to furnish all engineering, labor, equipment, permits and materials for the above project in accordance with the Contract Documents (Specifications and Drawings) prepared by the office of Kramer+Marks Architects for the GMP of:

\_\_\_\_\_ (\$ \_\_\_\_\_).  
(Write in words and numbers)

## 2. - **BID BREAKDOWN**

Bid Quote Breakdown – the following breakdown is required of all bidders. Failure to provide a breakdown by the bid date will disqualify a bid. All bids shall be kept confidential until the lowest qualified contractor has been selected.

### **A. General Conditions**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **B. Demo**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **C. Earthwork**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **D. Concrete / Masonry**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **E. Structural Steel**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **F. Rough Carpentry**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **G. Architectural Millwork**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **H. Insulation**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **I. Roofing**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **J. Joint Sealant**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **K. Doors & Windows**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

### **L. Drywall & Ceilings**

\_\_\_\_\_  
(Write in words and numbers) (\$ \_\_\_\_\_)

**M. Flooring**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**N. Painting**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**O. Specialties**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**P. Food Service**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**R. Sprinklers**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**S. Plumbing**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**T. Heating, Ventilation & Air Conditioning**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**U. Electrical**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**V. Lighting**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**W. Allowances (listed in items #3 below)**

\_\_\_\_\_  
(Write in words and numbers)

(\$     \$15,000     )

**X. TOTAL BASE BID**

\_\_\_\_\_  
(Write in words and numbers)

(\$ \_\_\_\_\_)

**3. ALLOWANCES (to be included in base scope)**

Allowance #1 – Floor preparation. Please provide lump sum allowance to furnish and install gypsum underlayment. \$ 6,000\_\_\_\_\_ (Please Initial)

Allowance #2 – Abandoned wiring removal. Please provide lump sum allowance for removal and disposal of unused/ abandoned wiring and subsequent restraints and hangers. \$ 2,000\_\_\_\_\_ (Please Initial)

Allowance #3 – Fire Proofing, Please provide lump sum allowance for fire proofing penetrations through fire rated assemblies that are discovered after demolition. \$ 2,000\_\_\_\_\_ (Please Initial)

Allowance #4 – 3<sup>rd</sup> Party Testing. Please provide lump sum allowance for 3<sup>rd</sup> party testing. \$ 5,000\_\_\_\_\_ (Please Initial)

**4. UNIT PRICES**

**Unit Prices**

We, the undersigned, agree if awarded the contract, that the value of work which may be added or omitted shall be computed in accordance with the Contract Documents and at the following established unit prices:

A. Floor Preparation furnish and install gypsum underlayment (S.F.)

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

B. Removal and replacement of GWB including Preparation and painting (S.F.)

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

C. Furnish and install new ceiling grid and tile (S.F.)

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

D. Furnish and install R-40 un-faced ceiling insulation (S.F.)

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

E. Furnish and install fire caulk (L.F.)

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

F. Provide the hourly rate of the Mechanical Contractor's Foreman.

\_\_\_\_\_ (\$\_\_\_\_\_)

(Write in words and numbers)

G. Provide the hourly rate of the Mechanical Contractor's Journeyman.

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

H. Provide the hourly rate of the Mechanical Contractor's Apprentice.

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

I. Provide the hourly rate of the Plumber's Foreman.

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

J. Provide the hourly rate of the Plumber's Journeyman.

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

K. Provide the hourly rate of the Plumber's Apprentice.

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

L. Provide the hourly rate of the Electrician's Foreman.

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

M. Provide the hourly rate of the Electrician's Journeyman.

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

N. Provide the hourly rate of the Electrician's Apprentice.

\_\_\_\_\_  
(Write in words and numbers) (\$\_\_\_\_\_)

## 5. **ALTERNATES**

**Alternate Prices** - The following alternates are requested. Please quote the cost differences involved. Failure to provide alternate cost quotations by the bid date will disqualify a bid. All bids shall be kept confidential until the lowest qualified contractor has been selected. Successful bidder will be required to provide a bid breakdown with the schedule of values for all alternates.

### **Add Alternate #1 –**

Cherry Blossom Wing – New Interior Finishes in Common Area

\_\_\_\_\_  
(Write in words and numbers) Circle whether this is an **Add** or **Deduct** (\$\_\_\_\_\_)



**Add Alternate #2 –**

Cherry Blossom Wing – New Finishes in Resident Units

\_\_\_\_\_  
(Write in words and numbers) Circle whether this is an **Add** or **Deduct** (\$ \_\_\_\_\_)

**Add Alternate #3 –**

Cherry Blossom Wing – Replace Existing Lights in Existing Locations

\_\_\_\_\_  
(Write in words and numbers) Circle whether this is an **Add** or **Deduct** (\$ \_\_\_\_\_)

**Add Alternate #4 –**

Willow Brook Court – Replace Existing Doors in Living/Activity & Dining Area  
With New Storefront System

\_\_\_\_\_  
(Write in words and numbers) Circle whether this is an **Add** or **Deduct** (\$ \_\_\_\_\_)

**6. CHANGE ORDER MARK-UP PERCENTAGE**

Change Order Mark-up for the subcontractors to be \_\_\_\_\_ %  
Change Order Mark-up for the General Contractor to be \_\_\_\_\_ %

Please note if the percentages are not filled in it will be agreed subcontractor mark-up will be 10%  
and General Contractor mark-up will be 5%.

**7. ACKNOWLEDGEMENTS OF CONSTRUCTION DOCUMENTS**

We acknowledge the receipt of the following Construction Docs:

Construction Drawings, \_\_\_\_\_ (Please Initial)

Construction Specifications, \_\_\_\_\_ (Please Initial)

**8. ACKNOWLEDGEMENTS OF ADDENDUMS**

We acknowledge the receipt of the following Addendums:

Addendum #1, \_\_\_\_\_ (Please Initial)

Addendum #2, \_\_\_\_\_ (Please Initial)

Addendum #3, \_\_\_\_\_ (Please Initial)

**9. CONSTRUCTION DURATION**

Construction duration \_\_\_\_\_ (business days)

- a. We, the Undersigned, acting through its authorized officers and intending to be legally bound, agree that this bid proposal shall constitute an offer by the Undersigned to enter into Contract with the acts and thing herein provided, which offer shall be irrevocable for 90 calendar days from the date of opening hereof and that the Owner may accept this offer at any time during said period by notifying the Undersigned of the acceptance of said offer.

- b. We, the Undersigned, a sole proprietor/partnership/corporation created and existing under the laws of the State, has its business

Address: \_\_\_\_\_

\_\_\_\_\_

Signature \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**END OF PROPOSAL FORM**

**Section 000220**  
**INSTRUCTIONS TO BIDDERS**

1. DEFINITIONS

- A. Bidding Documents include the Invitation to Bidders, Instructions to Bidders, Bid Form, Bid Bond, Agreement of Surety, Non-Collusion Affidavit, and other sample bidding and contract forms. The Contract Documents consist of the Bidding Documents, Agreement Between Owner and Contractor (hereinafter “Agreement”), Performance Bond, Payment Bond, Conditions of the Contract, Specifications, Drawings, and all Addenda issued prior to the execution of the Agreement.
- B. “Addenda” are written or graphic instruments issued by the Architect prior to the execution of the Agreement which modify or interpret the Contract Documents by additions, deletions, clarifications or corrections.
- C. A “Bid” or “Proposal” is a complete and properly signed proposal to do the Work for the sum stipulated therein, submitted in accordance with the Bidding Documents.
- D. The “Base Bid” is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which work may be added or from which work may be deleted for sums stated in Alternate Bids.
- E. An “Alternate Bid” or “Alternate” is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.
- F. A “Unit Price” is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.
- G. A Bidder is a person or entity who submits a bid or proposal.

2. OBTAINING BIDDING DOCUMENTS

- A. Bid Documents will be attached as PDF Files.

3. REVIEW OF DRAWINGS AND SPECIFICATIONS

- A. Bidders shall thoroughly examine and be familiar with the Specifications and Drawings. The failure or omission of any Bidder to receive or examine any form, instrument, document, or visit the site and acquaint himself with conditions there existing, shall in no way relieve any Bidder from any obligation with respect to his Bid. By submitting a Bid, the Bidder agrees and warrants that he has examined the site and the Specifications and Drawings and, where Specifications and/or Drawings require in any part of the Work a given result to be produced, that the

Specifications and Drawings are adequate and the required result can be produced under the Specifications and Drawings. No claim for any extra will be allowed because of alleged impossibilities in the production of the results specified or because of inadequate or improper plans and specifications and whenever a result is required, the successful Bidder shall furnish any and all extras and make any changes needed to produce the required result for the sum stated in the form of proposal.

- B. Should any Bidder find discrepancies, duplications or omissions in the documents or have doubt as to the meaning expressed by the Contract Documents, they shall make inquiry at once in writing to the Architect. Where changes, corrections or clarifications to Contract Documents are deemed necessary by the Architect, Architect will issue written Addenda accordingly. Addenda thus issued shall be a part of the Contract Documents. No oral, telephone or letter instructions will be considered as having effect upon the Contract Documents; Addenda only shall constitute change to the Contract Documents. Bidders and Sub-bidders are urged to make early examination of Contract Documents and make inquiries about the Contract Documents if necessary, even though prices may not be determined until late in the bidding period.

4. STANDARD OF QUALITY/ALTERNATIVES/SUBSTITUTIONS

- A. The various materials and products specified in the Specifications by name or description are given to establish a standard of the quality and of cost for Bid purposes. It is not the intent to limit the Bidder, the Bid or the evaluation of the Bid to any one material or product specified but rather to describe the minimum standard. When proprietary names are used, they shall be deemed to be followed by the words "or alternatives of the quality necessary to meet the specifications." A Bid containing an alternative which does not meet the Specifications may be declared non-responsive. A Bid containing an alternative may be accepted but, if an award is made to that Bidder, the Bidder will be required to replace any alternatives which do not meet the Specifications.
- B. No substitution (alternative) will be considered prior to receipt of Bids unless written request for approval has been received by the Architect only from prime Contract Bidders at least ten (10) days prior to the date for receipt of Bids. Such requests shall be in accordance with substitution request procedure specified in Division 1, Product Requirements, Section 01600 and shall include, but not be limited to, the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. In addition, a statement setting forth changes in other materials, equipment or other portions of the Work including changes in the work of other contracts that incorporation of the proposed substitution (alternative) would require shall be included. The burden of proof of the merit of the proposed substitution (alternative) is upon the proposer.
- C. If the Architect approves a proposed substitution (alternative) prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon

approvals in any other manner.

- D. In accordance with the “Standard of Quality” provisions, substitutions (alternatives) may be submitted as part of a Bid only if the Bidder includes all information required for substitutions (as defined herein and in Division 1, Product Requirements, Section 01600) for each substitution (alternative) submitted as part of the Bid and clearly indicates the request for substitution (alternative) on the form of proposal. Bidder must submit evidence that the substitution (alternative) does not require extensive revision to the Contract Documents, that such substitution (alternative) is consistent with the Contract Documents and will produce indicated results, that such substitution (alternative) will not adversely affect the construction schedule, that such substitution (alternative) has received necessary approval of authorities having jurisdiction, that such substitution (alternative) is compatible with other portions of the Work and that such substitution (alternative) provides the specified warranty, or if no warranty is specified, a warranty comparable to that of the material or product named in the Specifications. In addition to the aforesaid requirements, Bidder must provide a detailed comparison of the significant qualities of the proposed substitution (alternative) with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated. Bidder shall provide a list of similar installations for completed projects with project names, addresses and contact persons, if requested. Bidder shall provide samples if requested. A proposed substitution (alternative) will not be considered to meet the Specifications unless all of the aforesaid requirements have been determined satisfied by the Architect. Failure of Bidder to supply the requested information will result in non-approval of any proposed substitution (alternative).

Non-approval of any proposed substitution (alternative) shall not entitle the successful bidder to any additional compensation or an extension of time to complete the Work.

Owner shall not be required to consider or accept any substitution (alternative) that is not specifically identified in a written request for substitution included with the bid submittal. Failure of the successful bidder to specifically identify a substitution (alternative) in a request for substitution included with its bid submittal shall result in the successful bidder being required to complete the Work using materials and products named in the Specifications.

Bidders are cautioned that substitutions (alternatives) submitted as part of the Bid may render that Bid non-responsive, and that Bidder may be required to provide the materials or products specified without change in cost to Bid submitted, if the substitution (alternative) information is incomplete or the substitution (alternative) is judged to be inferior to the standard of quality specified.

- E. No substitutions (alternatives) will otherwise be considered after the Contract award unless specifically provided in the Contract Documents.
- F. No substitutions (alternatives) will be considered for pre-bid approval later than

ten (10) days before bids are due.

5. ADDENDA

- A. Addenda, if any, will be mailed, transmitted or delivered to all whom are known by the issuing office to have received a set of Bid Documents. No Addendum will be issued later than three (3) days before the deadline for receipt of Bids except Addendum withdrawing the request for Bids or extending the deadline for receipt of Bids. Bidders shall acknowledge receipt of Addenda on the Bid Form.

6. PREPARATION OF BID

- A. Any Contract will be entered into by the Owner with the understanding that the Bidder, prior to submission of his Bid, acquainted himself with the requirements of the Plans and Specifications, conditions of the site, and all other matters pertinent to the Work contemplated. It will be assumed that the Bidder has satisfied itself as to the conditions to be encountered overhead, on the surface and concealed, the character, quality and quantities of work to be done and materials to be furnished, and the requirements of the Contract and Specifications. No allowance or concession will be made for the lack of such information on the part of the Bidder. The Bidder shall not at any time after execution of the Agreement make any claims whatsoever based upon insufficient data or incorrectly assumed conditions, nor shall he claim any misunderstanding in regard to the nature, conditions or character of the Work to be done under the Contract, and it assumes all risk resulting from any changes in the conditions which may occur during the progress of the Work.

- B. Bids can be emailed with the name of the Bidder and the contract which is being bid to:

Elena Kim – ekim@kramermarks.com

and

Jason Guss – Jason.Guss@actslife.org

- C. If a Bidder elects to submit a Bid by mail or hand delivery, the sealed Bid envelope shall be marked with the name of the Bidder and the contract which is being bid shall be enclosed in a mailing envelope addressed to:

Elena Kim  
Kramer+Marks Architects  
27 S. Main Street  
Ambler, PA 19002

- D. Bids received after the time and date for receipt of Bids will be returned unopened.
- E. Bids shall be submitted on forms identical to the Form of Proposal included in the Bidding Documents. All blanks on the Form of Proposal shall be filled in by

typewriter or manually in ink.

- F. Oral, telephonic or telegraphic Bids are invalid and will not receive consideration.
- G. Where so indicated by the make-up of the Form of Proposal, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern.
- H. Interlineations, alterations and erasures must be initialed by the authorized signer of the Bid. Each Bid must contain the full business address of the Bidder and must be signed correctly by an authorized representative of Bidder. If the proposal is made by an individual, in addition to his signature, his post office address should be shown. If the proposal is made by a partnership, the name and post office address of each partner of the partnership must be shown and the proposal must be signed in the partnership name by at least one (1) of the general partners. If the Bid is made by a corporation, the proposal should be signed by the President or Vice President and attested by the Secretary or Assistant Secretary, and identify the name, business address and state of incorporation for the corporation, and have the corporate seal affixed. If the proposal is made by a limited liability company, the name and post office address of each member and manager, if any, of the limited liability company must be shown and the proposal must be signed in the name of the limited liability company by at least one (1) authorized representative of the limited liability company.

7. ALTERNATES

- A. All requested alternates as set forth on the Bid Form shall be bid. Bidder shall provide prices for those alternates indicated on the Form of Proposal and shall include changes to Contract Sum. Alternate prices shall be held for a period beyond date of agreement as stated in the Supplementary General Conditions. If there is no change in Contract Sum enter "N.C." in the appropriate fields.

8. UNIT PRICES

- A. All requested unit prices as set forth on the Bid Form shall be bid. Bidder shall provide prices for those unit prices indicated on the Form of Proposal. No unit costs shall be included in the Base Bid. Unit costs will be used for adjustment of the Contract Sum if any are required. The Owner reserves the right to reject any unit prices bid.

9. OPENING OF PROPOSALS

- A. Proposals will be opened privately.

10. AWARD OF CONTRACT

- A. The Owner reserves the right to reject any or all proposals, or any part thereof or items therein, and to waive technicalities, as it may deem best to protect the interests

of the Owner.

11. IRREGULAR PROPOSALS

- A. Proposals indicating a qualification of the Bid, conditions or uninvited alternate Bids or which contain alteration of the form request for a proposal, or additions or deductions not requested shall be rejected. Bids containing minor irregularities or informalities, not relating to price, time, or changes affecting the quality of work, may be rejected at Owner's sole discretion. Owner reserves the right to waive any such informalities or irregularities.

12. QUALIFICATIONS OF BIDDERS

- A. The Owner may make such investigation as the Owner deems necessary to determine the ability of the Bidder to perform the work according to the requirements of the Contract Documents. The Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any Bid if by the evidence submitted, or as the result of investigation, such Bidder fails to satisfy the Owner that the Bidder is properly qualified to carry out the obligations of the Contract.

13. FAILURE TO EXECUTE CONTRACT

- A. Failure of the Bidder to whom Notice of Intent to Award has been given to deliver appropriate, Certificates of Insurance, or execute the Agreement within the time specified, shall constitute a default by such Bidder and the Owner may, at the Owner's sole discretion, award the contract to another Bidder or re-advertise for Bids.

14. PROJECT COMPLETION

- A. Each proposal shall be based on project completion within time limits indicated on the Drawings, Specifications, or Bid Form.
- B. Bidder must agree to commence work on or before a date to be specified in a written "Notice To Proceed" by the Owner and to fully complete the Project within the time specified.

15. CASH ALLOWANCES

- A. Cash allowances are to be treated as a Change Order request and need to be approved by the owner and architect before used.

16. TAXES

- A. Contractor's Responsibilities.

Contractor shall be responsible for and shall pay all applicable sales, use, excise or other taxes required by law on all materials, tools, apparatus, equipment,



fixtures, services, incidentals or otherwise that are purchased or used in connection with the Work or portions thereof. The Bid shall be made in accordance with such laws and shall include all applicable taxes in the Bid amount.

17. SITE INSPECTION

A. THE CONTRACTORS CAN INSPECT THE EXISTING SITE, ONLY WITH PRIOR ARRANGEMENT WITH OWNER:

18. ARCHITECTURAL QUESTIONS

A. Any questions relative to the drawings and specifications shall be directed to:

Elena Kim  
Kramer+Marks Architects.  
27 S. Main Street  
Ambler, PA 19002  
Email: [ekim@kramermarks.com](mailto:ekim@kramermarks.com)

**B. All questions must be submitted in writing per the Invitation To Bid**

**END OF DOCUMENT**

**Acts Granite Run Farms Estates**  
**WBC Phase 2**  
**DRAWING LIST**

**ARCHITECTURAL DRAWINGS**

**GENERAL**

G-001 COVER SHEET

**PHASING PLAN**

PH101 PHASING PLANS

**LIFE SAFETY**

AL101 LIFE SAFETY PLANS

**DEMOLITION**

AD001 DEMOLITION NOTES  
AD101 WBC PARTIAL DEMOLITION PLAN  
AD102 WBC PARTIAL DEMOLITION PLAN  
AD103 WBC PARTIAL DEMOLITION PLAN  
AD104 CHERRY BLOSSOM DEMOLITION PLAN  
AD105 WBC PARTIAL DEMOLITION RCP  
AD106 WBC PARTIAL DEMOLITION RCP  
AD107 WBC PARTIAL DEMOLITION RCP  
AD108 CHERRY BLOSSOM DEMOLITION RCP

**ARCHITECTURAL**

A-001 ABBREVIATIONS, SYMBOLS, & GENERAL NOTES  
A-002 WALL AND PARTITION ASSEMBLIES  
A-003 WALL ASSEMBLIES AND DETAILS  
A-004 HORIZONTAL ASSEMBLIES  
A-101 FIRST FLOOR PLAN  
A-102 FIRST FLOOR REFLECTED CEILING PLAN  
A-105 ROOF PLAN  
A-201 VESTIBULE AND NEW LOBBY ELEVATIONS  
A-202 PORTE COCHERE, VESTIBULE/SITTING ELEVATIONS  
A-203 PORTE COCHERE ELEVATIONS  
A-204 SUNROOM ELEVATIONS  
A-301 BUILD. SECTIONS - VESTIBULE & NEW LOBBY  
A-302 BUILD. SECTIONS - PORTE COCHERE & CANOPY  
A-303 BUILDING SECTIONS - SUNROOM  
A-311 WALL SECTIONS  
A-401 VESTIBULE AND NEW LOBBY PLAN  
A-402 VESTIBULE AND NEW LOBBY ELEVATIONS  
A-403 VESTIBULE AND NEW LOBBY RCP  
A-404 LAUNDRY ENLARGED PLAN, RCP, ELEVATIONS  
A-405 SPA ENLARGED PLAN, RCP AND ELEVATIONS  
A-406 PORTE COCHERE & VESTIBULE/SITTING ENLARGED PLAN

**ARCHITECTURAL - Continued**

A-407	PORTE COCHERE & VESTIBULE/SITTING ENLARGED RCP
A-408	OFFICES, REHAB, CONFERENCE ROOM PLAN
A-409	OFFICES, REHAB, CONFERENCE ROOM ELEVATIONS
A-410	OFFICES, REHAB, CONFERENCE ROOM RCP
A-411	LIVING / DINING, NURSE ST. PLAN & ADD ALT #4 PLAN
A-412	LIVING, DINING, SERVERY, NURSE STATION ELEVAT.
A-413	LIVING, DINING, SERVERY, NURSE STATION RCP
A-414	SUNROOM PLAN AND RCP
A-415	STAFF LOUNGE & EMPLOYEE ENTR. PLAN & RCP
A-416	STAFF LOUNGE ELEVATIONS
A-417	ENLARGED CORRIDOR PLANS
A-418	ENLARGED CORRIDOR PLAN AND ELEVATIONS
A-419	ENLARGED CORRIDOR RCP
A-420	ENLARGED CORRIDOR RCP
A-421	ENLARGED PLANS AND RCPS - UNITS
A-422	ENLARGED PLANS AND RCPS - UNITS
A-423	ENLARGED PLANS AND RCPS - UNITS
A-424	UNIT INTERIOR ELEVATIONS
A-425	UNIT INTERIOR ELEVATIONS
A-426	UNIT ENTRY ELEVATION
A-430	ENLARGED PLANS & ELEVATIONS - BATHROOMS
A-431	ENLARGED PLANS & ELEVATIONS - UNIT BATHROOMS
A-501	PLAN DETAILS
A-502	CONSTRUCTION DETAILS
A-503	CONSTRUCTION DETAILS – PORTE COCHERE
A-504	CONSTRUCTION DETAILS
A-505	CONSTRUCTION DETAILS
A-506a	MILLWORK & CASEWORK DETAILS
A-506b	MILLWORK & CASEWORK DETAILS
A-506c	MILLWORK & CASEWORK DETAILS
A-511	STAIR #1 PLANS, RCP, SECTIONS & DETAILS
A-601	DOOR & FRAME SCHEDULE & DIAGRAMS
A-602	DOOR & FRAME SCHEDULE & DIAGRAMS
A-612	WINDOW SCHEDULE & DETAILS
A-621	ACCESSORY SCHEDULES & DIAGRAMS

**INTERIORS**

I-101	FINISH PLAN
I-102	FINISH PLAN – ADD ALTERNATE #1
I-103	FIRST FLOOR PATTERN PLAN
I-601	FINISH SCHEDULE
I-602	FINISH SCHEDULE (CONT'D)
I-603	FINISH SCHEDULE (CONT'D)
I-604	FINISH SCHEDULE (CONT'D)

**STRUCTURAL**

S1	OVERALL FOUNDATION PLAN
S1A	FOUNDATION PLAN
S1B	FOUNDATION PLAN AND DETAILS
S1C	FOUNDATION PLAN

**STRUCTURAL - continued**

S2	OVERALL SECOND FLOOR FRAMING PLAN
S2A	(E) 2ND FLOOR & CANOPY ROOF FRAMING PLAN
S2B	(E) 2ND FLOOR & ROOF FRAMING PLAN
S2C	(E) 2ND FLOOR & ROOF FRAMING PLAN
S3	FOUNDATION SECTIONS
S4	FRAMING SECTIONS
S5	NOTES

**MECHANICAL**

M-001	COVER SHEET - MECHANICAL
MD-101	DEMOLITION PLAN - MECHANICAL
MD-102	DEMOLITION UNIT PLANS - MECHANICAL
M-101A	FIRST FLOOR PLAN - MECHANICAL
M-101B	FIRST FLOOR PLAN - MECHANICAL
M-301	ENLARGED UNIT PLANS - MECHANICAL
M-400	DETAILS - MECHANICAL
M-401	DETAILS - MECHANICAL
M-500	SCHEDULES - MECHANICAL
M-501	SCHEDULES - MECHANICAL

**PLUMBING**

P-001	COVER SHEET - PLUMBING
PD-101	DEMOLITION PLAN - PLUMBING
PD-102	DEMOLITION UNIT PLANS - PLUMBING
P-101A	FIRST FLOOR PLAN - PLUMBING
P-101B	FIRST FLOOR PLAN - PLUMBING
P-300	ENLARGED PLANS - DRAINAGE
P-301	ENLARGED PLANS - DRAINAGE
P-302	ENLARGED PLANS - DRAINAGE
P-303	ENLARGED UNIT PLANS - DRAINAGE
P-304	ENLARGED PLANS - DOMESTIC WATER & GAS
P-305	ENLARGED PLANS - DOMESTIC WATER & GAS
P-306	ENLARGED UNIT PLANS - DOMESTIC WATER & GAS
P-400	DETAILS - PLUMBING
P-401	DETAILS - PLUMBING
P-500	SCHEDULES - PLUMBING
P-600	RISER DIAGRAMS - SANITARY/STORM
P-601	RISER DIAGRAMS - SANITARY/STORM
P-602	RISER DIAGRAM - DOMESTIC WATER/GAS

**ELECTRICAL**

E-001	COVER SHEET - ELECTRICAL
ED101	DEMOLITION PLAN - ELECTRICAL
ED102	DEMOLITION UNIT PLANS - ELECTRICAL
E-101A	FIRST FLOOR PLAN - LIGHTING
E-101B	FIRST FLOOR PLAN - LIGHTING
E-201A	FIRST FLOOR PLAN - POWER
E-201B	FIRST FLOOR PLAN - POWER
E-301	ENLARGED PLANS - LIGHTING

**ELECTRICAL - continued**

E-302	ENLARGED PLANS - LIGHTING
E-303	ENLARGED UNIT PLANS - LIGHTING
E-304	ENLARGED PLANS - POWER
E-305	ENLARGED PLANS - POWER
E-306	ENLARGED UNIT PLANS - POWER
E-400	SCHEDULES & DETAILS - ELECTRICAL
E-401	SCHEDULES & DETAILS - ELECTRICAL
E-500	SCHEDULES & DETAILS – ELECTRICAL
E-501	DETAILS - ELECTRICAL

**FOOD SERVICE**

Q100	FOOD SERVICE EQUIPMENT PLAN
Q200	FOOD SERVICE ELECTRICAL PLAN
Q300	FOOD SERVICE PLUMBING PLAN
Q900	MILLWORK PLAN & ELEVATIONS
Q901	MILLWORK DETAILS

**End of Section**

## SECTION 006000 FORMS

### 1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
  - 1. AIA Document **A102-2007**, "Standard Form of Agreement between Owner and Contractor, **"Lump Sum"**.
    - a. The General Conditions for Project are AIA Document A201, "General Conditions of the Contract for Construction."
  - 2. The General Conditions are incorporated by reference.
  - 3. The Supplementary Conditions for Project are separately prepared and included in the Project Manual.

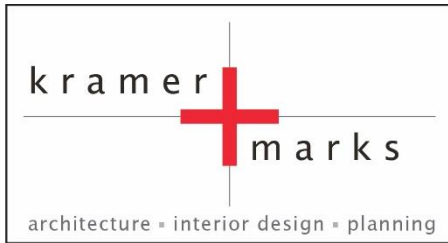
### 1.2 ADMINISTRATIVE FORMS

- A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
- B. Copies of AIA standard forms may be obtained from the American Institute of Architects; <http://www.aia.org/contractdocs/purchase/index.htm>; [docspurchases@aia.org](mailto:docspurchases@aia.org); (800) 942-7732.
- C. Preconstruction Forms:
  - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312, "Performance Bond and Payment Bond."
  - 2. Form of Certificate of Insurance: AIA Document G715, "Supplemental Attachment for ACORD Certificate of Insurance 25-S."
  - 3. Project Guide for the Construction Phase by Kramer+Marks Architects.
  - 4. Project Ready Check List for Construction Start by Kramer+Marks Architects.
- D. Information and Modification Forms:
  - 1. Form for Requests for Information (RFIs): AIA Document G716, "Request for Information (RFI)."
  - 2. Form of Request for Proposal: AIA Document G709, "Work Changes Proposal Request."
  - 3. Change Order Form: AIA Document G701, "Change Order."
  - 4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G707, "Architect's Supplemental Instructions."
  - 5. Form of Change Directive: AIA Document G714, "Construction Change Directive."
- E. Payment Forms:
  - 1. Schedule of Values Form: AIA Document G703, "Continuation Sheet."

2. Payment Application: AIA Document G702/703, "Application and Certificate for Payment and Continuation Sheet."
3. Form of Contractor's Affidavit: AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
4. Form of Affidavit of Release of Liens: AIA Document G706A, "Contractor's Affidavit of Payment of Release of Liens."
5. Form of Consent of Surety: AIA Document G707, "Consent of Surety to Final Payment."

F. Construction Closeout

1. Site Ready Checklist form for Punchlist by Kramer+Marks Architects.
2. Project Ready Checklist form for Final Closeout by Kramer+Marks Architects.
3. Project Guide Closeout Table of Contents by Kramer+Marks Architects.



## PROJECT GUIDE

FOR THE

# CONSTRUCTION PHASE

The following is an outline/guide for the key components of the Construction Phase. This guide will help define roles, expectations and key items that comprise this phase of the project.

### ROLES:

- ❖ **General Contractor (GC):** A *general contractor* is a contractor with primary contract responsibility for the construction, improvement, or renovation. The GC is the party who signs the Prime Contract for a construction project. This is the party that is responsible for completing and/or overseeing all facets of the construction, improvement, or renovation project. Sometimes referred to as the *Prime Contractor*. Can act as a *construction manager* in previous phases.

➤ **Sub-Contractor (SC):** A qualified subordinate contractor to the prime or main contractor.

- ❖ **Owner (O):** An individual or corporation that owns a real property and has final say on all matters related to the project.

➤ **Owner's Representative (OR):** Acts as an extension of staff to the owner and manages the entire project with pre-planning, design, construction, engineering and management expertise that can assure the best possible project outcome. Term is often used interchangeably with Project Manager (PM) or Construction Manager (CM).

➤ **Owner's Vendors:** Vendors contracted directly with the owner that have a role in construction and need to be coordinated as part of entire process. Typical vendors include IT, AV, Security, utility companies, etc.

➤ **Construction Inspection/Testing Agency:** Company engaged by owner to test/inspect various elements of construction. Typical tests include soil/backfill values, concrete strength, steel inspections, etc.

➤ **Third Party Certifications/Inspections:** Other entities involved in review and verification of construction. Often include bank/funding agency inspectors, commissioning agents, etc.

- ❖ **Architect (AR):** Responsible for managing the design and documentation of a project pre construction. Also responsible for supporting a project through construction administration.

➤ **Architect's Consultants:** Typically professional engineers.

- ❖ **Code Official/Inspector:** A qualified government representative authorized to inspect construction for compliance with applicable building codes, regulations and ordinances. Courts have ruled that building inspections are exempt from errors and omissions liabilities.

- ❖ **Other Municipal or Government Agencies:** Other entities requiring review and approval of construction. Often includes Fire Marshall, State and Local Health Departments, Electrical inspectors, etc.

### KEY RESPONSIBILITIES:

- GC:**
- Establish construction staff (Project Manager, Superintendent, etc)
  - Management of entire construction site
  - Conduct all construction activities
  - Establish field offices
  - Establish site signage
  - Establish project website/webcam
  - Establish project directory
  - Ensure security and safety of site
  - Create and maintain schedule, milestones, expectations



Run construction meetings  
Provide complete submittals after internal review  
Provide complete RFI's  
Start close out process early (punchlist, as-builts, manuals, COO, releases)  
Contact/coordinate code official inspections  
Contact utility companies

**Owner:** Make site available  
Establish decision making process/personnel  
Attend bi-weekly meetings  
Pay bills  
Review/Sign PCO/CO documents  
Coordinate any vendors  
Coordinate any inspections  
Provide any utility information  
Attend punchlist

**Architect:** Establish project personnel  
Establish paperwork submittal process  
Review construction paperwork (24 hours for RFIs, 2 weeks for submittals)  
Visit the site bi-weekly  
Review/Sign GC payment applications  
Review/Sign PCO/CO documents  
Conduct punchlist at project completion  
Coordinate consultants as needed for paperwork, site visits and punchlist  
Issue Substantial Completion Form

## **CONSTRUCTION WORKFLOW/MILESTONES**

### **Project Start Up:**

1. Permit submission and acquisition
2. Submittal process starts (prioritize long lead items)
3. Site mobilization

### **Actual Construction:**

1. Demolition and/or Site Work (subsurface inspections needed)
2. Foundations (concrete inspections needed)
3. Structural framing (steel inspections needed)
4. Rough-ins (trade inspections needed)
5. Building Close in (inspection needed)
6. Finish work (final inspections needed)

### **Project Close Out:**

1. Testing and balancing
2. Punchlists
3. Startup meetings
4. Closeout documents
5. Substantial completion
6. FF&E

**KEY TERMS AND ABBREVIATIONS:** (See full glossary for additional terms and abbreviations)

**Architect's Supplemental Instructions (ASI):** A formal notice issued from an architect to address and resolve minor, non-contractual, issues that might arise during the construction process.

**As-Built Drawings (As-builts):** Drawings or plans that show the work, as actually installed. Also known as *Record Drawings*. A general contractor is required to maintain as-built drawings and submit them to the owner and architect at the end of the construction phase.

**Change Order (CO):** A written agreement or directive between contracted parties which represents an addition, deletion, or revision to the contract documents, identifies the change in price and time and describes the nature (scope) of the work involved.

**Change Order Request (COR):** A written document requesting an adjustment to the contract sum or an extension of the contract time.

**Contingency:** An amount of money reserved by the owner and/or the **General Contractor (GC)** to pay for unforeseen changes in the work or increases in cost.

**Date of Substantial Completion:** The date certified by the architect when the work or a designated portion thereof is sufficiently complete, in accordance with the contract documents, so the owner may occupy the work or designated portion thereof for the use for which it is intended.

**FF&E:** An abbreviation for furniture, fixtures and equipment.

**HVAC:** Short for *Heating, Ventilation, and Air Conditioning*.

**MEP:** Short for *Mechanical, Electrical, and Plumbing*.

**Pay App:** Short for **payment application**.

**Payment Application (Pay App):** An application that indicates project work has been completed by a contractor (or sub-contractor) and defined the invoice and payment terms for remitting payment to the contractor.

**Potential Change Order (PCO):** Any potential change in cost that would affect the project's Prime Contract. Potential Change Orders are typically created by the general contractor (GC) to receive a pricing estimate from subcontractors for changes on a project that affect a project's scope of work, construction schedule, which are expected to result in additional project costs. A PCO can contain one or more pricing items that may involve multiple subcontractors.

**Punch List:** A list made near the completion of the construction work indicating items of work that remain unfinished, do not meet quality or quantity requirements as specified or are yet to be performed by the contractor prior to completing the terms of the contract.

**Retainage:** A percentage amount of contract money that is withheld from the party responsible for completing the work on a job. It is commonly used by the construction project owner to ensure that sufficient work and/or materials are in place to assure completion of the work. The retainage amount is typically due to the contractor/subcontractor when the contracted work is deemed substantially complete.

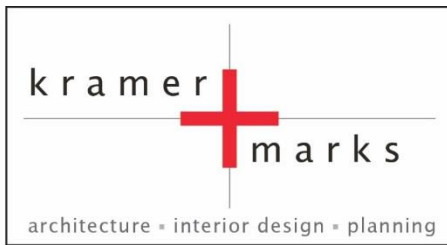
**Request for Information (RFI):** A written request from a contractor to the owner or architect for clarification or information about the contract documents following contract award.

**Shop Drawings:** Drawings prepared by the contractor or sub, based upon the contract documents and provided in sufficient detail that indicate to the designer that the contractor intends to construct the referenced work in a manner that is consistent with the design intent and the contract documents.

**Submittals:** The written and/or physical information provided by a responsible contractor to the general contractor. This information is submitted to the design team for approval of equipment, materials, etc. before they are fabricated and delivered to the project. Submittals can be presented in various formats, such as shop drawings, cut sheets on equipment, and material samples. Submittals are required primarily for the architect to verify that the correct products will be installed on the project in compliance with the design documents/contract documents.

**T&M:** An abbreviation for a contracting method called Time and Materials

**Value Engineering (VE):** A specialized cost control technique, which utilizes a systematic and creative analysis of the functions of a project or operation to determine how best to achieve the necessary function, performance, and reliability at the minimum life cycle cost. VE seeks to improve the "value" of goods or products and services by using an examination of function. Typically VE is pursued in an attempt to lower overall project costs or costs of a particular building system.



## GLOSSARY OF TERMS FOR CONSTRUCTION PHASE

The following is a glossary of terms associated with the Construction Phase of any project. It should be used with our construction phase project guide and throughout construction.

### **Terms and Abbreviations:**

**Activity:** A scheduling term

**Addendum:** (Addenda) Written information adding to, clarifying or modifying the bidding documents.

**AEC:** Short for *Architecture, Engineering, and Construction (AEC)*.

**AFR:** Short for *Architect Field Report*.

**AIA:** Short for *American Institute of Architects*.

**Alternate Bid:** Amount stated in the bid to be added or deducted from the base bid amount proposed for alternate materials and/or methods of construction.

**American Institute of Architects:** The *American Institute of Architects (AIA)* is the leading professional membership association for licensed **architects**, emerging professionals, and allied partners.

**Approved Changes:** Changes in the contract documents that have been subjected to an agreed upon change approval process and have been approved by the party empowered to approve such changes. See also **Change Order**.

**Architect Field Report:** An *Architect Field Report (AFR)* is a required report where the **architect** visits a field site and produces a report to keep the **owner** apprised of construction progress and the quality of work being completed. It is a record of a project's progress, job site decisions, concerns and is typically issued by the architect after each field visit.

**Architect's Supplemental Instructions:** A formal notice issued from an **architect** to address and resolve minor, non-contractual, issues that might arise during the construction process. It addresses how work should proceed and is used to resolve issues where the instructions do not change the contract terms. ASI forms are added to the original contract data and legally modify the original contract details. These changes are usually minor and provide clarification and small changes, such as slightly altering dimensions or changing a color scheme, to be implemented by the architect. ASI should not change the cost quoted on the contract or alter the contract timeline.

**As-Built Drawings:** **Drawings** or **plans** that show the **work**, as actually installed. Also known as *Record Drawings*.

A **general contractor** is required to maintain as-built drawings and submit them to the **owner** and **architect** at the end of the construction phase. GC's often require major **subcontractors** to submit "as-builts" for their **scope of work**.

**ASI:** Short for *Architect's Supplemental Instructions*.

**At-Risk Construction Management:** A delivery method which entails a commitment by the **Construction Manager (CM)** to deliver the project within a **Guaranteed Maximum Price (GMP)**. The **CM** acts as consultant to the **owner** in the development and design phases, but as the equivalent of a **general contractor** during the construction phase. When a construction manager is bound to a GMP, the most fundamental character of the relationship is changed. In addition to acting in the owner's interest, the construction manager also protects him/herself.

**Attic Stock:** The term, *Attic Stock*, is used to describe excess/surplus construction material that are either left over from a job and taking up storage space. The term is also used to refer to materials that have been ordered intentionally, typically as part of a contractual obligation, to ensure that identical materials are available for future replacement and/or repairs on a project.

**Basic Services:** Scope of service as defined in the original agreement between **owner** and **CM** as basic services.

**Beneficial Occupancy:** The use of the constructed facility by the **owner** prior to final completion of the construction.

**BIM:** Short for *Building Information Modeling*.

**Bond:** A pledge from a surety guaranteeing the performance of the obligation defined in the bond, including the completion of work or payment of the bond amount to the obligee (**owner** or contractor) in the event of a default, or nonpayment by a principal (contractor or **subcontractor**), as with bid, performance and labor and material bonds.

**Builders Risk Insurance:** See *Course of Construction Insurance*.

**Building Information Modeling:** *Building Information Modeling (BIM)* is a term used in the construction management industry to describe the technologies used to generate and manage digital representations (i.e., images) of facilities (i.e., construction sites). BIM technologies provide design and construction teams with the opportunity to generate digital models that simulate the construction process, including actions and issues at the site with the overall goal of improving safety, correcting issues and problems, and analyzing potential impacts prior to the physical construction process.

**Building Permit:** A written document issued by the appropriate governmental authority permitting construction to begin on a specific project in accordance with drawings and specifications approved by the governmental authority.

**CA:** Short for *Contract Administration*.

**CCD:** Short for *Construction Change Directive*.

**CCO:** Short for *Commitment Change Order*.

**CD:** Short for *Construction Documents*.

**CE:** Short for *Continuing Education*.

**Change Order:** A *Change Order* (CO) is a written agreement or directive between contracted parties which represents an addition, deletion, or revision to the contract documents, identifies the change in price and time and describes the nature (scope) of the work involved. Also known as Contract Modifications. Change Orders may exist between the **owner** and the **General Contractor** (GC) and/or the GC and **subcontractors**.

**Changed Conditions:** Conditions or circumstances, physical or otherwise, which alter the conditions or circumstances on which the contract documents were based.

**Change Order Request:** A written document requesting an adjustment to the contract sum or an extension of the contract time.

**Codes:** Prevailing regulations, ordinances or statutory requirements set forth by governmental agencies associated with building construction practices and owner occupancy, adopted and administered for the protection of public health, life safety and welfare.

**Claim:** A formal demand for compensation, filed by a contractor or the **owner** with the other party, in accordance with provisions of the Contract Document (CD). Tends to lead to form legal action and may escalate to litigation.

**CM:** Short for *Construction Management*.

**CM Fee:** A form of contractual payment for services, where the **CM** is paid a fee for services performed.

**CMP:** Short for *Construction Management Plan*.

**CO:** Short for *Change Order*.

**Code of Accounts:** The **owner's** written description of the cost elements of the project, used for the owner's accounting purposes.

**Commissioning:** Building commissioning (Cx) is the process of verifying, in new construction, all (or some, depending on scope) of the subsystems for mechanical (HVAC), plumbing, electrical, fire/life safety, building envelopes, interior systems (example laboratory units), cogeneration, utility plants, sustainable systems, lighting, wastewater, controls, and building security to achieve the owner's project requirements as intended by the building **owner** and as designed by the building architects and engineers. Recommissioning is the methodical process of testing and adjusting the aforementioned systems in existing buildings.

**Committed Cost:** A *committed cost* is an investment or obligation that has already been made and cannot be recovered.

**Constructability:** The ease with which a project can be built, based upon the clarity, consistency, and completeness of the contract documents for bidding, administration, and interpretation to achieve overall project objectives.

**Construction Budget:** The sum established, normally during the planning or design phase, as available for construction of the project.

**Construction Contract Documents:** The documents which provide the basis for the contract entered into between parties. They typically include the bid documents updated to reflect the agreement between the owner and the contractor(s) including but not limited to the drawings, specifications, project requirements, and other written documents.

**Construction Cost:** All costs attributed to the construction of the project, including the cost of contracts with the contractor(s), construction support items, general condition items, all purchased labor, material, and fixed equipment.

**Construction Documents:** All drawings, specifications and addenda associated with a specific construction project.

**Construction Management Plan:** A Construction Management Plan (CMP) is a written document prepared by the OR or CM, which clearly identifies the roles, responsibilities and authority of the project team and the procedures to be followed during construction.

**Construction Schedule:** A graphic, tabular or narrative representation or depiction of the time of construction of the project, showing activities and duration of activities in sequential order. Often in Gantt Chart format.

**Construction Specifications Institute:** Construction Specifications Institute (CSI) CSI is a national association of volunteers, including specifiers, architects, engineers, contractors, facility managers, product representatives, manufacturers, owners and others who are experts in building construction and dedicated to improving the communication of construction information.

**Contingency:** An amount of money reserved by the owner and/or the **General Contractor** (GC) to pay for unforeseen changes in the work or increases in cost. May be "hidden" by GC so that it can be used internally, or may be a transparent cost that is tracked by the GC and openly shared with the **owner**.

**Contract Administration:** Construction Administration (CA) is the function of implementing the terms and conditions of a contract, based upon established systems, policies, and procedures. Also referred to as CA or "C.A." and additionally used to refer to the role of the **architect** in the construction phase to attend meetings, go to site, and so on.

**Contract Period:** The elapsed number of working days or calendar days from the specified date of commencing work to the specified date of completion, as specified in the contract.

**Contract Sum:** The total agreeable amount payable by the owner to the contractor for the performance of the work under the contract documents. (see Change Order)

**Contract Time:** The time period set forth established in the contract documents for completing a specific project; usually stated in working days or calendar days. The contract time can only be adjusted by valid time extensions through change order.

**Contract Warranty:** A *contract warranty* is a legal or implied contract which warranties that any work defects found in the original construction will be repaired during the specified warranty period.

**COR:** Short for *Change Order Request*.

**Cost Control:** The function of limiting the cost of the construction project to the established budget based upon owner-approved procedures and authority.

**Cost Management:** The act of managing all or partial costs of a planning, design, and construction process to remain within the budget.

**Cost of Construction:** All costs attributed to the construction of the project, including the cost of contracts with the Contractor(s), construction support items, general condition items, all purchased labor, material and fixed equipment.

**Cost of Work:** All costs incurred by the contractor in the proper performance of the work required by the plans and specifications for a specific project.

**Cost Plus:** A *cost plus* is a contract type where the owner agrees to pay all construction costs plus an agreed upon markup percentage.

**Course of Construction Insurance:** *Builder's Risk Insurance* (also known as "course of construction") is a specialized form of insurance designed to insure buildings or projects against repair or replacement costs while they are under construction and, in some cases, for a specified period afterwards. This insurance will usually also cover build materials, fixtures and appliances all of which are intended to become an integral part of the structure under construction. The policy may be held by the Project Owner or by the Contractor depending on the requirements of the job.

**CPM:** Short for *Critical Path Method*.

**Critical Path:** The set of activities that must be completed on time for the project completion date to be met. Activities on the critical path have no slack time.

**Critical Path Method (C. P.M.):** A planning scheduling and control line and symbol diagram drawn to show the respective tasks and activities involved in constructing a specific project.

**CSI:** Short for *Construction Specifications Institute*.

**CSI Master Format:** The CSI Master Format is a system of numbers and titles for organizing construction information into a regular, standard order or sequence. By establishing a master list of titles and numbers Master Format promotes standardization and thereby facilitates the retrieval of information and improves construction communication. It provides a uniform system for organizing information in project manuals, for organizing project cost data, and for filing product information and other technical data.

**Cx:** Short for building *commissioning*.

**Daily Construction Report:** A written document and record that has two main purposes:

1. they furnish information to off-site persons who need and have a right to know important details of events as they occur daily and hourly, and
2. they furnish historical documentation that might later have a legal bearing in cases of disputes. Daily reports should be as factual and impersonal as possible, free from the expression of personal opinions and feelings. Each report should be numbered to correspond with the working days established on the progress schedule. In the event of no-work days, a daily report should still be made, stating "no work today" (due to rain, strike, or other causes). The report includes a description of the weather; a record of the total number of employees, subcontractors by name, work started and completed today, equipment on the job site, job progress today, names and titles of visitors, accidents and/or safety meetings, and a remarks column for other job related information.

**Date of Commencement of the Work:** The date established in a written notice to proceed from the owner to the contractor.

**Date of Substantial Completion:** The date certified by the architect when the work or a designated portion thereof is sufficiently complete, in accordance with the contract documents, so the owner may occupy the work or designated portion thereof for the use for which it is intended.

**DBB:** Short for *Design-Bid-Build*.

**DD:** Short for *Detailed Design or Design Development*. See *Design - Preliminary*.

**Design-Build:** Design-Build is a project delivery method which combines architectural and engineering design services with construction performance under one contract agreement.

**Direct Costs:** The field costs directly attributed to the construction of a project, including labor, material, equipment, subcontracts and their associated costs.

**Draw Request:** A *draw request* is a payment application from the **subcontractor** to the contractor.

**EIN:** Short for *Employer Identification Number*.

**Employer Identification Number:** An *Employer Identification Number* (EIN) is a nine-digit number assigned by the Internal Revenue Service (IRS) to identify business entities operating in the United States.

**Estimated Cost to Complete:** The current estimate of the remaining costs to be incurred on a project at a specific point in time.

**Estimated Final Cost:** The anticipated cost of a project or project element when it is complete. The sum of the cost to date and the estimated cost to complete.

**Fast Track:** The process of dividing the design of a project into phases in such a manner as to permit construction to start before the entire design phase is complete. The overlapping of the construction phase with the design phase.

**Field Order:** A written order effecting a minor change or clarification in the work not involving an adjustment to the contract sum or an extension of the contract time.

**Field Report** (see Daily Construction Report)

**Field Work Order:** A written request to a subcontractor or vendor, usually from the general or main contractor, site for services or materials.

**Final Acceptance:** The action of the owner accepting the work from the contractor when the owner deems the work completed in accordance with the contract requirements. Final acceptance is confirmed by the owner when making the final payment to the contractor.

**Final Inspection:** A final site review of the project by the contractor, owner or owner's authorized representative prior to issuing the final certificate for payment.

**Final Payment:** The last payment from the owner to the contractor of the entire unpaid balance of the contract sum as adjusted by any approved change orders. (see Final Acceptance)

**Finish Date:** The date that an activity or project is completed.

**Fixed Fee:** A set contract amount for all labor, materials, equipment and services; and contractors overhead and profit for all work being performed for a specific scope of work.

**Fixed Limit of Construction Costs:** A construction cost ceiling agreed to between the owner and architect or engineer for designing a specific project. (See Budget)

**FF&E:** An abbreviation for furniture, fixtures and equipment.

**Float:** Contingency time that exists on a schedule of activities. It is measured by comparing the early and late dates on a start and finish basis.

**G702:** A *G702* (Officially known as the AIA G702™–1992, Application and Certificate for Payment) is an industry-standard, payment form developed by the **American Institute of Architects** (AIA). The form is completed by a contractor in application for payment. It requires the contractor to show the status of the contract sum to date, including the total dollar amount of the work completed and stored to date, the amount of retainage (if any), the total of previous payments, a summary of change orders, and the amount of current payment requested.

**G703:** A *G703* (Officially known as the AIA G703™–1992, Continuation Sheet) is an industry-standard, payment form developed by the **American Institute of Architects** (AIA) that breaks the contract sum into portions of the work in accordance with a **Schedule of Values** (SOV) prepared by the contractor as required by the general conditions.

**GC:** Short for *General Contractor*.

### **General Conditions**

A section of general clauses in the Contract Specifications that establish how the project is to be administered. Included are obligations such as providing temporary work, insurance, field offices, etc. Costs associated with General Conditions, often referred to as GC's, is carried in its own division of the estimate/budget. Generally don't involve swinging a hammer or installing something permanently.

**Gantt Chart:** The schedule of activities for a project. A Gantt Chart shows start and finish dates, critical and non-critical activities, slack time, and predecessor relationships.

**GMP:** Short for *Guaranteed Maximum Price*.

**General Contracting (the traditional method):** When a prime or main contractor bids the entire work AFTER the final design, plans and specifications are complete.

**Guarantee:** A legally enforceable assurance by a third party of satisfactory performance, quality or quantity of products or work during a specific period of time stated and included in the contract in the event the product or work fails to perform properly. Manufactured items often come with a manufacturer's guarantee and works in conjunction with a warranty from the General Contractor or Subcontractors. See also **Warranty**.

**Guaranteed Maximum Price:** A contractual form of agreement wherein a maximum price for the work is established based on an agreed-to scope. Cost-type contract (also known as an open-book contract) where the contractor is compensated for actual costs incurred plus a fixed fee subject to a ceiling price.<sup>[1]</sup> Abbreviated as **GMax** or **GMP**.

**HVAC:** Short for *Heating, Ventilation, and Air Conditioning*.

**IFB:** Short for *Invitation For Bid*.

**Indirect Cost (or expense):** A contractor's or consultant's overhead expense; expenses indirectly incurred and not chargeable to a specific project or task. The terms Indirect costs and soft costs are synonymous. (see Soft Costs)

**Inspection Report:** Sometimes used to describe an *Inspection List*. (see Inspection List)

**IPD:** Short for *Integrated Project Delivery*. Similar to **GMP** except there is shared savings and shared risk for all major parties. Often touted as the way of the future, but very rarely used because people aren't willing to take on the extra risk.

**JTD:** Short for *Job to Date*.

**Kickoff Meeting:** In the construction industry, a kickoff meeting refers to a group assembly that takes place at the start of a project to introduce members of the project team, review project objectives, as well as to review and discuss items related to site logistics, project phases, and scheduling.

**L:** Denotes a 'Labor' line item type on a **prime contract**.

**LDs:** Short for *Liquidated Damages*.

**Lien:** A claim made against a property by a contractor or other professional who has supplied labor or materials for work on that property. Designed to protect professionals from the risk of not being paid for services rendered. Subcontractors and GCs are both entitled to file liens on Projects due to lack of payment.

**Lien Release:** A written document from the contractor to the owner that releases the Lien, Mechanic's or Material following its satisfaction.

**Lien Waiver:** A *lien waiver* is a document from a contractor, subcontractor, materials man, equipment lessor or other party stating they have received the payment and waive any future lien rights to the property.

**Life Cycle Cost:** Life cycle costs include all costs incident to the planning, design, construction, operation, maintenance and demolition of a facility, or system, for a given life expectancy, all in terms of present value.

**Liquidated Damages:** An amount of money usually set on a per-day basis, which the contractor agrees to pay the owner for delay in completing the Work in accordance with the contract documents - If you are late to finish, you start paying a daily LD cost to compensate the owner. Abbreviated as **LDs**.

**Long-Lead Items:** The identification given to material and equipment having an extended delivery time and which may be considered for early procurement and purchase. Items which would be delivered too late for timely installation if their procurement or purchase were included as part of the procurement for the entire contract or project.

**Long-Lead Time:** The time interval between purchase and delivery of long-lead items.

**Lump Sum:** A fixed amount that includes the cost of overhead and profit paid, in addition to all other direct and indirect costs of performing work. Common type of contracting method.

**MasterFormat:** The MasterFormat is an organization standard that defines that master list of Divisions, Sections, and Section Titles for construction project specifications in the United States and Canada. It is authored by the Construction Standards Institute (CSI) and Construction Specifications Canada (CSC).

**Master Schedule:** An executive level summary schedule identifying the major components of a project, their sequence and durations. The schedule can be in the form of a network, Milestone Schedule, or bar chart. May include entitlements, design phase, construction, move-in, etc.

**Meeting Notes:** A written report consisting of a project number, project name, meeting date and time, meeting place, meeting subject, a list of persons attending, and a list of actions taken and/or discussed during the meeting. Generally, this report is distributed to all persons attending the meeting and any other person having an interest in the meeting.

**MEP:** Short for *Mechanical, Electrical, and Plumbing*.

**Milestone Schedule:** A schedule representing important events along the path to project completion. All milestones may not be equally significant. The most significant are termed "major milestones" and usually represent the completion of a group of activities.

**MOP:** Short for *Manual of Procedures*.

**MPP:** Short for *Microsoft Project file*.

**MTD:** Short for *Month to Date*.

**Multiple Prime Contracts:** Separate contractors contracting directly with the owner for specific and designated elements of the work.

**Non-Conforming Work:** Work that does not meet the requirements of the contract documents.

**Notice of Award:** A formal document informing an individual or organization of successfully securing a contract.

**Notice to Proceed:** A formal document and/or point in the project's life cycle authorizing an individual or organization to commence work under its contract. The issuance of the notice to proceed typically marks the end of a procurement phase.

**NTP:** Short for *Notice to Proceed* (with construction).

**OAC:** Short for *Owner-Architect-Contract*.

**OAC Meeting:** Short for *Owner-Architect-Contract Meeting*. A meeting between the project owner, the architect on the design team, and the general contractor.

**OC:** Refers to the 'Owner Cost' line item on a **prime contract**.

**O&P:** Short for *Operations and Procedures*.

**Owner Construction Management:** A form of Construction Management that does not use an independent construction management organization as a team member. The owner performs all required Construction Management services with in-house staff.

**Pay App:** Short for **payment application**.

**Payment Application:** A *payment application* (also called a **Pay App**) is an application that indicates project work has been completed by a contractor (or subcontractor) and defined the invoice and payment terms for remitting payment to the contractor.

**PCO:** Short for *Potential Change Order*.

**PCCO:** Short for *Prime Contract Change Order*.

**Penalty:** A punitive measure, usually associated with failure to fulfill a contractual obligation.

**Phased Construction:** An incremental approach to construction or design and construction. Each overlapping or sequential phase or element to have a defined work scope and to be considered as a separate project. Common for large projects with multiple buildings. **PM** short for Project Manager.

**PMO:** Short for *Project Management Office*.

**Post-Construction Phase:** The period following substantial completion. May also be referred to as close out.

**Potential Change Order:** A *Potential Change Order* (PCO) represents any potential change in cost that would affect the project's Prime Contract (i.e. the contract between the owner and general contractor). Potential Change Orders are typically created by the general contractor (GC) to receive a pricing estimate from subcontractors for changes on a project that affect a project's scope of work, construction schedule, which are expected to result in additional project costs. A PCO can contain one or more pricing items that may involve multiple subcontractors. Depending on whether or not the owner agrees to pay for some or all of the proposed changes, any PCO runs the risk of impacting the overall profitability of the project.

**PRC:** Short for *Pending Revised Contract*.

**Predecessor:** An activity that must be completed before another activity can begin.

**Prime Contract:** A direct contract with an owner. It can be a single contract and/or include the work specified for several contracts depending upon division of work. Typically refers to the contract between the GC and the Owner.

**Prime Contractor:** A contractor, typically a **General Contractor** (GC), who has a contract with an **owner**.

**Professional Services:** Services provided by a professional or by an organization that has specific competence in a field of endeavor that requires professional (and technical) knowledge and capabilities and that meets recognized standards of performance.

**Progress Meeting:** A meeting dedicated to the subject of progress during any phase of project delivery. May also be referred to as an OAC meeting (Owner Architect Contractor).

**Progress Payment:** A payment from the owner to the contractor determined by calculating the difference between the completed work and materials stored and a predetermined schedule of values or unit costs. (see Schedule of values; Unit Costs).

**Progress Schedule:** A line diagram showing proposed and actual starting and completion times the respective project activities. (see Activity)

**Project Budget:** The sum or target figure established to cover all the owner's costs of the project. It includes the cost of construction and all other costs such as land, legal and professional fees, interest, and other project-related costs.

**Project Cost:** The actual cost of the entire project.

**Project Directory:** A written list of all parties connected with a specific project. The list usually includes a classification or description of the party (i.e., Owner, Architect, Attorney, General Contractor, Civil Engineer, Structural Engineer, etc.); name, address, telephone and FAX numbers opposite their respective classifications or description. It is particularly important that the emergency or after hour telephone numbers are included. These numbers should be kept confidential if requested by the respective parties.

**Project Management:** The use of integrated systems and procedures by a team of professionals during project design and construction. As applied to a construction project, Project Management can be used synonymously with Construction Management.

**Project Management Plan:** A document prepared by the OR or CM, and approved by the owner, which defines the owner's goals and expectations including scope, budget, schedule, and quality and the strategies to be used to fulfill the requirements of the project.

**Project Manager (Project Management):** A qualified individual or firm authorized by the owner to be responsible for coordinating time, equipment, money, tasks and people for all or specified portions of a specific project. (see Construction Manager)

**Project Procedures Manual:** A detailed definition of the project team responsibilities and authority, project systems, and procedures.



**Project Representative:** A qualified individual authorized by the owner to assist in the administration of a specific construction contract.

**Project Team:** Initially consists of the owner, design professional, and CM. Thereafter, as prime construction contractors are engaged they are added to the Team.

**Punch List:** A list made near the completion of the construction work indicating items of work that remain unfinished, do not meet quality or quantity requirements as specified or are yet to be performed by the contractor prior to completing the terms of the contract.

**Purchase Order:** A written document from a buyer to a seller to purchase materials, services, equipment or supplies with acceptable purchase terms indicated.

**QA:** Short for *Quality Assurance*.

**QC:** Short for *Quality Control*.

**Quality:** The degree to which the project and its components meet the owner's expectations, objectives, standards, and intended purpose; determined by measuring conformity of the project to the plans, specifications, and applicable standards.

**Quality Assurance:** The application of planned and systematic methods to verify that quality control procedures are being effectively implemented. Abbreviated as QA.

**Quality Control:** The continuous review, certification, inspection, and testing of project components, including persons, systems, materials, documents, techniques, and workmanship to determine whether or not such components conform to the plans, specifications, and applicable standards. Abbreviated as QC.

**Quality Management:** The process of planning, organization, implementation, monitoring and documenting of a system of policies and procedures that coordinate and direct relevant project resources and activities in a manner that will achieve quality. See also *Quality*.

**Record Drawings:** See *As-Built Drawings*.

**Reimbursable Expenses (or Costs):** Amounts expended for or on account of the project which, in accordance with the terms of the appropriate agreement, are to be reimbursed by the owner.

**Resident Architect:** An architect permanently assigned at a job site who supervises the construction work for the purpose of protecting the owner's interests during construction.

**Resident Engineer (inspector):** An individual permanently assigned at a job site for the purpose of representing the owner's interests during the construction phase. (see Owner's Inspector)

**Retainage:** *Retainage* refers to a percentage amount of contract money that is withheld from the party responsible for completing the work on a job (e.g., the contractor/subcontractor). It is commonly used by the construction project owner to ensure that sufficient work and/or materials are in place to assure completion of the work. The retainage amount is typically due to the contractor/subcontractor when the contracted work is deemed substantially complete.

**Request for Information:** A written request from a contractor to the owner or architect for clarification or information about the contract documents following contract award.

**RFI:** Short for *Request for Information*.

**RFP:** An abbreviation for Request for Proposal.

**RFP:** Short for *Request for Payment*.

**RFQ:** Short for *Request for Quotation*.

**Rolling Schedule:** See *Short Term Construction Activity Plan*.

**RTAB:** Short for *Real Time As-Built*s.

**Safety Report:** The Occupational Safety and Health Act of 1970 clearly states the common goal of safe and healthful working conditions. A Safety Report is prepared following a regularly scheduled project safety inspection of the specific project.

**Schedule of Values:** A statement furnished by the contractor to the architect or engineer reflecting the portions of the contract sum allotted for the various parts of the work and used as the basis for reviewing the contractor's applications for progress payments.

**Schedule of Values:** A list of basic contract segments in both labor and material, where each line item consists of a description of a portion of work and a related cost and the sum of the lines of the contract equals the total contract price. Generally used to determine progress payments to contractor(s). Abbreviated as SOV.

**Scope:** See *Scope of Work*.

**Scope Changes:** Changes that expand or reduce the requirements of the project during design or construction. May be related to change orders.

**Scope of Work:** The division of work to be performed under a contract or subcontract in the completion of a project, typically broken out into specific tasks with deadlines. Abbreviated as SOW.

**Shop Drawings:** Drawings typically prepared by the contractor or sub, based upon the contract documents and provided in sufficient detail that indicate to the designer that the contractor intends to construct the referenced work in a manner that is con-

sistent with the design intent and the contract documents. Many trades submit shop drawings, a few examples include: Structural Steel, Doors and Frames, and Concrete Reinforcing.

**Short Term Construction Activity Plan:** The planning and scheduling of prime contractor(s) activities on site, for the short duration or "foreseeable future" usually developed on a week-by-week basis using milestones for planning intervals and coordinated by Construction Management personnel. Also known as *Rolling Schedule*, *Look Ahead Schedule*, and *Short Interval Schedule*.

**SI:** Short for either *International System of Units* or *Site Instruction*.

**Site Instruction:** A *site instruction* is a formal instruction sent from the head contractor that contains directives for contractors working on a project.

**Site Mobilization:** The timeframe at the start of the construction phase when a contractor is establishing their construction operations at the site. Includes office/trailer set up, site fencing, signage, temporary partitions, entrance/exit, etc.

**Soft Costs:** Soft Costs are cost items in addition to the direct Construction Cost. Soft Costs generally include architectural and engineering, legal, permits and fees, financing fees, construction interest and operating expenses, leasing and real estate commissions, advertising and promotion, and supervision. (see Construction Cost)

**SOP:** Short for *Standard Operating Procedure*.

**SOV:** Short for *Schedule of Values*.

**SOW:** Short for *Scope of Work*.

**SP:** Short for *Service Provider*.

**Specifications:** A detailed, exact statement of particulars, especially statements prescribing materials and methods; and quality of work for a specific project. The most common arrangement for specifications substantially parallels the CSI (Construction Specification Institute) format. (see CSI)

**Special Conditions:** Refers to Special Conditions of the Contract for Construction. See *Supplementary General Conditions*.

**Special Conditions:** A section of the conditions of the contract, other than the General Conditions and Supplementary Conditions, which may be prepared for a particular project. Specific clauses setting forth conditions or requirements peculiar to the project under consideration, and covering work or materials involved in the proposal and estimate, but not satisfactorily covered by the General Conditions. (See General Conditions)

**Special Consultants:** The designation for various professionals, including engineers, architects, designers and other experts, who provide expertise in specialized fields.

**Specifications:** The detailed written descriptions of materials, equipment, systems, and required workmanship and other qualitative information pertaining to the work. Provided by the **architect** and design team.

**Start Date:** The date that an activity or project begins.

**Start-Up:** The period prior to occupancy when systems are activated and checked out, and the owner's operating and maintenance staff assumes the control and operation of the systems.

**Statute of Limitations:** The period of time in which legal action must be brought for an alleged damage or injury. The period commences with the discovery of the alleged damage or injury; or in construction industry cases with completion of the work or services performed. Legal advice should be obtained.

**Sub:** An abbreviation for Subcontractor.

**Subcontract:** A written form of agreement between the prime or main contractor and another contractor or supplier for the satisfactory performance of services or delivery of material as set forth in the plans and specifications for a specific project.

**Submittals:** A *submittal* refers to the written and/or physical information provided by a responsible contractor (i.e., contractors and subs) to the general contractor. This information is submitted to the design team for approval of equipment, materials, etc. before they are fabricated and delivered to the project. Submittals can be presented in various formats, such as **shop drawings**, cut sheets on equipment, and material samples. Submittals are required primarily for the **architect** and engineer to verify that the correct products will be installed on the project in compliance with the design documents/contract documents.

**Submittal Package:** A *submittal package* is a container that stores one or more **submittals**. Typically, a **general contractor** creates submittal packages that list all of the individual submittals specific to a particular trade or **subcontractor**. For example, one might create a submittal package to contain all of the plumbing-related submittals in a commercial building project.

**Substitution:** A proposed replacement or alternate offered in lieu of and represented as being equivalent to a specified material or process.

**Substructure:** The supporting part of a structure; the foundation.

**Sub-subcontractor:** An individual or firm having a written contract with a subcontractor to perform a portion of the work.

**Sub-surface Investigation:** 1. A term used to represent an examination of soil conditions below the ground.

2. Investigations include soil borings and geographical laboratory tests for structural design purposes.

**Successor:** 1. One that succeeds another

2. A scheduled activity whose start depends on the completion of one or more predecessors.

**Supplementary Conditions:** A written section of the contract documents supplementing and qualifying or modifying the contracts general conditions. (See Conditions of the Contract)

**SWPPP:** Short for *Storm Water Pollution Prevention Plans*.

**Testing:** The application of specific procedures to determine if work has been completed in the prescribed manner and at the required levels of workmanship.

**T&M:** An abbreviation for a contracting method called Time and Materials

**TI'S (Tenant Improvements):** TI'S is a term used to define the interior improvements of the project after the Building Envelope is complete. TI'S usually include finish floor coverings; ceilings; partitions; doors, frames, hardware; fire protection; HVAC consisting of branch distribution duct work, control boxes, and registers; electrical consisting of lighting, switches, power outlets, phone/data outlets, exit and energy lighting; window coverings; general conditions; and the general contractor's fee. The cost of tenant improvements are generally born by the tenant and the costs of tenant improvements will vary with every building, and with tenant requirements.

**Trade Contractors:** Construction contractors who specialize in providing and/or installing specific elements of the overall construction requirements of a complete project.

**Trade-Off Study:** The study to define the comparative values and risks of a substitution or exchange of a design component. The trade-off can identify both monetary and functional values. Also known as *Alternatives Analysis*.

**Transmittal:** A *transmittal* is a record that acts much like a packing slip to record the documents, drawings, goods, materials, samples, supplies that are transferred between entities on a project.

**Underwriter's Laboratories Label (UL):** A label on a product or manufactured item showing the material is regularly tested by, and complies with the minimum standards of the Underwriter's Laboratories specification for safety and quality.

**Unit Price Contract:** A written contract wherein the owner agrees to pay the contractor a specified amount of money for each unit of work successfully completed as set forth in the contract.

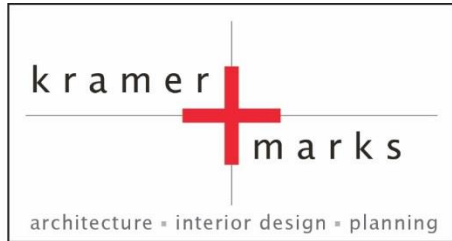
**Unit Prices:** A predetermined price for a measurement or quantity of work to be performed within a specific contract. The designated unit price would include all labor materials, equipment or services associated with the measurement or quantity established.

**Value Engineering:** Abbreviated as VE. A specialized cost control technique, which utilizes a systematic and creative analysis of the functions of a project or operation to determine how best to achieve the necessary function, performance, and reliability at the minimum life cycle cost. VE seeks improve the "value" of goods or products and services by using an examination of function. Typically VE is pursued in an attempt to lower overall project costs or costs of a particular building system i.e. **HVAC**

**VE:** Short for *Value Engineering*.

**Warranty:** A warranty, sometimes called **guarantee**, defines and limits the responsibility of contractors for repairs of the construction project, both during and after completion of construction. Warranties are furnished by the subcontractors and general contractor to the owner of a project. Warranties establish the standards for determining defective work. Most construction warranties are express warranties and are required in the construction agreement, general conditions, plans or specifications, supplementary general conditions. Typical subjects of warranties are:

- A roofing contractor may warrant a roofing system against leakage for twenty years.
- An air conditioning contractor may warrant the ability of a system to achieve certain temperatures.
- A general contractor may warrant the quality of the work performed by its forces and those of its subcontractors.



## PROJECT READY CHECKLIST FOR CONSTRUCTION START

Project/Location: \_\_\_\_\_  
Punchlist Date(s): \_\_\_\_\_  
Contractor/Contact Info: \_\_\_\_\_

The following Project items listed below are items included in construction phase start up by the GC. Note: All items are further detailed in the project specifications. Please complete all items on this checklist. Send the Architect a signed copy of this checklist completed for confirmation of readiness and your contact information.

- | ✓                        | Date Completed | Initials |   |
|--------------------------|----------------|----------|---|
| <input type="checkbox"/> | _____          | _____    | Project Management and Coordination           |
|                          |                |          | _____ Provide start up schedule               |
|                          |                |          | _____ General coordination procedures         |
|                          |                |          | _____ Coordination drawings                   |
|                          |                |          | _____ Project website/webcam                  |
|                          |                |          | _____ Conduct preconstruction conference      |
|                          |                |          | _____ Create project directory                |
|                          |                |          | _____ Provide subcontractor list              |
|                          |                |          | _____ Key personnel names                     |
| <input type="checkbox"/> | _____          | _____    | Temporary Facilities and Controls             |
|                          |                |          | _____ Establish temporary utilities           |
|                          |                |          | _____ Provide construction site plan          |
|                          |                |          | _____ Provide E&S plan                        |
|                          |                |          | _____ Provide fire safety program             |
|                          |                |          | _____ Provide moisture protection plan        |
|                          |                |          | _____ Provide dust and HVAC control plan      |
|                          |                |          | _____ Install site fencing                    |
|                          |                |          | _____ Install temporary partitions            |
|                          |                |          | _____ Establish field office                  |
|                          |                |          | _____ Provide project signage                 |
|                          |                |          | _____ Establish contractor parking            |
|                          |                |          | _____ Establish waste disposal plan           |
|                          |                |          | _____ Establish temporary exits and entrances |

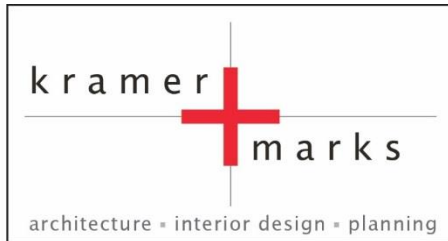
\_\_\_\_\_ Establish security plan and protocol

After reviewing this checklist please let us know if you have any issues or concerns and when you feel all the information will be submitted as defined above.

---

**Verified by:**

**Date:**

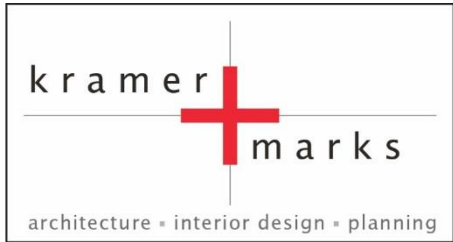


## SUBMITTAL LIST

The following is a generic list of required submittals, this list may not be complete. The GC should review the list with the team and reference it to the project specifications.

### **Generic Submittal list**

- Life Safety Plan
- Coordination Plan
- Concrete
- Gypsum Cement Underlayment
- Masonry Mortar & Grout
- Structural Steel
- Metal Framing
- Sheathing
- Millwork, Mouldings, Trim & Handrails
- Mineral Profile Paneling
- Waterproofing
- Insulation
- WRB
- Roofing & Accessories
- Sheet metal flashing
- Fire Stopping
- Joint Sealers
- Doors and Frames
- Door Hardware
- Windows
- Glazing
- Gypsum Board Assemblies
- Tile & Grout
- Flooring
- Ceilings
- Paint
- Wall Covering
- Toilet Partitions
- Corner Guards
- Fire Extinguisher& Cabinets
- Toilet Accessories
- Food Service Equipment
- Countertops
- Floor Mats
- Roller Shades
- HVAC Equipment Ductwork, Diffusers, Accessories & Balancing
- Plumbing Fixtures, Piping, Valves and Accessories
- Fire Protection
- Electrical Fixtures, Wiring Controls, Panels, Outlets and Accessories



## SITE READY CHECKLIST

FOR

## PUNCHLIST

Project/Location: \_\_\_\_\_  
Punchlist Date(s): \_\_\_\_\_  
Contractor/Contact Info: \_\_\_\_\_

The following site conditions listed below are considered ready the punch. Please complete all items on this checklist. Send the Architect a signed copy of this checklist completed for confirmation of readiness and your contact information.

- | ✓ Date Completed         | Initials |   |
|--------------------------|----------|---|
| <input type="checkbox"/> | _____    | The site needs to have ALL of the construction completed with very minimal punch happening:<br>_____ all finishes for floors & walls installed (Provide Photos)<br>_____ all shelving installed (Provide Photos)<br>_____ all lighting installed and operational with proper lamps (Provide Photos)<br>_____ all painting and wall covering complete (Provide Photos)<br>_____ all trim work complete (Provide Photos)<br>_____ all built-ins/casework complete (Provide Photos)<br>_____ all countertops complete, etc. (Provide Photos) |
| <input type="checkbox"/> | _____    | All of the spaces need to be deep cleaned (shelves, floors, counters, lights, walls etc.)   |
| <input type="checkbox"/> | _____    | All protective materials need to be removed. (Basically we should see very few if any contractors onsite)   |
| <input type="checkbox"/> | _____    | All electrical/power outlets/wall switches installed and operational. (Provide Photos)  |
| <input type="checkbox"/> | _____    | All IT systems/outlets installed and operational. (Provide Photos)  |
| <input type="checkbox"/> | _____    | HVAC systems fully operational. (Provide Photos)  |
| <input type="checkbox"/> | _____    | Electrical systems/outlets installed and fully operational. (Provide Photos)  |
| <input type="checkbox"/> | _____    | Plumbing fixtures fully operational and toilets/hand wash sinks available for use. (Provide Photos)   |
| <input type="checkbox"/> | _____    | Temporary Occupancy or final COO if possible.   |
| <input type="checkbox"/> | _____    | All Pavement and site work completed. (Provide Photos)  |
| <input type="checkbox"/> | _____    | Elevators fully operational. (If applicable)  |
| <input type="checkbox"/> | _____    | All inspections passed so that we do not have to leave the site during the punch to accommodate inspections. (e.g. fire alarm, life safety, sprinklers)   |
| <input type="checkbox"/> | _____    | Contractor supplied signage installed for COO. (Provide Photos)   |
| <input type="checkbox"/> | _____    | Contractor supplied window treatments installed. (Provide Photos)   |
| <input type="checkbox"/> | _____    | Contractor equipment installed. (Provide Photos)  |
| <input type="checkbox"/> | _____    | Provide KMA with overall exterior and interior photos of the spaces to confirm they are completed and ready to receive FF&E.  |
| <input type="checkbox"/> | _____    | Provide KMA with Contractor's completed punchlist.  |

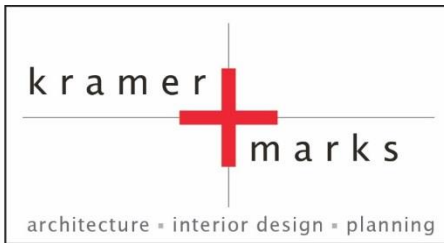
We want this punch to be the most successful it can be and the most efficient. After reviewing this checklist please let us know if you have any issues or concerns and when you feel the building will be ready to punch per the requirements above.

Kramer+Marks Architects  
Ambler, PA

Acts Granite Farms Estates  
WBC – Phase 2  
Media, PA 19063

**Verified by: Date:**





## PROJECT READY CHECKLIST

FOR

## FINAL CLOSEOUT

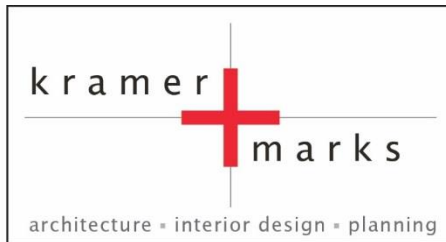
Project/Location: \_\_\_\_\_

Contractor/Contact Info: \_\_\_\_\_

The following Project items listed below are considered ready for final closeout. Note: All items are further detailed in the project specifications. Please complete all items on this checklist. Send the Architect a signed copy of this checklist completed for confirmation of readiness and your contact information.

✓	Date Completed	Initials	
<input type="checkbox"/>	_____	_____	Substantial Completion Procedures
			_____ Provide contractor's list of incomplete items (punchlist)
			_____ Certificates of release: COO, operating certificates and similar releases
			_____ Spare parts and Attic Stock
			_____ Maintenance material submittals
			_____ Test/Adjust/Balance Report
			_____ Warranties
			_____ Bonds
			_____ Maintenance agreements
			_____ Change over utilities
			_____ Remove all temporary facilities from site
<input type="checkbox"/>	_____	_____	Final Cleaning
			_____ Final HVAC cleaning and written report
			_____ Pest control report
<input type="checkbox"/>	_____	_____	Operation and Maintenance Data
			_____ Operation and maintenance documentation directory
			_____ Emergency manuals
			_____ Operation manuals for systems, subsystems and equipment
			_____ Product maintenance manuals
			_____ System and equipment maintenance manuals
<input type="checkbox"/>	_____	_____	Record Documents
			_____ Record Drawings
			_____ Record Specifications
			_____ Record Product Data
			_____ Final completion construction photographs
			_____ Final site survey (if applicable)
<input type="checkbox"/>	_____	_____	Demonstration and Training
			_____ Demonstration of operation of systems, subsystems and equip.
			_____ Training in operation and maintenance of systems
			_____ Demonstration and training video recordings
<input type="checkbox"/>	_____	_____	Final Completion Procedures (Note: Complete items above first)
			_____ Submit final payment application
			_____ Certificate of insurance
			_____ Certified list of incomplete items

After reviewing this checklist please let us know if you have any issues or concerns and when you feel all the information will be submitted as defined above.



# PROJECT READY CHECKLIST

FOR

## FINAL CLOSEOUT

## TABLE OF CONTENTS

Project Name: \_\_\_\_\_  
Project Address: \_\_\_\_\_  
Contractor Name: \_\_\_\_\_  
Contractor Address: \_\_\_\_\_

The following is an outline/guide for the final closeout table of contents. Please use this format when assembling the project closeout documentations and naming the files. All items are further detailed in the project specifications.

### Table of Contents

1. Project Directory
  - a. GC contacts with company name, address, contact(s), phone number and email address
  - b. Subcontractors with company name, address, contact(s), phone number and email address
  - c. Owner/Facility with company name, address, contact(s), phone number and email address
  - d. Architects and Engineers with company name, address, contact(s), phone number and email address
2. Certificates of Release
  - a. Permit
  - b. CO
  - c. Operating Certificates
  - d. Final Release of Liens
3. Photographic Documentation (per spec. section 013233)
  - a. Preconstruction photographs.
  - b. Periodic construction photographs.
  - c. Final completion construction photographs.
  - d. Preconstruction video recordings.
4. Warranties
  - a. GC Workmanship Warranty
  - b. Subcontractor Warranties
  - c. Material Warranties
5. Operation, Maintenance and Emergency Manuals (per spec. section 017283)
6. Testing Reports (per spec. section 014529)
7. Record Documentation (per spec. section 017830)
  - a. Record Drawings / As-Built
  - b. Record Specification
  - c. Record Product Submittals
    - i. Final Submittal
  - d. Record RFIs

8. Field Reports (per spec. section 017830)
9. Attic Stock and Spare Parts (per spec. section 017840)
  - a. Attic stock spreadsheet specific information required for acceptance of Attic Stock include:
    - i. Item names listed on the construction documents (WC-1 Wallcovering #)
    - ii. Specification number.
    - iii. Item description.
    - iv. Item technical information, specification, manufacturer name, address and phone number.
    - v. Suggested supplier name, address and phone number.
    - vi. Re-order quantity.
      1. At what on-hand quantity should the item be re-ordered?
      2. What is the re-order quantity?
    - vii. Cost of the item, if known.
    - viii. Quantity of material installed.
    - ix. Percentage of attic stock required.
    - x. Quantity of attic stock provided.
    - xi. Date material delivered.
    - xii. Name and signature who accepted the delivery.
  - b. Transmittals detailing material and quantities to be provided during delivery and copies of the transmittals included in the project closeout documents.
10. Demonstration and Training Videos (per spec. section 017900)

---

Verified by:

Date:

**END OF SECTION**

**SECTION 007300  
SUPPLEMENTARY GENERAL CONDITIONS**

1. GENERAL

These Supplementary General Conditions, together with the General Conditions and changes to them, govern all work in so far as applicable. Where the General Conditions and Supplementary General Conditions may have bearing upon similar subject matter, both shall apply wherever possible; otherwise the more stringent conditions shall govern.

2. REVIEW OF CONSTRUCTION DOCUMENTS

- A. Contractor shall thoroughly examine and be familiar with the Drawings and Specifications. The failure or omission of Contractor to receive or examine any form, instrument, document, or visit the site and acquaint himself with existing conditions there existing, shall in no way relieve Contractor from obligation with respect to his bid. By having submitted a bid, the Contractor agrees and warrants that he has examined the site and the Specifications and Drawings and, where Specifications or Drawings require in any part of the Work a given result to be produced, that the Specifications and Drawings are adequate and the required result can be produced under the Specifications and Drawings. No claim for any extra will be allowed because of alleged impossibilities in the production of the results specified or because of inadequate or improper plans and specifications and whenever a result is required, the Contractor shall furnish any and all extras and make any changes needed to produce the required result.

3. ERRORS AND OMISSIONS

- A. Contractor shall notify Architect in writing regarding any necessary items which may have been omitted from the Specifications or Drawings, or both, and irregularities, discrepancies or duplications between Drawings and Specifications according to the evident intent. In case of such errors or omissions, the Contractor shall not proceed with the Work in uncertainty, but shall consult the Architect regarding proper intent, and revision if it be necessary.
- B. Any duplication of work specified in two or more sections shall require the Contractor to provide the work so duplicated without extra or additional charge to the Owner. Such duplications, if any, are not intended.
- C. Typographical and spelling errors shall be interpreted by the Architect for their obvious meaning and intent.
- D. In case of any conflict or inconsistency within the Contract Documents, the better quality or greater quantity of work shall be provided in accordance with Architect's interpretation.

4. COOPERATION AND COORDINATION

- A. Where any job condition arises and no detailed Drawings exist to give Architect's intent, Contractor shall consult with Architect for proper manner of doing work, so that aesthetic effect is not compromised.

- B. Observation of Work by the Architect or by employees of the Architect shall not be interpreted as relieving Contractor from his responsibility for coordination of all work, his Superintendence of the work, and his scheduling of the work.
- C. The General Contractor shall arrange, during progress of the Work, for necessary openings (temporary and permanent), chases, sleeves in walls, floors, ceilings, roof and partitions as required by his subcontractors.

5. EXCLUSIONS

- A. Certain items are not included in the scope of the General Contractor's work. These items will be furnished and installed by others through arrangements made by the Owner and Architect. These items are identified on the plans as "NIC" (not in contract), "future", "by others", or "by Owner". Refer to the drawings and specifications, including the equipment schedules.

6. USE OF PREMISES BY OWNER

- A. The Owner reserves the right to occupy any portion of the project before it has been entirely completed, with the distinct understanding that such occupancy shall not in any way constitute acceptance of the Work or any part thereof, or of any work performed under contract.

7. WRITTEN INTERPRETATIONS REQUIRED

- A. Neither the price bid for the Work of any Contractor, nor the Contract Sum shall be based in any manner upon oral opinions, or real or alleged instructions of an oral nature, regardless of whether such opinions or instructions are expressed by the Owner, the Architect, the Contractor or agents or representatives of any of them.
- B. These provisions do not intend to deny normal discussion, recommendations, explanations, suggestions, approvals, rejections, and similar activity in pursuit of the work of the Project on an oral basis, such as at Job Conferences and otherwise at the Site. In such instances the written minutes, correspondence, Shop Drawings Records, written Field Orders and other written data shall control over claims regarding statements made contrary to the written data.
- C. Interpretations of Contract Documents, to be effective for claim purposes or for justification as to proper procedure in performing the Work, must be obtained in writing before such claim is made or such work begun.
- D. Written or graphic interpretations by the Architect will be considered as minor changes in the Work. No claims for additional time or money will be honored due to such interpretation. Any interpretations offered by the Architect that Contractor determines to affect Contract Sum or time shall be returned to the Architect within 5 days and will be treated as a Change Proposal Request. Provide complete substantiation of changes in contract time or money as required for a Change Proposal Request.

8. ALTERNATES

- A. Except as noted otherwise, bid prices for alternates not included in Contract at time of execution shall be held by Contractor for a period of no less than ninety (90) days thereafter. During this time and at the discretion of the Owner, any of these alternates may be incorporated into the Contract by Change Order for the Bid price(s). Refer to Division 01230 Section "Alternates".

9. LIQUIDATED DAMAGES

- A. Actual damages for delay in the time of completion are impossible to determine. Accordingly, each Contractor shall be liable for, and shall pay to the Owner as fixed, agreed and liquidated damages, the sum or sums indicated for each calendar day (Sundays and holidays included) which the actual time of substantial completion shall be delayed beyond the time of completion as indicated.
- B. In addition, Contractor shall be liable for, and shall pay to Owner as fixed, agreed and liquidated damages, the sum or sums indicated for each calendar day (Sundays and holidays included) which the actual time of final completion, including completion or correction of punch list items, shall be delayed beyond the time of completion indicated in the General Conditions.
- C. The Owner shall have the right to deduct the total amount of any fixed, agreed and liquidated damages for which the Contractor may be liable from any moneys otherwise due to the contractor under the Contract, including any retainage held by the Owner.

10. CONSTRUCTION PERMITS AND FEES

- A. The contractor shall be responsible for obtaining all permits, connection and tap-in fees relative to the Work of that Contract. The cost of these permits will be paid by the contractor and will be reimbursed as a Change Order with no mark-up.
- B. To the extent Contractor pays any permit, connection and/or tap-in fee not otherwise properly due, the Owner shall be entitled to any refund relating thereto and the Contractor agrees to assign any and all rights to said refund or refund claim to Owner. The Contractor and all subcontractors hereby assign to Owner all rights to claim any such refund claim and to any resulting refund and hereby appoint the Owner as their Attorney-in-Fact to execute and acknowledge in their respective names and to prosecute such refund claims before administrative agencies and courts in Pennsylvania having jurisdiction over such claims. The Owner or its agent shall have the right to review the books and records of Contractor and all subcontractors for the purpose of documenting and substantiating any such refund claim. Contractor and all subcontractors shall cooperate fully with Owner in pursuing any such refund claim and shall make available to Owner any applicable documents.

11. DISCRIMINATION PROHIBITED: The Contractor agrees that:

- A. In the hiring of employees for the performance of work under this Contract, or any sub-contract, no contractor, subcontractor, or any person acting on behalf of the contractor or subcontractor shall, by reason of gender, race, creed or color, discriminate against any citizen of this Commonwealth who is qualified and

available to perform the work to which the employment relates.

- B. No contractor, sub-contractor, or any person acting on their behalf, shall in any manner discriminate against or intimidate any employee hired for the performance of work under this Contract on account of gender, race, creed or color.
  - C. The Contract may be canceled or terminated by the Owner, and all money due or to become due under the Contract may be forfeited, for violation of the terms or conditions of that portion of the Contract.
12. STANDARD OF QUALITY: The various materials and products specified in the specifications by name or description are given to establish a standard of quality and of cost for bid purposes. It is not the intent to limit Bidder, the Bid or the evaluation of the Bid to any one material or product specified, but rather to describe the minimum standard. When proprietary names are used, they shall be followed by the words “or alternatives of the quality necessary to meet the specifications”. A Bid containing an alternative which does not meet the specifications may be declared non-responsive. A Bid containing an alternative may be accepted, but if an award is made to that Bidder, the Bidder will be required to replace any alternatives which do not meet the specifications. (Refer to Article 4 of the Instructions to Bidder) .
13. RIGHT TO KNOW ACT: Contractor shall comply with all terms and conditions of the Worker and Community Right to Know Act, Act No. 159 of 1984, 35 P.S. § 7301 et seq., and its implementing regulations.
14. WAIVER OF CONSEQUENTIAL DAMAGES
- Contractor waives claims against Owner for consequential damages arising out of or relating to this Contract, including, but not limited to, damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.
15. ALL APPLICABLE LAWS, STATUTES, REGULATIONS AND STANDARDS
- Contractor shall comply with all applicable federal, state, local and industry statutes, regulations, ordinances, codes and standards. The failure to specifically reference or include said matters in the Contract Documents does not excuse Contractor from compliance with same.

**END OF DOCUMENT**

## **SECTION 011000 SUMMARY**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Phased construction.
- 4. Work by Owner.
- 5. Work under separate contracts.
- 6. Future work.
- 7. Purchase contracts.
- 8. Owner-furnished products.
- 9. Contractor-furnished, Owner-installed products.
- 10. Access to site.
- 11. Coordination with occupants.
- 12. Work restrictions.
- 13. Specification and drawing conventions.
- 14. Miscellaneous provisions.

- B. Related Requirements:

- 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### **1.3 PROJECT INFORMATION**

- A. Project Identification: ACTS Granite Farms Estate WBC – Phase 2
  - 1. Project Location: 1343 West Baltimore Pike,, Media, PA 19063
- B. Owner: ACTS Retirement-Life Communities
  - 1. Owner's Representative: Jason Guss
- C. Architect: Kramer+Marks Architects, 27 S. Main Street, Ambler, PA 19002



- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
1. Eustace Engineering, Landscape Architecture, & Land Surveying Consulting, 606 Easton Road Building B – 2<sup>nd</sup> Floor, Willow Grove, PA 19090
    - a. Landscape Architecture and Land Surveying Consulting
  2. McCloskey & Faber, PC Landscape Architects and Planners, 831 DeKalb Pike, Blue Bell, PA 19422
    - a. Landscape Architect
  3. Elton & Thompson, PC Structural Engineers, 100 W. Main street, Suite 365 Lansdale, PA 19446
    - a. Structural Engineering
  4. McHugh Engineering Associates, 136 Poplar Street, Ambler, PA 19002.
    - a. Mechanical, Electrical, Plumbing and Fire Protection engineering.
  5. Vision Builders Design, 1515 Shopton Road Suite 104, Charlotte, NC 28217
    - a. Food Service Consultants
- E. Other Owner Consultants: The Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:
- F. Contractor: To Be Selected.
- G. Construction Manager: To Be Selected.
1. Construction Manager for this Project is Project's constructor. The terms "Construction Manager" and "General Contractor", a "Contractor are synonymous.
- H. Project Web Site: A project Web site administered by Architect will be used for purposes of managing communication and documents during the construction stage.
1. See Section 013100 "Project Management and Coordination." for requirements for establishing, administering and using the Project Web site.

#### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
- The project is a renovation to all private and semi-private assisted living resident rooms and common spaces, and ancillary spaces. There will additional construction to expand common space including vestibules, porte cochere, and sunroom.
- B. Type of Contract:
1. Project will be constructed under a Lump Sum contract.

## 1.5 PHASED CONSTRUCTION

- A. The Work shall be conducted in many phases shown on sheet PH101-Phasing Plans.
- B. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates, and move-out and -in dates of Owner's personnel for all phases of the Work.

## 1.6 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
- B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
  - All furniture and desired equipment relocation within work area.
  - All artwork relocation.
  - Signage installation (General Contractor to furnish and install all signage required for TCO and CO's).
  - Decorative window treatment installation, other than blinds and roller shades.
- C. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
  - 1. I.T./Data wiring/equipment installation.
- D. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.
  - 1. Furniture and equipment installation
  - 2. Decorative window treatment installation, other than blinds and roller shades.

## 1.7 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

- B. Concurrent Work: Owner will award and will assign to Contractor separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
  - 1. IT/Data:
- C. Subsequent Work: Owner will award separate contract(s) for the following additional work to be performed at site following Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.
  - 1. FF&E

#### 1.8 PURCHASE CONTRACTS

- A. General: Owner has negotiated purchase contracts with suppliers of material and equipment to be incorporated into the Work. Owner will assign these purchase contracts to Contractor. Include costs for purchasing, receiving, handling, storage if required, and installation of material and equipment in the Contract Sum, unless otherwise indicated.
  - 1. Contractor's responsibilities are same as if Contractor had negotiated purchase contracts, including responsibility to renegotiate purchase and to execute final purchasing agreements.

#### 1.9 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.
- B. Owner-Furnished Products:
  - 1. Final Data/Technology equipment/connections.
  - 2. Furniture

#### 1.10 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- C. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to designated work areas and approved/designated laydown areas.
  2. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet (12.2 m) beyond building perimeter; 10 feet (3 m) beyond surface walkways, patios, surface parking, and utilities less than 12 inches (300 mm) in diameter; 15 feet (4.5 m) beyond primary roadway curbs and main utility branch trenches; and 25 feet (7.6 m) beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area. General Contractor to coordinate with Civil Drawings.
  3. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- D. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

#### 1.11 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
  2. Maintain egress path of travel.
  3. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.
- B. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction, unless the space is required for owner's operation. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.

2. Maintain egress path of travel.
  3. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- C. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
  2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
  3. Before limited Owner occupancy, mechanical, plumbing, electrical and fire protection systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain systems serving occupied portions of Work.
  4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

#### 1.12 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 8:00 a.m. to 4:30 p.m., Monday through Friday, unless otherwise indicated.
1. Weekend Hours: 8:00 a.m. – 4:30 p.m. must be approved prior times permitted for weekend work.
  2. Early Morning Hours: Must be approved.
  3. Hours for Utility Shutdowns: 72-hours notice with approval.
  4. Hours for Core Drilling and other loud activities 9:00 – 3:00 with owner's approval.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify Owner not less than two days in advance of proposed utility interruptions.
  2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.
  2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Nonsmoking and tobacco free campus: Smoking is not permitted within the building or on campus.
- F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with Owner's requirements for background screening of Contractor personnel working on Project site.
1. Maintain list of approved screened personnel with Owner's representative.
- I. Daily employee list: Contractor to maintain a daily list of all personnel working on project site.

#### 1.13 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
  3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

Kramer+Marks Architects  
Ambler, PA

Acts Granite Farms Estates  
WBC – Phase 2  
Media, PA 19063

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION**

## **SECTION 012100 ALLOWANCES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements governing allowances.
  - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.
  - 3. Quantity allowances.
  - 4. Contingency allowances.
  - 5. Testing and inspecting allowances.
- C. Related Requirements:
  - 1. Section 012200 "Unit Prices" for procedures for using unit prices.
  - 2. Section 014000 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

#### **1.3 SELECTION AND PURCHASE**

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.



#### 1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

#### 1.6 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

#### 1.7 ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

#### 1.8 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part

of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and no overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

#### 1.9 TESTING AND INSPECTING ALLOWANCES

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. Costs of services not required by the Contract Documents are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

#### 1.10 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
  - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
  - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
  - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
  - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.

2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 ALLOWANCES**

- A. Cash allowance are to be treated as a Change Order Request and need to be approved by the owner and architect before used. General Contractor to keep a separate allowance log.

### **3.2 EXAMINATION**

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

### **3.3 PREPARATION**

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

### **3.4 SCHEDULE OF ALLOWANCES**

- A. See Invitation To Bid for a list of Allowances.

## **END OF SECTION**

## **SECTION 012200 UNIT PRICES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
  - 1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
  - 2. Section 014000 "Quality Requirements" for general testing and inspecting requirements.

#### **1.3 DEFINITIONS**

- A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

#### **1.4 PROCEDURES**

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

**PART 2 - PRODUCTS** (Not Used)

**PART 3 - EXECUTION**

3.1 SCHEDULE OF UNIT PRICES

**Unit Price**

A. See Invitation To Bid for a list of Unit Prices.

**END OF SECTION**

## **SECTION 012300 ALTERNATES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for alternates.

#### **1.3 DEFINITIONS**

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

#### **1.4 PROCEDURES**

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.

- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 ALTERNATES**

- A. See Invitation To Bid for a list of Alternates

## **END OF SECTION**

## **SECTION 012500 SUBSTITUTION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for products selected under an allowance.
  - 2. Section 012300 "Alternates" for products selected under an alternate.
  - 3. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

#### **1.3 DEFINITIONS**

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

#### **1.4 ACTION SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use CSI Form 13.1A
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.



- b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
  - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
  - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
  - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within fifteen (15) days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

## 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

# PART 2 - PRODUCTS

## 2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed, unless otherwise indicated.
- C. Substitutions for Convenience: Architect will consider requests for substitution if received within sixty (60) days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
  - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied,

Architect will return requests without action, except to record noncompliance with these requirements:

- a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
- b. Requested substitution does not require extensive revisions to the Contract Documents.
- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Substitution request is fully documented and properly submitted.
- e. Requested substitution will not adversely affect Contractor's construction schedule.
- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

### **PART 3 - EXECUTION (Not Used)**

### **END OF SECTION**

## **SECTION 012600 CONTRACT MODIFICATION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

#### **1.3 MINOR CHANGES IN THE WORK**

- A. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

#### **1.4 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a detail breakdown of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

- c. Include labor hours and rates directly attributable to the change.
  - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time. There shall be no extra fees for supervision if the work is being performed within the original construction schedule.
  - e. Allowed Markup: Per owner/contractor contract .
  - f. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail."
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a detailed breakdown list of quantities of each products required or eliminated and unit costs for each product, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
  - 7. Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail."

## 1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

## 1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Construction Manager will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 before work is performed.

## 1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Work Change Directive: Architect may issue a Work Change Directive on AIA Document G714. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Work Change Directive contains a complete description of change in the Work and a itemized breakdown of material cost, labor hours and labor rates. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

## **SECTION 012900 PAYMENT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
  - 2. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
  - 3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

#### **1.3 DEFINITIONS**

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### **1.4 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect through Construction Manager at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.
  3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values coordinated with each phase of payment.
  4. Sub-schedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide sub-schedules showing values coordinated with each element.
  5. Sub-schedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide sub-schedules showing values coordinated with the scope of each design services contract as described in Section 011000 "Summary."
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  2. Arrange schedule of values consistent with format of AIA Document G703.
  3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
      - 1) Labor.
      - 2) Materials.
      - 3) Equipment.
  4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five (5) percent of the Contract Sum.



- a. Include separate line items under Contractor and principal subcontracts for other Project closeout requirements in an amount totaling five (5) percent of the Contract Sum and subcontract amount.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Approved Change Orders or Construction Change Directives result in a change in the Contract Sum.

## 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Retainage: Per owner/contractor contract.

- D. Payment Application Times: Submit Application for Payment to Architect by the twentieth 20th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
1. Submit Notarized draft copy of Application for Payment seven (7) days prior to due date for review by Architect and two (2) days before the last construction meeting of each month.
  2. Draft copy of applications for payment will be reviewed at the construction meeting.
- E. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 AIA Document G702/CMA and AIA Document G703 as form for Applications for Payment.
- F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- G. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
  4. Provide photographs of stored materials.

- H. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- I. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit conditional final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- J. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit conditional final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Submit final Application for Payment with or preceeded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- K. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of values.
  - 3. Contractor's construction schedule (preliminary if not final).
  - 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
  - 5. Products list (preliminary if not final).
  - 6. Schedule of unit prices.
  - 7. Submittal schedule (preliminary if not final).
  - 8. List of Contractor's staff assignments.
  - 9. List of Contractor's principal consultants.
  - 10. Copies of building permits.

11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  12. Initial progress report.
  13. Report of preconstruction conference.
  14. Certificates of insurance and insurance policies.
  15. Performance and payment bonds.
  16. Data needed to acquire Owner's insurance.
- L. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- M. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements including a letter stating that the punch list items have been 100% completed.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.
  8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  9. Final liquidated damages settlement statement.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION (Not Used)**

### **END OF SECTION**

## **SECTION 015000 TEMPORARY FACILITIES AND CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 01100 "Summary" for work restrictions and limitations on utility interruptions.
  - 2. Section 02700 "Asphalt Paving" for construction and maintenance of asphalt pavement for temporary roads and paved areas.
  - 3. Section 03310 "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

#### **1.3 USE CHARGES**

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- G. Sewer, Water, and Electric Power Service: Use charges are specified in Section 011200 "Multiple Contract Summary."

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
  - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
  - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
  - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.
  - 2. HVAC system isolation schematic drawing.
  - 3. Location of proposed air-filtration system discharge.
  - 4. Waste handling procedures.
  - 5. Other dust-control measures.

#### 1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1.

## 1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. EXTERIORS

- 1. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.
- 2. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts.

#### B. INTERIOR IN OCCUPIED SPACES:

- 1. Gypsum board partition with trim matching adjacent existing partitions. Partitions and trim to be painted to match existing partitions.

#### C. INTERIOR IN UNOCCUPIED SPACES

- 1. Wood Enclosure Fence: Plywood, 8 feet (2.4 m) high, framed with four 2-by-4-inch (50-by-100-mm) rails, with preservative-treated wood posts spaced not more than 8 feet (2.4 m) apart.

#### D. DUST CONTROL

- 1. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

2. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).

#### E. INSULATION

1. Insulation: Un-faced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

### 2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
  1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
  2. Conference room of sufficient size to accommodate meetings of (10) ten individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
  3. Drinking water and private toilet.
  4. Coffee machine and supplies.
  5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
  6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
  7. Computer with internet connection and 11"x17" printer.
  8. Telephone.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  1. Store combustible materials apart from building.

### 2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.



1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
  3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of (8) eight at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures".
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION, GENERAL**

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

#### **3.2 TEMPORARY UTILITY INSTALLATION**

- A. General: Install temporary service or connect to existing service.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
1. Connect temporary sewers to private system indicated as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

- E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
  - 1. Toilets: Use of Owner's owner designated existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- F. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
  - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
    - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
  - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
  - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- H. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
  - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- I. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- J. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - 1. Install electric power service overhead unless otherwise indicated.

2. Connect temporary service to Owner's existing power source, as directed by Owner.
- K. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  2. Install lighting for Project identification sign.
- L. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one (1) telephone line for each field office with speaker phone capability.
1. Provide additional telephone lines for the following:
    - a. Provide a dedicated telephone line for each facsimile machine in each field office.
  2. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect's office.
    - f. Engineers' offices.
    - g. Owner's office.
    - h. Principal subcontractors' field and home offices.
  3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- M. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:
1. Processor: Intel Pentium D or Intel CoreDuo, (3.0) GHz processing speed.
  2. Memory: (4) four gigabyte.
  3. Disk Storage: (300) three hundred gigabyte hard-disk drive and combination DVD-RW/CD-RW drive.
  4. Display: 22-inch (560-mm) LCD monitor with 256-Mb dedicated video RAM.
  5. Full-size keyboard and mouse.
  6. Network Connectivity: 10/100BaseT Ethernet.
  7. Operating System: Microsoft Windows XP Professional or Microsoft Windows Vista Business.
  8. Productivity Software:

- a. Microsoft Office Professional, XP or higher, including Word, Excel, and Outlook.
  - b. Adobe Reader 7.0 or higher.
  - c. WinZip 7.0 or higher.
9. 11"x17" Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
  10. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum (384) three hundred eighty-four Kbps upload and (1) one Mbps download speeds at each computer.
  11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
  12. Backup: External hard drive, minimum (40) forty gigabyte, with automated backup software providing daily backups.

### 3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install sub-base and base for temporary roads and paved areas according to Section 312000 "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, re-grading, proof rolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course

pavement before installation of final course according to Section 321216 "Asphalt Paving."

- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
  - 2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Maintain and touchup signs so they are legible at all times.
- H. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- L. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Site Enclosure Fence: Before construction operations begin furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
  2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- D. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- F. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
1. General Contractor responsible for maintain required egress during the duration of construction.
- G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas.
  2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

### 3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
  2. Protect stored and installed material from flowing or standing water.
  3. Keep porous and organic materials from coming into prolonged contact with concrete.
  4. Remove standing water from decks.
  5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  2. Keep interior spaces reasonably clean and protected from water damage.
  3. Periodically collect and remove waste containing cellulose or other organic matter.
  4. Discard or replace water-damaged material.
  5. Do not install material that is wet.
  6. Discard, replace, or clean stored or installed material that begins to grow mold.
  7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  2. Use permanent HVAC system to control humidity.
  3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
    - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for (48) forty-eight hours are considered defective.
    - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for (48) forty-eight hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    - c. Remove materials that cannot be completely restored to their manufactured moisture level within (48) forty-eight hours.

### 3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements



- for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

**END OF SECTION**

## **SECTION 016000 PRODUCT REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for products selected under an allowance.
  - 2. Section 012300 "Alternates" for products selected under an alternate.
  - 3. Section 012500 "Substitution Procedures" for requests for substitutions.
  - 4. Section 014200 "References" for applicable industry standards for products specified.

#### **1.3 DEFINITIONS**

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance,

physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within (15) fifteen days of receipt of request, or (7) seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

#### 1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
  - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

#### 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

## 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," Architect will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
  - 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
  - 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  - 3. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    - b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  - 4. Manufacturers:
    - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies

- with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
- b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
- 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
- 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  - 3. Evidence that proposed product provides specified warranty.
  - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  - 5. Samples, if requested.

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

## **SECTION 017300 EXECUTION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for limits on use of Project site.
  - 2. Section 013300 "Submittal Procedures" for submitting surveys.
  - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
  - 4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
  - 5. Section 078400 "Penetration Firestopping" for patching penetrations in fire-rated construction.

#### **1.3 DEFINITIONS**

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.



#### 1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least (10) ten days prior to the time cutting and patching will be performed. Include the following information:
1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
  2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
  3. Products: List products to be used for patching and firms or entities that will perform patching work.
  4. Dates: Indicate when cutting and patching will be performed.
  5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
    - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

#### 1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
  2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Mechanical systems piping and ducts.
    - f. Control systems.
    - g. Communication systems.
    - h. Fire-detection and -alarm systems.
    - i. Conveying systems.
    - j. Electrical wiring systems.
    - k. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Sprayed fire-resistive material.
    - d. Equipment supports.
    - e. Piping, ductwork, vessels, and equipment.
    - f. Noise- and vibration-control elements and systems.
  4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work.
  2. List of detrimental conditions, including substrates.
  3. List of unacceptable installation tolerances.
  4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

### 3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

- a. Clean exposed structural elements, piping, conduit, and similar features before applying paint or other finishing materials.
  - b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
  1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  2. Pre-installation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
  5. Keep areas open to the public clean and free of debris at all times.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean and protected. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls.", Section 017419 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.



### 3.8 FINAL CLEANING

- A. Provide final cleaning per Section 01770 Closeout Procedures

### 3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

### 3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

## END OF SECTION

**SECTION 017410  
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
  - 1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.

**1.3 DEFINITIONS**

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators.
  - a. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
    - 1) Paper.
    - 2) Cardboard.
    - 3) Boxes.
    - 4) Plastic sheet and film.
    - 5) Polystyrene packaging.
    - 6) Wood crates.
    - 7) Plastic pails.

#### 1.5 INFORMATIONAL SUBMITTALS (Not Used)

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION**

#### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to everyone concerned.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 SALVAGING DEMOLITION WASTE

- A. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- B. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- C. Plumbing Fixtures: Separate by type and size.

### 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  4. Store components off the ground and protect from the weather.
  5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

### END OF SECTION

## **SECTION 017700 CLOSEOUT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.
- B. Related Requirements:
  - 1. Section 013230 "Photographic Documentation" for submitting final completion construction photographic documentation.
  - 2. Section 017300 "Execution" for progress cleaning of Project site.
  - 3. Section 017820 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 4. Section 017830 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 5. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

#### 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list, reasons why the Work is incomplete and date to be completed.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of (10) ten days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
  - 5. Submit test/adjust/balance records.
  - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

- C. Procedures Prior to Substantial Completion: Complete the following a minimum of (10) ten days prior to requesting observation for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
  6. Advise Owner of changeover in heat and other utilities.
  7. Provide contractors punch list.
  8. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  10. Complete final cleaning requirements, including touchup painting.
  11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Observation: Submit a written request for observation to determine Substantial Completion a minimum of (10) ten days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Re-visit: Submit a letter to the Architect stating the punch list items are completed or corrected. Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.
  3. Each additional punch after the second visit will be billed Time & Material to the General Contractor thru the owner.

## 1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list),

- endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
- B. Observation: Submit a written request for final observation to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Re-visit: Request re-visit when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
1. Organize list of spaces in sequential order proceeding from lowest floor to highest floor.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect
    - d. Name of Contractor.
    - e. Page number.
  4. Submit list of incomplete items in the following format:
    - a. MS Excel electronic file. Architect will return annotated file.
    - b. PDF electronic file. Architect will return annotated file.
    - c. (3) three paper copies. Architect will return (2) two copies.

#### 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.



- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
    - a. To be included with Record Drawings.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  - 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
    - a. To be included with Record Drawings.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

## **PART 3 - EXECUTION**

### **3.1 FINAL CLEANING**

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - l. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

- o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
  - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

### END OF SECTION

## **SECTION 017820 OPERATION AND MAINTENANCE DATA**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Product maintenance manuals.
  - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### **1.3 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
    - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    - b. Enable inserted reviewer comments on draft submittals.
  2. (3) three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return (2) two copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least (30) thirty days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least (15) fifteen days before commencing demonstration and training. Architect will return copy with comments.
1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within (15) fifteen days of receipt of Architect's comments and prior to commencing demonstration and training.
  2. Final submittal: submit one (1) paper copy set. Submit three (3) DVD's PDF Electronic files of each manual.

## **PART 2 - PRODUCTS**

### **2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
1. List of documents.
  2. List of systems.
  3. List of equipment.
  4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- B. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor.
  - 6. Name and contact information for Construction Manager.
  - 7. Name and contact information for Architect.
  - 8. Name and contact information for Commissioning Authority.
  - 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  - 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
  2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
  4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
  5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
  2. Emergency instructions.

3. Emergency procedures.

- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
  2. Flood.
  3. Gas leak.
  4. Water leak.
  5. Power failure.
  6. Water outage.
  7. System, subsystem, or equipment failure.
  8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.



3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## 2.5 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.

2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## **PART 3 - EXECUTION**

### **3.1 MANUAL PREPARATION**

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from

the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of operation and maintenance manuals.
  2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."
- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

**END OF SECTION**

**SECTION 017830  
PROJECT RECORD DOCUMENTS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 017300 "Execution" for final property survey.
  - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
  - 3. Section 017820 "Operation and Maintenance Data" for operation and maintenance manual requirements.

**1.3 CLOSEOUT SUBMITTALS**

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit (1) one set(s) of marked-up record prints.
  - 2. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit (1) one paper-copy set(s) of marked-up record prints.
      - 2) Submit Two (2) DVD's or USB Drive PDF electronic files of scanned record prints (one (1) copy for the Architect) and (1) one of file prints.
    - b. Final Submittal:
      - 1) Submit (1) one paper-copy set(s) of marked-up record prints.
      - 2) Submit Three (3) DVD's or USB Drive PDF electronic files of scanned record prints (one (1) copy for the Architect) and (3) three set(s) of prints.

- 3) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit (1) one paper copy and (3) three DVD's or USB Drives annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit (1) one paper copy and (3) three DVD's or USB Drives annotated PDF electronic files and directories of each submittal.
  1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit (1) one paper copy and (3) three DVD's or USB Drives annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

## **PART 2 - PRODUCTS**

### **2.1 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding archive photographic documentation.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.

- d. Locations and depths of underground utilities.
  - e. Revisions to routing of piping and conduits.
  - f. Revisions to electrical circuitry.
  - g. Actual equipment locations.
  - h. Duct size and routing.
  - i. Locations of concealed internal utilities.
  - j. Changes made by Change Order or [Construction] [Work] Change Directive.
  - k. Changes made following Architect's written orders.
  - l. Details not on the original Contract Drawings.
  - m. Field records for variable and concealed conditions.
  - n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
  2. Format: DWG Version Windows 7 Microsoft Windows operating system.
  3. Format: Annotated PDF electronic file with comment function enabled.
  4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  5. Refer instances of uncertainty to Architect for resolution.
  6. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
    - a. See Section 013300 "Submittal Procedures" for requirements related to use of Architect's digital data files.
    - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
  4. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file, paper copy, scanned PDF electronic file(s) of marked-up paper copy of Specifications.
  1. Submit (1) one paper copy set and (2) two DVS's or USB Drives with PDF's.



## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file, paper copy.
  - 1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

## 2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file, paper copy.
  - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

# PART 3 - EXECUTION

## 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

## END OF SECTION

**SECTION 017846  
ATTIC STOCK**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All sections of the project manual are directly applicable to this specification section. Should a conflict arise between specification sections or between specifications and drawings and/or code requirements, the contractor shall notify the Architect/Engineer of the conflict in writing. If direction is not provided prior to the submission of the bid, the contractor shall price the more extensive system.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Attic Stock
  - 2. Spare Parts

**1.3 DEFINITIONS**

- A. Acceptance: The transfer of goods from an outside entity to the owner that has been documented and acknowledged by both parties in writing.
- B. Appropriate Credit: Amount of compensation agreed to by both parties. This value should be the vendor documented purchase price of the material, including tax, shipping, and contractor markup.
- C. Attic Stock: Additional material and accessories designated in the design specifications, including but not limited to ceiling tile, fire alarm devices, door hardware, etc.
- D. OEM: Original Equipment Manufacturer.
- E. Perishable Items: Items such as paint, adhesives, and other items with a finite shelf life.
- F. Spare Parts: Parts or equipment components that are included in the purchase of the original equipment, and are provided by the OEM for use by the owner.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each item provided.

## 1.5 DELIVERY, STORAGE, AND HANDLING

### A. Prepare items for storage as follows:

1. Items shall be delivered in undamaged, original packing.
2. Item description and quantity shall be clearly marked on a visible surface of the packaging.
3. Include item technical documentation.

## PART 2 - PRODUCTS

### 2.1 ATTIC STOCK

#### A. Provide the following quantities of materials for "Attic Stock"

1. 064113 – Wood Veneer Custom Cabinets
  - a. Cabinetry Hardware: Furnish not less than 5 hinges, 5 glides and 5 pulls.
2. 064116 – Plastic Laminate Architectural Cabinets
  - a. Cabinetry Hardware: Furnish not less than 5 hinges, 5 glides and 5 pulls.
3. 093113, 093116 and 093413 –Tiling
  - a. Tile and Trim Units: Furnish quantity of full-size units equal to 5 percent of amount installed for each type, composition, color, pattern, and size indicated.
  - b. Grout: Furnish quantity of grout equal to 5 percent of amount installed for each type, composition, and color indicated.
4. 095123 – Acoustical Tile Ceilings
  - a. Acoustical Ceiling Units: Furnish full-size tiles equal to 4 percent of quantity installed of each type, pattern or color.
  - b. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 4 percent of quantity installed of each type or color.
5. 096513 – Resilient Base and Accessories
  - a. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.
6. 096516 – Resilient Sheet Flooring
  - a. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full width for each type, color and pattern of flooring installed.
7. 096519 – Resilient Tile Flooring
  - a. Furnish one box for every 50 boxes or fraction thereof, of each type, color and pattern of floor tile installed.
8. 096813 –Carpet Tile
  - a. Furnish full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.
9. 096816 – Sheet Carpeting
  - a. Furnish Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 5 sq. yd.
10. 097200 – Wall Covering
  - a. Furnish full width by length rolls equal to 5 percent of amount installed for each type, color, texture and finish.
11. 099123 –Painting
  - a. Furnish 5 percent, but not less than 1 gal. of each material and color applied properly labeled in original container(s).
12. 099323 – Staining and Transparent Finishes
  - a. Furnish 5 percent, but not less than 1 gal. of each material and color applied properly labeled in original container(s).
13. 102600 – Wall and Door Protection

- a. Wall-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, 96-inch-long units.
- b. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than 2, 48-inch long units.
- c. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.
- 14. 105126 – Solid Plastic Lockers
  - a. Full-size locker doors, complete with specified door hardware. Furnish no fewer than one door of each type and color installed.
  - b. Two (2) full-size units of hinges, pulls and shelf rests.
- 15. 122113 – Horizontal Louver Blinds
  - a. Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and gloss indicated, but no fewer than two units.
- 16. 122413 – Roller Shades
  - a. Furnish fabric and brackets equal to 5 percent of quantity installed for each color, type and material.
- 17. 123530 – Residential Casework
  - a. Cabinetry Hardware: Furnish not less than 5 hinges, 5 glides and 5 pulls.
- 18. 124813 - Entrance Floor Mats and Frames
  - a. Tile: Furnish full-size units equal to 5 percent of amount installed for each type indicated, but not less than 5 sq. yd.

## 2.2 SPARE PARTS

- 1. Items included with the purchase of materials or equipment that are considered spare or replacement parts are the property of the owner, and shall be submitted to the them for acceptance and storage.
- 2. Installation aids, transportation tools and all items that are not deemed as spare parts shall be disposed of, or may be retained by the contractor.

## PART 3 - EXECUTION

### 3.1 OWNER DOCUMENTATION REQUIREMENTS

- A. Attic Stock material shall be provided to the owner with the following documentation. Items not inventoried will not be accepted.
  - 1. Specific information required for acceptance of Attic Stock include:
    - a. Item description.
    - b. Item technical information and specification.
    - c. Suggested supplier.
    - d. Quantity.
    - e. Re-order quantity.
      - 1) At what on-hand quantity should the item be re-ordered?
      - 2) What is the re-order quantity?
    - f. Cost of the item, if known.

3.2 DELIVERY

- A. Material shall be delivered directly to an approved, designated storage area, confirmed prior to delivery. Material acceptance must be verified in writing by the requesting party.

3.3 STORAGE

- A. Mechanical rooms, electrical rooms, telecom, and other service areas are not to be used as storage or staging areas unless prior written approval.
- B. Designated storage areas in mechanical spaces must be clearly identified prior to delivery.

**END OF SECTION**

## **SECTION 017900 DEMONSTRATION AND TRAINING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Demonstration and training video recordings.
- B. Related Requirements:
  - 1. Section 017700 "Closeout Procedures: for general closeout procedures.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Demonstration and Training Video Recordings: Submit (3) three copies within (7) seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:
  - a. Name of Project.
  - b. Name and address of videographer.
  - c. Name of Architect.
  - d. Name of Construction Manager.
  - e. Name of Contractor.
  - f. Date of video recording.
2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
4. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals in PDF electronic file format on compact disc.

#### 1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  1. Inspect and discuss locations and other facilities required for instruction.
  2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  3. Review required content of instruction.
  4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## 1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

## PART 2 - PRODUCTS

### 2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  - 2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.



3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
8. Repairs: Include the following:
  - a. Diagnosis instructions.

- b. Repair instructions.
- c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
- d. Instructions for identifying parts and components.
- e. Review of spare parts needed for operation and maintenance.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

### **3.2 INSTRUCTION**

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner with at least (7) seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

### 3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
  - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
  - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
  - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
  - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
    - a. Name of Contractor/Installer.
    - b. Business address.
    - c. Business phone number.
    - d. Point of contact.
    - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
  - 1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
  - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Pre-produced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

**END OF SECTION**

## **SECTION 023000 EARTHWORK**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Site grading of disturbed areas due to work of this contract.
  - 2. Minor removal of topsoil and subsoil.
  - 3. Foundation trench excavating.
  - 4. Utility trenching.
  - 5. Backfilling, and compacting.

#### **1.2 SUBMITTALS**

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- C. Dewatering Plan: Describe equipment, materials, installation and operation required to lower ground water table if required; include calculations to support plan.

#### **1.3 SAMPLES**

- A. Section 01455 - Testing Laboratory Services: Testing requirements.
- B. Submit 10 lb sample of each type of fill to testing laboratory, in air tight containers.
- C. Determine optimum moisture density relationship in accordance with ASTM D1557.

#### **1.4 QUALITY ASSURANCE**

- A. Prepare excavation protection plan and dewatering plan by professional engineer licensed in the Commonwealth of Pennsylvania.

#### **1.5 REGULATORY REQUIREMENTS**

- A. Perform work in accordance with local soil conservation and erosion protection regulations.

## PART 2 PRODUCTS

### 2.1 SOIL MATERIALS

- A. Topsoil: Reusable excavated or imported friable loam; free of subsoil, roots, grass, excessive amount of weeds, large stone, and foreign matter.
- B. Subsoil: Imported or excavated material, graded free of lumps larger than 6 inches, rocks larger than 3 inches, and debris.

### 2.2 FILL MATERIALS

- A. Type A - Select Granular Material: 2A coarse stone aggregate with the following gradation:

Sieve Size	Percent Passing
2 inch	100
3/4 inch	52-100
3/8 inch	36-70
Number 4	24-50
Number 8	16-38
Number 16	10-30
Number 200	0-10

- B. Type C – Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
- C. Type D – Subsoil: Reused or Imported, free of rock larger than 3 inch size, and debris, conforming to ASTM D2487 Group Symbol CL or OL.
- D. Type E - Structural Fill: Reusable excavated subsoil comprised primarily of fine sand or silt free of debris such as cinders and ash conforming to the following gradation:

Sieve Size	Percent Finer
4 inch	100
1/4 inch	50 to 95
No. 40	10 to 70
No. 200	0 to 10

## PART 3 EXECUTION

### 3.1 EXAMINATION AND PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Survey existing adjacent structural elements for position and elevation prior to beginning excavation Work. Monitor adjacent structural elements during excavation for movement caused by excavation operations. Notify Owner immediately of any measured movement.

- C. Notify Architect of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- D. Call Local One Call System, Inc. not less than three working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- E. Identify and flag known utility locations. Notify utility company to remove and relocate utilities. Coordinate utility company access to construction areas.
- F. Maintain and protect existing utilities to remain.
- G. Verify foundation or basement walls are braced to support surcharge forces imposed by backfilling operations.

### 3.2 PROTECTION OF ADJACENT WORK

- A. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.
- B. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- C. Design sheeting and shoring to be removed at completion of excavation work.
- D. When excavation protection is required, Contractor shall assume responsibility for damages caused by failure of the sheeting, shoring, or bracing and for settlement of either filled excavations or adjacent soil. Repair damage to new and existing work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.
- E. Grade excavation top perimeter to prevent surface water run-off into excavation or to adjacent properties.
- F. Tree protection zone. Provide an area surrounding individual trees or groups of trees to be protected during construction defined by a circle concentric with each tree with a radius 12 times the tree's caliber per size and with a minimum radius of 96 inches, unless indicated otherwise.
  - 1. Do not disturb soil within 24 inches of a trees canopy.

### 3.3 TOPSOIL EXCAVATING

- A. Do not excavate wet topsoil.
- B. Excavate topsoil and stockpile in area designated on site. Remove excess topsoil not being reused from site.

### 3.4 DEWATERING

- A. Develop dewatering plan based on site surface and subsurface conditions and available soils and hydrological data.
- B. Remove ground water by pumping or other methods to prevent the softening of surfaces exposed by excavation.
- C. Lower ground water levels within excavation areas 12 inches, minimum below bottom of excavations. Relieve hydrostatic pressure in pervious zones below subgrade elevation in layered soils to prevent uplift.
- D. Place dewatering system in operation before excavating below ground water level. Operate system continuously, 24 hours per day, 7 days per week, until construction work below existing ground water levels is complete.

### 3.5 SUBSOIL EXCAVATING

- A. Excavate subsoil required for building foundations, construction operations, and other Work.
- B. Slope banks to angle of repose or less, until shored.
- C. Excavation shall not interfere with 45 degree bearing splay of any foundation without proper shoring of adjacent structures.
- D. Correct unauthorized excavation at no extra cost to Owner.
- E. Fill over-excavated areas under structure bearing surfaces in accordance with direction by Architect.
- F. Stockpile subsoil in area designated on site. Remove excess subsoil not being reused from site.

### 3.6 TRENCHING

- A. Excavate 12 inches minimum below required bearing elevation.
- B. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.
- C. Compact subgrade to 95 percent of maximum dry density.
- D. Provide controlled fill Type E bedding material placed in maximum 8 inch loose depth lifts compacted to 95 percent maximum dry density to elevations indicated on Drawings.
- E. Support pipe and conduit during placement and compaction of bedding fill.
- F. Backfill trenches to required contours and elevations.



- G. Place and compact fill materials as for Backfilling.
- H. Perform compaction tests in accordance with ASTM D1557 in number and frequency as directed by soils engineer.

### 3.7 BACKFILLING

- A. Backfill areas to contours and elevations. Use unfrozen and unsaturated materials.
- B. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Place and compact fill materials in continuous layers not exceeding 6 inches loose depth
- D. Place and compact soil material in continuous layers not exceeding 8 inches loose depth.
- E. Employ a placement method so not to disturb or damage foundations, foundation perimeter drainage, foundation waterproofing and protective cover, or utilities in trenches.
- F. Maintain optimum moisture content of backfill materials to attain required compaction density.
- G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- H. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise.

### 3.8 SCHEDULE

- A. Interior Slab-On-Grade: Type A fill, minimum 8 inches thick, compacted to 95 percent; with cover of Type C fill, 2 inches thick, compacted to 95 percent; unless otherwise indicated on drawings.
- B. Exterior Side of Foundation Walls and Retaining Walls Over Granular Filter Material and Foundation Perimeter Drainage: Type A or Type D fill, to subgrade elevation, each lift compacted to 90 percent.

**END OF SECTION**

## **SECTION 024119 SELECTIVE DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

- 1. Demolition and removal of selected portions of building or structure.
  - 2. Demolition and removal of selected site elements.
  - 3. Salvage of existing items to be reused or recycled.

- B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
  - 2. Section 015639 "Temporary Tree and Plant Protection" for temporary protection of existing trees and plants that are affected by selective demolition.
  - 3. Section 017300 "Execution" for cutting and patching procedures.
  - 4. Section 013516 "Alteration Project Procedures" for general protection and work procedures for alteration projects.

#### **1.3 DEFINITIONS**

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

#### 1.5 PRE-INSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review structural load limitations of existing structure.
  - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
  - 5. Review areas where existing construction is to remain and requires protection.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Use of elevator and stairs.
  - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- E. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused

by demolition operations. Comply with Section 013233 "Photographic Documentation."  
Submit before Work begins.

- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

## 1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

## 1.8 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

## 1.9 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  - 1. Before selective demolition, Owner will remove the following items:
    - a. Furniture
    - b. Artwork
    - c. Window Treatment
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. Hazardous materials will be removed by Owner before start of the Work.
  - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

- E. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
  - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
  - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
  - 3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.
- F. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.
- G. Storage or sale of removed items or materials on-site is not permitted.
- H. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

#### 1.10 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

#### 1.11 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

- B. Standards: Comply with ASSE A10.6 and NFPA 241.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
  - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings preconstruction photographs or video and templates.
  - 1. Comply with requirements specified in Section 013233 "Photographic Documentation."
  - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
  - 3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

### **3.2 PREPARATION**

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

### 3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. Arrange to shut off utilities with utility companies.
  - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

### 3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

### 3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  5. Maintain fire watch during and for at least two (2) hours after flame-cutting operations.
  6. Maintain adequate ventilation when using cutting torches.
  7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  10. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.



- C. Work in Historic Areas: Selective demolition may be performed only in areas of Project that are not designated as historic. In historic spaces, areas, and rooms, or on historic surfaces, the terms "demolish" or "remove" shall mean historic "removal" or "dismantling" as specified in Section 024296 "Historic Removal and Dismantling."
- D. Removed and Salvaged Items:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.
- E. Removed and Reinstalled Items:
  - 1. Clean and repair items to functional condition adequate for intended reuse.
  - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  - 3. Protect items from damage during transport and storage.
  - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

### 3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

- F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Sections for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

### 3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction, and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

- B. Burning: Do not burn demolished materials.

### 3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

### 3.9 SELECTIVE DEMOLITION SCHEDULE

- A. Not Used.

**END OF SECTION**

## **SECTION 033000**

### **CAST-IN-PLACE CONCRETE**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### **1.2 SUMMARY**

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

##### **1.3 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

##### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

##### **1.5 INFORMATIONAL SUBMITTALS**

- A. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.

2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Curing compounds.
6. Floor and slab treatments.
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

C. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

E. Field quality-control reports.

## 1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

## 1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows:
  - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

## PART 2 - PRODUCTS

### 2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301 (ACI 301M).
  - 2. ACI 117 (ACI 117M).

## 2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
  - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. High-density overlay, Class 1 or better.
    - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
    - c. Structural 1, B-B or better; mill oiled and edge sealed.
    - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
  - 3. Overlaid Finish birch plywood.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- H. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## 2.3 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60 (Grade 420) deformed bars, assembled with clips.
- D. Deformed-Steel Wire: ASTM A 1064/A 1064M.
- E. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- F. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.

## 2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
  2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
  3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

## 2.5 CONCRETE MATERIALS

- A. Regional Materials: Concrete shall be manufactured within 500 miles (800 km) of Project site from aggregates and cementitious materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

C. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I white.
2. Fly Ash: ASTM C 618, Class F.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

D. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

E. Air-Entraining Admixture: ASTM C 260/C 260M.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

G. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

H. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

I. Water: ASTM C 94/C 94M and potable.

2.6 VAPOR RETARDERS

A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.



## 2.7 FLOOR AND SLAB TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
  - 1. Liquid floor treatments shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.8 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

## 2.9 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, according to ASTM D 2240.
- C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

## 2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## 2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 (ACI 301M).
  1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  1. Fly Ash: 25 percent.
  2. Combined Fly Ash and Pozzolan: 25 percent.
  3. Slag Cement: 50 percent.
  4. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
  5. Silica Fume: 10 percent.
  6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
  7. Combined Fly Ash or Pozzolans, Slag Cement, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
  1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
  4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

## 2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Normal-weight concrete.

1. Minimum Compressive Strength: 3500 psi (20.7 MPa) at 28 days.
2. Maximum W/C Ratio: 0.40.
3. Slump Limit: 4 inches (100 mm) before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch (25 mm).
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.

B. Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Maximum W/C Ratio: 0.35.
3. Minimum Cementitious Materials Content: 540 lb/cu. yd. (320 kg/cu. m).
4. Slump Limit: 4 inches (100 mm) plus or minus 1 inch (25 mm).
5. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.

## 2.13 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.14 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

## **PART 3 - EXECUTION**

### **3.1 FORMWORK INSTALLATION**

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures as indicated.

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.4 VAPOR-RETARDER INSTALLATION

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

### 3.5 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
  - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into

concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

- D. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.7 WATERSTOP INSTALLATION

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

### 3.8 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M).
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

### 3.9 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.

1. Apply scratch finish to surfaces indicated.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces indicated.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces indicated.
  2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
    - a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.
  3. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.
1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- G. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions and as follows:
1. Uniformly apply dry-shake floor hardener at a rate as recommended by manufacturer.
  2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
  3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.



### 3.10 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

### 3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 (ACI 301M) for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

- b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
  - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
- 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
- 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### 3.12 LIQUID FLOOR TREATMENT APPLICATION

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
  - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  - 2. Do not apply to concrete as per manufacturers recommendations.
  - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

### 3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.
  - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.15 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
1. Steel reinforcement placement.
  2. Steel reinforcement welding.
  3. Headed bolts and studs.
  4. Verification of use of required design mixture.
  5. Concrete placement, including conveying and depositing.
  6. Curing procedures and maintenance of curing temperature.
  7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
  - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.
  - a. Cast and laboratory cure three sets of two standard cylinder specimens for each composite sample.
  - b. Cast and field cure three sets of two standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days, one set of two specimens at 28 days and one set of two specimens at 56 days.
  - a. Test one set of two field-cured specimens at 7 days one set of two specimens at 28 days and one set of two specimens at 56 days.
  - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name

of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
  13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
  14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 24 hours of finishing.

### 3.16 PROTECTION OF LIQUID FLOOR TREATMENTS

- A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

### END OF SECTION

**SECTION 035410**  
**GYPSUM CEMENT UNDERLAYMENT**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes gypsum-cement-based, self-leveling underlayment for application below interior floor coverings.

**1.3 ALLOWANCES**

- A. Furnish gypsum-cement-based underlayment as part of underlayment allowance.
- B. Furnish and install gypsum-cement-based underlayment as part of underlayment allowance.

**1.4 UNIT PRICES**

- A. Work of this Section is affected by underlayment unit price.

**1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.

**1.6 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: Signed by manufacturers of underlayment and floor-covering systems certifying that products are compatible.
- C. Minutes of pre-installation conference.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.
- B. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.
- C. Fire-Resistance Ratings: Where indicated, provide gypsum-cement underlayment systems identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- D. Sound Transmission Characteristics: Where indicated, provide gypsum-cement underlayment systems identical to those of assemblies tested for STC and IIC ratings per ASTM E 90 and ASTM E 492 by a qualified testing agency.
- E. Pre-installation Conference: Conduct conference at Project site

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

## 1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
  - 1. Place gypsum-cement-based underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

## 1.10 COORDINATION

- A. Coordinate application of underlayment with requirements of floor-covering products and adhesives, to ensure compatibility of products.



## PART 2 - PRODUCTS

### 2.1 GYPSUM-CEMENT-BASED UNDERLAYMENTS

- A. Underlayment: Gypsum-cement-based, self-leveling product that can be applied in minimum uniform thickness of 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C 219.
  - 2. Compressive Strength: Not less than 5000 psi (27.6 MPa) at 28 days when tested according to ASTM C 109/C 109M.
  - 3. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.
  - 1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
  - 1. Primer shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D.
  - 2. Primer shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- F. Corrosion-Resistant Coating: Recommended in writing by underlayment manufacturer for metal substrates.
  - 1. Coating shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D.
  - 2. Coating shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for conditions affecting performance.
  - 1. Proceed with application only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
  - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
  - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
  - 1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m) in 24 hours.
- C. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.
  - 1. Install underlayment reinforcement recommended in writing by manufacturer.
- D. Metal Substrates: Mechanically remove, according to manufacturer's written instructions, rust, foreign matter, and other contaminants that might impair underlayment bond. Apply corrosion-resistant coating compatible with underlayment if recommended in writing by underlayment manufacturer.
- E. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces according to manufacturer's written instructions.
- F. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

### 3.3 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
  - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
  - 2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
  - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply underlayment to produce uniform, level surface.
  - 1. Apply a final layer without aggregate to product surface.
  - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Install a clear, water base, vinyl acrylic co-polymer sealer on existing and cured new underlayment according to manufacturer's written instructions where given down finish floor is specified.
- G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

### 3.4 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

**END OF SECTION**

## **SECTION 040650 MASONRY MORTAR AND GROUT**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Mortar for masonry.
  - 2. Grout for masonry.

#### **1.2 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Samples: Submit two samples of mortar, illustrating each type mortar color and color range.
- C. Product Data: mortar for brick. Color to match existing adjacent.
- D. Manufacturer's Installation Instructions: Submit premix mortar manufacturer's installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

#### **1.3 QUALITY ASSURANCE**

- A. Perform Work in accordance with the MSJC Code and MSJC Specification.

#### **1.4 ENVIRONMENTAL REQUIREMENTS**

- A. Section 016000 - Product Requirements.
- B. Hot and Cold Weather Requirements: Comply with applicable code requirements.

### **PART 2 PRODUCTS**

#### **2.1 MATERIALS**

- A. Portland Cement: ASTM C150, Types and cement colors as required to match existing mortars for brickwork.
- B. Mortar Aggregate: ASTM C144, standard masonry type.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Grout Aggregate: ASTM C404, fine and coarse.

- E. Water: Clean and potable.
- F. Mortar Type: Ready mixed ASTM C1142. Site mixed ASTM C270.
- G. Masonry Grout: ASTM C94 or ASTM C476.
- H. Mortar Color: Mineral oxide pigment; colors to match existing mortars for brickwork.
  - 1. Solomon Grind-Chem Services; SGS Mortar Colors.
  - 2. Frank D. Davis Company; True Tone Mortar.
  - 3. Bayer Corporation, Industrial Chemicals Div.
  - 4. Substitutions: Section 016000 - Product Requirements.
- I. Water Repellent: Dry Block manufactured by Grace Construction Products.
- J. Bonding Agent: Latex type.
- K. Calcium chloride is not permitted.

## 2.2 MIXES

- A. Mortar Mixes: Types and cement colors as required to match existing mortars for brickwork.
- B. Mortar Mixing:
  - 1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
  - 2. Achieve uniformly damp sand immediately before the mixing process.
  - 3. Add mortar admixtures. Provide uniformity of mix and coloration.
  - 4. Re-temper only within two hours of mixing.
- C. Masonry Grout Mixes:
  - 1. Grout for Masonry: 3,000 psi strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476.
    - a. Coarse Grout: For grouting spaces with minimum 4 inch dimension in every direction.
    - b. Fine Grout: For grouting other spaces.
- D. Grout Mixing:
  - 1. Transit Mixed Grout: Mix grout in accordance with ASTM C94, modified to use ingredients complying with ASTM C476.
  - 2. Site Mixed Grout: Mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476.
  - 3. Add admixtures; mix uniformly.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Request inspection of spaces to be grouted.

### **3.2 PREPARATION**

- A. Apply bonding agent as required to existing surfaces.

### **3.3 INSTALLATION**

- A. Install mortar and grout to requirements of Section 048100.

### **3.4 FIELD QUALITY CONTROL**

- A. Section 01400 - Quality Requirements: Testing and Inspection Services.
- B. Establishing Mortar Mix: In accordance with ASTM C270.

### **3.5 SCHEDULES**

- A. Exterior Brick Wall: Mortar Type suitable for application.

## **END OF SECTION**

## **SECTION 042200 CONCRETE UNIT MASONRY**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Concrete masonry units.
  - 2. Mortar and grout.
  - 3. Steel reinforcing bars.
  - 4. Masonry-joint reinforcement.
  - 5. Embedded flashing.
  - 6. Miscellaneous masonry accessories.
- B. Related Requirements:
  - 1. Section 071900 "Water Repellents" for water repellents applied to unit masonry assemblies.
  - 2. Section 076200 "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

#### **1.3 DEFINITIONS**

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

#### **1.4 PREINSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at Project site.

#### **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.

2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
  1. Masonry units.
    - a. Include data on material properties.
    - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
  2. Integral water repellant used in CMUs.
  3. Cementitious materials. Include name of manufacturer, brand name, and type.
  4. Mortar admixtures.
  5. Pre-blended, dry mortar mixes. Include description of type and proportions of ingredients.
  6. Grout mixes. Include description of type and proportions of ingredients.
  7. Reinforcing bars.
  8. Joint reinforcement.
  9. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
  2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

## 1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.



## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver pre-blended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.9 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect the base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

### **2.2 PERFORMANCE REQUIREMENTS**

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
  1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
  2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

### **2.3 UNIT MASONRY, GENERAL**

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
  1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

## 2.4 CONCRETE MASONRY UNITS

- A. Regional Materials: CMUs shall be manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Provide square-edged units for outside corners unless otherwise indicated.
  - 3. Provide bullnose-edge unit for outside corners that are left exposed as finish material.
- C. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
  - 1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514/E 514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
- D. CMUs: ASTM C 90.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi (19.3 MPa).
  - 2. Density Classification: Normal weight.
  - 3. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less-than-nominal dimensions.
  - 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
  - 5. Faces To Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

## 2.5 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Aggregate for mortar and grout, cement, and lime shall be extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
  - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C 91/C 91M.
- F. Mortar Cement : ASTM C 1329/C 1329M.
- G. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.
- H. Aggregate for Mortar: ASTM C 144.
  - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  - 2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
  - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- I. Aggregate for Grout: ASTM C 404.
- J. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for glazed or pre-faced masonry units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's colors.
- K. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- L. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
- M. Water: Potable.

## 2.6 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

- C. Masonry-Joint Reinforcement, General: Truss type complying with ASTM A 951/A 951M.
1. Exterior Walls: Hot-dip galvanized carbon steel.
  2. Wire Size for Side Rods: 0.187-inch (4.76-mm) diameter.
  3. Wire Size for Cross Rods: 0.187-inch (4.76-mm) diameter.
  4. Spacing of Cross Rods: Not more than 16 inches (407 mm) o.c.
  5. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

## 2.7 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into masonry but with at least a 5/8-inch (16-mm) cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 641/A 641M, Class 1 coating.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Tie Section: Triangular-shaped wire tie made from 0.25-inch- (6.35-mm-) diameter, stainless steel wire.
    - a. Hohmann & Barnard, Inc: Thermal Concrete 2-Seal Wing Nut Anchor

## 2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" Section 076200 "Sheet Metal Flashing and Trim" and as follows:
1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch (0.40 mm) thick.
  2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. (4.9-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. (3.7-kg/sq. m) weight or 0.0162 inch (0.41 mm) thick.
  3. Prefinished galvanized steel: 0.0276 (0.70 mm) thick.
  4. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
  5. Fabricate through-wall metal flashing embedded in masonry from [stainless steel] [copper], with ribs at 3-inch (76-mm) intervals along length of flashing to provide an integral mortar bond.
  6. Delete first subparagraph below if referencing Section 076200 "Sheet Metal Flashing and Trim" or if not required.

7. Fabricate through-wall flashing with snap-lock receiver on exterior face where indicated to receive counter-flashing.
8. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
9. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch (19 mm) at exterior face of wall and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
10. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 4 inches (101.6 mm) into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam sheds water.
11. Fabricate metal drip edges from stainless steel. Extend at least 4 inches (101.6 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
12. Fabricate metal sealant stops from stainless steel. Extend at least 4 inches (101.6 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
13. Fabricate metal expansion-joint strips from stainless steel copper to shapes indicated.
14. Solder metal items at the corners.
15. Joint lap 4" min. and solder.

## 2.9 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  1. Do not use calcium chloride in mortar or grout.
  2. Use Portland cement-lime mortar unless otherwise indicated.
  3. For exterior masonry, use Portland cement-lime mortar.
  4. For reinforced masonry, use Portland cement-lime mortar.
  5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Pre-blended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a pre-blended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  1. For masonry below grade or in contact with earth, use Type M.
  2. For reinforced masonry, use Type S.

3. For mortar parge coats, use Type S.
  4. For exterior, above-grade, load-bearing and non-load-bearing walls, and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
  5. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
  2. Proportion grout in accordance with ASTM C 476, Table 1.
  3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.
- E. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.
1. Application: Use epoxy pointing mortar for exposed mortar joints with pre-faced CMUs.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
  4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION, GENERAL**

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

### 3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm).

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).



### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches (100 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
  - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
  2. Wet joint surfaces thoroughly before applying mortar.
  3. Rake out mortar joints for pointing with sealant.
- D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch (6 mm) and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- F. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- G. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

### 3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
1. Space reinforcement not more than 16 inches (406 mm) o.c.
  2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
  3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by the manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### 3.7 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall

- flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape.
2. At lintels, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
  3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  4. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
  6. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
  7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

### 3.8 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

### 3.9 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
  1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- I. Prism Test: For each type of construction provided, according to ASTM C 1314 at 28 days.

### 3.10 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of 3/4 inch (19 mm). Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3 mm per 300 mm). Form a wash at top of parging and a cove at bottom.

- C. Damp-cure parging for at least 24 hours and protect parging until cured.

### 3.11 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel un-cleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

### 3.12 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
  - 1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
  - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
  - 3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

**END OF SECTION**

## **SECTION 042610 MASONRY VENEER**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

- 1. Clay face brick.
- 2. Mortar.
- 3. Ties and anchors.
- 4. Embedded flashing.
- 5. Miscellaneous masonry accessories.

- B. Products Installed but not Furnished under This Section:

- 1. Steel lintels in masonry veneer.
- 2. Steel shelf angles for supporting masonry veneer.

- C. Related Requirements:

- 1. Section 033000 "Cast-in-Place Concrete" for installing dovetail slots for masonry-veneer anchors.
- 2. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
- 3. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

#### **1.3 DEFINITIONS**

- A. CMU(s): Concrete masonry unit(s).

#### **1.4 PREINSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at Project site.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Verification: For each type and color of the following:
  - 1. Clay face brick, in the form of straps of five or more bricks.
  - 2. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
  - 3. Weep holes and vents.
  - 4. Accessories embedded in masonry.

## 1.6 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
  - 1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Material Certificates: For each type and size of the following:
  - 1. Masonry units.
    - a. Include data on material properties material test reports substantiating compliance with requirements.
    - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
    - d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing according to ASTM C 67 or a list of addresses of buildings in Project's area where proposed brick has been used successfully and with a history of durability.
  - 2. Integral water repellent used in decorative CMUs.
  - 3. Cementitious materials. Include name of manufacturer, brand name, and type.
  - 4. Mortar admixtures.
  - 5. Pre-blended, dry mortar mixes. Include description of type and proportions of ingredients.
  - 6. Anchors, ties, and metal accessories.



- C. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.
  - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
- D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

## 1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Build mockup of typical wall area as shown on Drawings.
  - 2. Build mockups for each type of exposed unit masonry construction typical exterior wall in sizes approximately 48 inches (1200 mm) high by full thickness, including face and backup wythes and accessories.
    - a. Include a sealant-filled joint at least 16 inches (400 mm) long in each mockup.
    - b. Include lower corner of window opening, framed with stone trim, at upper corner of exterior wall mockup. Make opening approximately 12 inches (300 mm) wide by 16 inches (400 mm) high.
    - c. Include through-wall flashing installed for a 24-inch (600-mm) length in corner of exterior wall mockup approximately 16 inches (400 mm) down from top of mockup, with a 12-inch (300-mm) length of flashing left exposed to view (omit masonry above half of flashing).
    - d. Include metal wood studs, sheathing, water-resistive barrier sheathing joint-and-penetration treatment air barrier, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.
  - 3. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
  - 4. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
  - 5. Protect accepted mockups from the elements with weather-resistant membrane.
  - 6. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

7. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver pre-blended, dry mortar mix in moisture-resistant containers. Store pre-blended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.9 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of veneer, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  1. Extend cover a minimum of 24 inches (600 mm) down face of veneer, and hold cover securely in place.
- B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry. Immediately remove grout, mortar, and soil that come in contact with masonry.
  1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  2. Protect sills, ledges, and projections from mortar droppings.
  3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

### **2.2 UNIT MASONRY, GENERAL**

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed Work and will be within 20 feet (6 m) vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

### **2.3 BRICK**

- A. Regional Materials: Brick shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
  1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.

3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
  4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- C. Clay Face Brick: Facing brick complying with ASTM C 216 or hollow brick complying with ASTM C 652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area).
1. Where shown to "match existing," provide clay face brick matching color range, texture, and size of existing adjacent brickwork.

## 2.4 MORTAR MATERIALS

- A. Regional Materials: Aggregate for mortar, cement, and lime shall be extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C 91/C 91M.
- F. Mortar Cement: ASTM C 1329/C 1329M.
- G. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.
- H. Colored Cement Products: Packaged blend made from Portland cement and hydrated lime masonry cement or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
1. Colored Portland Cement-Lime Mix:
  2. Colored Masonry Cement:
  3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
  4. Pigments shall not exceed 10 percent of Portland cement by weight.
  5. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.

- I. Aggregate for Mortar: ASTM C 144.
  - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  - 2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
  - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- J. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- K. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
- L. Water: Potable.

## 2.5 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, stainless-steel wire.
  - 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Tie Section: Triangular-shaped wire tie made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
- E. Adjustable Masonry-Veneer Anchors:
  - 1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf (445-N) load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch (1.5 mm).

2. Fabricate wire ties from 0.187-inch- (4.76-mm-) 0.25-inch- (6.35-mm-) diameter, hot-dip galvanized-steel wire unless otherwise indicated.
3. Fabricate wire connector sections from 0.187-inch- (4.76-mm-) 0.25-inch- (6.35-mm-) diameter, hot-dip galvanized, carbon steel wire.
4. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with a projecting vertical tab having a slotted hole for inserting wire tie.
5. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section.
6. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches (32 mm) wide by 9 inches (229 mm) long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch (16 mm) wide by 5-1/2 inches (140 mm) long, stamped into center to provide a slot between strap and base for inserting wire tie.
7. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches (32 mm) wide by 6 inches (152 mm) long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch (16 mm) wide by 3-5/8 inches (92 mm) long, stamped into center to provide a slot between strap and base for inserting wire tie.
8. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, 1-1/4 inches (32 mm) wide by 6 inches (152 mm) long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch (16 mm) wide by 6 inches (152 mm) long, stamped into center to provide a slot between strap and base for inserting wire tie. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs.
9. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing.
10. Seismic Masonry-Veneer Anchors: Connector section and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having slotted holes for inserting vertical leg of connector section. Connector section consists of a rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire.
11. Seismic Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having

holes for inserting vertical legs of wire tie. Wire tie has sheet metal clip welded to it with integral tabs designed to engage continuous wire.

12. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83-mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B 117.
13. Stainless-Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83-mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads; either made from Type 410 stainless steel or made with a carbon-steel drill point and 300 Series stainless-steel shank.

## 2.6 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" Section 076200 "Sheet Metal Flashing and Trim" and as follows:

1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch (0.40 mm) thick.
2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. (4.9-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. (3.7-kg/sq. m) weight or 0.0162 inch (0.41 mm) thick.
3. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
4. Fabricate through-wall metal flashing embedded in masonry from stainless steel copper, with ribs at 3-inch (76-mm) intervals along length of flashing to provide an integral mortar bond.
5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
6. Fabricate through-wall flashing with drip edge where unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
7. Fabricate through-wall flashing with sealant stop where unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch (19 mm) at exterior face of wall and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
8. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches (76 mm) into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam sheds water.
9. Fabricate metal drip edges from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.

10. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches (76 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
  11. Fabricate metal expansion-joint strips from stainless steel copper to shapes indicated.
  12. Solder metal items at corners.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:
1. Copper-Laminated Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) 7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
  2. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) 7-oz./sq. ft. (2-kg/sq. m) copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
  3. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.030 inch (0.76 mm) 0.040 inch (1.02 mm).
    - a. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
- C. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60 Grade Sn96, with acid flux of type recommended by stainless-steel sheet manufacturer.
  2. Solder for Copper: ASTM B 32, Grade Sn50 with maximum lead content of 0.2 percent.
  3. Elastomeric Sealant: ASTM C 920, chemically curing urethane polysulfide silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- E. Termination Bars for Flexible Flashing: Aluminum Stainless steel steel bars 0.075 inch by 1 inch (1.9 mm by 25 mm) 1/8 inch by 1 inch (3 mm by 25 mm).
- F. Termination Bars for Flexible Flashing: Stainless steel sheet 0.019 inch by 1-1/2 inches (0.48 mm by 38 mm) with a 3/8 inch (9.5 mm) sealant flange at top.
- G. Termination Bars for Flexible Flashing: Aluminum sheet 0.064 inch by 1-1/2 inches (01.6 mm by 38 mm) with a 3/8 inch (9.5 mm) sealant flange at top.



## 2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.
- B. Weep/Vent Products: Use one of the following unless otherwise indicated:
  - 1. Aluminum Weep Hole/Vent: Units made from sheet aluminum, designed to fit into a head joint and consisting of a vertical channel, with louvers stamped in web and with a top flap to keep mortar out of the head joint; factory primed and painted before installation to comply with Section 099113 "Exterior Painting" in color selected by Architect.
  - 2. Vinyl Weep Hole/Vent: Units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color selected by Architect.
- C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  - 1. Configuration: Provide one of the following:
    - a. Strips, full depth of cavity and 10 inches (250 mm) high, with dovetail-shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.
    - b. Strips, not less than 3/4 inch (19 mm) 1-1/2 inches (38 mm) thick and 10 inches (250 mm) high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
    - c. Sheets or strips, full depth of cavity and installed to full height of cavity.
    - d. Sheets or strips not less than 3/4 inch (19 mm) 1 inch (25 mm) thick and installed to full height of cavity with additional strips 4 inches (100 mm) high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.

## 2.8 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

## 2.9 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
  2. Use Portland cement-lime masonry cement or mortar cement mortar unless otherwise indicated.
  3. For exterior masonry, use Portland cement-lime masonry cement or mortar cement mortar.
  4. For reinforced masonry, use Portland cement-lime masonry cement or mortar cement mortar.
  5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Pre-blended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a pre-blended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Property Specification. Use Type N unless another type is indicated.
1. For masonry below grade or in contact with earth, use Type M Type S.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of Portland cement by weight.
  2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
  3. Mix to match Architect's sample.
  4. Application: Use pigmented mortar for exposed mortar joints.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Mix to match Architect's sample.
  2. Application: Use colored aggregate mortar for exposed mortar joints.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- D. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- E. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- F. Tooth in brick when infilling existing openings.

### 3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
  - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
  - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
  - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
  - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
  - 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
  - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.
6. Match existing joints U.N.O.

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond stack bond one-third running bond Flemish bond English bond bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- B. Lay hollow brick and CMUs with face shells fully bedded in mortar and with head joints of depth equal to bed joints. At starting course, fully bed entire units, including area under cells.
  - 1. At anchors and ties, fully bed units and fill cells with mortar as needed to fully embed anchors and ties in mortar.
- C. Set stone cast-stone trim units in full bed of mortar with full vertical joints.
  - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
  - 2. Allow cleaned surfaces to dry before setting.
  - 3. Wet joint surfaces thoroughly before applying mortar.
  - 4. Rake out mortar joints for pointing with sealant.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
  - 1. For glazed masonry units, use a nonmetallic jointer 3/4 inch (19 mm) or more in width.

### 3.6 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and concrete and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:
  - 1. Fasten screw-attached and seismic anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  - 2. Embed tie sections connector sections and continuous wire in masonry joints.
  - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  - 4. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, with not less than one anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.
  - 5. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 25 inches (635 mm) o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. (0.25 sq. m) 3.5 sq. ft. (0.33 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

6. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and horizontally. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 24 inches (610 mm), around perimeter.
- B. Provide not less than 2 inches (50 mm) 1 inch (25 mm) <Insert distance> of airspace between back of masonry veneer and face of sheathing insulation.
  1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

### 3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete to comply with the following:
  1. Provide an open space not less than 1/2 inch (13 mm) 1 inch (25 mm) 2 inches (50 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
  3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

### 3.8 EXPANSION JOINTS

- A. General: Install expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form expansion joints as follows:
  1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches (100 mm) in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
  2. Build flanges of factory-fabricated, expansion-joint units into masonry.
  3. Build in compressible joint fillers where indicated.
  4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Section 07920 "Joint Sealants."
- C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch (10 mm).
  1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

### 3.9 LINTELS

- A. Install steel lintels where indicated.
- B. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

### 3.10 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under water-resistive barrier air barrier, lapping at least 4 inches (100 mm). Fasten upper edge of flexible flashing to sheathing through termination bar.
  - 3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
  - 4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  - 5. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  - 6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
  - 7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
  - 8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

- D. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.
  - 1. Use specified weep/vent products or open-head joints to form weep holes.
  - 2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
  - 3. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.
  - 4. Space weep holes formed from plastic tubing or wicking material 16 inches (400 mm) o.c.
  - 5. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
  - 6. Trim wicking material flush with outside face of wall after mortar has set.
- E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products or open-head joints to form vents.
  - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

### 3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
- C. Testing Prior to Construction: One set of tests.
- D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.



### 3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry and entire portion of wall where new brick was infilled. as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
  - 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
  - 7. Clean stone trim to comply with stone supplier's written instructions.
  - 8. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

### 3.13 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
  - 1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
  - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
  - 3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.

- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

**END OF SECTION**

## **SECTION 051200 STRUCTURAL STEEL FRAMING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Structural steel.
  - 2. Grout.
- B. Related Sections:
  - 1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.

#### **1.3 DEFINITIONS**

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, to withstand loads indicated and comply with other information and restrictions indicated.
  - 1. Select and complete connections using schematic details indicated and AISC 360.
  - 2. Use ASD; data are given at service-load level.

#### **1.5 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pre-tensioned and slip-critical high-strength bolted connections.
5. Indicate on shop drawings the capacity of the proposed connection at ends of beam.
6. Identify demand critical welds.

C. Welding certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.
6. Non-shrink grout.

F. Source quality-control reports.

## 1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

B. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

## 1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

- B. Store fasteners in a protected place in sealed containers with the manufacturer's labels intact.
  - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
  - 2. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
  - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

## 1.8 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

## PART 2 - PRODUCTS

### 2.1 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angles: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 572/A 572M, Grade 50.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Welding Electrodes: Comply with AWS requirements.

### 2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
  - 1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.
- B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
  - 1. Finish: Plain.
- C. Headed Anchor Rods: ASTM A 36/A 36M].

1. Configuration: Straight
2. Nuts: ASTM A 563 heavy-hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436, Type 1, hardened carbon steel.
5. Finish: Plain.

D. Threaded Rods: ASTM A 36/A 36M.

1. Nuts: ASTM A 563 hex carbon steel.
2. Washers: ASTM A 36/A 36M carbon steel.
3. Finish: Plain.

## 2.3 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanizing Repair Paint: ASTM A 780.
- C. Intumescent Fireproofing: Where intumescent fireproofing is scheduled steel shall be prepared to the following:
  1. Galvanized Steel: SSPC-SP7 with a 37-50 micron angular profile.
  2. Other Steel: SSPC-SP6 with a minimum 37-50 micron angular profile.
  3. Primers shall be as specified in Section 09 96 46.

## 2.4 GROUT

- A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

## 2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
  1. Camber structural-steel members where indicated.
  2. Fabricate beams with rolling camber up.
  3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
  4. Mark and match-mark materials for field assembly.
  5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
  1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
  3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

## 2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

## 2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
  1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
  2. Surfaces to be field welded.
  3. Surfaces to be high-strength bolted with slip-critical connections.
  4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
  5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  1. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5

mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

## 2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize exterior dunnage for roof top equipment.
3. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls.

## 2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

- B. Correct deficiencies in Work that test reports and inspections indicate do not comply with the Contract Documents.

- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.



### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedment's for compliance with requirements.
  - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedment's showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
  - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

#### **3.3 ERECTION**

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base, Bearing, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
  - 2. Weld plate washers to top of baseplate.
  - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.
  - 2. Make allowances for difference between temperature at time of erection and mean

temperature when structure is completed and in service.

- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M].
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

### 3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
  - 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
  - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.
  - 1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    - c. Ultrasonic Inspection: ASTM E 164.
    - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
  - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.

2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

### 3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

**END OF SECTION**

## **SECTION 053100 - STEEL DECKING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Floor Deck
- B. Related Requirements:
  - 1. Division 03 Section "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
  - 2. Division 05 Section "Structural Steel Framing" for shop- and field-welded shear connectors.
  - 3. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
  - 4. Division 09 painting Sections for repair painting of primed deck and finish painting of deck.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of deck, accessory, and product indicated.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Welding certificates.
- B. Product Certificates: For each type of steel deck.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
  - 1. Power-actuated mechanical fasteners.

## 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."
- C. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
  - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

# PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Conform to SDI specifications.

## 2.2 FLOOR DECK

- A. Non-composite Steel Form Deck: Fabricate ribbed-steel sheet non-composite form-deck panels to comply with "SDI Specifications and Commentary for Non-composite Steel Form Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:
  - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) G90 (Z275) zinc coating.

2. Profile Depth: As indicated
3. Select one steel thickness from subparagraph below or revise to suit Project.
4. Design Uncoated-Steel Thickness: As shown on drawings.
5. Span Condition: span or more.
6. Side Laps: Overlapped.

## 2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.
- D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- E. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.
- F. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and level recessed pans of 1-1/2-inch (38-mm) minimum depth. For drains, cut holes in the field.
- G. Galvanizing Repair Paint ASTM A 780 with dry film containing a minimum of 94 percent zinc dust by weight].
- H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

### 3.3 FLOOR-DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
  - 1. Weld Diameter: 5/8 inch (16 mm), nominal.
  - 2. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches (305 mm) apart, but not more than 18 inches (457 mm) apart.
  - 3. Weld Spacing: Space and locate welds as indicated.
  - 4. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches (910 mm), and as follows:
  - 1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.
  - 2. Mechanically clinch or button punch.
  - 3. Fasten with a minimum of 1-1/2-inch- (38-mm-) long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
  - 1. End Joints: Lapped.

- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.
- F. Install piercing hanger tabs at 14 inches (355 mm) apart in both directions, within 9 inches (228 mm) of walls at ends, and not more than 12 inches (305 mm) from walls at sides, unless otherwise indicated.

### 3.4 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

**END OF SECTION**



**SECTION 054100  
COLD FORMED METAL FRAMING**

**PART 1 GENERAL**

**1.01 SUMMARY:**

- A. Provide metal framing, consisting of cold formed structural members as shown on the Drawings, or needed for a complete and proper installation.

**1.02 Related Documents:**

- A. The following documents are a part of this specification and carry the same weight and force as if bound herein.
  - 1. AISC, Specification for Design of Light Gage, Cold-Formed Steel Structural Members.
  - 2. ASTM A 446, Grade A.
  - 3. Galvanizing, ASTM A 525, Designation G60.

**1.03 SUBMITTALS**

- A. Product data: Within 28 calendar days after Notice to Proceed, submit:
  - 1. Materials list of items proposed to be provided.
  - 2. Manufacturer's specifications and other related data.
  - 3. Shop Drawings showing layout of framing, with details of framing conditions identifying materials, gages, fasteners, accessories, and welds.  
Note design criteria for walls, floors, and bracing.
  - 4. All connections and member sizes to be sealed by a registered professional engineer licensed in the state of the project and shall be solely responsible for same.

**1.04 QUALITY ASSURANCE**

- A. Use skilled workmen who are experienced in metal framing and the specified requirements and methods needed.
- B. When the materials of this Section are used as part of an assembly indicated on the Drawings in which fire-resistive construction ratings are required, demonstrate approval by Underwriters' Laboratories, Inc. and the governmental agencies

having jurisdiction. Note on the drawings the UL No. of the assembly to be employed.

- C. Testing of the structure shall be by an independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E329. The testing agency shall provide a certification of the integrality of the completed structure.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS:**

- A. Light gage metal framing members shall be the standard product of one of the following manufacturers:
  - 1. Marino-Ware, Div. of Ware Industries
  - 2. Incor Div. of Dale Industries
  - 3. Clark Steel Framing Systems
- B. All studs and/or joists and accessories shall be made of the type, size, gauge and spacing shown on the drawings.
- C. All structural members shall be designed in accordance with AISI Specifications and as shown on the Drawings, but no member shall be less than 18 ga.
- D. All structural members shall be formed from corrosion resistant, galvanized steel corresponding to the requirements of ASTM A 653, with a minimum yield strength of 50 ksi for SJ studs and grade A, 33 ksi for CR runners.

### **2.02 MISCELLANEOUS MATERIALS:**

- A. Sill-Sealer Gaskets on all exterior walls: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

## **PART 3 EXECUTION**

### **3.01 FABRICATION:**

- A. Prior to fabrication of framing, Contractor shall submit erection drawings to the Architect for approval.
- B. Prefabricated panels may be assembled off site or on site and shall be square with components attached in a manner to prevent racking and to minimize distortion while lifting and transporting.

- C. All framing components shall be cut square for attachment to perpendicular members or as required for an angular fit. All framing components shall be plumbed, aligned, and leveled.
- E. Fastening of components shall be by screw fasteners as shown on the Drawings and sufficient to develop the full strength of the member. At the option of the Contractor, fastening of components may be by fusion welding. Welds shall be designated by size and sufficient to develop the full strength of the member. Wire tying shall not be permitted. All welds shall be touched up with a zinc rich paint.
- F. Provided calculations signed and sealed by a registered engineer to substantiate the design of trusses and structural applications.
- G. Splices in framing components, other than runner tracks, shall not be permitted.
- H. Temporary bracing where required shall be provided until erection is complete.

### 3.02 INSTALLATION

- A. Axially loaded studs shall be installed so the ends are positioned against the inside of the runner track web prior to fastening and shall be attached to both flanges of the lower runner track.  
In all locations where structural roof deflection may occur,
- B. Complete, uniform and level bearing support shall be provided for the bottom runner.
- C. Resistance to bending and rotation about the minor axis shall be provided by horizontal strap and blocking or cold rolled channel bracing as detailed or as may be recommended by AISC Specifications
- D. Diagonal bracing shall be in accordance with AISC Specifications as indicated and shall be provided at locations designated, for frame stability and lateral load resistance. Additional members, when necessary, shall be provided to adequately resist the vertical component loads.
- E. Joists shall be located directly overbearing stud locations for load distribution.
- F. Web stiffeners shall be provided at reaction points and/or at points of concentrated loads.
- G. End blocking shall be provided where joist ends are not otherwise restrained from rotation.
- H. Half wall framing: Provide stiffening brackets at every stud properly secured into the floor structure below.

### 3.03 TOUCH-UP

- A. At completion of installation, and as a condition of its acceptance, visually inspect each item installed and locate surface damage.
  - 1. Touch up welds and abraded galvanized surfaces with zinc rich primer or other galvanized repair paint approved for the purpose.

**END OF SECTION**

## **SECTION 055000**

### **METAL FABRICATIONS**

#### **PART 1 GENERAL**

##### **1.1 SUMMARY**

- A. Steel sections includes shop fabricated metal items.
  - 1. Lintels.
  - 2. Ladders.
  - 3. Structural supports other miscellaneous attachments.
  - 4. Anchor bolts for sill plates and base plates.

##### **1.2 DESIGN REQUIREMENTS**

- A. Design vertical ladders and attachments to resist two 300 pounds loads, located between two consecutive supports.
  - 1. Rung Load: 300 pounds applied at center of rung.

##### **1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- C. All connections and member sizes to be sealed by a registered professional engineer licensed in the state of the project and shall be solely responsible for same.

##### **1.4 QUALIFICATIONS**

- A. Welders: AWS qualified within previous 12 months.
- B. Design ladders and structural supports under direct supervision of a professional engineer experienced in design of this work and licensed at the place where the Project is located.

##### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

##### **1.6 FIELD MEASUREMENTS**

- A. Verify field measurements prior to fabrication.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS - STEEL**

- A. Steel Sections: ASTM A992.
- B. Steel Tubing: ASTM A500, Grade C.
- C. Plates: ASTM A36.
- D. Pipe: ASTM A53, Grade C.
- E. Bolts, Nuts, and Washers: ASTM A325, galvanized to ASTM A153/A153M for galvanized components.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type II Organic zinc rich.

### **2.2 LINTELS**

- A. Lintels: Steel angles, size and configuration as shown on the Drawings, length to allow 8 inches minimum bearing on both sides of opening.
  - 1. Exterior Locations: Galvanized.
  - 2. Interior Locations: Prime paint, one coat.

### **2.3 LADDERS**

- A. Vertical Steel Ladders:
  - 1. Side Rails: Steel sections, 3/8 x 2 inches with following clear spacing between rails:
    - a. Other Ladders: 24 inches.
  - 2. Rungs: Steel solid rod; refer to details on drawings for sizes and configurations.
  - 3. Roof Ladder: Extend side rails minimum 42 inches above top rung/floor level.
  - 4. Mounting: Steel mounting brackets for bolted attachment to wall
  - 5. Clearance to Centerline of Rungs:
    - a. Minimum 7 inch clearance from wall.

### **2.4 STRUCTURAL SUPPORTS**

- A. Structural Supports: Steel sections, shape and size required to support applied loads with maximum deflection of 1/240 of the span. Shop prime, one coat.

### **2.5 ANCHOR BOLTS**

- A. Anchor Bolts: 3/4 inch bolt, standard J-hook, with nut and washer; F1554 GR 55

galv.

## 2.6 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## 2.9 FACTORY APPLIED FINISHES - STEEL

- A. Prepare surfaces to be primed in accordance with SSPC SP 2 or SP 3.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat except where galvanizing is specified.
- D. Galvanized Structural Steel Members: Galvanize after fabrication to ASTM A123. Provide minimum 1.25 oz/sq ft galvanized coating.
- E. Galvanized Non-structural Items: Galvanized after fabrication to ASTM A123. Provide minimum 1.25 oz/sq ft galvanized coating.

## 2.10 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that field conditions are acceptable and are ready to receive Work.

### 3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

### 3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.
- G. Finish paint steel components as specified in Section 09 90 00.

### 3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.
- C. Maximum Offset From True Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**



## **SECTION 055100 METAL STAIRS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Concrete Pan-filled Stairs
- B. Railing System

#### **1.02 RELATED SECTIONS**

- A. Railings not directly related to metal stairs are specified in Section 05 52 00 - Metal Railings.
- B. For stair nosings, see Section 05 50 00 - Metal Fabrications.

#### **1.03 MEASUREMENT AND PAYMENT**

- A. Measurement
  - 1. Metal stairs and related railings and handrails will be measured for payment by the lump-sum method, acceptably fabricated and installed. Top, bottom, and intermediate landings, and supporting steel will be included in the lump-sum measurement.
  - 2. Accessories, shop painting and field touchup, concrete, anchorage and grouting will not be measured separately for payment; such items will be considered incidental to the metal stairs installation.
- B. Payment: Metal stairs and related railings and handrails will be paid for at the Contract lump-sum price as indicated in the Bid Schedule of the Bid Form.

#### **1.04 REFERENCES**

- A. American Concrete Institute (ACI):
  - 1. ACI 117                      Standard Specifications for Tolerances for Concrete Construction and Materials
  - 2. ACI 301                     Standard Specifications for Structural Concrete
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM A36/A36M          Specification for Carbon Structural Steel
  - 2. ASTM A53                   Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
  - 3. ASTM A307                 Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength

4. ASTM A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
  5. ASTM A501 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
  6. ASTM A570/  
A570M Specification for Steel, Sheet and Strip, Carbon, Hot-  
Quality Rolled, Structural
  7. ASTM A611 Specification for Steel, Sheet, Carbon, Cold-Rolled, Structural  
Quality
  8. ASTM C33 Specification for Concrete Aggregates
- C. Steel Structures Painting Council (SSPC):
1. SSPC-SP 1 Solvent Cleaning
  2. SSPC-SP 3 Power Tool Cleaning

## **1.05 SUBMITTALS**

- A. General: Refer to Section 01 33 00 - Submittal Procedures, and Section 01 33 23 - Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Stair Design: Stairs shall be designed and engineered by the manufacturer, incorporating specified criteria, and employing a professional structural engineer currently registered in the State of the project to perform the design engineering. Include design data/calculations along with Shop Drawings. Drawings and design data/calculations shall be stamped and signed by the manufacturer's professional engineer.
- C. Shop Drawings: Submit fully detailed Shop Drawings of metal stairs and railings, showing sizes, details of fabrication and construction, methods of assembly, handrail brackets, locations of hardware, anchors, and accessories, and installation details. Design data/calculations must be included with the submittal shop drawings, or review/approval will not occur.
- D. Product Data: Submit manufacturer's product data of stair type and corrosion-inhibitive finish system. Include patterned or embossed treads, safety coated treads, railing system, handrails, and handrail brackets.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Type and Manufacture: Provide steel stairs of the following types as indicated:
1. Concrete Pan-Filled Stairs: Steel pan-type stairs with concrete-filled treads and landings, and with treads, risers, and platforms constructed of structural steel sheet. Treads shall have nosings.

2. Railing System: All stairs shall be provided with a complete stair railing system, including handrails and handrail brackets at walls, fabricated from steel pipe.
- B. Stringers and Supporting Steel:
1. Structural Shapes: Standard structural sections, as indicated, conforming to ASTM A36/A36M.
  2. Structural Tubing: Welded or seamless steel tubing, conforming to ASTM A500 or ASTM A501 (minimum yield point of 33,000 psi), of size and shape indicated.
- C. Treads and Risers, Platforms and Landings:
1. Steel Sheet: Treads, risers, and platforms shall be fabricated from structural steel sheet, of gage or thickness indicated, conforming with ASTM A570/A570M or ASTM A611, with minimum yield point of 33,000 psi, formed as indicated. When gage is not indicated, provide 14 gage steel sheet.
  2. Safety Coated Treads: Formed steel sheet coated with anti-skid or nonslip encapsulated aluminum oxide material bonded or fused to the steel surface. Submit product data and sample for approval.
- D. Railings and Handrails:
1. Pipe: Pipe for railings, pipe supports, and handrails shall be seamless steel pipe conforming to ASTM A53, Type S, Grade A, with special instructions to the manufacturer to provide Architectural Handrail Grade, of diameters and sizes indicated.
  2. Handrail Brackets: Provide handrail brackets for handrails at walls, manufactured specifically for the purpose of cast, forged, or wrought steel, of configuration indicated or required to suit conditions, galvanized after fabrication.
- E. Welding Rod/Electrodes: Refer to Section 05 05 22 - Metal Welding, for requirements.
- F. Anchors, Fasteners, and Accessories: Provide all required anchors, fasteners, miscellaneous components, and accessories as required for a complete and finished stair installation. Bolts, nuts, and washers shall conform with ASTM A307, galvanized in accordance with ASTM A153.
1. Expansion Bolts: Where anchors are not cast into the concrete construction, provide galvanized expansion type anchors with matching galvanized steel bolts or studs with nuts, of sizes as indicated or required. Provide washers under all bolt heads and nuts. Expansion bolts require approval of the Engineer before they may be installed in post-tensioned slabs. Expansion bolts will not be permitted for use on concrete curbs or along the edge of concrete or a concrete joint.
- G. Paint: Corrosion-inhibitive protective primer as specified in Article 2.04 herein.
- H. Grout: Refer to Section 03 61 11 - Non-Shrink Grout, for requirements.

## **2.02 FABRICATION**

- A. Metal stairs and railings shall be fabricated by firms or shops experienced and skilled in the construction of metal stairs and architectural railings. There shall be no exposed screws, bolts, and fasteners in the finished work.
- B. For items bearing on concrete, provide steel bearing plates and anchors as indicated or required. Base or bearing plates shall be leveled by means of adjustment nuts. The space below plates shall be packed solid with full bed of non-shrink grout. Templates shall be furnished, together with instructions for setting of anchors, anchor bolts, and bearing plates. The Contractor shall supervise and ensure that anchors and related items are properly set in concrete during the progress of the work.
- C. Welded connections shall be made in accordance with applicable requirements of Section 05 05 22 - Welding. Welding shall be performed in the shop, unless otherwise indicated. Welds where exposed to view shall be ground down and dressed smooth, so that the shape and profile of the item welded are maintained.
- D. Holes shall be cut, drilled, or punched at right angles to the surface of the metal and shall not be made or enlarged by burning. Holes in base or bearing plates shall be drilled. Holes shall be provided in members as required to permit connecting the work of other trades.
- E. Metal stairs and railings shall be prefabricated and preassembled in the factory or shop as far as practicable.

## **2.03 GALVANIZING**

- A. Where certain components are indicated to be galvanized, comply with galvanizing requirements of Section 05 50 00 - Metal Fabrications.

## **2.04 CLEANING AND PAINTING**

- A. Cleaning and painting shall conform to the requirements specified in Section 05 12 00 - Structural Steel Framing.
- B. All surfaces of metal stairs and railings, including surfaces of pan-filled stairs, shall be cleaned, and treated to assure maximum paint adherence, prior to application of the shop prime coat, in accordance with SSPC-SP 1 and SSPC-SP 3 as applicable for the exposure and application.
- C. Ferrous metalwork shall be given a shop coat of rust-inhibitive metal primer as specified in Section 05 12 00 - Structural Steel Framing, or other approved rust-inhibitive metal primer standard with the stair manufacturer. All surfaces of stairwork and railings shall be spray-painted.
- D. Where galvanized surfaces are indicated to be painted, comply with cleaning and painting requirements of Section 05 50 00 - Metal Fabrications.
- E. Coordinate with Section 09 91 00 - Painting, for compatibility of the prime coat and finish coats of paint.

## **2.05 CONCRETE**

- A. Concrete for pan-filled stair treads and landings shall be concrete, weighing not less than 120 pounds per cubic foot, with a minimum compressive strength at 28 days of 4,000 psi. Maximum aggregate size shall be 3/8 inch (ASTM C33, Size No. 8). Include a mix of aluminum oxide and silicone carbide grit particles as required to produce non-slip tread surfaces.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Stairs and railings shall be installed by the manufacturer or its authorized representative as indicated and in accordance with the approved Shop Drawings and the manufacturer's installation instructions. Stairs and railings shall be installed with all accessories furnished by the manufacturer or fabricator as required for complete and finished stair installations.
- B. Installation of stair work shall be true and horizontal or perpendicular as the case may be, level and square, with angles and edges parallel with related lines of the building or structure. Field verify all conditions and dimensions prior to installation, all field modification must be brought to the GC attention prior to making those modifications.
- C. Shop fabricated items subject to damage shall be braced and carefully handled to prevent distortions or other damage.
- D. Field welding, where required, shall conform with requirements specified for shop fabrication.
- E. Bearing plates shall be supported at the proper level by means of adjustment nuts on anchor bolts. Bases and plates shall be set accurately using a high-strength, non-shrink grouting mortar to obtain uniform bearing.

### **3.02 FIELD PAINTING**

- A. After installation, exposed painted surfaces, field welds, and other abraded or damaged primed surfaces shall be touched up with an additional coat of the same primer for ferrous surfaces as herein before specified for shop painting. Spray paint all touch-up work.
- B. Finish field painting is specified in Section 09 91 00 - Painting.

### **3.03 CONCRETE WORK**

- A. Concrete for pan-filled stairs shall be placed, compacted, finished, and cured in accordance with applicable requirements of ACI 301.
- B. Treads and landings shall receive a "troweled finish" in combination with a "nonslip finish" with "very flat" tolerances as specified in ACI 301 and ACI 117.

**END OF SECTION**

## **SECTION 055213 PIPE AND TUBE RAILINGS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Steel pipe and tube railings.
  - 2. Aluminum pipe and tube railings.
- B. Related Sections:
  - 1. Section 092216 "Non-Structural Metal Framing" for metal backing for anchoring railings.
  - 2. Section 061000 "Rough Carpentry" for wood blocking for anchoring railings.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
    - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 2. Infill of Guards:
    - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
    - b. Infill load and other loads need not be assumed to act concurrently.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Manufacturer's product lines of mechanically connected railings.
  - 2. Railing brackets.
  - 3. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes on stainless steel.
- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the state of the project responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

#### 1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
  - 3. AWS D1.6, "Structural Welding Code - Stainless Steel."

#### 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

## 1.8 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

## PART 2 - PRODUCTS

### 2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

### 2.2 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed).
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
  - 1. Provide galvanized finish for exterior installations and where indicated.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

### 2.3 ALUMINUM

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.



- B. Extruded Bars and Tubing: ASTM B 221 (ASTM B 221M), Alloy 6063-T5/T52.
- C. Extruded Structural Pipe and Round Tubing: ASTM B 429/B 429M, Alloy 6063-T6.
  - 1. Provide Standard Weight (Schedule 40) pipe, unless another grade and weight are required by structural loads.

## 2.4 FASTENERS

- A. General: Provide the following:
  - 1. Hot-Dip Galvanized Railings: Hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
  - 2. Aluminum Railings: Type 316 stainless-steel fasteners.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
  - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
  - 2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
  - 3. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

## 2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welding.

1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B. Etching Cleaner for Galvanized Metal: Sherwin Williams: Clean N Etch.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- E. Shop Primer for Galvanized Steel: Water based galvanized metal primer complying with Sherwin Williams Pro-Cryl Universal Primer.
- F. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## 2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.

3. Remove flux immediately.
  4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- J. Form changes in direction as follows:
1. By inserting prefabricated elbow fittings of radius indicated.
- K. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- L. Close exposed ends of railing members with prefabricated end fittings.
- M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.
- N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- P. For railing posts set in concrete, provide galvanized steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.
- Q. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

## 2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

## 2.8 STEEL AND IRON FINISHES

- A. Galvanized Railings:
  - 1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
  - 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
  - 3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
  - 4. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
  - 5. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
  - 1. Do not apply primer to galvanized surfaces.
- E. Shop-Painted Finish: Comply with Section 099113 "Exterior Painting." and Section 099123 "Interior Painting."
  - 1. Color: As selected by Architect from manufacturer's full range.

## 2.9 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

## 2.10 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

## 2.11 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
  - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
  - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).
- C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

## 2.12 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

## 2.13 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-

shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

- B. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.
- C. Leave anchorage joint exposed with 1/8-inch (3-mm) buildup, sloped away from post.

## 2.14 ATTACHING RAILINGS

- A. Attach railings to wall with wall brackets, except where end flanges are used. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
  - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
  - 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- B. Secure wall brackets and railing end flanges to building construction as follows:
  - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

## 2.15 ADJUSTING AND CLEANING

- A. Clean aluminum by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

## 2.16 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

**END OF SECTION**

## **SECTION 057300 DECORATIVE METAL RAILINGS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Steel and iron decorative railings.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for wood blocking for anchoring railings.
  - 2. Section 064023 "Interior Architectural Woodwork" for wood railings.

#### **1.3 DEFINITIONS**

- A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

#### **1.4 COORDINATION AND SCHEDULING**

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not meet structural performance requirements.

#### **1.5 ACTION SUBMITTALS**

- A. Product Data: For the following:



1. Manufacturer's product lines of railings assembled from standard components.
2. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, and attachment details.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes.
- D. Samples for Verification: For each type of exposed finish required.
  1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
  2. Fittings and brackets.
  3. Base collars
  4. Welded connections.
  5. Brazed connections.
  6. Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.
- E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E894 and ASTM E935.
- E. Preconstruction test reports.
- F. Evaluation Reports: For post-installed anchors, from ICC-ES.

#### 1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  1. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches (600 mm) in length.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Steel and Iron Baluster:
  1. Cheap Stair Parts or equal
    - a. Cheapstairparts.com
- B. Wood Rail and Newel Post:
  1. Stair Supplies or equal
    - a. Stairsupplies.com
- C. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods, including structural analysis, preconstruction testing, field testing, and in-service performance.
  1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Product Options: Drawings indicate size, profiles, and dimensional requirements of railings and are based on the specific system indicated. See Section 016000 "Product Requirements."
  1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
  - 1. Steel: 72 percent of minimum yield strength.
- C. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
    - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 2. Infill of Guards:
    - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
    - b. Infill load and other loads need not be assumed to act concurrently.

## 2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
  - 1. Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.
  - 2. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.
  - 3. Provide formed-steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.

## 2.4 STEEL AND IRON

- A. Bars: Hot-rolled, carbon steel complying with ASTM A29/A29M, Grade 1010.
- B. Plates, Shapes, and Bars: ASTM A36/A36M.

- C. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.
- 1. Balusters: Cheap Stair Parts: 16.6.7 Marquise Modern and 16.2.1-T Bar Iron baluster.

## 2.5 FASTENERS

- A. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- B. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.
  - 1. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.
- C. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or **ASTM F1941** (**ASTM F1941M**), Class Fe/Zn 5, unless otherwise indicated.

## 2.6 MISCELLANEOUS MATERIALS

- A. Wood Rails: Clear, straight-grained hardwood rails secured to recessed metal sub-rail.
  - 1. Species: Maple
  - 2. Finish: Transparent polyurethane.
  - 3. Staining: Stain to match CAB-1.
  - 4. Profile: 6210 Bending Handrail.
- B. Wood Newel Post: Clear, straight-grained hardwood post.
  - 1. Species: Maple
  - 2. Finish: Custom paint
  - 3. Profile: 4600 Primed Ranch Newel
- C. Wood Rails: Hardwood rails complying with Section 064023 "Interior Architectural Woodwork."
- D. Polyurethane Topcoat: Complying with MPI#72 and compatible with undercoat.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

- F. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

## 2.7 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- F. Connections: Fabricate railings with non-welded connections unless otherwise indicated.
- G. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
- H. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- I. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- J. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and to prevent bracket or fitting rotation and crushing of substrate.

## 2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

## 2.9 STEEL AND IRON FINISHES

- A. Powder-Coat Finish: Prepare, treat, and coat non-galvanized ferrous metal to comply with resin manufacturer's written instructions and as follows:
  1. Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  2. Treat prepared metal with iron-phosphate pretreatment, rinse, and seal surfaces.
  3. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils (0.04 mm).
  4. Color: As selected by Architect from manufacturer's full range.

## 2.10 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

## 2.11 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.

- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
- 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
- 2. Set posts plumb within a tolerance of **1/16 inch in 3 feet (2 mm in 1 m)**.
- 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet (5 mm in 3 m)**.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

## 2.12 RAILING CONNECTIONS

- A. Non-welded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

## 2.13 CLEANING

- A. Clean wood rails by wiping with a damp cloth and then wiping dry.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- C. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099123 "Interior Painting."

## 2.14 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

**END OF SECTION**



**SECTION 061000**  
**ROUGH CARPENTRY**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:

- 1. Framing with dimension lumber.
- 2. Framing with engineered wood products.
- 3. Shear wall panels.
- 4. Wood blocking, cants, and nailers.
- 5. Utility shelving.
- 6. Plywood backing panels.

- B. Related Requirements:

- 1. Section 061600 "Sheathing."
- 2. Section 061753 "Shop-Fabricated Wood Trusses" for wood trusses made from dimension lumber.

**1.3 DEFINITIONS**

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
  - 2. NLGA: National Lumber Grades Authority.
  - 3. RIS: Redwood Inspection Service.
  - 4. SPIB: The Southern Pine Inspection Bureau.
  - 5. WCLIB: West Coast Lumber Inspection Bureau.
  - 6. WWPAA: Western Wood Products Association.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
  - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Delegated-Design Submittal: For wood stairs indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the state of the project and responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
  - 1. Wood-preservative-treated wood.
  - 2. Fire-retardant-treated wood.
  - 3. Engineered wood products.
  - 4. Shear panels.
  - 5. Power-driven fasteners.
  - 6. Powder-actuated fasteners.
  - 7. Expansion anchors.
  - 8. Metal framing anchors.

#### 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having

jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

### 2.1 WOOD PRODUCTS, GENERAL

- A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," for the following:
  - 1. Dimension lumber framing.
  - 2. Laminated-veneer lumber.
  - 3. Parallel-strand lumber.
  - 4. Rim boards.
  - 5. Miscellaneous lumber.
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- C. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.
- D. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
  - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

## 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
  - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
  - 4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
  - 5. Wood floor plates that are installed over concrete slabs-on-grade.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
  - 1. Use treatment that does not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
1. Concealed blocking.
  2. Roof construction as indicated.
  3. Plywood backing panels.

## 2.4 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: grade, as indicated on design drawings.
- B. Load-Bearing Partitions: grade, as indicated on design drawings.
1. Application: Exterior walls and interior load-bearing partitions.

## 2.5 ENGINEERED WOOD PRODUCTS

- A. Engineered Wood Products, General: Products shall contain no urea formaldehyde.
- B. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.
- C. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.
1. Extreme Fiber Stress in Bending, Edgewise: 2800 psi (20.0 MPa) for 12-inch nominal- (286-mm actual-) depth members.
  2. Modulus of Elasticity, Edgewise: 2,000,000 psi (12 400 MPa).
- D. Parallel-Strand Lumber: Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to

ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

1. Extreme Fiber Stress in Bending, Edgewise: 3000 psi (20 MPa) for 12-inch nominal- (286-mm actual-) depth members.
  2. Modulus of Elasticity, Edgewise: 2,200,000 psi (15 100 MPa).
- E. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.
1. Manufacturer: Provide products by same manufacturer as I-joists.
  2. Material: product made from any combination solid lumber, wood strands, and veneers.
  3. Thickness: 1-1/8 inches (28 mm).
  4. Provide performance-rated product complying with APA PRR-401, rim board grade, factory marked with APA trademark indicating thickness, grade, and compliance with APA standard.

## 2.6 SHEAR WALL PANELS

- A. Wood-Framed Shear Wall Panels: As indicated on design drawings.
1. Products shall contain no urea formaldehyde.

## 2.7 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
  2. Nailers.
  3. Rooftop equipment bases and support curbs.
  4. Cants.
  5. Furring.
  6. Grounds.
  7. Utility shelving.
- B. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber and any of the following species:
1. Hem-fir (north); NLGA.
  2. Mixed southern pine; SPIB.
  3. Spruce-pine-fir; NLGA.
  4. Hem-fir; WCLIB or WWPA.
- C. For utility shelving, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Hem-fir or hem-fir (north); Select Merchantable or No. 1 Common grade; NLGA, WCLIB, or WWPA.
  2. Spruce-pine-fir (south) or spruce-pine-fir; Select Merchantable or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. For concealed boards, provide lumber with 19 percent maximum moisture content and [any of ]the following species and grades:
1. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
  2. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.8 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, Exterior, AC in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

## 2.9 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

## 2.10 METAL FRAMING ANCHORS

- A. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
1. Use for wood-preservative-treated lumber and where indicated.
- D. Joist Hangers: U-shaped joist hangers with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges at least 85 percent of joist depth.
1. Thickness: 0.050 inch (1.3 mm).
- E. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
1. Strap Width: 1-1/2 inches (38 mm).
  2. Thickness: 0.050 inch (1.3 mm).
- F. Bridging: Rigid, V-section, nailless type, 0.050 inch (1.3 mm) thick, length to suit joist size and spacing.
- G. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch (25 mm) above base and with 2-inch- (50-mm-) minimum side cover, socket 0.062 inch (1.6 mm) thick, and standoff and adjustment plates 0.108 inch (2.8 mm) thick.
- H. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
1. Width: 3/4 inch (19 mm).



2. Thickness: 0.050 inch (1.3 mm).
  3. Length: 16 inches (400 mm).
- I. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches (38 mm) wide by 0.050 inch (1.3 mm) thick.
  - J. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches (57 mm) wide by 0.062 inch (1.6 mm) thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.
  - K. Floor-to-Floor Ties: See design drawings
  - L. Hold-Downs: See design drawings

## 2.11 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- C. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).
- D. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
  1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Shear Wall Panels: Install shear wall panels to comply with manufacturer's written instructions.
- F. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- G. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- H. Do not splice structural members between supports unless otherwise indicated.
- I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
- J. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
  - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
  - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches (2438 mm) o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- (38-mm actual-) thickness.
  - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.

4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.
  - K. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
  - L. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
    1. Use inorganic boron for items that are continuously protected from liquid water.
    2. Use copper naphthenate for items not continuously protected from liquid water.
  - M. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
    1. NES NER-272 for power-driven fasteners.
    2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
    3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
  - N. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
  - O. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
    1. Comply with approved fastener patterns where applicable.
    2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
    3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.
- 3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION
- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
  - B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
  - C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

- D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

### 3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring [horizontally and vertically at 24 inches (610 mm) o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) o.c.

### 3.4 WALL AND PARTITION FRAMING INSTALLATION

- A. General: Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions and for load-bearing partitions where framing members bearing on partition are located directly over studs. Fasten plates to supporting construction unless otherwise indicated.
  - 1. For exterior walls, provide 2-by-6-inch nominal- (38-by-140-mm actual-) or 2-by-4-inch nominal- (38-by-89-mm actual-) as indicated size wood studs spaced 16 inches (406 mm)o.c. unless otherwise indicated.
  - 2. For interior partitions and walls, provide 2-by-4-inch nominal- (38-by-89-mm actual-) size wood studs spaced 16 inches (406 mm)o.c. unless otherwise indicated.
  - 3. Provide continuous horizontal blocking at mid-height of partitions more than 72 inches (2438 mm) high, using members of 2-inch nominal (38-mm actual) thickness and of same width as wall or partitions.
- B. Construct corners and intersections with three or more studs, except that two studs may be used for interior non-load-bearing partitions.
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
  - 1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal (89-mm actual) depth for openings 48 inches (1200 mm) and less in width, 6-inch nominal (140-mm actual) depth for openings 48 to 72 inches (1200 to 1800 mm) in width, 8-inch nominal (184-mm actual) depth for openings 72 to 120 inches (1800 to 3000 mm) in width, and not less than 10-inch nominal (235-mm actual) depth for openings 10 to 12 feet (3 to 3.6 m) in width.

2. For load-bearing walls, provide double-jamb studs for openings 48 inches (1500 mm) and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.
- D. Provide diagonal bracing in exterior walls, at both walls of each external corner walls, at locations indicated, at 45-degree angle, full-story height unless otherwise indicated. Use 1-by-4-inch nominal- (19-by-89-mm actual-) size boards, let-in flush with faces of studs metal wall bracing, let into studs in saw kerf.

### 3.5 STAIR FRAMING INSTALLATION

- A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:
  1. Size: 2-by-12-inch nominal- (38-by-286-mm actual-) size, minimum.
  2. Material: solid lumber.
  3. Notching: Notch rough carriages to receive treads, risers, and supports; leave at least 3-1/2 inches (89 mm) of effective depth.
  4. Spacing: At least three framing members for each 36-inch (914-mm) clear width of stair.
- B. Provide stair framing with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.
- C. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in the state of the project.

### 3.6 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

**END OF SECTION**

## **SECTION 616000**

### **SHEATHING**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Wall sheathing.
  - 2. Roof sheathing.
  - 3. Sheathing joint-and-penetration treatment.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for plywood backing panels.

##### **1.2 SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Research/Evaluation Reports: For the following:
  - 1. Building wrap.

##### **1.3 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

##### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Stack panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

#### **PART 2 - PRODUCTS**

##### **2.1 WOOD PANEL PRODUCTS**

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- B. Certified Wood: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
  - 1. Plywood DOC PS 1.
  - 2. Oriented strand board DOC PS 2.
- C. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- D. Factory mark panels to indicate compliance with applicable standard.

## 2.2 WALL SHEATHING

- A. Gypsum Board Wall Sheathing: ASTM C1177/C1177M; fiberglass faced, 5/8 inch thick, Type X core.
  - 1. Georgia Pacific; DensGlass Gold.

## 2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated.
  - 1. For wall and roof sheathing panels, provide fasteners with corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

## 2.4 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing Board: Elastomeric silicone joint sealant recommended by sheathing manufacturer.

## 3.5 ROOF SHEATHING

- A. Plywood Roof Sheathing: Exterior, Structural I sheathing.
  - 1. Span Rating: Not less than 48/24.
  - 2. Nominal Thickness: Not less than 5/8 inch (16 mm).
- B. Oriented-Strand-Board Roof Sheathing: Exposure 1, Structural I sheathing.
  - 1. Span Rating: Not less than 48/24.
  - 2. Nominal Thickness: Not less than 5/8 inch (16 mm).

### 3.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
- B. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- C. Nails, Brads, and Staples: ASTM F 1667.
- D. Power-Driven Fasteners: NES NER-272.
- E. Wood Screws: ASME B18.6.1.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
- B. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that exclude exterior moisture. structural support elements.

### 3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Wall and Roof Sheathing:
    - a. Nail to wood framing.
    - b. Screw to cold-formed metal framing.
    - c. Space panels 1/8 inch (3 mm) apart at edges and ends.

### 3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to wood framing with nails or screws.
  - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 3. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
  - 4. Install boards with a 1/4-inch gap where they abut masonry or similar materials.

### 3.4 SHEATHING JOINT-AND-PENETRATION TREATMENT



- A. Seal sheathing joints according to sheathing manufacturer's written instructions.
  - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Seal other penetrations and openings.

### 3.5 INSTALLATION - NAILABLE INSULATION

- A. Install insulation with mechanical fasteners in accordance with insulation manufacturer's instructions.
- B. Coordinate installation of vapor retarder before installing nailable roof insulation.
- C. Install wood blocking continuous along eave and rake. Use thickness equal to nailable roof insulation.
- D. Install nailable roof insulation with long dimension parallel to roof rake with joints staggered. Fasten insulation with mechanical insulation fasteners, unless otherwise directed by insulation and roofing system manufacturer's installation instructions.
- E. Fasten insulation with mechanical insulation fasteners to meet uplift performance requirements. Arrange fasteners in uniform pattern to present a neat appearance on exposed to view surface of structural deck.

**END OF SECTION**

## **SECTION 061750**

### **SHOP-FABRICATED WOOD TRUSSES**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Wood roof trusses.
  - 2. Wood girder trusses.
  - 3. Wood truss bracing.
  - 4. Metal truss accessories.
- B. Related Requirements:
  - 1. Section 061600 "Sheathing" for roof sheathing and subflooring.
- C. Allowances: Provide wood truss bracing under the Metal-Plate-Connected Truss Bracing Allowance as specified in Section 012100 "Allowances."

##### **1.3 DEFINITIONS**

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

##### **1.4 ACTION SUBMITTALS**

- A. Shop Drawings: Show fabrication and installation details for trusses.
  - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
  - 2. Indicate sizes, stress grades, and species of lumber.
  - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
  - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.

5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
  6. Show splice details and bearing details.
- B. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the state of the project and responsible for their preparation.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For metal connector-plate manufacturer, professional engineer and fabricator.
- B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss fabricating firm.
- D. Evaluation Reports: For the following, from ICC-ES:
1. Metal-plate connectors.
  2. Metal truss accessories.

## 1.6 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
  2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in the state of the project.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
  - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
  - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
  - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.
- B. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
  - 1. Design Loads: As indicated.
  - 2. Maximum Deflection Under Design Loads:
    - a. Roof Trusses: Vertical deflection as indicated.
- C. Comply with applicable requirements and recommendations of the following publications:
  - 1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
  - 2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
  - 3. TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

## 2.2 DIMENSION LUMBER

- A. Certified Wood: For metal-plate-connected wood trusses and permanent bracing, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
  - 3. Provide dressed lumber, S4S.
  - 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
- C. Minimum Chord Size for Roof Trusses: as required by loading.
- D. Minimum Specific Gravity for Top Chords: 0.50.
- E. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

## 2.3 METAL CONNECTOR PLATES

- A. Source Limitations: Obtain metal connector plates from single manufacturer.
- B. General: Fabricate connector plates to comply with TPI 1.
- C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.
  - 1. Use for interior locations unless otherwise indicated.

## 2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
  - 2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

- B. Nails, Brads, and Staples: ASTM F 1667.

## 2.5 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
  - 1. Use for interior locations unless otherwise indicated.
- C. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches (38 mm) wide by 0.050 inch (1.3 mm) thick. Tie fastens to one side of truss, top plates, and side of stud below.
- D. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches (32 mm) wide by 0.050 inch (1.3 mm) thick. Clip is fastened to truss through slotted holes to allow for truss deflection.
- E. Roof Truss Hangers: U-shaped hangers, full depth of floor truss, with 1-3/4-inch; formed from metal strap 0.062 inch (1.6 mm) thick with tabs bent to extend over and be fastened to supporting member.
- F. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches (38 mm) wide by 1 inch (25 mm) deep by 0.040 inch (1.0 mm) thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.

## 2.6 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
  - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

## 2.7 SOURCE QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.
  - 1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
  - 2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate does not comply with the Contract Documents.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
  - 1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
  - 1. Install bracing to comply with Section 061000 "Rough Carpentry."

2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- J. Install wood trusses within installation tolerances in TPI 1.
  - K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
  - L. Replace wood trusses that are damaged or do not meet requirements.
    1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

### 3.2 REPAIRS AND PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- C. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- D. Protective Coating: Clean and prepare exposed surfaces of metal connector plates. Brush apply primer, when part of coating system, and one coat of protective coating.
  1. Apply materials to provide minimum dry film thickness recommended by coating system manufacturer.

### END OF SECTION



## **SECTION 062020 INTERIOR FINISH CARPENTRY**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

- 1. Interior trim.
- 2. Interior plywood paneling.
- 3. Shelving.
- 4. Interior ornamental wood columns.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for framing exposed to view.
- 2. Section 064400 "Ornamental Woodwork."
- 3. Section 099123 "Interior Painting" for priming and backpriming of interior finish carpentry.

#### **1.3 DEFINITIONS**

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
  - 1. Include data for wood-preserved treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.

2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
  3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.
  4. Include copies of warranties from chemical-treatment manufacturers for each type of treatment.
- B. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.
- C. Samples for Verification:
1. For each species and cut of lumber and panel products with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels.
  2. Submit profiles for running trim to confirm matches existing where applicable.
  3. For foam plastic moldings, with 1/2 of exposed surface finished; 50 sq. in. (300 sq. cm).
  4. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels.
  5. For interior wood columns, include quarter-section Samples of cap, base, plinth, and 6-inch- (150-mm-) long quarter-section Sample of shaft. Samples need not be same diameter as required columns.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For fire-retardant-treated wood, from ICC-ES.
- B. Sample Warranty: For manufacturer's warranty.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and

nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
  - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## 1.8 WARRANTY

- A. Manufacturer's Warranty for Columns: Manufacturer agrees to repair or replace columns that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period for Columns: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Materials:
  - 1. Interior trim.
  - 2. Interior plywood paneling.
  - 3. Shelving.
  - 4. Interior ornamental wood columns.
  - 5. Wood handrails.
- B. Lumber: DOC PS 20 and the following grading rules:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association, "Standard Grading Rules for Northeastern Lumber."
  - 2. NHLA: National Hardwood Lumber Association, "Rules for the Measurement and Inspection of Hardwood & Cypress."
  - 3. NLGA: National Lumber Grades Authority, "Standard Grading Rules for Canadian Lumber."
  - 4. SPIB: The Southern Pine Inspection Bureau, "Standard Grading Rules for Southern Pine Lumber."
  - 5. WCLIB: West Coast Lumber Inspection Bureau, Standard No. 17, "Grading Rules for West Coast Lumber."
  - 6. WWPA: Western Wood Products Association, "Western Lumber Grading Rules."
- C. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
  - 1. For exposed lumber, mark grade stamp on end or back of each piece.
- D. Softwood Plywood: DOC PS 1.

- E. Hardboard: AHA A135.4.
- F. MDF: ANSI A208.2, Grade 130, made with binder containing no urea-formaldehyde resin.
- G. Particleboard: ANSI A208.1, Grade M-2.
- H. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
  - 1. Color: To match adjacent cabinet finish. No Melamine to be used if shelving is exposed.

## 2.2 INTERIOR TRIM

- A. Softwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
  - 1. Species and Grade: Eastern white pine, [C Select] [D Select] [Finish or 1 Common] [Premium or 2 Common]; NeLMA or NLGA.
  - 2. Maximum Moisture Content 15 percent with at least 85 percent of shipment at 12 percent or less.
  - 3. Finger Jointing: Not allowed.
  - 4. Face Surface: Surfaced (smooth).
- B. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
  - 1. Species and Grade: Maple, Clear; NHLA.
  - 2. Maximum Moisture Content: [13] [10] [9] <Insert value> percent.
  - 3. Finger Jointing: Not allowed.
  - 4. Gluing for Width: Allowed Use for lumber trim wider than 6 inches (150 mm).
  - 5. Veneered Material: Allowed [Use for lumber trim wider than 6 inches (150 mm).
  - 6. Face Surface: Surfaced (smooth).
  - 7. Matching: Selected for compatible grain and color.
- C. Lumber Trim for Opaque Finish (Painted Finish):
  - 1. Species and Grade: Douglas fir-larch or Douglas fir south, Superior or C & Btr finish; NLGA, WCLIB, or WWPA.
  - 2. Maximum Moisture Content: 15 percent [ with at least 85 percent of shipment at 12 percent or less].
  - 3. Maximum Moisture Content: [9] percent.
  - 4. Finger Jointing: [Not allowed].
  - 5. Face Surface: [Surfaced (smooth)]
  - 6. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.

## 2.3 PANELING

- D. Hardwood Veneer Plywood Paneling: Manufacturer's stock hardwood plywood panels complying with HPVA HP-1, made without urea-formaldehyde adhesive.
1. Face Veneer Species and Cut: Plain-sliced Maple
  2. Veneer Matching: Selected for similar color and grain.
  3. Backing Veneer Species: Any hardwood compatible with face species.
  4. Construction: Veneer core.
  5. Thickness: 7/16 inch (11 mm).
  6. Panel Size: 48 by 96 inches 1219 by 2438 mm
  7. Glue Bond: Type II (interior).
  8. Face Pattern: Manufacturer's standard V channel-grooved pattern, with grooves at edges, center, and third points of panels, and at other locations to provide pattern resembling random-width boards.
  9. Finish: As selected by Architect from manufacturer's full range.

## 2.4 SHELVING

- A. Exposed Shelving: Made from one of the following material, 3/4 inch (19 mm) thick.
1. Wood boards as specified above for number trim for opaque hardwood lumber trim for transparent finish.
- B. Shelf Cleats: 3/4-by-3-1/2-inch (19-by-89-mm) boards
- C. Shelf Brackets without Rod Support: BHMA A156.16, B04041; prime-painted formed steel.
- D. Standards for Adjustable Shelf Brackets: BHMA A156.9, B04102; powder-coat-finished steel.

## 2.5 ORNAMENTAL WOOD COLUMNS

- A. Factory fabricate columns for transparent finish from clear, kiln-dried red oak
- B. Shafts: Built up from tongue-and-groove staves joined with waterproof glue. Lathe turn shafts to provide base diameter indicated and true architectural entasis taper. Precisely mill flutes as indicated.
- E. Capital and Base: Built up from wood components with waterproof glue. Turn circular elements on lathes.
- F. Prime columns for opaque finish with one coat of interior wood primer compatible with specified topcoats.

## 2.6 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, conceal at any location exposed to view.
- B. Low-Emitting Materials: Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
  - 1. Wood glue shall have a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Installation Adhesive for Foam Plastic Moldings: Product recommended for indicated use by foam plastic molding manufacturer.
  - 1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Paneling Adhesive: Comply with paneling manufacturer's written recommendations for adhesives.
  - 1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.
  - 1. Adhesive shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.7 FABRICATION

- A. Back out or kerf backs of the following members except those with ends exposed in finished work:
  - 1. Interior standing and running trim except shoe and crown molds.
  - 2. Wood-board paneling.
- B. Ease edges of lumber less than 1 inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1 inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 120 hours unless longer conditioning is recommended by manufacturer.

### **3.3 INSTALLATION, GENERAL**

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, too small to fabricate with proper jointing arrangements, or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
  - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
  - 3. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
  - 4. Install stairs with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and with no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.
  - 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

### 3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
  - 1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
  - 2. Install trim after gypsum-board joint finishing operations are completed.
  - 3. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

### 3.5 PANELING INSTALLATION

- A. Plywood Paneling: Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels. Leave 1/4-inch (6-mm) gap to be covered with trim at top, bottom, and openings. Install with uniform tight joints between panels.
  - 1. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners. Space fasteners and adhesive as recommended by panel manufacturer.
  - 2. Conceal fasteners to greatest practical extent.
  - 3. Arrange panels with grooves and joints over supports. Fasten to supports with nails of type and at spacing recommended by panel manufacturer. Use fasteners with prefinished heads matching groove color.

### 3.6 SHELVING INSTALLATION

- A. Cut shelf cleats at ends of shelves about 1/2 inch (13 mm) less than width of shelves and sand exposed ends smooth.
- B. Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled. Space fasteners not more than 16 inches (400 mm) o.c. Use 2 fasteners at each framing member or fastener location for cleats 4 inches nominal (89 mm actual) in width and wider.
  - 1. Apply a bead of multipurpose construction adhesive to back of shelf cleats before installing. Remove adhesive that is squeezed out after fastening shelf cleats in place.
- C. Install shelf brackets according to manufacturer's written instructions, spaced not more than [32 inches (800 mm)] [36 inches (900 mm)] o.c. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.



- D. Install standards for adjustable shelf supports according to manufacturer's written instructions. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Space fasteners not more than 12 inches (300 mm) o.c.
- E. Install standards for adjustable shelf brackets according to manufacturer's written instructions, spaced not more than 36 inches (900 mm) o.c. and within 6 inches (150 mm) of end of shelves. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
- F. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled. Install shelves, fully seated on cleats, brackets, and supports.
  - 1. Fasten shelves to cleats with finish nails or trim screws, set flush.
  - 2. Fasten shelves to brackets to comply with bracket manufacturer's written instructions.

### 3.7 ORNAMENTAL COLUMN INSTALLATION

- A. Install columns to comply with manufacturer's written instructions. Comply with requirements below unless manufacturer's written instructions state otherwise.
- B. Lay out column locations on ceiling and plumb down to locate column locations at floor.
- C. Set plinths in location, shim as required to temporarily level, and scribe and trim as required so that tops of plinths will sit level without use of shims. Seal cut surfaces with wood sealer or primer and fasten plinths to floor using pins or fasteners as recommended by manufacturer.
- D. Set columns in location, shim as required to temporarily plumb, and scribe and trim as required so that columns will sit plumb without shims.
- E. Scribe and trim tops of columns to fit to ceiling.
- F. Seal ends of columns with wood sealer or primer.
- G. Install column caps on columns and fasten to columns.
- H. Secure columns in place at top and bottom with fasteners recommended by manufacturer.

### 3.8 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

### 3.9 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes, if any.

### 3.10 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
  - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**END OF SECTION**

## **SECTION 064023 INTERIOR ARCHITECTURAL WOODWORK**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

- 1. Interior standing and running trim.
- 2. Closet and utility shelving.
- 3. Interior frames and jambs.
- 4. Interior stairs and railings.
- 5. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork items that are not concealed within other construction.
- 6. Shop priming of interior architectural woodwork.
- 7. Shop finishing of interior architectural woodwork.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing interior architectural woodwork that are concealed within other construction before interior architectural woodwork installation.
- 2. Section 062023 "Interior Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.

#### **1.3 COORDINATION**

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections, to ensure that interior architectural woodwork can be supported and installed as indicated.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For the following:

- 1. Anchors.
- 2. Adhesives.

3. Shop finishing materials.
  4. Wood-Preservative Treatment:
    - a. Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
    - b. Indicate type of preservative used and net amount of preservative retained.
    - c. Include chemical-treatment manufacturer's written instructions for finishing treated material and manufacturer's written warranty.
  5. Fire-Retardant Treatment: Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
  6. Waterborne Treatments: For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. Shop Drawings:
1. Include the following:
    - a. Dimensioned plans, elevations, and sections.
    - b. Attachment details.
  2. Show full-size details.
  3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.
  4. Apply AWI Quality Certification and WI Certified Compliance Program label to Shop Drawings.
- C. Samples: For each exposed product and for each shop-applied color and finish specified.
1. Size:
    - a. Panel Products: 12 inches by 12 inches (300 mm by 300 mm).
    - b. Lumber Products: Not less than [5 inches (125 mm) wide by 12 inches (300 mm) long] [5 inches (125 mm) wide by 24 inches (600 mm) long], for each species and cut, finished on one side and one edge.
- D. Samples for Initial Selection: For each type of shop-applied exposed finish.
1. Size:
    - a. Panel Products: 12 inches by 12 inches (300 mm by 300 mm).
    - b. Lumber Products: Not less than [5 inches (125 mm) wide by 12 inches (300 mm) long] [5 inches (125 mm) wide by 24 inches (600 mm) long], for each species and cut, finished on one side and one edge.

E. Samples for Verification: For the following:

1. Lumber with shop-applied Transparent Finish: Not less than [5 inches (125 mm) wide by 12 inches (300 mm) long] [5 inches (125 mm) wide by 24 inches (600 mm) long], for each species and cut, finished on one side and one edge.
2. Veneer Leaves: Representative of and selected from flitches to be used for transparent-finished interior architectural woodwork.
3. Lumber and Panel Products with Shop-Applied Opaque Finish: 5 inches (125 mm) wide by 12 inches (300 mm) long for lumber and [8 by 10 inches (200 by 250 mm)] [12 by 12 inches (300 by 300 mm)] for panels, for each finish system and color.
  - a. Finish one-half of exposed surface.
4. PVC edge material,
5. Thermoset decorative panel.
6. Submit profiles for running trim to confirm matches existing where applicable.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For [architectural woodwork manufacturer] [and] [Installer].
- B. Product Certificates: For the following:
  1. For each type of product
  2. Composite wood and agrifiber products.
  3. Adhesives.
- C. Evaluation Reports: For preservative-treated and fire-retardant-treated wood materials, from ICC-ES.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.7 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
  1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

2. Installer Qualifications: [Manufacturer of products] [and] [Licensed participant in AWI's Quality Certification Program.
  - B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
    1. Build mockups of typical interior architectural woodwork as shown on Drawings.
    2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
    3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Comply with the Architectural Woodwork Standards, Section 2.
  - B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.
  - C. Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
    1. Handle and store fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions.
- 1.9 FIELD CONDITIONS
- A. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of the construction period.
  - B. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between [25 and 55] percent during the remainder of the construction period.
  - C. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
    1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.
  - D. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide

allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

#### 1.10 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Frames: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Smoke- and Draft-Control Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

#### 2.2 ARCHITECTURAL WOODWORK MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, per the finish schedule.

#### 2.3 ARCHITECTURAL WOODWORK, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
  - 1. Provide labels and certificates from AWI and WI certification program indicating that woodwork[ and installation] complies with requirements of grades specified.
  - 2. The Contract Documents contain requirements that are more stringent than the Architectural Woodwork Standards. Comply with Contract Documents and Architectural Woodwork Standards.
- B. [<Double click to insert sustainable design text for regional wood materials.>](#)

- C. <Double click to insert sustainable design text for certified wood.>

## 2.4 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Architectural Woodwork Standards Grade: Premium.

- B. Hardwood Lumber:

1. Wood Species and Cut: Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building unless otherwise indicated.
2. Species: Red oak SS5 for painted locations only otherwise maple.
3. Cut: Plain sliced/plain sawn.
4. Wood Moisture Content: 4 to 9 percent.
5. Provide split species on trim that faces areas with different wood species, matching each face of woodwork to species and cut of finish wood surfaces in areas finished.
6. For trim items other than base wider than available lumber, use veneered construction. Do not glue for width.
  - a. For veneered base, use hardwood lumber core, glued for width.
7. For base wider than available lumber, glue for width. Do not use veneered construction.
8. For rails thicker than available lumber, use veneered construction. Do not glue for thickness.

- C. Softwood Lumber:

1. Wood Species and Cut: Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building unless otherwise indicated.
2. Species: Eastern white pine.
3. Cut: Plain sawn.
4. Wood Moisture Content: 4 to 9 percent.
5. Provide split species on trim that faces areas with different wood species, matching each face of woodwork to species and cut of finish wood surfaces in areas finished.
6. For trim items other than base wider than available lumber, use veneered construction. Do not glue for width.
  - a. For veneered base, use softwood lumber core, glued for width.
7. For base wider than available lumber, glue for width. Do not use veneered construction.
8. For rails thicker than available lumber, use veneered construction. Do not glue for thickness.
9. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than **3 inches (76 mm)** wide.



## 2.5 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

### A. Architectural Woodwork Standards Grade: Premium.

1. Wood Species: Any closed-grain hardwood.
2. Wood Moisture Content: 4 to 9 percent.

## 2.6 CLOSET AND UTILITY SHELVING

### A. Architectural Woodwork Standards Grade: Premium.

### B. Shelf Material: 3/4-inch (19-mm) solid lumber.

### C. Cleats: 3/4-inch (19-mm) solid lumber.

### D. Wood Species: Any closed-grain hardwood.

### E. Closet Rods: 1-1/2-inch- (38-mm-) diameter, [hardwood].

### F. Closet Rods: 1-5/16-inch- (33-mm-) diameter, color-coated-steel tubes complying with BHMA A156.16, L03131.

### G. Rod Flanges: Clear, kiln-dried, hardwood turnings.

### H. Rod Flanges: Color coated-steel.

### I. Wood Finish: As indicated on Drawings or in schedules.

### J. Adjustable shelf standards and supports. BHMA A156.9, B04071, with shelf rests, B04081.

### K. Shelf rests: BHMA A156.9, B04013: Metal.

## 2.7 INTERIOR FRAMES AND JAMBS FOR TRANSPARENT FINISH

### A. Architectural Woodwork Standards Grade: Premium.

### B. Wood Species and Cut: Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building unless otherwise indicated.

1. Species: Maple.
2. Cut: Plain sliced/plain sawn.
3. Wood Moisture Content: 4 to 9 percent.
4. Provide split species on frames and jambs that face areas with different wood species, matching each face of woodwork to species and cut of finish wood surfaces in areas finished.

- C. For frames or jambs wider than available lumber, use veneered construction. Do not glue for width.
  - 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than **3 inches (76 mm)** wide.
- D. Fire-Rated Interior Frames and Jambs: Products fabricated from fire-retardant particleboard or fire-retardant MDF with veneered exposed surfaces and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
  - 1. Fire Rating: 20 minutes.

## 2.8 INTERIOR FRAMES AND JAMBS FOR OPAQUE FINISH

- A. Architectural Woodwork Standards Grade: Premium.
- B. Wood Species: Any closed-grain hardwood.
  - 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than **3 inches (76 mm)** wide.
  - 2. Wood Moisture Content: 4 to 9 percent.
- C. Fire-Rated Interior Frames and Jambs: Products fabricated from fire-retardant particleboard with veneered exposed surfaces or fire-retardant MDF and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
  - 1. Fire Rating: 20 minutes.

## 2.9 INTERIOR WOOD STAIRS AND RAILINGS

- A. Architectural Woodwork Standards Grade: Premium.
- B. Wood for Transparent Finish:
  - 1. Species and cut:
    - a. Stringers: Hard maple, plain sawn.
    - b. Risers: Hard maple, plain sawn.
    - c. Treads: Hard maple, plain sawn.
    - d. Railings: Hard maple, plain sawn.
    - e. Balusters: Hard maple, plain sawn.
    - f. Newels: Hard maple, plain sawn.
    - g. Moldings: Hard maple, plain sawn.
  - 2. Wood Moisture Content: 4 to 9 percent.

- C. Wood for Opaque Finish:
  - 1. Species: [Any closed-grain hardwood].
  - 2. Wood Moisture Content: 4 to 9 percent.
- D. Rough Carriages for Stairs: Laminated veneer lumber, made with an exterior-type adhesive complying with ASTM D2559, and with the following allowable design values as determined according to ASTM D5456:
  - 1. Extreme Fiber Stress in Bending, Edgewise: 3100 psi (21.3 MPa) for 12-inch nominal- (286-mm actual-) depth members.
  - 2. Modulus of Elasticity, Edgewise: 2,000,000 psi (13 800 MPa).
- E. Rough Carriages for Stairs: [Select Structural] grade, kiln-dried to 15 percent maximum moisture content:
  - 1. Acceptable Species:
    - a. Refer to Structural Drawings.
- F. Finishes for Stair Parts:
  - 1. Treads: Transparent.
  - 2. Risers: Transparent.
  - 3. Stringers: Transparent.
  - 4. Balusters: Transparent.
  - 5. Handrails: Transparent.
  - 6. Scotia, Cove, and Other Moldings: Transparent.
- G. Handrail Brackets: Rakks HR-0303 cast aluminum with wall flange drilled and tapped for concealed hanger bolt and with support arm for screwing to underside of rail. Size to provide 1-1/2-inch (38-mm) clearance between handrail and face of wall.
  - 1. Finish: Custom Powder Coated.
- H. Handrail/Bumper Rail Brackets: Pairs of extruded-aluminum channels: one for fastening to back of rail and one for fastening to face of wall, assembled in overlapping fashion and fastened together at top and bottom with self-tapping screws. Size to provide 1-1/2-inch (38-mm) clearance between handrail and wall.

## 2.10 HARDWOOD SHEET MATERIALS

- A. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of the Architectural Woodwork Standards for each type of interior architectural woodwork and quality grade specified unless otherwise indicated.
  - 1. Medium-Density Fiberboard (MDF): ANSI A208.2, [Grade 130].
  - 2. Particleboard: ANSI A208.1, [Grade M-2-Exterior Glue].

3. Particleboard: Straw-based particleboard complying with requirements in ANSI A208.1, Grade M-2, except for density.
4. Softwood Plywood: DOC PS 1[, medium-density overlay].
5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.

## 2.11 PRESERVATIVE-TREATED-WOOD MATERIALS

- A. Preservative-Treated-Wood Materials: Provide with water-repellent preservative treatment complying with AWWPA N1 (dip, spray, flood, or vacuum-pressure treatment).
  1. Preservative Chemicals: 3-iodo-2-propynyl butyl carbamate (IPBC), combined with a compatible EPA-registered insecticide.
  2. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
- B. Extent of Preservative-Treated Wood Materials: Treat interior architectural woodwork in contact with concrete or masonry.
  1. Items fabricated from the following wood species need not be treated:
    - a. All-heart redwood.
    - b. Western red cedar
    - c. White oak.
    - d. African mahogany.
    - e. Honduras mahogany.
    - f. Ipe.
    - g. Dark red meranti.
    - h. Teak.

## 2.12 FIRE-RETARDANT-TREATED WOOD MATERIALS

- A. Fire-Retardant-Treated Wood Materials: Where fire-retardant-treated materials are indicated, use materials complying with requirements that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products according to test method indicated by a qualified testing agency.
  1. Use treated materials that comply with requirements of the Architectural Woodwork Standards. Do not use materials that are warped, discolored, or otherwise defective.
  2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
  3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
  2. For items indicated to receive a stained, transparent, or natural finish, use organic resin chemical formulation.
  3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
  4. Mill lumber before treatment, and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
- C. Fire-Retardant Particleboard: Made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture, to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less according to ASTM E84.
1. For panels 3/4 inch (19 mm) thick and less, comply with ANSI A208.1 for Grade M-2, except for the following minimum properties: modulus of rupture, 1600 psi (11 MPa); modulus of elasticity, 300,000 psi (2070 MPa); internal bond, 80 psi (550 kPa); and screw-holding capacity on face and edge, 250 and 225 lbf (1100 and 1000 N), respectively.
  2. For panels 13/16 to 1-1/4 inches (20 to 32 mm) thick, comply with ANSI A208.1 for Grade M-1, except for the following minimum properties: modulus of rupture, 1300 psi (9 MPa); modulus of elasticity, 250,000 psi (1720 MPa); linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf (1100 and 780 N), respectively.
- D. Fire-Retardant Fiberboard: Medium-density fiberboard (MDF) panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture, to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less according to ASTM E84.

## 2.13 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
1. Preservative Treatment: Provide softwood lumber treated by pressure process, AWPA U1; Use Category UC3b.
    - a. Provide where in contact with concrete or masonry.

- b. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
  - c. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  - d. Mark lumber with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee's (ALSC) Board of Review.
- 2. Fire-Retardant Treatment: Complying with requirements; provide where indicated.
- B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
  - 1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
  - 2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.
  - 1. Do not use adhesives that contain urea formaldehyde
  - 2. Use adhesives that meet testing and product requirements of the California Department of Health/services. Standard Practice for the testing of Volatile Organic Emissions from various sources using "Small-Scale Environmental Chambers.
  - 3. VOC limits for installation adhesives and sealants: Use products that comply with the following limits for VOC content when calculated according to HD CFR 59,m Support –D (EPA Method 24):
    - a. Wood Glues: 30 g/L.
    - b. Multi-purpose Construction Adhesives: - 70 g/L
    - c. Structural Wood Member Adhesive: 140 g/L.
    - d. Architectural Sealants: 250 g/L.

## 2.14 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.
  - 1. Ease edges to radius indicated for the following:
    - a. Edges of Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.
    - b. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).

- C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site.
  - 1. Disassemble components only as necessary for shipment and installation.
  - 2. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
  - 3. Notify Architect seven days in advance of the dates and times interior architectural woodwork fabrication will be complete.
  - 4. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled.
    - a. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting.
    - b. Verify that parts fit as intended, and check measurements of assemblies against field measurements indicated on approved Shop Drawings before disassembling for shipment.
- D. Stairs: Cut rough carriages to accurately fit treads and risers.
  - 1. Glue treads to risers, and glue and nail treads and risers to carriages.
  - 2. House [wall] [and] [face] stringers, and glue and wedge treads and risers.
  - 3. Fabricate stairs with treads and risers no more than **1/8 inch (3 mm)** from indicated position and no more than **1/16 inch (1.5 mm)** out of relative position for adjacent treads and risers.
- E. Backout or groove backs of flat trim members and kerf backs of other side, flat members except for members with ends exposed in finished work.
- F. Assemble casing in shop except where shipping limitations require field assembly.
- G. Assemble moldings in shop to maximum extent possible. Miter corners in shop and prepare for field assembly with bolted fitting designed to pull connections together.

## 2.15 SHOP PRIMING

- A. Preparations for Finishing: Comply with the Architectural Woodwork Standards for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.
- B. Interior Architectural Woodwork for Opaque Finish: Shop prime with one coat of wood primer as specified in Section 099123 "Interior Painting."
  - 1. Backpriming: Apply one coat of primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.

- C. Interior Architectural Woodwork for Transparent Finish: Shop-seal concealed surfaces with required pretreatments and first coat of finish as specified in Section 099300 "Staining and Transparent Finishing."

1. Backpriming: Apply one coat of sealer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.

## 2.16 SHOP FINISHING

- A. Finish interior architectural woodwork indicated on Drawings at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

- B. Preparation for Finishing: Comply with Architectural Woodwork Standards, Section 5 for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of interior architectural woodwork. Apply two coats to end-grain surfaces.

- C. Transparent Finish:

1. Finish: System - 1, Latex Acrylic, Water Based.
2. Finish: System - 2, Polyurethane, Water Based.
3. Wash Coat for Closed-Grain Woods: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
4. Staining: Match approved sample for color.
5. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
6. Filled Finish for Open-Grain Woods: After staining, apply wash-coat sealer and allow to dry. Apply paste wood filler and wipe off excess. Tint filler to match stained wood.
7. Sheen:
8. Semi-gloss, 46-60 gloss units measured on 60-degree gloss meter according to ASTM D523.

- D. Opaque Finish:

1. Architectural Woodworking Standards Grade: Premium
2. Finish: System - 1, Latex Acrylic, Water Based.
3. Finish: System - 2, Polyurethane, Water Based.
4. Color: As selected by Architect from manufacturer's full range.
5. Sheen: Semi-gloss, 46-60 gloss units measured on 60-degree gloss meter according to ASTM D523.



## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 120 hours prior to beginning of installation.
- B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and back-priming of concealed surfaces.

### 3.2 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion.
  - 1. Shim as required with concealed shims.
  - 2. Install level and plumb to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)**.
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWPA M4.
- F. Fire-Retardant-Treated Wood: Install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- G. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.
  - 1. Secure with countersunk, concealed fasteners and blind nailing.
  - 2. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with interior architectural woodwork.
  - 3. For shop-finished items, use filler matching finish of items being installed.
- H. Standing and Running Trim:
  - 1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
  - 2. Do not use pieces less than **60 inches (1500 mm)** long, except where shorter single-length pieces are necessary.

3. Scarf running joints and stagger in adjacent and related members.
4. Fill gaps, if any, between top of base and wall with [plastic wood filler; sand smooth; and finish same as wood base if finished] [latex sealant, painted to match wall].
5. Install standing and running trim with no more variation from a straight line than **1/8 inch in 96 inches (3 mm in 2400 mm)**.

I. Stairs: Securely anchor carriages to supporting substrates.

1. Install stairs with treads and risers no more than **1/8 inch (3 mm)** from indicated position.
2. Secure with countersunk, concealed fasteners and blind nailing.
3. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with wood surface.

J. Railings:

1. Install rails with no more than **1/8 inch in 96-inch (3 mm in 2400-mm)** variation from a straight line.
2. Stair Rails: Glue and dowel or pin balusters to treads and railings, and railings to newel posts.
  - a. Secure with countersunk, concealed fasteners and blind nailing.
  - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with wood surface.
3. Wall Rails: Support rails on wall brackets securely fastened to wall framing.
  - a. Space rail brackets not more than 32" o.c.

### 3.3 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
1. Inspection entity shall prepare and submit report of inspection.

### 3.4 REPAIR

- A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects and to result in interior architectural woodwork being in compliance with requirements of Architectural Woodwork Standards for the specified grade.
- B. Where not possible to repair, replace defective woodwork.

- C. Shop Finish: Touch up finishing work specified in this Section after installation of interior architectural woodwork.
  - 1. Fill nail holes with matching filler where exposed.
  - 2. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.
- D. Field Finish: See Section 099123 "Interior Painting" and Section 099300 "Staining and Transparent Finishing" for final finishing of installed interior architectural woodwork not indicated to be shop finished.

### 3.5 CLEANING

- A. Clean interior architectural woodwork on exposed and semi-exposed surfaces.

### **END OF SECTION**

**SECTION 064113**  
**WOOD VENEER CUSTOM CABINETS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Special fabricated casework.
  - 2. Cabinet hardware.
  - 3. Prefinished surfaces.
  - 4. Preparation for installing utilities.

**1.2 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, elevations and section, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Submit data for hardware accessories.
- D. Samples:
  - 1. Submit three (3), 8 x 10-inch size samples, illustrating cabinet finish.
  - 2. Submit three (3), 8 x 10-inch size samples, illustrating countertop finish.
  - 3. Submit three (3), samples of each type of cabinet hardware, illustrating hardware construction and finish.
- E. Certification: Submit copy of fabricator's authorization to use AWI Grade Stamps.

**1.3 QUALITY ASSURANCE**

- A. Perform work in accordance with AWI Custom quality.
- B. Maintain one copy of each document on site.

**1.4 QUALIFICATIONS**

- A. Fabricator: Company specializing in performing Work of this section with minimum three years documented experience.
- B. Fabricator: Licensed by AWI Quality Certification Program.

**1.5 MOCKUP**

- A. Section 0140000 - Quality Requirements: Mockup requirements.
- B. Construct mockup of full-size base cabinet.
- C. Locate where directed by Architect.

- D. Remove mockup when directed by Architect.

#### 1.6 PRE-INSTALLATION MEETING

- A. Section 013000 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week prior to commencing work of this section.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Protect units from moisture damage.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.

#### 1.9 MAINTENANCE MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish not less than 5 hinges, 5 glides and 5 pulls.

#### 1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

### **PART 2 PRODUCTS**

#### 2.1 LUMBER MATERIALS

- A. Softwood Lumber: PS 20; Graded in accordance with AWI; maximum moisture content of 8 percent; species and cut as indicated in finish Schedule.
  - 1. Lumber Scheduled for Opaque Finish: Grade III or better, southern pine.
- B. Hardwood Lumber: Graded in accordance with AWI; maple species, maximum moisture content of 8 percent; suitable for transparent finish.
  - 1. Lumber Scheduled for Transparent Finish: Grade I, maple, plain sliced.
- C. Use lumber materials for the following locations:
  - 1. Cabinet frame.
  - 2. Exposed stiles and rails.
  - 3. Drawer box and other internal construction.

#### 2.2 PANEL MATERIALS

- A. Standard Cabinets

1. Plywood: Graded in accordance with AWI Custom; veneer core, 7 ply, type of glue recommended for application; face veneer species, cut, and panel matching and matching between panels as specified in Finish Schedule.
  - a. Plywood Scheduled for Opaque Finish: Grade B veneer or better, pine.
  - b. Plywood Scheduled for Transparent Finish: Grade A or better, red oak, plain sliced veneer.
- B. Food Service Cabinets
  1.  $\frac{3}{4}$ " marine grade plywood with selected plastic laminate finish or wood veneer per finish schedule.
  2. All surfaces to be finished. No exposed surfaces.
  3. All ends concealed from view to have black plastic laminate finish unless otherwise noted
- C. Use panel materials for the following locations:
  1. Door and drawer fronts.
  2. Cabinet and drawer interiors.
  3. Drawer bottoms.
  4. Gables and backs.

## 2.3 ACCESSORIES

- A. Adhesive: Type recommended to suit application.
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.
- D. Concealed Joint Fasteners: Threaded steel.
- E. Sealants: As specified in Section 079000.

## 2.4 HARDWARE

- A. Hardware: BHMA A156.9, satin chrome finish unless specified otherwise.
- B. Shelf Standards and Rests: Formed steel channels and rests, cut for fitted rests spaced at 1/2 inch centers; Knappe & Vogt (800) 253-1561, No. 255 standards with No. 256 shelf supports.
- C. Shelf Standards and Rests: Formed steel channels and rests, cut for fitted rests spaced at one inch centers; satin finish.
- D. Shelf Brackets: Formed steel brackets, formed for attachment with lugs; satin finish.
- E. Drawer and Door Pulls: Type as indicated.
  1. Type 1: Oil Rubbed Bronze, full mortised pull, lengths as indicated on Drawings.
  2. Type 2: "U" shaped pull, steel, 4-inch centers.
- F. Cabinet Locks: Keyed cylinder, two keys for each lock, master keyed, Oil Rubbed Bronze finish.
- G. Ratchet Locks: Adjustable type to suit door thickness; Knappe & Vogt model 962 CHR or 963 CHR, as required for door thickness.

- H. Catches: Magnetic.
- I. Slides: Galvanized steel construction, ball bearings separating tracks; galvanized, Accuride.
  - 1. Storage Drawer Slides: Full extension type; 100 pound capacity.
- J. Hinges: Knuckle disappearing type, steel, 110 degree opening capabilities; soft-close operation.

## 2.5 FABRICATION

- A. Refer to details on drawings.
- B. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- C. Fit shelves, doors, and exposed edges with matching edging. Use one piece for full length only.
- D. Door and Drawer Fronts: 3/4 inch thick; flush style.
- E. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.
- F. Fabricate cabinets and counter tops with cutouts for plumbing fixtures, outlet boxes. Verify locations of cutouts from on-site dimensions. Seal cut edges.

## 2.6 FABRICATION TOLERANCES

- A. Cabinetry: AWI Section 01400 - Quality Requirements.
  - 1. Maximum Offset from Alignment with Abutting Materials: 1/32 inch

## 2.7 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler matching surrounding surfaces and of types recommended for applied finishes.
- D. Finish work in accordance with AWI - Section 1500, color and sheen as selected.
  - 1. Transparent Finish: System TR-6 polyurethane with stain.
  - 2. Opaque Finish: OP-6 polyurethane.
- E. Seal surfaces in contact with cementitious materials.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify adequacy of backing and support framing.

- C. Verify location and sizes of utility rough-in associated with work of this section.

### 3.2 INSTALLATION

- A. Set and secure casework in place; rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- D. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- E. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- F. Seal and caulk around all penetrations, cracks, crevices and any other openings capable of harboring insects or rodents.

### 3.3 ADJUSTING

- A. Section 017300 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust moving or operating parts to function smoothly and correctly.

### 3.4 CLEANING

- A. Section 017300 - Execution Requirements: Final cleaning.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**END OF SECTION**



**SECTION 064116**  
**PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Plastic-laminate-clad architectural cabinets.
  - 2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.
- B. Related Requirements:
  - 1. Section 061000 Rough Carpentry for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

**1.3 COORDINATION**

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

**1.4 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

**1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Show large-scale details.
  - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.
- D. Samples for Initial Selection: For each type of exposed finish.
- E. Samples for Verification: For the following:
  1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
    - a. Provide one sample applied to core material with specified edge material applied to one edge.
  2. Corner Pieces:
    - a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
    - b. Miter joints for standing trim.
  3. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For the following:
  1. Composite wood and agrifiber products.
  2. High-pressure decorative laminate.
  3. Adhesives.
- C. Field quality-control reports.

#### 1.7 MAINTENANCE SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Furnish not less than 5 hinges, 5 glides and 5 pulls for each type installed.

#### 1.8 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Manufacturer of product.

- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Provide sample door in specified plastic laminate with finished edges.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

## 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- D. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

## PART 2 - PRODUCTS

### 2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
  - 1. Provide labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
  - 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

- B. Architectural Woodwork Standards Grade: Custom.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
  - 1. Refer to Interior Design finish schedule.
- F. Laminate Cladding for Exposed Surfaces:
  - 1. Horizontal Surfaces: Grade HGS.
  - 2. Post-formed Surfaces: Grade HGP.
  - 3. Vertical Surfaces: Grade VGS.
  - 4. Edges: Grade HGS or Grade VGS .
  - 5. Pattern Direction: As indicated.
- G. Materials for Semi-exposed Surfaces:
  - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
    - a. Edges of Plastic-Laminate Shelves: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
    - b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
    - c. For cabinet interiors and semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
  - 2. Drawer Sides and Backs: Solid-hardwood lumber.
  - 3. Drawer Bottoms: Hardwood plywood.
- H. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- J. Drawer Construction: Fabricate with exposed fronts fastened to sub-front with mounting screws from interior of body.
  - 1. Join sub-fronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.
- K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As indicated on drawings. Refer to Interior Design finish schedule.
  - 2. Match Architect's sample.

## 2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
  - 1. Wood Moisture Content: 5 to 10 percent.
  - 2. Thickness:  $\frac{3}{4}$ "-thick
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
  - 1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
  - 2. Particleboard: ANSI A208.1, Grade M-2,,minimum density of 45 lb/cubic foot.
- C. Use lumber materials for the following locations:
  - 1. Cabinet frame/box.
  - 2. Exposed stiles and rails.
  - 3. Drawer box and other internal construction.

## 2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified.
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 110 degrees of opening, soft-closing.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
- D. Cabinet Door/Drawer Pulls: Refer to Interior Design finish schedule.
- E. Catches: Magnetic catches, BHMA A156.9, B03141.
- F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- G. Shelf Rests: BHMA A156.9, B04013; two-pin metal shelf support.
  - 1. Shelves routed at one-side for fitted rest support.
- H. Drawer Slides: BHMA A156.9.
  - 1. Grade 1 and Grade 2: Side mounted.
    - a. Type: Full extension with 100-pound load capacity.
    - b. Material: Epoxy-coated steel with polymer rollers.
- I. Door Locks: BHMA A156.11, E07121. Keyed cylinder, two keys for each lock, master keyed.
- J. Drawer Locks: BHMA A156.11, E07041. Keyed cylinder, two keys for each lock, master keyed.
- K. Door and Drawer Silencers: BHMA A156.16, L03011.

- L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  - 1. Satin Stainless Steel: BHMA 630.
- M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

## 2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Per plastic laminate manufacturer's recommendation.
  - 1. Adhesive for Bonding Edges: Hot-melt adhesive.

## 2.5 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
  - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
  - 2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

### 3.2 EXAMINATION

- A. Section 013000 – Administrative Requirements: Coordination and project conditions.
- B. Verify adequacy of backing and support framing.
- C. Verify locations and sizes of utility rough-ins associated with work of this section.

### 3.3 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
  - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
  - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
  - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.

### 3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semi-exposed surfaces.

### END OF SECTION

**SECTION 066116**  
**BIOPRISM® SOLID SURFACE WINDOWSILLS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Windowsills

1.2 SECTION INCLUDES

- A. BioPrism® Solid Surface Windowsills

1.3 REFERENCES

- A. American National Standards Institute (ANSI)
- B. International Cast Polymer Alliance (ICPA)

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide windowsills that conform to the following requirements of regulatory agencies and the quality control of InPro® Corporation.
  - 1. Provide windowsills that conform to ANSI/ICPA SS-1 for workmanship and finish, structural integrity and material characteristics.
  - 2. Fungal and Bacterial Resistance: Provide BioPrism® Solid Surface that does not support fungal or bacterial growth as tested in accordance with ASTM G-21 and ASTM G-22.

1.5 SUBMITTALS

- A. Product Data:
  - 1. Manufacturer's printed product data for each type of windowsill specified.
  - 2. Flame spread information for windowsill specified.
- B. Samples: Color samples a minimum of 2" x 2" indicating color and pattern.
- C. Manufacturer's Installation Instruction: Printed installation instructions for each type of windowsill specified.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in unopened factory packaging to the jobsite
- B. Inspect materials at delivery to assure that specified products have been received.
- C. Store in original packaging in an interior climate controlled location away from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Products must be installed in an interior climate controlled environment.

1.8 WARRANTY

- A. Standard BioPrism® Solid Surface Limited 10 Year Warranty against material and manufacturing defects.

**PART 2 - PRODUCTS**

2.1 MANUFACTURER

- A. Acceptable Manufacturer:
  - InPro® Corporation,
  - PO Box 406 Muskego, WI 53150 USA;
  - Telephone: 800.222.5556, Fax: 888.715.8407,
  - www.inprocorp.com
- B. Substitutions: Not permitted
- C. Provide all windowsills from a single source.



## 2.2 MANUFACTURED UNITS

### A. Windowsills

#### 1. BioPrism® Solid Surface Windowsills

- a. Provide windowsills from 1/2" BioPrism® Solid Surface to size and shape as specified on the drawings. Seams shall be adhesively joined and inconspicuous.

## 2.3 ACCESSORIES

- A. Solid Surface Bonding Adhesive
- B. Adhesive Cartridge Dispenser
- C. Adhesive Mixing Tips
- D. Silicone Sealant

## 2.4 MATERIALS

- A. BioPrism® Solid Surface: Windowsills shall be manufactured from polyester/acrylic blended resins with natural filler material.

## 2.5 FINISHES

- A. Color: As indicated in Interior Design Finish Schedule.

## **PART 3 - EXECUTION**

### 3.1 EXAMINATION

- A. Examine areas and conditions in which windowsills will be installed.

### 3.2 PREPARATION

- A. General: Prior to installation, clean area to remove dust, debris and loose particles.

### 3.3 INSTALLATION

- A. General: Install components plumb and level, scribe adjacent finishes, in accordance with approved shop drawings and recommended installation instructions.

### 3.4 CLEANING

- A. At completion of the installation, clean surfaces in accordance with the manufacturer's clean-up and maintenance instructions.

## **END OF SECTION**

**SECTION 066400  
PLASTIC PANELING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Plastic sheet paneling.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for wood furring for installing plastic paneling.
  - 2. Section 102600 "Wall and Door Protection" for corner guards installed over plastic paneling.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Flame spread Data: For each type of product.
- C. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

**1.4 QUALITY ASSURANCE**

- A. Testing Agency: Acceptable to authorities having jurisdiction.

**1.5 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.
  - 1. Refer to Interior Design Finish Schedule.

### **2.2 PLASTIC SHEET PANELING**

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319. Panels shall be USDA accepted for incidental food contact.
  - 1. SEE INTERIOR DESIGN FINISH SCHEDULE.
  - 2. Low-Emitting Materials: Paneling shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
  - 3. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  - 4. Nominal Thickness: Not less than 0.09 inch.
  - 5. Surface Finish: See Interior Design finish schedule.
  - 6. Color: See Interior Design finish schedule.

### **2.3 ACCESSORIES**

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners and caps as needed to conceal edges.
  - 1. Color: See Interior Design finish schedule.
- B. Exposed Fasteners: Nylon drive rivets recommended by panel manufacturer.
- C. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.
- D. Adhesive: As recommended by plastic paneling manufacturer and with a VOC content of 50 g/L or less.
- E. Adhesive: As recommended by plastic paneling manufacturer and that complies with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- F. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079000 "Joint Sealants."
  - 1. Sealant shall have a VOC content of 250 g/L or less.
  - 2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Remove wallpaper, vinyl wall covering, loose or soluble paint, and other materials that might interfere with adhesive bond.
- B. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.
- C. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- D. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- E. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.
  - 1. Mark plumb lines on substrate at trim accessory locations for accurate installation.
  - 2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

#### **3.3 INSTALLATION**

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install panels with fasteners. Layout fastener locations and mark on face of panels so that fasteners are accurately aligned.
  - 1. Drill oversized fastener holes in panels and center fasteners in holes.
  - 2. Apply sealant to fastener holes before installing fasteners.

- D. Install factory-laminated panels using concealed mounting splines in panel joints.
- E. Install trim accessories with adhesive. Do not fasten through panels.
- F. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- G. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- H. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures. Fill space with sealant.
- I. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

**END OF SECTION**

**SECTION 071416**  
**DRYLOK® EXTREME Latex Base Masonry Waterproofer**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
1. Waterproofing below grade exterior surface of concrete, cement or concrete block brick, or stone basements, and foundation walls as scheduled.
  2. Waterproofing above grade exterior surfaces of concrete, cement, brick, stone or concrete block walls, ceilings or floors as scheduled.
  3. Waterproofing below grade interior surface of concrete, cement, brick, stone or concrete block basements and foundation walls as scheduled.
  4. Waterproofing above grade interior surfaces of concrete, cement, brick, stone or concrete block walls, ceilings or floors as scheduled.
  5. Waterproofing above or below grade non-potable water tanks, pools, lagoons, ponds, fountains or water features as scheduled.
- B. Related Sections:
1. Section 03 30 00 – Cast-in-Place Concrete.
  2. Section 03 41 00 – Precast Structural Concrete.
  3. Section 03 47 13 – Tilt-Up Concrete.
  4. Section 04 21 00 – Masonry Assemblies Unit Masonry.
  5. Section 04 22 00 – Concrete Unit Masonry

**1.3 REFERENCES**

- A. ASTM International (ASTM)
1. ASTM D 16 – Standard Terminology for Paint, Related Coatings, Materials and Applications.
  2. ASTM D 1653 Method A (Dry Cup) – Standard Test Methods for Water Vapor Transmission of Organic Coating Films.
  3. ASTM D 6904 – Standard Practice for Resistance to Wind-Driven Rain for Exterior Coatings Applied to Masonry.
  4. ASTM D 7088 – Standard Practice for Resistance to Hydrostatic Pressure for Coatings Used in Below Grade Applications Applied to Masonry.

**1.4 ACTION SUBMITTALS**

- A. Submit under provisions of Section 01 30 00.

- B. Product Data: For each type of product.
  - 1. Include construction details, materials descriptions and tested physical properties of water proofing.
  - 2. Include manufacturer's instructions for evaluating, preparing and treating substrate.
- C. Shop Drawings:
  - 1. Show locations and extent of waterproofing.
- D. Samples:
  - 1. For each product specified, two samples, minimum 4 inches square, representing actual product color and texture.

## **1.5 QUALITY ASSURANCE**

- A. Comply with Section 01 40 00.
- B. Qualifications:
  - 1. Manufacturer Qualifications: Company with minimum 15 years of experience in manufacturing of specified products and systems.
  - 2. Applicator Qualifications: Company with minimum of 5 years' experience in application of waterproofing as specified in this section on projects of similar size and scope, and employs installers and supervisors who are trained by and acceptable to product manufacturer.
    - a. Successful completion of a minimum of 5 projects of similar size and complexity to specified Work.
- C. Field Mock-up:
  - 1. Install at Project site or pre-selected area of building an area for field mock-up, as directed by Architect.
  - 2. Apply material in strict accordance with manufacturer's written application instructions.
  - 3. Manufacturer's representative or designated representative will review technical aspects; surface preparation, application, and workmanship.
  - 4. Field sample will be standard for judging workmanship on remainder of Project.
  - 5. Maintain field mock-up during construction for workmanship comparison.
  - 6. Do not alter, move, or destroy field mock-up until Work is completed and approved by Architect.
  - 7. Obtain Architect's written approval of field mock-up before start of material application, including approval of aesthetics, color, texture, and appearance.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with Section 01 60 00.
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Transport and store in unopened containers and keep in clean, dry condition protected from rain, dew, and humidity.
- E. Do not allow DRYLOK® to freeze.

## **1.7 PROJECT CONDITIONS**

- A. Environmental Requirements:
  - 1. Do not apply in rain or when rain is expected within 24 hours. Do not apply above 90 degrees F (32 degrees C) or below 50 degrees F (10 degrees C) or when temperatures are expected to fall below 40 degrees F (4 degrees C) within 24 hours.

## **1.8 WARRANTY**

- A. Manufacturer agrees to replace product or refund product purchase price if product fails to provide a waterproof coating.
  - 1. Warranty Period: 15 years from application.
  - 2. Specific Warranty Limitations:
    - a. Review manufacturer website: <http://www.drylok.com/warranty/ugl-drylok-extreme-masonry-waterproofer-15-year-warranty.pdf> for complete warranty details.
  - 3. Warranty Inspection: Manufacturer representative or designated representative.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, provide products from the following manufacturer:
  - 1. United Gilsonite Laboratories (UGL), which is located at 1396 Jefferson Avenue, P.O. Box 70 Scranton, PA 18501; Customer Service: 1-800-845-5227 or 1-570-344-1202; Email: [ugllabs@ugl.com](mailto:ugllabs@ugl.com); Website: [www.ugl.com](http://www.ugl.com)
- B. Substitutions: Not Permitted.
- C. Specifications and Drawings are based on manufacturer's proprietary literature from United Gilsonite Laboratories (UGL).
- D. Single Source Limitation for Complete System: Obtain materials from a single manufacturer to create a complete system.

### **2.2 MATERIALS**

- A. Latex based coating for concrete and masonry that resists both positive and negative hydrostatic pressure.
  - 1. Acceptable Product:
    - a. DRYLOK® EXTREME Latex Base Masonry Waterproofer

### **2.3 MIXING**

- A. Stir thoroughly before and during application. Do not thin.
- B. Color:
  - 1. White
  - 2. Custom color. Refer to Drawings.



## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Comply with Section 01 70 00.

### **3.2 SURFACE PREPARATION**

- A. Ensure that substrates are sound and free of dust, dirt, paints, form oils, wax curing compounds, or other contaminants that could impair bond of the coating. Old paint in poor condition must be removed by wire-brushing, sand blasting or other suitable means.
- B. Ensure substrate has properly cured. Concrete should obtain 80 percent of design strength. If efflorescence is present, remove it with DRYLOK® ETCH or muriatic acid before proceeding.

### **3.3 APPLICATION - GENERAL**

- A. Stir DRYLOK® EXTREME thoroughly during application.
- B. Apply coating directly on to bare masonry with a DRYLOK® Brush, nylon bristle brush or equivalent stiff fiber brush or by textured spray equipment. Spray or back-brush first coat to fill pores of masonry and achieve uniformity.
- C. Two coats shall be applied. Allow first coat to cure 3 hours, then apply second coat by brush, spray or roller.
- D. Examine finished surface after two coats and inspect for any leaking, open pores or pinholes. If observed, spot-treat rejected areas, repaint entire surface with another coat of DRYLOK® EXTREME and reinspect.
- E. Allow coating to cure 7 to 10 days before immersion in water.

### **3.4 CLEANING**

- A. Clean waterproofing material from tools and equipment with water. Remove cured materials by washing or scraping.

### **3.5 PROTECTION**

- A. Protect work from damage of other trades during construction. Correct deficiencies or damage by cleaning or recoating, as approved by Architect.

**END OF SECTION**

**SECTION 071813  
PEDESTRIAN TRAFFIC COATING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Waterproof vinyl traffic membrane, internally reinforced, single-ply, walkable roof surface.
- B. Waterproof vinyl traffic membrane, internally reinforced, two-ply walkable roof surface.
- C. Waterproof vinyl traffic membranes can be used on the following residential applications:
  - 1. Balcony decks.
  - 2. Roof decks.
  - 3. Walkways.
  - 4. Stairways.
  - 5. Above grade court yards.
  - 6. Above grade swimming pool decks.
  - 7. Hot tub decks.

**1.2 RELATED SECTIONS**

- A. Section 03 30 00 - Cast-In-Place Concrete: Concrete flooring to receive vinyl decking.
- B. Section 06 16 00 - Sheathing: Subfloor plywood or cementitious underlayment to receive vinyl decking.
- C. Section 06 46 00 (subsection) – Exterior Finish Carpentry: Moldings and trims at floor penetrations and terminations.
- D. Section 06 600 00 (subsection) – Plastic Fabrication: Moldings and trims at floor penetrations and terminations.
- E. Section 07 18 13 (subsection) - Pedestrian Traffic Coatings.
- F. Section 07 54 19 (subsection) – Polyvinyl-Chloride Roofing.
- G. Section 07 61 00 – Flashings and Sheet Metal.
- H. Section 07 71 13 – Roof and Wall Specialties and Accessories: Scuppers, drains counter flashings and reglets.

**1.3 REFERENCES**

- A. **ASTM D 4434-12:** Standard Specifications for (Polyvinyl Chloride) Sheet Roofing. Reference Tufdek / Intertek CCRR-1122
- B. **CCMC 07544:** Canadian Construction Materials Centre. Polyvinyl Chloride Roofing and Waterproof Membranes, "PVC Sheet - Applied Roofing" Type 4, Class B. Tufdek listing # 13293-L.

- C. **CAN/CGSB 37.54-95:** Canadian General Standards Board Standard for Roofing and Waterproofing Membrane, Sheet Applied, Flexible Polyvinyl Chloride. Reference Tufdek / Intertek CCRR-1122
- D. **Intertek:** Code compliance review report, Listing, Quality Control Manual and License to Mark. [https://bpdirectory.intertek.com/Pages/DLP\\_Search.aspx](https://bpdirectory.intertek.com/Pages/DLP_Search.aspx)
- E. **QAI Class A and Class C Fire Testing:** Tufdek test report RJ3782 – 1 - Rev 1, ASTM E108-11 Class C fire rating. Tufdek test report RJ3782 – 2 - Rev 2, ASTM E108-11 Class A fire rating.
- F. **Intertek Audited Fire Testing Report:** Class A. Intertek test report 103913168COQ-002 and Intertek CCRR-1122
- G. **ICC-ES AC39 and AC75:** Acceptance Criteria for Walking Decks, Roofing membrane and roof covering systems. Trinity / Tufdek test report # T32800.08.10. Intertek CCRR-1122
- H. **Florida Building Code:** Trinity ERD / Evaluation report T32790.08.10 / Florida Building Code approval listing number - FL13993. Intertek CCRR-1122.

#### 1.4 DESIGN REQUIREMENTS

- A. Drainage:
  - 1. Slope: 1/4 inch in 12 inches (6mm in 305mm) recommended.
  - 2. Direction: Slope towards drain or drainage point.
- B. Structural:
  - 1. Tufdek membranes are acceptable for use with structures designed to support lightweight deck / roof assemblies.
  - 2. Tufdek is not acceptable for commercial use or public access areas.
  - 3. Adequacy of the structural support must be verified by the GC or the GC's technical representative and is their sole responsibility to determine.
  - 4. Potential live loads, such as snow or ponding water, should be considered.
- C. Acceptable Substrate:
  - 1. Minimum 5/8" exterior grade Fir plywood.
  - 2. Minimum 5/8" Tolko T-Ply Pro or Ultra T & G plywood subfloor.
  - 3. Minimum 1/2" PermaBase, cementitious underlayment.
- D. Chemical Compatibility:
  - 1. Tufdek membranes must not come in contact with bitumen or tar based products, pressure treated wood products or polystyrene insulations.
  - 2. Tufdek membranes must not come in contact with copper based metals as water runoff from copper can discolor the surface of the membrane.
  - 3. Tufdek membranes can be affected by chemicals found in commercial / residential environments. Many chemicals left to absorb into the membrane and / or then exposed to extreme heat or ultra violet light can cause permanent discoloration or damage to Tufdek membranes. Contact Tuff Technical Department for question related to chemical incompatibilities.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
  2. Storage and handling requirements and recommendations.
  3. Installation methods.
- C. Detail Drawings: Submit copies of manufacturer's detail drawings describing installation methods, seaming plan showing joints, termination details and interface with other materials as well as flashing conditions applicable to the project.
- D. Selection Samples: For each finish product specified two complete sets of color samples 8 1/2 inches by 11 inches (216mm x 280mm), representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches by 4 inches (152 mm x 102 mm) square representing actual product, color, and patterns.
- F. Installer's qualifications.
- G. Draft Warranty

## **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: All primary products specified in this section must have third party auditing of the manufacturing process, be internally reinforced and supplied by a single manufacturer with a minimum of ten (10) years' experience.
- B. Installer Qualifications: All products listed in this section are to be installed by an installer with a minimum of two (2) years demonstrated experience installing products of the same type and scope as specified. Installer must have completed the factory training or have been trained by an authorized dealer who has completed the factory training.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
  2. Do not proceed with remaining work until workmanship, color, and details are approved by Architect. Complete mock-up as required to produce acceptable work.
  3. Pre Installation Meeting: Discuss waterproof practices and precautions applicable to this project.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- C. Deliver all materials to the job site in their original, tightly-sealed container or unopened packaging.
- D. All materials must be clearly labeled with the manufacturer's name and product identification.

- E. All materials must be protected from damage during transit, handling, storage and installation. Leave all materials on pallets fully protected from moisture.
- F. Reject damaged materials at delivery. Replace all damaged materials with new materials.
- G. All materials shall be stored in a dry area and protected from the elements. Store membrane rolls flat on pallets.
- H. Store adhesive at temperatures between 5 C (40 F) and 26 C (80 F): if adhesives are exposed to lower temperatures, verify usability with manufacturer before using.
- I. Store all flammable materials in a cool, dry area away from sparks and open flames. Follow precautions outlined by manufacturer / supplier.

## **1.8 AMBIENT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, dew point and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## **1.9 WARRANTY AND MAINTENANCE**

- A. At project closeout, provide to Owner or Owners Representative a copy of the manufacturer's current standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage. Include a copy of the manufacturer's current Tufdek membrane maintenance instructions.

# **PART 2 PRODUCTS**

## **2.1 MANUFACTURERS**

Acceptable Manufacturer: Tuff Industries Inc, located at:  
9570 Bottom Wood Lake Rd; Lake Country, BC, Canada V4V 1S7;  
Toll Free: 877-860-9333; Email: [info@tuffindustriesinc.com](mailto:info@tuffindustriesinc.com) Web: [www.tufdek.com](http://www.tufdek.com)

- A. Substitutions: Not permitted.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

## **2.2 APPLICATIONS/SCOPE**

- A. Apply Tufdek vinyl deck flooring over all "light foot" traffic bearing decks and roof decks in commercial, institutional and residential applications; restoration and new construction.
- B. Fully adhered vinyl flooring without ballast to solid construction, suspended concrete or fir plywood, on flat, sloped and unusual configuration traffic decks.

## **2.3 BASE SHEET MEMBRANE FOR TUFDEK 2-PLY SYSTEM**

- A. Base Sheet Membrane:
  - 1. Membrane Overall Thickness: Tufdek TX 60 mil, (1.52 mm).

2. Internal 18x14 Weft reinforced roof membrane with Ultra Violet resistance.
3. Sheet Width: 64.25 inches (1632 mm) typical; other standard widths as applicable to project requirements and available from the manufacturer.
4. Weight: 1653 g/m<sup>2</sup>.
5. Elongation Tear Strength - ASTM D 751: PASS.
6. Dimensional Change - CGSB 37.54-95: PASS.
7. Accelerated Weathering - ASTM G 154 at 5000 hours: PASS.
8. Color: TX white top, black back. Product can have either side facing up.

## 2.4 TRAFFIC MEMBRANE

- A. Supreme Tufdek Waterproof Traffic Membrane:
1. Membrane Overall Thickness: 61 mil, (1.55 mm).
  2. Internal 18x14 Weft reinforced roof membrane with Ultra Violet resistance.
  3. Sheet Width: 64 inches (1626 mm); other standard widths as applicable to project requirements may be available from the manufacturer.
  4. Weight: 1653 g/m<sup>2</sup>.
  5. Seam Strength - CGSB 37.54-95: PASS.
  6. Elongation Tear Strength - ASTM D 751: PASS.
  7. Dimensional Change - CGSB 37.54-95: PASS.
  8. Accelerated Weathering - ASTM G 154 at 5000 hours: PASS.
  9. Color: Graphite
  10. Color: Pearl
  11. Color: Walnut
  12. Color: Almond
  13. Color: Desert Sand
  14. Color: Slate Grey
  15. Color: Valencia Marble
  16. Color: Sanibel Marble
  17. Color: Carrara Marble
- B. Designer Tufdek Waterproof Traffic Membrane:
1. Membrane Overall Thickness: 61 mil, (1.55 mm).
  2. Internal 18x14 Weft reinforced roof membrane with Ultra Violet resistance.
  3. Sheet Width: 64 inches (1626 mm); other standard widths as applicable to project requirements may be available from the manufacturer.
  4. Weight: 1653 g/m<sup>2</sup>.
  5. Seam Strength - CGSB 37.54-95: PASS.
  6. Elongation Tear Strength - ASTM D 751: PASS.
  7. Dimensional Change - CGSB 37.54-95: PASS.
  8. Accelerated Weathering - ASTM G 154 at 5000 hours: PASS.
  9. Color: Aggregate
  10. Color: Birch
  11. Color: Rustic Plank
  12. Color: Driftwood

## 2.5 ADHESIVES

- A. Tuff – “Trowel On”: Water-based synthetic polymer trowel on adhesive used for bonding all Tufdek membranes to flat horizontal wood surfaces, Shelf life 1 Year.
- B. Tuff – “Low VOC Contact Adhesive”: Solvent based, roll or brush on adhesive for bonding all Tufdek membranes to flat or vertical wood and / or concrete surfaces. Shelf life 1 Year.
- C. Tuff – “Roll-On”: Water-based synthetic polymer roll on adhesive used for bonding

all Tufdek membranes to flat horizontal or vertical wood and / or concrete surfaces,  
Shelf life 1 Year.

## 2.6 ACCESSORIES

- A. Tuff – “Deck Patch”: Cement based floor leveling compound used for filling plywood gaps, knotholes and uneven surfaces, follow directions for mixing on container.
- B. Tuff-Seal Drain: Spun aluminum drain with PVC coated flange and removable clean out grate and clamping ring.
- C. Tuff-Seal Overflows: Welded aluminum overflows with PVC coated flange and a 12 inch (304.8 mm) outflow pipe.
  - 1. Drain Diameter: 2 inch (50.8 mm) O.D. (sloped at 10%).
  - 2. Drain Diameter: 3 inch (76.2 mm) O.D. (sloped at 10%).
  - 3. Drain Diameter: 2 inch (50.8 mm) I.D. (sloped at 0%).
  - 4. Drain Diameter: 3 inch (76.2 mm) O.D. (sloped at 0%).
- D. Tuff-Clad H/D PVC Metal: 21 mil unreinforced membrane laminated to 24 gauge G-90 Galvanized steel fabricated by contractor into metal flashings and edge details.
  - 1. Color: Grey
  - 2. Color: Sandalwood
  - 3. Color: White.
  - 4. Color: Black.
- E. Tuff-Seal Box Scuppers: All aluminum construction with PVC coating and welded exit pipe. 4 by 4 by 12 inches (101 by 101 by 305 mm).

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 SUBSTRATE PREPARATION

**It is the Installation contractor's responsibility to ensuring the substrate is acceptable for the Tufdek membrane system**

- A. Correct Substrate Defects.
  - 1. Defects that need to be corrected before work can commence should be brought to the attention of the General Contractor or Owner in writing and addressed by them.
  - 2. For re-decking applications, remove existing waterproof system components as specified by the project designer. If components are discovered during installation that could be detrimental to the performance of the new Tufdek system, they should be brought to the attention of the Project Designer, General Contractor or Owner for corrective action.
  - 3. If soundness and integrity of the existing structure cannot be verified, good practice requires a complete tear-off for inspection and repair. However, recovering an existing structure is an alternative to removing all existing

components. Non-destructive testing, in conjunction with core cuts, must be completed to determine the condition of the existing structure.

4. The installation contractor is responsible for assuring that all wet substrate materials are dry prior to the installation of the new waterproof system.
5. In the absence of a Design Professional or General Contractor, the Installation Contractor should coordinate with the building owner to assure conditions are satisfactory to commence with the project as designed.

**B. Remove Moisture**

1. Ponded water, snow, frost and/or ice, must be removed from the work surface(s) and completely dried prior to installing the Tufdek System.

**C. Prepare Surface**

1. Acceptable substrates to which the Tufdek System is installed must be properly prepared prior to the system installation. The surface must be relatively even, clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease and other materials that may damage the system. Rough surfaces that could cause damage to the membrane must be repaired as determined by the Design Professional.

**D. Fill Voids**

1. All surface voids of the immediate membrane substrate greater than 1/4" (6.35 mm) wide must be filled.

**3.3 FULLY-ADHERED TUFDEK TX 60 "BASE PLY" MEMBRANE FOR TWO – PLY SYSTEM**

- A. Unroll the TX 60 membrane and position without stretching. Allow the membrane to relax for 15 minutes if the temperature is above 60 F (15 C), or at least 30 minutes if temperature is lower. Inspect membrane, remove or replace any product that is creased or damaged.
- B. Lap sheets a minimum of 1.0 inch / 25.4 mm (minimum) or per acceptable standard roof practice to allow for a continuous weld area leaving room for adjustments and trimming of seams if necessary.
- C. Fold back one half the width of the membrane and apply Tufdek adhesive in accordance with the manufacturers written instructions. Upon proper curing of the recommended adhesive roll membrane into the adhesive and push out air as to not create wrinkles or bubbles under the membrane. Fold back the remaining half, and repeat the process.
- D. Refer to all manufacturer's instructions / specifications or contact Tufdek Technical Department for requirements.
- E. Hot-air weld all seams with a continuous nominal 1.0 inch / 25.4 mm (minimum) weld width or per acceptable standard roof practice.
- F. Inspect all welded seams for continuity and integrity using a seam probe, rounded screwdriver or similar blunt object. Seam checks are to be made daily by the contractor.

**3.4 FULLY-ADHERED MEMBRANE**

- A. Unroll the Tufdek membrane and position without stretching. Allow the membrane to relax for 15 minutes if the temperature is above 60 F (15 C), or at least 30 minutes if



temperature is lower. Inspect membrane, remove or replace any product that is creased or damaged.

- B. Lap sheets a minimum of 1.0 inch / 25.4 mm (minimum) weld width or per acceptable standard roof practice to allow for a continuous weld area leaving room for adjustments and trimming of seams if necessary.
  - 1. For 2 ply system, stagger the seams on the top ply to ensure they are not directly on top of the base ply seams; to avoid build up of materials.
- C. Fold back one half the width of the membrane and apply Tufdek adhesive in accordance with the manufacturers written instructions. Upon proper curing of the recommended adhesive roll membrane into the adhesive and push out air as to not create wrinkles or bubbles under membrane. Fold back the remaining half, and repeat the process.
- D. Refer to all manufacturer's instructions / specifications or contact Tufdek Technical Department for further information.
- E. Hot-air weld all seams with a continuous nominal 1.0 inch / 25.4 mm (minimum) weld width or per acceptable standard roof practice.
- F. Inspect all welded seams for continuity and integrity using a seam probe, rounded screwdriver or similar blunt object. Seam inspections are to be made daily by the contractor.

### **3.5 FLASHINGS**

- A. Install Tuff-Clad PVC metal and / or membrane flashings and hot air weld 1.0 inch / 25.4 mm (minimum) or per acceptable standard roof practice to all metal and membrane flashings.
- B. Install all flashings concurrently with the membrane as Work progresses.

### **3.6 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Manufacturer is not responsible or liable for the quality of the work performed by the installation contractor.

### **3.7 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

## **SECTION 072100 BUILDING INSULATION**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Batt insulation in exterior walls ceiling and roof construction.
  - 2. Firesafing and sound batt insulation in all interior and fire rated partitions.

#### **1.2 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on product materials, characteristics, performance criteria, and limitations including all accessories.
- C. Manufacturer's Installation Instructions: Submit special environmental conditions required for installation and installation techniques, special perimeter conditions requiring special treatment.
- D. Manufacturer's Certificate:
  - 1. Certify that products meet or exceed specified requirements.

#### **1.3 QUALIFICATIONS**

- A. Batt and Board Insulation Manufacturers: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Batt and Board Insulation Applicators: Company specializing in performing the work of this section with minimum three years documented experience and certified by the manufacturer.

#### **1.4 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01600 - Product Requirements.
- B. Do not install adhesives when temperature or weather conditions are detrimental to successful installation.

#### **1.5 REGULATORY REQUIREMENTS**

- A. Comply with applicable code requirements.

## 1.6 SEQUENCING

- A. Section 011000 - Summary: Work sequence.
- B. Sequence Work to ensure firestopping materials are in place before beginning the Work of this section.

## 1.7 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.

## PART 2 PRODUCTS

### 2.1 BATT INSULATION

- A. Manufacturers:
  - 1. Owen Corning.
  - 2. Substitutions: No substitutions.
- B. Batt Insulation: ASTM C665, Type III, preformed glass fiber batt type, paper faced one side, with maximum flame/smoke properties of 75/450 in accordance with ASTM E84. For walls and un-faced for floor ceiling and roof ceiling assemblies.
- C. Thermal Resistance:
  - 1. R=30: All ceilings adjacent to exterior.
  - 2. R=19: All exterior walls.
  - 3. R=11 min. (Thickness to fill depth of wall): Interior walls as shown for sound attenuation fire blanket (SAFB).
  - 4. R=13: At furred exterior concrete masonry unit walls.
- D. Batt Size: To fit stud spacing. Staple all.

### 2.2 FIRESAFING AND SOUND BATT INSULATION

- A. Manufacturers:
  - 1. Owen Corning Thermafiber Sound Attenuation Fire Blankets (SAFB).
  - 2. Substitutions: No substitutions.
- B. Batt Insulation: ASTM C665, Type I, unfaced semi rigid mineral fiber batt type, 2.5 pcf density, 3 to 6 inches thick to fill wall depth, with maximum flame/smoke properties of 15/0 in accordance with ASTM E84.
- C. Locations:
  - 1. All interior walls
  - 2. Floor ceiling assemblies
- D. Batt Size
  - 1. Friction fit of sizes to fit stud spacing.
  - 2. Friction fit of size of joist spacing with insulation supports

## 2.3 ACCESSORIES

- A. Adhesive Type 1: Type recommended by insulation manufacturer for application.
- B. Tape: Self-adhering type for foil faced insulation.
- C. Wood Blocking: Preservative treated wood blocking as specified in Section 061000.
- D. 15-Minute Thermal Barrier: Type as approved by authorities having jurisdiction; refer to details on Drawings.
- E. Simpson Strong-Tie Insulation Supports Model # IS16-R100 for 16" o.c. spacing and IS24-R100 for 24" o.c. spacing.
- F. Spray foam insulation.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify that substrate, adjacent materials, and insulation boards are dry; and substrates are ready to receive insulation and adhesive.
- C. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances that may impede adhesive bond.

### 3.2 INSTALLATION - BATT INSULATION

- A. Install in exterior walls and roof between joists without gaps or voids. Fluff insulation to full thickness for specified R-value before installation. Do not compress insulation.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- C. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
- D. When the cavity contains obstructions such as electrical boxes, wiring or plumbing, fill gap with spray foam insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Staple or nail and tape facing flanges in place at maximum 6 inches oc.
- G. Tape seal all butt ends, lapped flanges, and tears or cuts in membrane.

- H. Install unfaced insulation with insulation supports between joist. Follow insulation manufacturer's insulation instructions.

### 3.3 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution Requirements: Protecting installed construction.
- B. Do not permit work to be damaged or disturbed prior to covering insulation.

**END OF SECTION**

**SECTION 072500  
HYDROGAP™ DRAINABLE HOUSEWRAP**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Weather barrier membrane (Benjamin Obdyke HydroGap® Drainable Housewrap)
- B. Seam Tape (Benjamin Obdyke HydroFlash® 2.5" Sealing Tape)
- C. Flashing (Benjamin Obdyke HydroFlash® 12
- D. Fasteners
- E. Adhesive/Sealant (per "Approved Compatible Products" list for HydroGap Drainable Housewrap)

**1.2 REFERENCES**

- A. ASTM International
  - ASTM D5034; Test Method for Dry Tensile Strength
  - ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
  - ASTM E96; Test Method for Water Vapor Transmission of Materials
  - ASTM E2178; Test Method for Air Permeance of Building Materials
  - ASTM E2273; Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies
- A. AATCC – American Association of Textile Chemists and Colorists
  - Test Method 127 Water Resistance: Hydrostatic Pressure Test

**1.3 SUBMITTALS**

- A. Refer to Section 013300 Submittal Procedures.
- B. Product Data: Submit manufacturer current technical literature for each component.
- C. Samples: Weather Barrier membrane, minimum 8-1/2 inches by 11 inch.
- D. Quality Assurance Submittals

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.
  - 1. Contractor to schedule the local manufacturer field service representative to visit the site prior to construction, during construction and after construction.
- B. Pre-installation Meetings:
  - 1. Contractor to schedule a pre-installation meeting with the local manufacture field representative.
- C. Mock-Ups:
  - 1. Subject to acceptance by owner and architect, mock-up may be retained as part of finish work.
  - 2. If mock-up is not retained, remove and properly dispose of mock-up.

## 1.5 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

## 1.6 WARRANTY

- E. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- F. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.
  - 1. Enhanced Warranty Option: 15 years, covering product and labor. HydroGap 15 year system warranty requires: HydroGap® Drainable Housewrap, HydroFlash for windows and other penetration flashing, and cap fasteners. Optionally, use HydroCorner in addition to HydroFlash to protect window sill. If taping housewrap seams, HydroFlash 2.5" width (or greater) must be used. Taping of house wrap seams not required for 10 or 15 year warranty per installation guidelines.

## PART 2 PRODUCTS

### 2.1 WEATHER RESISTIVE BARRIER

- A. Manufacturer: Benjamin Obdyke Incorporated.
  - 1. Contact: 400 Babylon Road, Suite A, Horsham, PA 19044; Telephone: (800) 523-5261; Fax: (215) 672-3731; E-mail: [info@benjaminobdyke.com](mailto:info@benjaminobdyke.com); website: [www.benjaminobdyke.com](http://www.benjaminobdyke.com).)
- B. Proprietary Products/Systems: Weather Resistive Barrier, including the following:
  - 1. HydroGap™ Drainable Housewrap General Characteristics
    - a. Description: tri-laminate substrate (2 layers of nonwoven with water-holdout film layer in between) with 1mm thermopolyolefin (TPO) spacers adhered to it to allow for a drainage gap.
    - b. Material: Polypropylene
    - c. Width: 5 ft (1.52 m).
    - d. Length: 100 ft (30.48 m).
    - e. Thickness: 0.05 inches (1.3 mm).
    - f. Weight: 17 lbs/roll
    - g. Spacer Design: 175 spacers per sq. ft.
  - 2. HydroGap™ Drainable Housewrap Performance Characteristics
    - a. Air Penetration: 0.0082 L/(sm<sup>2</sup>) at 75 psi, when tested in accordance with ASTM E2178.
    - b. Water Vapor Transmission: 16.1 perms, when tested in accordance with ASTM E 96, Method A.
    - c. Water Penetration Resistance: 55 cm for 5 hours when tested in accordance with AATCC Test Method 127.
    - d. Tensile Strength: 58.0 MD, 50.6 CD, when tested in accordance with ASTM

D5034.

- e. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 0, Smoke Developed: 75.
- f. Drainage Efficiency 96%, when tested in accordance with ASTM E2273.

## 2.2 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted.

## 2.3 ACCESSORIES

A. Provide the following accessories:

- 1. Taping of housewrap seams is not required. If taping seams, HydroFlash® 2.5 in must be used.
  - a. HydroFlash® 2.5 in Characteristics:
    - i. Description: specially-formulated self-adhered flashing for HydroGap Drainable Housewrap.
    - ii. Material: polypropylene film with aggressive synthetic adhesive.
    - iii. Width: 2.5 inches
    - iv. Length: 75 feet (26.8 m)
    - v. Thickness: 14.5 mil (368.3 microns)
- 2. Flashing: [HydroFlash™ Self-Adhered Flashing]
  - a. HydroFlash™ Self-Adhered Flashing Characteristics:
    - i. Description: specially-formulated self-adhered flashing for HydroGap Drainable Housewrap.
    - ii. Material: polypropylene film with aggressive synthetic adhesive.
    - iii. Width:[4; 6; 9; 12] inches (101.6; 152.4; 228.6 mm)
    - iv. Length: 75 feet (26.8 m)
    - v. Thickness: 14.5 mil (368.3 microns)
  - b. Material Standard: [butyl-based adhesive or synthetic based adhesive must be approved by Benjamin Obdyke for use with HydroGap Drainable Housewrap per installation instructions.]
- 3. Sill Flashing:
  - a. Benjamin Obdyke HydroCorner™ rigid sill corner flashing and HydroFlash Self Adhered Flashing 12"
- 4. Fasteners:
  - a. Acceptable to manufacturer of HydroGap Drainable Housewrap, Benjamin Obdyke.
- 5. Adhesives/Sealants:
  - a. Acceptable to manufacturer of HydroGap Drainable Housewrap, Benjamin Obdyke.

## PART 3 EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the manufacturer.

### 3.2 EXAMINATION

A. Site Verification of Conditions:



1. Verify that site conditions are acceptable for installation of housewrap.
2. Do not proceed with installation of housewrap until unacceptable conditions are corrected.

### 3.3 INSTALLATION

#### A. Basic Installation

1. Unroll HydroGap™ Drainable Housewrap with blue spacers facing to the exterior and fasten to sheathing with nails, staples or cap fasteners.
2. Fasteners should provide a minimum ½" penetration into the nail base and be spaced approximately 12 to 18 inches apart along the horizontal and vertical laps. Fasten every 3 sq. ft elsewhere.
3. HydroGap Drainable Housewrap should be installed shingle lap fashion (i.e. begin installation at the base of the wall assembly). Extend housewrap a minimum 2" over sill plate.
4. Overlap all horizontal seams by at least 4 inches, all vertical seams by at least 6 inches and corners by 12".
5. Be sure that the housewrap installation and flashing provide for positive drainage to the exterior of the assembly.
6. Do not allow the housewrap to be exposed to sunlight in excess of 120 days. Recommended coverage within 30 days.
7. If you must tape seams, with HydroFlash 2.5 in or greater width must be used.

#### B. Window Preparation

1. Wrap the entire building including window and door openings\*.
2. At each window opening, cut an "I" shape into housewrap. Cut housewrap above top corners 45 degrees away from window opening to account for flashing width.
3. Fold side and bottom flaps into rough opening and cut/fasten.
4. Fold up top trapezoid shaped "flap" and secure temporarily with tape prior to installing window.

\*Flash windows and doors according to building code requirements.

\*\*Install windows, doors and flashing as per manufacturers' installation instructions.

#### C. Special Considerations

1. Flash other wall penetrations (such as outlets, exhaust vents, etc.) with proper shingling technique to maintain drainage to the exterior.
2. Tape all tears and holes that may have been inadvertently introduced during the construction process.
3. HydroGap can be installed in any direction with the spacers facing to the exterior and still maintain its drainage characteristics.
4. When installing HydroGap as the *primary air barrier*, consider the following:
  - i. Tape all seams with HydroFlash 2.5"
  - ii. Seal the bottom of the first course to the foundation
  - iii. Seal the top of the last course to the sheathing or top plate
  - iv. Tape/seal all penetrations and tears
  - v. Use cap fasteners

### 3.4 PROTECTION

- #### A. Protect installed work from damage due to subsequent construction activity on the site.

**END OF SECTION**

**SECTION 072726**  
**FLUID APPLIED MEMBRANE AIR BARRIERS**

**PART 1 GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes materials and installation of vapor permeable fluid applied air and moisture barrier membrane over vertical above grade concrete walls, concrete masonry walls, and wall sheathing.
- B. Related Requirements (add/delete, depending on specific project requirements):
  - 1. Section 033000: Cast-In-Place Concrete
  - 2. Section 042200: Concrete Unit Masonry
  - 3. Section 061600: Sheathing
  - 4. Section 072500: Weather Barriers
  - 5. Section 072600: Vapor Retarders
  - 6. Section 075000: Membrane Roofing
  - 7. Section 076000: Flashing and Sheet Metal
  - 8. Section 079000: Joint Protection
  - 9. Section 085000: Windows

**1.3 DEFINITIONS**

- A. Air Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air Barrier Auxiliary Material: A transitional component that provides air barrier continuity furnished by a source other than the primary air barrier manufacturer.
- D. Air Barrier Assembly: The collection of air barrier materials, accessory and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

**1.4 PRE-INSTALLATION MEETINGS**

- A. Pre-installation Conference
  - 1. Review air barrier installation requirements and installation details, mock-ups, testing requirements, protection, and sequencing of work.

## 1.5 REFERENCES

- A. Building Code and Material Evaluation Service Standards
  - ICC ES AC 212 March 1, 2005, ICC Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing
  - 2012, 2015 IBC International Building Code
  - 2012, 2015 IRC International Residential Code
  - 2012, 2015 IECC International Energy Conservation Code
- B. ASTM Standards
  - C 297-94 Test Method for Tensile Strength of Flat Sandwich Constructions in Flat wise Plane
  - C 1177-08 Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  - D 522-93a Test Methods for Mandrel Bend Test of Attached Organic Coatings
  - D 1970-00 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
  - D 3273-00 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
  - D 4541-09 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
  - E 84-98 Test Method for Surface Burning Characteristics of Building Materials
  - E 96-00 Test Method for Water Vapor Transmission of Materials
  - E 779-10 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
  - E 783-02 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
  - E 1186-03 (2009) Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
  - E 1827-96 (2007) Standard Test Methods for Determining Air Tightness of Buildings Using an Orifice Blower Door
  - E 2178-03 Test Method for Air Permeance of Building Materials
  - E 2357-05 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- C. APA – The Engineered Wood Association
  - E30U-2007 Engineered Wood Construction Guide
- D. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)
  - 2005 ASHRAE Handbook Fundamentals
  - ASHRAE 90.1 2010, Energy Standard for Buildings Except Low-Rise Residential Buildings
  - ASHRAE 189.1 2009, Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings
- E. National Fire Protection Association (NFPA)
  - NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

- F. South Coast Air Quality Management District (SCAQMD)  
Rule 1113 (2007) Architectural Coatings

## **1.6 COORDINATION/SCHEDULING**

- A. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier.
- B. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall.
- C. Provide sill flashing to direct water to the exterior before windows and doors are installed.
- D. Install window and door head flashing immediately after windows and doors are installed.
- E. Install diverter flashings wherever water can enter the assembly to direct water to the exterior.
- F. Install parapet cap flashing and similar flashing at copings and sills to prevent water entry into the wall assembly.
- G. Install cladding within 180 days of air and moisture barrier installation.

## **1.7 SUBMITTALS**

- A. Manufacturer's specifications, details and product data.
- B. Manufacturer's standard warranty.
- C. Manufacturer's ICC evaluation report confirming compliance with the IBC, IRC, and IECC as an air barrier and water-resistive barrier.
- D. Samples for approval as directed by architect or owner.
- E. Shop drawings: substrate joints, cracks, flashing transitions, penetrations, corners, terminations, and tie-ins with adjoining construction, and interfaces with separate materials that form part of the air barrier assembly.

## **1.8 QUALITY ASSURANCE**

- A. Manufacturer requirements
  - 1. Manufacturer of exterior wall air and moisture barrier materials for a minimum of 30 years in North America.
  - 2. ISO 9001:2008 Certified Quality System and ISO 14001:2004 Certified Environmental Management System.
- B. Contractor requirements
  - 1. Knowledgeable in the proper use and handling of Sto materials.
  - 2. Employ skilled mechanics who are experienced and knowledgeable in waterproofing and air barrier application, and familiar with the requirements of the specified work.
  - 3. Provide the proper equipment, manpower and supervision on the job-site to install the air barrier assembly in compliance with the project plans & specifications, shop drawings, and Sto's published specifications and details.

C. Regulatory Compliance

1. Primary air barrier and joint treatment reinforcement materials:
  - a. Listed by IBC and recognized for use on all types of construction. Refer to ICC ESR 1233 for limitations.
  - b. Comply with VOC requirements of SCAQMD Rule 1113.
  - c. Comply with air barrier material requirements of ASHRAE 90.1 – 2010, 2013
  - d. Comply with air barrier material requirements of ASHRAE 189.1 – 2009
  - e. Comply with 2012 and 2015 IRC requirement for a continuous air barrier
  - f. Comply with air barrier material requirements of 2012 and 2015 IBC and IECC.

D. Mock-ups

1. Build stand-alone site mock up or sample wall area on as-built construction to incorporate back-up wall construction, typical details covering substrate joints, cracks, flashing transitions, penetrations, corners, terminations, tie-ins with adjoining construction, and interfaces with separate materials that form part of the air barrier assembly.

**1.9 PRE-CONSTRUCTION TESTING AND Meeting**

A. Conduct testing by qualified test agency or building envelope consultant.

1. Conduct assembly air leakage testing in accordance with ASTM E 783.
2. Conduct adhesion testing to substrates in accordance with ASTM D 4541.
3. Conduct wet sealant compatibility testing in accordance with sealant manufacturer's field quality control test procedure.
4. Notify design professional minimum 7 days prior to testing.

B. Pre-construction Meeting

1. General Contractor to conduct a pre-construction onsite meeting with the product rep and installation contractor prior to starting the work and a follow up meeting after the work is complete and prior to covering the work up.

**1.10 DELIVERY, STORAGE AND HANDLING**

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.
- B. Protect coatings (pail products) from freezing temperatures and temperatures in excess of 90 degrees F (32 degrees C). Store away from direct sunlight.
- C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.
- D. Protect and store accessory and auxiliary products in accordance with manufacturer's written instructions.

## **1.11 PROJECT/SITE CONDITIONS**

- A. Maintain ambient and surface temperatures above 40 degrees F (4 degrees C) during application and drying period, minimum 24 hours after application of air and moisture barrier materials.
- B. Provide supplementary heat for installation in temperatures less than 40 degrees F (4 degrees C) or if surface temperature is likely to fall below 40 degrees F (4 degrees C).
- C. Provide protection of surrounding areas and adjacent surfaces from application of materials.

## **1.12 WARRANTY**

- A. Provide manufacturer's standard warranty.

# **PART 2 PRODUCTS**

## **2.1 MANUFACTURERS**

- A. Sto Corp.
- B. Obtain primary air barrier and accessory air barrier materials from single source.

## **2.2 MATERIALS**

- A. Primary Air Barrier Material: StoGuard with Sto EmeraldCoat – ready-mixed flexible spray or roller applied air and moisture barrier material.
- B. Accessory Materials
  - 1. Sheathing Joint Treatments
    - a. StoGuard RapidFill™: one component rapid drying gun-applied joint treatment for sheathing joints.
    - b. Sto Gold Fill® with StoGuard Mesh: ready mixed coating applied by trowel or knife over nominal 4.2 oz/yd<sup>2</sup> (142 g/m<sup>2</sup>) self-adhesive, flexible, symmetrical, interlaced glass fiber mesh.
    - c. Sto EmeraldCoat® with StoGuard Fabric: flexible air and moisture barrier membrane material for embedding non-woven integrally reinforced cloth reinforcement.
  - 2. Rough Opening Treatments)
    - a. StoGuard RapidSeal: one component rapid drying gun-applied rough opening protection for frame and CMU walls. Also used as a detail component for shingle lap transition at flashing.
    - b. Sto EmeraldCoat with StoGuard Fabric and StoGuard Redicorner™: flexible waterproof air barrier membrane material with non-woven integrally reinforced cloth reinforcements. Also used as a detail component for shingle lap transition at flashing.
    - c. Sto Gold Fill with StoGuard Mesh: ready mixed coating applied by trowel or knife with nominal 4.2 oz/yd<sup>2</sup> (142 g/m<sup>2</sup>) self-adhesive, flexible, symmetrical, interlaced glass fiber mesh. Also used as a detail component for shingle lap transition at flashing.

- d. StoGuard Tape: self-adhered rubberized asphalt tape for frame walls with polyester fabric facing.
- 3. Transition Membrane
  - a. StoGuard Transition Membrane: flexible air barrier membrane for continuity at transitions: sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, flashing shingle lap transitions, floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction.
  - b. StoGuard RapidFill: one component gun-applied air and moisture barrier membrane material for continuity at static transitions such as: flashing shingle laps, wall to balcony floor slab or ceiling, and through wall penetrations such as pipes, electrical boxes, and scupper penetrations.
- 4. Sealant
  - a. StoGuard RapidSeal – one component rapid drying air and moisture barrier membrane material for sealing fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials
  - b. StoGuard RapidFill – one component rapid drying waterproof air and moisture barrier membrane material for sealing fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials
- 5. Primers
  - a. StoGuard Primer: rubber resin emulsion primer for use with StoGuard Tape to enhance adhesion.
- C. Auxiliary Materials
  - 1. Wet sealant: Dow Corning 758, 790, 791, and 795 sealants
  - 2. Pre-cured sealant tape: Dow 123
  - 3. Spray adhesive: 3M Super 77 Spray Adhesive
  - 4. Spray foam: Dow Great Stuff for Gaps and Cracks
- D. Patch and Leveling Material for Concrete and Masonry
  - 1. Sto Leveler: polymer modified cementitious patch and leveling material for prepared concrete and masonry surfaces for leveling up to 1/4 inch (6 mm).
  - 2. Sto BTS-Xtra: polymer modified lightweight cementitious patch and leveling material for prepared concrete and masonry surfaces for leveling up to 1/8 inch (3 mm).

## **2.3 PERFORMANCE REQUIREMENTS**

- A. Durability, resistance to aging, water and water penetration resistance, structural loading: joint treatment and primary air barrier material, comply with ICC ES AC 212
- B. Flexibility: ASTM D 522, primary air barrier material, no cracking or delamination before and after aging using 1/8 inch (3 mm) mandrel at 14° F (10° C)
- C. Nail sealability: ASTM D 1970, 7.9.1, primary air barrier passes
- D. Resistance to mold: ASTM D 3273, no mold growth after 28 day exposure



- E. Adhesion: joint treatment and primary air barrier material, ASTM C 297 or D 4541,  $\geq 30$  psi (207 kPa), or exceeds strength of glass mat facing on glass mat gypsum substrates
- F. Surface burning: ASTM E 84, joint treatment and primary air barrier material flame spread  $\leq 25$ , smoke developed  $\leq 450$ , Class A building material
- G. Water vapor permeance: ASTM E 96 Method B,  $> 10$  perms (570 ng/Pa·s·m<sup>2</sup>)
- H. Field adhesion testing: ASTM D 4541,  $\geq 30$  psi (207 kPa) or exceeds strength of glass mat facing on glass mat gypsum substrates
- I. Fire resistance: ASTM E 119, permitted for use in exterior walls of fire-resistance-rated construction assemblies. Refer to ICC-ESR 1233.
- J. Building envelope air leakage: ASTM E 779 or 1827,  $\leq 0.4$  cfm/ft<sup>2</sup> (2 L/s·m<sup>2</sup>)
- K. Material air leakage: ASTM E 2178, primary air barrier and joint treatment  $< 0.004$  cfm/ft<sup>2</sup> at 1.57 psf (0.02 L/s·m<sup>2</sup> at 75 Pa)
- L. Assembly air leakage: ASTM E 2357,  $\leq 0.04$  cfm/ft<sup>2</sup> (0.2 L/s·m<sup>2</sup>) air leakage after conditioning protocol
- M. Fire propagation: NFPA 285, meets requirements for use on all Types of construction. Refer to ICC-ESR 1233.
- N. Volatile Organic Compounds: SCAQMD Rule 1113, joint treatment and primary air barrier material  $\leq 100$  g/L
- O. Water-resistive barrier: ICC ES 212, joint treatment and primary air barrier comply and are listed in a valid ICC ESR.

## 2.4 DESIGN CRITERIA

- A. Structural (Wind and Axial Loads)
  - 1. Design for maximum allowable deflection normal to the plane of the wall: L/240. Where cladding dictates stiffer deflection criteria use cladding design criteria for maximum allowable deflection.
  - 2. Design for wind load in conformance with code requirements.
- B. Moisture Control
  - 1. Prevent the accumulation of water in the wall assembly and behind the exterior wall cladding:
    - a. Minimize condensation within the assembly.
    - b. Drain water directly to the exterior where it is likely to penetrate components in the wall assembly (windows and doors, for example).
    - c. Provide corrosion resistant flashing to direct water to the exterior in accordance with code requirements, including: above window and door heads, beneath window and door sills, at roof/wall intersections, floor lines, decks, intersections of lower walls with higher walls, and at the base of the wall.
- C. Air Barrier Continuity: provide continuous air barrier assembly of compatible air barrier components.

D. Substrates

1. Concrete Masonry Units: provide CMU surfaces in conformance with the applicable building code, and such that a void and pinhole free air barrier is achieved. Provide normal weight units with flush joints (struck flush with the surface) and allow for a minimum of 2 coats of the primary air barrier material applied by spray or roller. Alternatively, for “rough” CMU wall surfaces allow for a cementitious parge coat to fill and level irregular surfaces, prior to 1 coat of the primary air barrier material.
2. Concrete: provide concrete in conformance with the applicable building code.
3. Sheathing: provide gypsum sheathing in compliance with ASTM C 1177, provide APA Exterior or Exposure 1 wood-based sheathing, and provide sheathing that meets required design wind pressures.

- E. Mechanical Ventilation: maintain pressurization and indoor humidity levels in accordance with recommendations of ASHRAE (see 2005 ASHRAE Handbook—Fundamentals).

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Inspect concrete and concrete masonry surfaces for:
1. Contamination – algae, dirt, dust, efflorescence, form oil, fungus, grease, mildew or other foreign substances.
  2. Surface deficiencies – weak, friable, chalkiness, laitance, bugholes, and spalls.
  3. Cracks – measure crack width and record location of cracks.
  4. Damage or deterioration.
  5. Moisture content and moisture damage – use a moisture meter to determine if the surface is dry enough to receive the waterproof air barrier and record any areas of moisture damage or excess moisture.
  6. Flush masonry mortar joints completely filled with mortar.
- B. Inspect sheathing application for compliance with applicable requirement:
1. Exterior Grade and Exposure I wood based sheathing: E30U-2007, Engineered Wood Construction Guide, and the requirements of the applicable building code.
  2. Glass mat faced gypsum sheathing in compliance with ASTM C 1177: consult manufacturer’s published recommendations and ICC ES Report. Conform with project requirements for wind load resistance.
  3. Cementitious sheathing – Consult manufacturer’s published recommendations and ICC ES Report. Conform with project requirements for wind load resistance.
- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the air and moisture barrier installation. Do not start work until deviations are corrected.

### **3.2 SURFACE PREPARATION**

- A. Concrete Masonry

1. Surface must be structurally sound and free of weak or damaged surface conditions such as laitance or spalls. Surface must be clean, dry, frost-free, and free of any bond-inhibiting materials such as dust, dirt, oil, algae, mildew, salts, efflorescence, or any other surface contamination. Mortar joints must be struck flush with the surface.
2. Remove excess mortar from masonry ties, lintels and shelf angles.
3. Remove loose or damaged material by water-blasting, sandblasting or mechanical wire brushing. Remove surface contamination such as dirt or efflorescence by chemical or mechanical means. Repair surface defects such as spalls, voids and holes with Sto BTS Xtra (up to 1/8 inch [3 mm] thick) or Sto Leveler (up to 1/4 inch [6 mm] thick).
4. Repair non-structural cracks up to 1/8 inch (3 mm) wide by raking with a sharp tool to remove loose, friable material and blow clean with oil-free compressed air. Apply joint treatment material over crack, embed reinforcement (where applicable), and smooth joint treatment material with a trowel, drywall or putty knife to cover the reinforcement.

B. Concrete

1. Surface must be structurally sound and free of weak or damaged surface conditions such as laitance, bugholes, or spalls. Surface must be clean, dry, frost-free, and free of any bond-inhibiting materials such as dust, dirt, oil, form release, algae, mildew, salts, efflorescence, or any other surface contamination.
2. Remove projecting fins, ridges, form ties, and high spots by mechanical means.
3. Remove loose or damaged material by water-blasting, sandblasting or mechanical wire brushing. Remove form release by chemical or mechanical means. Repair surface defects such as honeycombs, pitting, spalls, voids or holes with Sto BTS Xtra (up to 1/8 inch [3 mm] thick) or Sto Leveler (up to 3/8 inch [9 mm] thick).
4. Repair non-structural cracks up to 1/8 inch (3 mm) wide by raking with a sharp tool to remove loose, friable material and blow clean with oil-free compressed air. Apply joint treatment material over crack, embed reinforcement (where applicable), and smooth joint treatment material with a trowel, drywall or putty knife to cover the reinforcement.

C. Sheathing

1. Remove and replace damaged sheathing.
2. Spot surface defects such as over-driven fasteners, knot holes, or other voids in sheathing with knife grade joint treatment material.
3. Spot fasteners with knife grade or coating joint treatment material.

### 3.3 INSTALLATION

#### 3.3.1 **Air/Moisture Barrier Installation over Exterior or Exposure I Wood-Based Sheathing (Plywood and OSB), Glass Mat Faced Gypsum Sheathing in compliance with ASTM C 1177, concrete, and concrete masonry (CMU) wall construction**

- A. Coordinate work with other trades to ensure air barrier continuity with connections at foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks and balconies, and roof line.
- B. Transition Membrane Detailing: detail transition areas with StoGuard Transition Membrane to achieve air barrier continuity. For illustrations of installation, including complex geometries such as inside and outside corners, refer to Sto Guide Details and StoGuard Transition Membrane Installation Guide ([www.stocorp.com](http://www.stocorp.com)).

- C. Floor line deflection joints up to 1 inch (25 mm) wide, static joints and transitions – sheathing to foundation, dissimilar materials (CMU to frame wall), flashing shingle lap transitions, wall to balcony floor slab or ceiling:
  - 1. Apply air and moisture barrier coating (Sto EmeraldCoat) liberally to properly prepared surfaces with brush, roller, or spray.
  - 2. Place pre-cut lengths of StoGuard Transition Membrane centered over the transition in the wet coating. At changes in plane crease the membrane and similarly place the membrane material in the wet coating.
  - 3. Immediately top coat the membrane with additional coating and apply pressure with brush or roller to fully embed the membrane in the coating and achieve a smooth and wrinkle-free surface without gaps or voids.
  - 4. Apply coating liberally along all top horizontal edges on walls and along all edges on balcony floor slabs to fully seal the edges.
  - 5. Overlap minimum 2 inches (51 mm) at ends and adhere lap seams together with coating. Shingle lap vertical seams and vertical to horizontal intersections with minimum 2 inch (51 mm) overlap.
- D. Movement joints up to 1 inch (25 mm) wide and up to  $\pm 50\%$  movement: masonry control joints, through wall joints in masonry or frame construction
  - 1. Insert backer rod sized to friction fit in the joint (diameter 25% greater than joint width).
  - 2. Recess the backer rod  $\frac{1}{2}$ " (13 mm).
  - 3. Apply the waterproof coating liberally to properly prepared surfaces with brush, roller, or spray along each side of the joint (not in the joint).
  - 4. Immediately place the membrane by looping it into the joint against the backer rod surface to provide slack.
  - 5. Embed the membrane in the wet coating along the sides of the joint by top coating with additional coating material and applying pressure with a brush or roller.
- E. After the membrane installation is complete and the air and moisture barrier coating is dry:
  - 1. Apply a final liberal coat of the coating to all top horizontal edges on walls to ensure waterproofing integrity. Similarly apply coating at all edges on balcony floor slabs.
  - 2. Inspect the installed membrane for fish mouths, wrinkles, gaps, holes or other deficiencies. Correct fish mouths or wrinkles by cutting, then embedding the area with additional coating applied under and over the membrane.
  - 3. Seal gaps, holes, and complex geometries at three dimensional corners with StoGuardRapidSeal or StoGuard RapidFill.
- F. Rough opening protection
  - 1. Install rough opening protection. Refer to Sto details 20.20M, 20.20F, 20.20FT, 20.20T, 20.20R, 21.20G, and 21.20R and applicable Sto product bulletins.
- G. Sheathing joints
  - 1. Install joint treatment material with applicable reinforcement over sheathing joints. Refer to Sto detail 20.00a and applicable Sto product bulletins.
- H. Air and moisture barrier coating

1. Concrete – install one coat of Sto EmeraldCoat by spray or roller in a uniform, continuous wet film of 10 mils to the prepared concrete substrate. Do not install over working or moving joint sealants.
2. Concrete Masonry – install one liberal coat of Sto EmeraldCoat by spray or roller in a uniform, continuous film to the prepared concrete masonry substrate. Backroll spray applications. Allow to dry. Install a second liberal coat in a uniform, continuous film, and backroll spray applications, to achieve a void and pinhole free surface. Depending on the condition of the surface a minimum of 10 wet mils up to a maximum of 30 wet mils per coat is required. Apply additional coats if needed to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.
3. Sheathing
  - a. Glass mat faced gypsum sheathing: install one coat of Sto EmeraldCoat by spray or roller in a uniform, continuous film of 10 wet mils to the prepared glass mat gypsum substrate to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.
  - b. Plywood sheathing: install one coat of Sto EmeraldCoat by spray or roller in a uniform, continuous film of 10 wet mils to the prepared substrate to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.
  - c. OSB sheathing: install one coat of Sto EmeraldCoat by spray or roller in a uniform, continuous film of 10 wet mils to the prepared substrate and to a void and pinhole free surface. Inspect surface and touch-up with a second coat at raised wood strands. Do not install over working or moving joint sealants.

### **3.4 FIELD QUALITY CONTROL**

- A. Contractor's qualified testing agency or building envelope consultant shall perform inspections and tests.
- B. Inspections: air barrier materials are subject to inspection to verify compliance with requirements.
  1. Condition of substrates and substrate preparation.
  2. Installation of primary air barrier material, accessory materials, and compatible auxiliary materials over structurally sound substrates and in conformance with architectural design details, contractor's shop drawings, project mock-up, and manufacturer's written installation instructions.
  3. Air barrier continuity and connections without gaps and holes at foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks and balconies, and roof line.
- C. Tests: air barrier materials and assembly are subject to tests to verify compliance with performance requirements:
  1. Qualitative air leakage test: ASTM E 1186
  2. Quantitative air leakage test: ASTM E 779, E 783, and E 1827
  3. Adhesion test: ASTM D 4541
  4. Qualitative adhesion and compatibility testing: wet sealant manufacturer's field quality control adhesion test

- D. Repair non-conforming substrates and air barrier material installation to conform with project requirements.
- E. Take corrective action to repair and replace, reinstall, seal openings, gaps, or other sources of air leakage to conform with project performance requirements.

### **3.5 PROTECTION AND CLEANING**

- A. Protect air barrier materials from damage during construction caused by wind, rain, freezing, continuous high humidity, or prolonged exposure to sun light.
- B. Protect air barrier materials from damage from trades, vandals, and water infiltration during construction.
- C. Repair damaged materials to meet project specification requirements.
- D. Clean spills, stains, soiling from finishes or other construction materials that will be exposed in the completed work with compatible cleaners.
- E. Remove all masking materials after work is completed.

**END OF SECTION**

**SECTION 073113**  
**ASPHALT SHINGLE ROOFING**

**PART I GENERAL**

**1.01 SECTION INCLUDES**

- A Asphalt roofing shingles.
- B Leak barrier and roof deck protection.
- C Metal flashing associated with shingle roofing.
- D Attic ventilation.

**1.02 RELATED SECTIONS**

- A Section 076200 - Flashing and Sheet Metal: Sheet metal flashing not associated with shingle roofing; gutters and downspouts.
- B Section 086300 - Unit Skylights: Skylights

**1.03 REFERENCES** American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards

- 1. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- 2. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- 3. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
- 4. ASTM D 3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules.
- 5. ASTM D 3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
- 6. ASTM D 3462 – Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules.
- 7. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- 8. ASTM D 7158 - Standard Test Method for Wind-Resistance of Sealed Asphalt Shingles (Uplift Force/Uplift Resistance Method).
- 9. AC438-1011-R1 – New Acceptance Criteria for Alternative Asphalt Roofing Shingles
- 10. ASTM E 903 – Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TFWZ.R21)
- 13. UL 790 - Tests for Fire Resistance of Roof Covering Materials.
- 14. UL 997 - Wind Resistance of Prepared Roof Covering Materials.

15. UL 2218 – Impact Resistance of Prepared Roof Covering Materials.

- B Asphalt Roofing Manufacturers Association (ARMA)
- C Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- D National Roofing Contractors Association (NRCA)
- E American Society of Civil Engineers (ASCE).
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- F U.S. Green Building Council (USGBC)
- G Leadership in Energy and Environmental Design (LEED)
- H Cool Roof Rating Council (CRRRC)
- I Miami Dade County

1.04 DEFINITIONS

- A Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

1.05 SUBMITTALS

- A Submit copies of GAF® product data sheets, detail drawings and samples for each type of roofing product.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Provide all primary roofing products, including shingles, underlayment, leak barrier, and ventilation, by a single manufacturer.
- B Installer Qualifications: Installer must be approved for installation of all roofing products to be installed under this section.

1.07 REGULATORY REQUIREMENTS

- A Provide a roofing system achieving an Underwriters Laboratories (UL) Class A fire classification.
- B . Install all roofing products in accordance with all federal, state and local building codes.
- D All work shall be performed in a manner consistent with current OSHA guidelines.

1.08 PREINSTALLATION MEETING

- A General: For all projects in excess of 250 squares of roofing, a pre-installation meeting is required.
- B Timing: The meeting shall take place at the start of the roofing installation, no more than 2 weeks into the roofing project.
- C Attendees: Meeting to be called for by manufacturer's certified contractor. Meeting's mandatory attendees shall include the certified contractor and the manufacturer's representative. Non-mandatory attendees shall include the



owner's representative, architect or engineer's representative, and the general contractor's representative.

- D Topics: Certified contractor and manufacturer's representative shall review all pertinent requirements for the project, including but not limited to, scheduling, weather considerations, project duration, and requirements for the specified warranty.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A Store all products in manufacturer's unopened, labeled packaging until they are ready for installation.
- B Store products in a covered, ventilated area, at temperature not more than 110 degrees F (43 degrees C); do not store near steam pipes, radiators, or in direct sunlight.
- C Store bundles on a flat, properly drained surface. Maximum stacking height shall not exceed manufacturer's recommendations. Store all rolls on end.
- D Store and dispose of solvent-based materials in accordance with all federal, state and local regulations.

#### 1.10 WEATHER CONDITIONS

- A Proceed with work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations

#### 1.11 WARRANTY Provide to the owner a **GAF® Shingle & Accessory Ltd. Warranty** for:

- 1. Against algae discoloration for 10 years
- B Provide to the owner a **GAF® WeatherStopper® Golden Pledge® Ltd Warranty** covering:
  - 1. Roofs installed by a Certified GAF® Master Elite™ Contractor only.
  - 2. Manufacturing defects: 100% coverage for materials and labor for:
    - a Single family detached homes owned by individuals the first
      - 50 years non-prorated, then 20% thereafter for all GAF lifetime shingles.
      - 20 years non-prorated, then 20% thereafter for GAF Marquis Weathermax and GAF Royal Sovereign Shingles.
    - b Any other type of owner or building – 40 years with the first 20 years non-prorated. (excludes Marquis WeatherMax and Royal Sovereign)
  - 3. Workmanship errors: 100% coverage for workmanship errors for:
    - a Single family detached homes owned by individuals - the first 25 years for after installation. (20 years for Marquis WeatherMax and Royal Sovereign)
    - b Any other type of owner or building - 20 years.
  - 4. Roof system NOT installed over an existing roof, all existing roof materials must be removed to the deck.
  - 5. Warranted against algae discoloration for 10 years

6. Full roof installations (Roofs installed on portions of buildings do not qualify) using the following GAF® products.
  - a You must use GAF® Roof Deck Protection.
  - b You must use eligible GAF® Leak Barrier in valleys and around dormers, sidewalls, firewalls, chimneys, plumbing vents, and skylights. In the North, leak barriers must be used at all eaves at least 24 inch inside warm wall.
  - c You must use GAF® pre-cut starter strip products (only those with factory applied adhesive) at the eaves. Note: To obtain bonus wind coverage, you must use GAF® pre cut starter strip products (with factory applied adhesive) at the eaves and rakes and you must install each shingle using 6 nails. For Miami Dade County Florida, no adhesive on rakes. You must cement the starter strip in and nail along the rake.
  - d You must use eligible COBRA® ventilation with adequate intake ventilation. Master Flow® exhaust ventilation products can be substituted only if COBRA® ridge ventilation cannot be installed due to a structure's architecture. In any event, adequate ventilation should meet the following requirements:
    - i. Minimum net free ventilation area of 1 sq ft per 150 sq ft of ceiling area is required. When intake vents are located at the eaves and exhaust vents are located near the roof's peak (in a properly balanced system) for maximum air flow, ventilation may be reduced to 1 sq ft per 300 sq ft. If these standards are not met, GAF® cannot be responsible for damage caused by inadequate ventilation.
  - e You must use GAF® Ridge Cap Shingles or shingles that correspond to the shingle product you are installing.
  - f You must use eligible GAF® Roofing Shingles.
  - g New metal flashings must be installed. Metal drip edge must be used at eaves and is recommended at rake edges.
7. In addition to the requirements listed above, you installer must register and pay for this warranty. On projects that total more than 250 squares, the permanent Golden Pledge® Ltd Warranty will be issued only if the project passes GAF®'s final inspection. GAF® reserves the right to withhold the warranty if the roof has not been installed according to GAF®'s written application instructions. GAF® also strongly recommends that your Master Elite® Contractor schedule a start-up and at least one interim inspection on projects of 250 squares or more by contacting GAF® at least three weeks prior to the start of roof work.

## **PART II PRODUCTS**

### **2.01 MANUFACTURER**

- A Acceptable Manufacturer: GAF®, 1 Campus Drive, Parsippany, NJ 07054. Tel: 1-973-628-3000.

- B Requests for substitutions will be considered in accordance with provisions of Section 016000.

## 2.02 VENTILATED ROOF INSULATION PANELS

- A. Preassembled panel consisting of a oriented strand board top surface a wood spacer block separating a layer of Isocyanurate insulation on the bottom, **ThermaCal® 1 Ventilating Roof Insulation Panel** by GAF-Cornell.
1. 5/8", OSB or plywood
  2. 1-1/2" wood spacers blocks
- B. Preassembled panel with two layers of oriented strand board separated by spacer blocks and isocyanurate insulation on the bottom, **ThermaCal® 2 Ventilating Roof Insulation Panel** by GAF-Cornell.
3. 5/8", 3/4" OSB or plywood
  4. 1-1/2" wood spacers blocks

## 2.03 SHINGLES

- A. Self sealing, granule surfaced, asphalt shingle with a strong fiberglass reinforced Micro Weave core and StainGuard protection, which prevents pronounced discoloration from blue-green algae through formulation/unique blends of granules. Architectural laminate styling provides a wood shake appearance with a 5 5/8in. exposure. Features GAF's patented High Definition color blends and enhanced shadow effect. UL 790 Class A rated with UL 997 Wind Resistance Label; ASTM D 7158, Class H; ASTM D 3161, Type 1; ASTM D 3018, Type 1; ASTM D 3462; AC438 compliant; CSA 123.5-98; Dade County Approved, Florida Building Code Approved, Texas Dept of Insurance Approved, ICC Report Approval. **Timberline HD®** Lifetime High Definition Shingles, by GAF®.
1. Color: As selected from manufacturers' full range.

## 2.04 HIP AND RIDGE SHINGLES

- A. High profile self sealing hip and ridge cap shingle matching the color of selected roof shingle. Each bundle covers approx. 20 lineal feet (6.10m). **Timbertex®** Premium Ridge Cap Shingles, by GAF®.

## 2.05 STARTER STRIP

- A. Self sealing starter shingle designed for premium roof shingles. Each bundle covers approx. 100 lineal feet (30.48m) for English and metric shingles or 50 lineal feet (15.24m) for oversized shingles. **WeatherBlocker™** Eave/Rake Starter Strip by GAF®.

## 2.06 LEAK BARRIER

- A. Self-adhering, self-sealing, bituminous leak barrier surfaced with fine, skid-resistant granules. Approved by UL, Dade County, ICC, State of Florida and Texas Department of Insurance. Each roll contains approx. 150 sq ft (13.9 sq.m.), 36" X 50' (0.9m x 20.3m) or 200 sq ft (18.6 sq.m.), 36" X 66.7' (0.9m x 20.3m). **WeatherWatch®** Leak Barrier, by GAF®.

2.07 SHINGLE UNDERLAYMENT \*

- A. Premium, water repellent, breather type non-asphaltic underlayment. UV stabilized polypropylene construction. Meets or exceeds ASTM D226 and D4869. Approved by Dade County, Florida Building Code, and ICC. Each roll contains approximately 10 squares (1003 sq. ft.) of material and is 54 in. x 223 ft. **Deck-Armor™** Premium Breathable Roof Deck Protection, by GAF®.

2.08 ROOFING CEMENT

- A. Asphalt Plastic Roofing Cement meeting the requirements of ASTM D 4586, Type I or II.

2.09 ROOF ACCESSORIES

- A. Exterior acrylic rust resistant aerosol roof accessory paint. Each 6 oz can is available in boxes of 6 and in a wide variety of colors to compliment the roof. **Shingle-Match™** Roof Accessory Paint by GAF®.
  - 1. All plumbing stacks to be painted to match roof color
- B. UV stable solid molded PVC compression collar, Kynar PVDF coated 24 gauge galvanized flange, **Ultimate Pipe Flashing** by Lifetime Tool.

2.10 ATTIC VENTILATION

A. Ridge Vents

- 1. Flexible rigid plastic ridge ventilator designed to allow the passage of hot air from attics, while resisting snow infiltration. For use in conjunction with eave/soffit ventilation products. Provides 12.5 sq inches Net Free Ventilation Area per lineal foot (26460 sq.mm/m). Each package contains 20 lineal feet (6.10m) of vent. **Cobra® Ridge Runner™** Ridge Vent by GAF®.

B. Fascia and Soffit/Under Eave Vents

- 1. Flexible ridge ventilator designed to allow the passage of air into thru the fascia. 1"x3" (25 mm x 76mm) provides a Net Free Ventilation Area of 11 square inches per foot and 1½" x3" (38 mm x 76 mm) provides a Net Free Ventilation Area of 16 square inches per foot. **Cobra® Fascia Vent**, by GAF®.

C. Hip Vents

- 1. Flexible low profile rigid plastic ridge ventilator designed to allow the passage of hot air from attics, while resisting rain and snow infiltration. For use in conjunction with eave/soffit ventilation products. Provides 9 sq inches Net Free Ventilation Area per lineal foot (19,046 sq.m/m). Each package contains 40 lineal feet (12.19m) of vent. **Cobra® Hip Vent Exhaust Vent** by GAF®.

D. Roof Louvers

Rooftop mounted, square-top designed, high-impact resin exhaust ventilator designed to evacuate hot air from attics. Each vent provides 60 sq in NFVA. **MasterFlow™ RT-65** Passive Roof Louver, by GAF®.

1. Rooftop mounted, low-profile square-top designed, high-impact resin exhaust ventilator designed to evacuate hot air from attics. Each vent provides 37 sq in NFVA. **MasterFlow™ IR-61** Passive Roof Louver, by GAF®.

#### 2.11 VENTILATION ACCESSORIES

- A. Not Used

#### 2.12 NAILS

- A. Standard round wire, zinc-coated steel or aluminum; 10 to 12 gauge, smooth, barbed or deformed shank, with heads 3/8 inch (9mm) to 7/16 inch (11mm) in diameter. Length must be sufficient to penetrate into solid wood at least 3/4 inch (19mm) or through plywood or oriented strand board by at least 1/8 inch (3.18mm).

#### 2.13.METAL FLASHING

- A. 24 gauge hot-dip galvanized steel sheet, complying with ASTM A 653/A 653M, G90/Z275.
- B. 16-oz/sq ft (0.56mm) copper sheet, complying with ASTM B 370.
- C. 0.032-inch (0.8mm) aluminum sheet, complying with ASTM B 209.

### PART III EXECUTION

#### 3.01 EXAMINATION

- A Do not begin installation until the roof deck has been properly prepared.
- B If roof deck preparation is the responsibility of another installer, notify the architect or building owner of unsatisfactory preparation before proceeding.

#### 3.02 PREPARATION Remove all existing roofing down to the roof deck.

- B Verify that the deck is dry, sound, clean and smooth. It shall be free of any depressions, waves, and projections.
- C Cover with sheet metal, all holes over 1 inch (25mm) in diameter, cracks over 1/2 inch (12mm) in width, loose knots and excessively resinous areas.
- D Replace damaged deck with new materials.
- E Clean deck surfaces thoroughly prior to installation of eaves protection membrane and underlayment.

#### 3.03 PREPARATION OF SUBSTRATE Clean deck surfaces thoroughly prior to installation of eaves protection membrane and underlayment.

- B At areas that receive eaves protection membrane, fill knotholes and cracks with latex filler.
- C Install crickets on the upslope side of all chimneys in the north, any chimney wider than 24" (610mm), and on all roofs steeper than 6/12.

#### 3.04 PREPARATION

- A Verify that the deck is structurally sound and free of deteriorated decking. All deteriorated decking shall be removed and replaced with new materials.

- B Verify that the existing shingles are dry, sound, clean and smooth. All curled, buckled or loose tabs shall be nailed down or removed.
- C Clean shingle surfaces thoroughly prior to installation of eaves protection membrane and underlayment.

### 3.05 SUBSTRATE INSTALLATION

- A The structural roof deck shown in the plans shall be smooth and level and free of water or debris before the nail base insulation is installed. Apply vapor retarder if required.

NOTE: GAF recommends that the designer carefully considers the need for a vapor/air retarder.

- B Installation shall follow the manufacturer's written installation instructions.
- C Fasten with ThermaCal® Fasteners to the supporting roof deck shown in the plans.
- D Protect nail base insulation work from exposure to moisture damage and deterioration, primarily by prompt installation of the roofing, sheet metal and waterproofing work.

### 3.06 INSTALLATION OF UNDERLAYMENTS General:

- 1. Install using methods recommended by manufacturer's in accordance with local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
- B Eaves:
  - 1. Install eaves edge metal flashing tight with fascia boards; lap joints 2 inches (51mm) and seal with plastic cement or high quality urethane sealant; nail at the top of the flange.
  - 2. In the north, and on all roofs between 2/12 and 4/12 (low slopes) install GAF® leak barrier up the slope from eaves edge a full 36 inches (914mm) or to at least 24 inches (610 mm) beyond the interior "warm wall". Lap ends 6 inches (152mm) and bond.
- C Valleys:
  - 1. Install eaves protection membrane at least 36 (914mm) inches wide and centered on the valley. Lap ends 6 inches (152mm) and seal.
  - 2. Where valleys are indicated to be "open valleys", install metal flashing over GAF® leak barrier before GAF® roof deck protection is installed; DO NOT nail through the flashing. Secure the flashing by nailing at 18 inches (457 mm) on center just beyond edge of flashing so that nail heads hold down the edge.
- D Hips and Ridges:
  - 1. Install GAF® leak barrier along entire lengths. If ridge vents are to be installed, position the GAF® leak barrier so that the ridge slots will not be covered.
- E Roof Deck Protection:

1. Install one layer of GAF® roof deck protection over the entire area not protected by GAF® leak barrier at the eaves or valley. Install sheets horizontally so water sheds and nail in place.
2. On roofs sloped at more than 4:12, lap horizontal edges at least 2 inches (51mm) and at least 2 inches (51mm) over eaves protection membrane.
3. On roofs sloped between 2:12 and 4:12, lap horizontal edges at least 19 inches (482 mm) and at least 19 inches (482mm) over eaves protection membrane.
4. Lap ends at least 4 inches (102 mm). Stagger end laps of each layer at least 36 inches (914 mm).
5. Lap GAF® roof deck protection over GAF® leak barrier in valley at least 6 inches (152mm).

F Deck-Armor™ Application

1. Deck-Armor shall be installed over a clean, dry deck.
2. Install Weather Watch® or StormGuard® Leak Barrier at eaves, valleys, rakes, skylights, dormers and other vulnerable leak areas.
3. Lay Deck-Armor™ over deck and overlap 3" (76mm) at side laps and 6" (152mm) at end laps.
4. For exposure to rain or snow, overlap 12" (305mm) at end laps.
5. For side and end laps: fasten Deck-Armor 12" (305mm) o.c. (6" (152mm)o.c. for high wind areas).
6. For middle of the roll: fasten Deck-Armor 24" (610mm) o.c. (12" (305mm) o.c. for high wind areas).
7. For exposure to rain or snow, completely cover all side laps, end laps and fasteners with tape.
8. For long term exposure see complete Deck-Armor installation instructions for side lap detail.
9. If roof may be exposed to high winds, apply tape over all fasteners at the center of the roll to prevent rain or snow from entering at the fasteners.
10. For slopes less than 2:12, a double application of Deck-Armor™ is required. See complete Deck-Armor installation instructions for more information.

G Penetrations:

1. Vent pipes: Install a 24 inch (610 mm) square piece of eaves protection membrane lapping over roof deck underlayment; seal tightly to pipe.
2. Vertical walls: Install eaves protection membrane extending at least 6 inches (152mm) up the wall and 12 inches (305mm) on to the roof surface. Lap the membrane over the roof deck underlayment.
3. Skylights and roof hatches: Install eaves protection membrane from under the built-in counterflashing and 12 inches (305mm) on to the roof surface lapping over roof deck underlayment.

4. Chimneys: Install eaves protection membrane around entire chimney extending at least 6 inches (152mm) up the wall and 12 inches (305mm) on to the roof surface. Lap the membrane over the roof deck underlayment.
5. Rake Edges: Install metal edge flashing over eaves protection membrane and roof deck underlayment; set tight to rake boards; lap joints at least 2 inches (51mm) and seal with plastic cement; secure with nails.

### 3.07 INSTALLATION OF STARTER SHINGLES

#### A General:

1. Install in accordance with GAF®'s instructions and local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
2. Refer to application instructions for the selected starter strip shingles.

#### B Placement and Nailing:

1. For maximum wind resistance along rakes & eaves, install any GAF® starter strip containing sealant or cement shingles to underlayment and each other in a 4" (102mm) width of asphalt plastic roof cement.
2. Place starter strip shingles 1/4" – 3/4" (6 – 19mm) over eave and rake edges to provide drip edge.
3. Nail approximately 1-1/2" – 3" (38 – 76mm) above the butt edge of the shingle.
4. Rake starter course should overlap eave edge starter strip at least 3" (76mm).

### 3.08 INSTALLATION OF SHINGLES

#### A General:

1. Install in accordance with GAF®'s instructions and local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
2. Minimize breakage of shingles by avoiding dropping bundles on edge, by separating shingles carefully (not by "breaking" over ridge or bundles), and by taking extra precautions in temperatures below 40 degrees F (4 degrees C).
3. Handle carefully in hot weather to avoid scuffing the surfacing, or damaging the shingle edges.

#### B Placement and Nailing: Secure with 4, 5, or 6 nails per shingle per GAF®'s application instructions or local codes.

2. Placement of nails varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.
3. Nails must be driven flush with the shingle surface. Do not overdrive or under drive the nails.
4. Shingle offset varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.



- C Placement and Nailing: Beginning with the starter strip, trim shingles so that they “nest” within the shingle located beneath it. This procedure will yield a first course that is typically 3 inch (76mm) to 4 inch (102mm) rather than a fully exposed shingle.
2. Laterally, offset the new shingles from the existing keyways, to avoid waves or depressions caused by excessive dips in the roofing materials.
  3. Using the bottom of the tab on existing shingles, align subsequent courses.
  4. \*Note: DO NOT install standard sized shingles (5inch exposure) over metric (5 5/8 inch exposure) shingles, as it will overexpose the shingles and reveal the nails. Use standard alignment methods to assure proper shingle placement.
  5. Secure with 4, 5, or 6 nails per shingle per GAF®’s instructions or local codes.
  6. Placement of nails varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.
  7. Nails must be driven flush with the shingle surface. Do not overdrive or under drive the nails.
  8. Shingle offset varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.

#### D Valleys

1. Install valleys using the "open valley" method:
  - a Snap diverging chalk lines on the metal flashing, starting at 3 inches (76mm) each side of top of valley, spreading at 1/8 inch per foot (9mm per meter) to the eaves.
  - b Run shingles to chalk line.
  - c Trim last shingle in each course to match the chalk line; do not trim shingles to less than 12 inches (305mm) wide.
  - d Apply a 2 inch (51mm) wide strip of plastic cement under ends of shingles, sealing them to the metal flashing.
2. Install valleys using the "closed cut valley" method:
  - a Run the first course of shingles from the higher roof slope across the valley at least 12 inches (305mm).
  - b Run succeeding courses of shingles from the lower roof slope across the valley at least 12 inches (305mm) and nail not closer than 6 inches (152mm) to center of valley.
  - c Run shingles from the upper roof slope into the valley and trim 2 inches (51mm) from the center line.
3. Install valleys using "woven valley" method: Run shingles from both roof slopes at least 12 inches (305mm) across center of valley, lapping alternate sides in a woven pattern.
  - b DO NOT nail less than 6 inches (152mm) from the valley center line.

#### E Penetrations

1. All Penetrations are to be flashed according to GAF®, ARMA and NRCA application instructions and construction details.

F Skylights and Roof Hatches

1. Consult the manufacturer of the skylight or roof hatch for specific installation recommendations.
2. Skylights and roof hatches shall be installed with pre-fabricated metal flashings specifically designed for the application of the unit.

3.09 INSTALLATION OF ATTIC VENTILATION

A General

1. Ventilation must meet or exceed current F.H.A., H.U.D. and local code requirements.

B Ridge / Soffit ventilation

1. Install ridge vent along the entire length of ridges:
2. Cut continuous vent slots through the sheathing, stopping 6 inches (152mm) from each end of the ridge.
3. On roofs without ridge board, make a slot 1 inch (25mm) wide, on either side of the peak (2 inch (51mm) overall).
4. On roofs with ridge board, make two slots 1-3/4 inches (44.5mm) wide, one on each side of the peak (3 ½ inch (89mm) overall).
5. Install ridge vent material along the full length of the ridge, including uncut areas.
6. Butt ends of ridge vent material and join using roofing cement.
7. Install eaves vents in sufficient quantity to equal or exceed the ridge vent area.

C Roof and Gable Louvers:

1. Cut vent hole through sheathing as specified by the manufacturer for the type of vent to be installed.
2. Install a 24 inches (610mm) square of leak barrier, centered around the hole for roof louvers
3. Install according to manufacturers instructions for flashing vent penetrations
4. Install eave vents in sufficient quantity to equal or exceed the exhaust vent area, calculated as specified by manufacturer.

D Powered (& Solar Powered) Ventilators & Roof turbines:

1. Cut vent hole through sheathing as specified by the manufacturer for the type of vent to be installed.
2. On rooftop applications, install a 36 inches (914mm) square of leak barrier, centered around the hole
3. Install according to manufacturers instructions for flashing vent penetrations
4. Install eave vents in sufficient quantity to equal or exceed the exhaust vent area, calculated as specified by manufacturer

E Hip Vents and Rooftop Vents

1. Install according to manufacturer's instructions.
2. Install vents in sufficient quantity to equal or exceed the exhaust vent area, calculated as specified by manufacturer.

F Whole House Fans

1. Install at desired locations in ceiling below attic space per manufacturer recommended location and application instructions.

3.10 INSTALLATION OF VENTILATION ACCESSORIES

A Chimney Caps

1. Install chimney caps to manufacturer recommendations

B Foundation Vents

1. Install foundation vents per manufacturer recommendations and applications.

3.11 PROTECTION

- A Protect installed products from foot traffic until completion of the project.
- B Any roof areas that are not completed by the end of the workday are to be protected from moisture and contaminants.

**END OF SECTION**

**SECTION 074646  
FIBER-CEMENT SIDING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Fiber cement lap siding, panels, shingle, trim, fascia, moulding and accessories; James Hardie HZ5 Engineered for Climate Siding.
- B. Factory-finished fiber cement lap siding, panels, shingle, trim, fascia, moulding and accessories; James Hardie HZ5 Engineered for Climate Siding.

**1.2 RELATED SECTIONS**

- A. Section 061000 - Rough Carpentry: Wood framing and bracing.
- B. Section 061000 - Rough Carpentry: Sheathing.
- C. Section 072100 - Insulation: Exterior wall insulation.
- D. Section 072500 – Weather Barriers

**1.3 REFERENCES**

- A. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets
- B. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.
- C. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 013300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

- E. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.
- F. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative. Indicating observation of siding installation.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum of 5 years-experience with installation of similar products.
- B. Contractor to schedule the local manufacturer field service representative to visit the site prior to construction during construction and after construction.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designated by Architect.
  - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

#### 1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### 1.8 WARRANTY

- A. Product Warranty: Limited, non-pro-rated product warranty.
  - 1. HardiePlank HZ5 lap siding for 30 years.
  - 2. HardieSoffit HZ5 panels for 30 years.
  - 3. HardieShingle HZ5 siding for 30 years.
- B. Product Warranty: Limited, product warranty.
  - 1. HardieTrim HZ and HZ5 boards for 15 years.
- C. Finish Warranty: Limited product warranty against manufacturing finish

defects.

1. When used for its intended purpose, properly installed and maintained according to James Hardie's published installation instructions, James Hardie's ColorPlus finish with ColorPlus Technology, for a period of 15 years from the date of purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.
- D. Workmanship Warranty: Application limited warranty for 2 years.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: James Hardie Building Products, Inc., which is located at: 26300 La Alameda Suite 400 ; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Fax: 949-367-4981; Email: [requestinfo \(info@jameshardie.com\)](mailto:requestinfo@jameshardie.com); Web: [www.jameshardiecommercial.com](http://www.jameshardiecommercial.com)
- B. Substitutions: Not permitted.
- C. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 016000.

### 2.2 SIDING

- A. Lap Siding: HardiePlank HZ5 Lap siding with a sloped top, beveled drip edge and nailing line as manufactured by James Hardie Building Products, Inc.
1. Type: Select Cedarmill 6-1/4 inches (159 mm) with 5 inches (127 mm) exposure.
- B. Shingle Siding: HardieShingle HZ5 siding as manufactured by James Hardie Building Products, Inc.
1. Type: HardiShingle Individual Shingles 6 inches (152 mm) wide by 18 inches (457 mm) high with 8 inches (203 mm) exposure.
- C. Panels: HardieSoffit Panels HZ5 siding as manufactured by James Hardie Building Products, Inc.
1. Type: Beaded Porch Panel 48 inches wide by 96 inches high with 0.25 inches thickness.
  2. Type: VenterPlus Smooth 16 inches wide by 144 inches high with 0.25 inches thickness.
  3. Type: VenterPlus Cedarmill 16 inches wide by 144 inches high with 0.25 inches thickness.
- D. Trim:
1. HardieTrim HZ5 boards and HardieTrim HZ boards as manufactured by James Hardie Building Products, Inc.
  2. HardieTrim HZ5 Fascia boards as manufactured by James Hardie Building Products, Inc.

3. HardieTrim HZ5 Crown moulding manufactured by James Hardie Building Products, Inc.
4. Artisan HZ5 Accent trim as manufactured by James Hardie Building Products, Inc.

## 2.3 FASTENERS

### A. Wood Framing Fasteners:

1. Wood Framing: 4d common corrosion resistant nails.
2. Wood Framing: 6d common corrosion resistant nails.
3. Wood Framing: 8d box ring common corrosion resistant nails.
4. Wood Framing: 0.089 inch (2.2 mm) shank by 0.221 inch (5.6 mm) head by 2 inches (51 mm) corrosion resistant siding nails.
5. Wood Framing: 0.093 inch (2.4 mm) shank by 0.222 inch (5.6 mm) head by 2 inches (51 mm) corrosion resistant siding nails.
6. Wood Framing: 0.093 inch (2.4 mm) shank by 0.222 inch (5.6 mm) head by 2-1/2 inches (64 mm) corrosion resistant siding nails.
7. Wood Framing: 0.091 inch (2.3 mm) shank by 0.221 inch (5.6 mm) head by 1-1/2 inches (38 mm) corrosion resistant siding nails.
8. Wood Framing: 0.091 inch (2.3 mm) shank by 0.225 inch (5.7 mm) head by 1-1/2 inches (38 mm) corrosion resistant siding nails.
9. Wood Framing: 0.121 inch (3 mm) shank by 0.371 inch (9.4 mm) head by 1-1/4 inches (32 mm) corrosion resistant roofing nails.
10. Wood Framing: No. 11 gauge 1-1/4 inches (32 mm) corrosion resistant roofing nails.
11. Wood Framing: No. 11 gauge 1-1/2 inches (38 mm) corrosion resistant roofing nails.
12. Wood Framing: No. 11 gauge 1-3/4 inches (44 mm) corrosion resistant roofing nails.

### B. Metal Framing:

1. Metal Framing: 1-1/4 inches (32 mm) No. 8-18 by 0.375 inch (9.5 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
2. Metal Framing: 1-5/8 inches (41 mm) No. 8-18 by 0.323 inch (8.2 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
3. Metal Framing: 1 inch (25 mm) No. 8-18 by 0.323 inch (8.2 mm) head self-drilling, corrosion resistant ribbed buglehead screws.
4. Metal Framing: 1 inch (25 mm) No. 8-18 by 0.311 inch (7.9 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
5. Metal Framing: 1.5 inch (38mm) [AGS-100] .100 inches by 25 inches (2540 mm by 635 mm) ET&F Pin or equivalent pneumatic fastener.

### C. Masonry Walls (CMU):

1. Masonry Walls: Aerico Stud Nail, ET&F ASM No.-144-125, 0.14 inch (3.6 mm) shank by 0.30 inch (7.6 mm) head by 2 inches (51 mm) long corrosion resistant nails.

## 2.4 FINISHES

### A. Factory Finish: Refer to Exterior Finish Schedule.

1. Product: ColorPlus Technology by James Hardie, Dreams Collection.

2. Submit color charts and samples of materials representing manufacturer's full range of available colors.
  3. Definition: Factory applied finish; defined as a finish applied in the same facility and company that manufactures the siding substrate.
  4. Process:
    - a. Factory applied finish by fiber cement manufacturer in a controlled environment within the fiber cement manufacturer's own facility utilizing a multi-coat, heat cured finish within one manufacturing process.
    - b. Each finish color must have documented color match to delta E of 0.5 or better between product lines, manufacturing lots or production runs as measured by photospectrometer and verified by third party.
  5. Protection: Factory applied finish protection such as plastic laminate that is removed once siding is installed
  6. Accessories: Complete finishing system includes pre-packaged touch-up kit provided by fiber cement manufacturer. Provide quantities as recommended by manufacturer.
- B. Factory Finish Color for Trim, Soffit and Siding Colors:
1. Product: ColorPlus Technology by James Hardie, Dreams Collection.
  2. Submit color charts and samples of materials representing manufacturer's full range of available colors.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Nominal 2 inch by 4 inch (51 mm by 102 mm) wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
  1. Install water-resistive barriers and claddings to dry surfaces.
  2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
  3. Protect siding from other trades.
- D. Minimum 20 gauge 3-5/8 inch (92 mm) C-Stud 16 inches maximum on center or 16 gauge 3-5/8 inches (92 mm) C-Stud 24 inches (610 mm) maximum on center metal framing complying with local building codes, including the use of water-resistive barriers and/or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
  1. Install water-resistive barriers and claddings to dry surfaces.



2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
3. Protect siding from other trades.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install a water-resistive barrier is required in accordance with local building code requirements.
- D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- E. Install HardieWrap™ flashing, and HardieWrap™ Flex Flashing
- F. Install six inch wide metal flashing behind all butt joints. Extend flashing one inch onto course below.

### 3.3 INSTALLATION - HARDIEPLANK HZ5 LAP SIDING AND ARTISAN HZ5 LAP SIDING

- A. Install materials in strict accordance with the current James Hardie installation guide.
- B. Starting: Install a minimum 1/4 inch (6 mm) thick lath starter strip at the bottom course of the wall. Apply planks horizontally with minimum 1-1/4 inches (32 mm) wide laps at the top. The bottom edge of the first plank overlaps the starter strip.
- C. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- D. Align vertical joints of the planks over framing members.
- E. Maintain clearance between siding and adjacent finished grade.
- F. Locate splices at least one stud cavity away from window and door openings.
- G. Wind Resistance: Where a specified level of wind resistance is required Hardieplank lap siding is installed to framing members and secured with fasteners described in Table No. 2 in National Evaluation Service Report No. NER-405.
- H. Locate splices at least 12 inches (305 mm) away from window and door openings.

### 3.4 INSTALLATION - HARDIEPANEL HZ5 VERTICAL SIDING

- A. Install materials in strict accordance with the current James Hardie

installation guide.

- B. Block framing between studs where HardiePanel siding horizontal joints occur.
- C. Install metal Z flashing and provide a 1/4 inch (6 mm) gap at horizontal panel joints.
- D. Place fasteners no closer than 3/8 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
- E. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- F. Maintain clearance between siding and adjacent finished grade.
- G. Specific framing and fastener requirements refer to Tables 2 and 3 in National Evaluation Service Report No. NER-405.
- H. Factory Finish Touch Up: Apply touch up paint to cut edges in accordance with manufacturer's printed instructions.
  - 1. Touch-up nicks, scrapes, and nail heads in pre-finished siding using the manufacturer's touch-up kit pen.
  - 2. Touch-up of nails shall be performed after application, but before plastic protection wrap is removed to prevent spotting of touch-up finish.
  - 3. Use touch-up paint sparingly. If large areas require touch-up, replace the damaged area with new pre-finished siding. Match touch up color to siding color through use of manufacturer's branded touch-up kits.

### 3.5 INSTALLATION - HARDIE HZ5 SHINGLESIDE CLADDING

- A. Install materials in strict accordance with the current James Hardie installation guide.
- B. Substrate: Install a minimum 7/16 inch (11 mm) thick OSB wall sheathing or equivalent braced walls complying with applicable building codes.
- C. Starting: Install a minimum 1/4 inch (6 mm) thick lath starter strip at the bottom course of the wall.
- D. Maintain clearance between siding and adjacent finished grade.
- E. Apply starter course of 10 inches (254 mm) shingles or 9-1/2 inches (241 mm) lap siding overlapping the starter strip.
- F. Apply subsequent courses horizontally with a minimum 10 inch overlap at the top and a minimum 2 inch (51 mm) side lap. The bottom edge of the first two courses overlaps the starter strip.
- G. Fasten between 1/2 inch (13 mm) and 1 inch (25 mm) in from the side edge and between 8-1/2 inches (216 mm) and 9 inches (229 mm) up from the shingle bottom edge.

- H. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- I. Ensure vertical joints of overlapping shingle course do not align.
- J. Wind Resistance: Where a specified level of wind resistance is required, Hardie Shingle siding is installed to substrate and secured with a minimum two fasteners described in Table No. 6, 7 and 8 in National Evaluation Service Report No. NER-405.

### 3.6 INSTALLATION - HARDIETRIM HZ5 BOARDS

- A. Install materials in strict accordance with manufacturer's installation instructions. Install flashing around all wall openings.
- B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch (19 mm) or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
- C. Place fasteners no closer than 3/4 inch (19 mm) and no further than 2 inches (51 mm) from side edge of trim board and no closer than 1 inch (25 mm) from end. Fasten maximum 16 inches (406 mm) on center.
- D. Maintain clearance between trim and adjacent finished grade.
- E. Trim inside corner with a single board trim both side of corner.
- F. Outside Corner Board Attach Trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2 inch (13 mm) from edge spaced 16 inches (406 mm) apart, weather cut each end spaced minimum 12 inches (305 mm) apart.
- G. Allow 1/8 inch gap between trim and siding.
- H. Seal gap with high quality, paint-able caulk.
- I. Shim frieze board as required to align with corner trim..
- J. Fasten through overlapping boards. Do not nail between lap joints.
- K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten HardieTrim boards to HardieTrim boards.
- L. Shim frieze board as required to align with corner trim.
- M. Install HardieTrim Fascia boards to rafter tails or to sub fascia.

### 3.7 FINISHING

- A. Finish unprimed siding with a minimum one coat high quality, alkali resistant primer and one coat of either, 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent

acrylic or latex, exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

- B. Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic or latex or oil based exterior grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

### 3.8 FIELD QUALITY CONTROL

- A. Notify manufacturer's designated representative to obtain start up site visit and required periodic manufacturer's observation of siding installation.

### 3.9 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

## **SECTION 075050 ROOF REPAIR**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Repair of existing roof areas where disturbed by work of this project.
  - 2. Membrane roof flashing and adhesives.

#### **1.2 SUBMITTALS**

- A. Section 013300 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on all products being used to repair existing roof areas. Submitted products must be compatible with existing roof materials.

#### **1.3 QUALIFICATIONS**

- A. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

#### **1.4 ENVIRONMENTAL REQUIREMENTS**

- A. Section 016000 – Product Requirements.
- B. Do not repair existing roofing when weather conditions threaten the integrity of the building contents or repair materials.
- C. Maintain continuous temporary protection prior to and during repair work to keep the building weather tight.

#### **1.5 COORDINATION**

- A. Section 013000 – Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work of this section with related work of other trades.

### **PART 2 PRODUCTS**

#### **2.1 COMPONENTS**

- A. New Roof Materials: Same type materials, thicknesses, as existing roof materials. Compatible with all existing roof materials being removed or repaired.
- B. Insulation: Same type insulation material, thickness and R=value as existing insulation.

- C. Accessories and Flashings: Recommended by the roofing manufacturer.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 013000 – Administrative Requirements: Coordination and project conditions.
- B. Verify that existing roof surfaces are clear and ready for work of this section.

### **3.2 INSTALLATION**

- A. Repair existing roof areas in strict accordance with manufacturer's instructions.
- B. Repaired areas shall be level with adjacent surfaces.
- C. Refer to drawings for locations and scope.

**END OF SECTION**

**SECTION 075323**  
**ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Adhered ethylene-propylene-diene-monomer (EPDM) roofing system.
  - 2. Vapor retarder.
  - 3. Roof insulation.
- B. Related Requirements:
  - 1. Section 061600 "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Section 072100 "Building Insulation" for insulation beneath the roof deck.
  - 3. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
  - 4. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

**1.3 DEFINITIONS**

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
  - 1. Base flashings and membrane terminations.
  - 2. Tapered insulation, including slopes.
  - 3. Roof plan showing orientation of steel roof deck and orientation of roofing and fastening spacings and patterns for mechanically fastened roofing.
  - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
  - 1. Submit evidence of complying with performance requirements.
- C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
- E. Field quality-control reports.
- F. Sample Warranties: For manufacturer's special warranties.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with



insulation manufacturer's written instructions for handling, storing, and protecting during installation.

- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

## 1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

## 1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  - 1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, roof pavers, and other components of roofing system.
  - 2. Warranty Period: 25 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain components including roof insulation fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
  - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
  - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

- C. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class C; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

## 2.3 EPDM ROOFING

- A. EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet.
  - 1. Manufacturers
    - a. Firestone
    - b. Johns Manville
    - c. Carlisle
  - 2. Thickness: 75 mils, nominal.
  - 3. Exposed Face Color: Black.

## 2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
  - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: 75-mil thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard.
- D. Seaming Material: Single-component, butyl splicing adhesive and splice cleaner or manufacturer's standard, synthetic-rubber polymer primer and 3-inch wide minimum, butyl splice tape with release film.
- E. Lap Sealant: Manufacturer's standard, single-component sealant.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.
- J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet

flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

- K. ½" Coverboard mechanically fastened,

## 2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

## 2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
  - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
  - 2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
  - 3. Full-spread spray-applied, low-rise, two-component urethane adhesive.

## 2.7 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads, approximately 3/16 inch thick and acceptable to roofing system manufacturer.
  - 1. Size: 24 by 24 inches. Manufacture pavers to dimensional tolerances of plus or minus 1/16 inch in length, height, and thickness.
  - 2. Weight: 18 lb/sq. ft.
  - 3. Compressive Strength: 7500 psi, minimum.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
  - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Install insulation strips according to acoustical roof deck manufacturer's written instructions.

### 3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

### 3.4 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
  - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
  - 1. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
- I. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
  - 1. Set each subsequent layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

### 3.5 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhereroofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.

- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeters.
- F. Apply roofing with side laps shingled with slope of roof deck where possible.
- G. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing terminations.
  - 1. Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.
- H. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing terminations.
- I. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- J. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal membrane roofing in place with clamping ring.

### 3.6 MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

- A. Mechanically fasten roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.
  - 1. For in-splice attachment, install roofing with long dimension perpendicular to steel roof deck flutes.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Mechanically fasten or adhere roofing securely at terminations, penetrations, and perimeter of roofing.
- E. Apply roofing with side laps shingled with slope of roof deck where possible.
- F. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing terminations.
  - 1. Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.

- G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing terminations.
- H. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- I. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.
- J. In-Splice Attachment: Secure one edge of roofing using fastening plates or metal battens centered within splice, and mechanically fasten roofing to roof deck. Field splice seam.
- K. Through-Membrane Attachment: Secure roofing using fastening plates or metal battens, and mechanically fasten roofing to roof deck. Cover battens and fasteners with a continuous cover strip.

### 3.7 COATING INSTALLATION

- A. Apply coatings to roofing and base flashings according to manufacturer's written recommendations, by spray, roller, or other suitable application method.

### 3.8 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

### 3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
  - 1. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of base flashing.
  - 2. Flood each area for 24 hours.
  - 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.

- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

### 3.10 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

### END OF SECTION



## **SECTION 076200 SHEET METAL FLASHING AND TRIM**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Flashings and counter flashings.
  - 2. Gutters and downspouts.
  - 3. Reglets and accessories.
  - 4. Other fabricated sheet metal items, as scheduled.

#### **1.2 DESIGN REQUIREMENTS**

- A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual".

#### **1.3 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Product Data: Submit data on manufactured component metal types, finishes, and characteristics.
- D. Samples:
  - 1. Submit three (3) three 12" long samples of each profile and finish.

#### **1.4 QUALITY ASSURANCE**

- A. Perform Work in accordance with SMACNA Architectural Sheet Metal Manual and NRCA Roofing and Waterproofing Manual.

#### **1.5 QUALIFICATIONS**

- A. Fabricator and Installer: Company specializing in sheet metal work with minimum (5) five years documented experience.

#### **1.6 PRE-INSTALLATION MEETING**

- A. Section 013000 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this section.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.

## 1.8 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate with the Work of Section 048100 for installing recessed flashing reglets.

# PART 2 PRODUCTS

## 2.1 REGLETS AND SPRING LOCKED FLASHING

- A. Manufacturers:
  - 1. Fry Reglet Co.
  - 2. Substitutions: Section 016000 - Product Requirements.
- B. Reglets: Furnish with Springlok Flashing:
  - 1. Built Into Masonry: Type MA.
  - 2. Surface Applied: Type SM.
- C. Material:
  - 1. Where exposed to view from ground, or adjacent to prefinished roofing or coping: Minimum 0.025 inch thick aluminum, shop pre-coated with PVDF (polyvinylidene fluoride) coating Kynar 500 or Hylar 5000, color as selected.
  - 2. Where not exposed to view from ground: Minimum 0.020 inch thick, type 304 stainless steel.

## 2.2 SHEET METAL FLASHING AND COPING

- A. Pre-Finished Galvanize steel on stainless steel: ASTM B209, alloy and temper to suit conditions; minimum 24 gauge; smooth finish, shop pre-coated with PVDF (polyvinylidene fluoride) coating Kynar 500 or Hylar 5000; color as selected.

## 2.3 ACCESSORIES

- A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
- B. Underlayment: ASTM D226, organic roofing felt, Type I, No. 15.
- C. Primer: Zinc molybdate type.

- D. Protective Backing Paint: Zinc molybdate alkyd.
- E. Sealant: Type sealant specified in Section 079000.
- F. Plastic Cement: ASTM D4586, Type I.
- G. Reglets: Surface mounted type, galvanized steel; face and ends covered with plastic tape; unless indicated otherwise.
- H. Draw Bands: Stainless steel with required hardware to secure flashing to roof penetrations.
- I. Solder: ASTM B32; type suitable for application and material being soldered.
- J. Self-Adhered flashing tape.

## 2.4 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet metal, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Form expansion joints with slip joints using 12 inch wide backup plate in accordance with SMACNA Architectural Manual Plate 42 Figure D. Form backup plate to profile matching face.
- G. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- H. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- I. Fabricate gutters to profile and size indicated on drawings.
- J. Fabricate downspouts to profile and size indicated on drawings.
- K. Fabricate accessories in profile and size to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA requirements.
  - 2. Gutter Supports: Straps.
  - 3. Downspout Supports: Straps.
- L. Soldered metal joints.

## 2.5 FACTORY FINISHING

- A. PVDF (polyvinylidene fluoride) coating: Multiple coat, thermally cured, fluoropolymer system conforming to AAMA 2605.
- B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.

### 3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
- C. Paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

### 3.3 INSTALLATION

- A. Cut reglets into existing masonry joints to accept new counterflashing. Cut reglets with power saw in a manner to avoid chipping, spalling or damaging adjacent masonry. Insert flashings and wedge for tight fit. Seal flashings into reglets with sealant.
- B. Overlap joints by 4" and solder, every third seam (24"-30") a loose lock expansion required.
- C. End dams are required where flashing terminates at openings, windows, walls, etc.
- D. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- E. Apply plastic cement compound between metal flashings and felt flashings.
- F. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

- G. Install 6" wide self-adhered flashing the seal the flashing to the substrate.
- H. Secure gutters and downspouts in place using concealed fasteners.
- I. Adjust slope for new gutters to match the slope of the existing adjacent gutter.
- J. Connect new downspout to existing adjacent downspout.
- K. Seal metal joints watertight.

**END OF SECTION**

**SECTION 077100**  
**MANUFACTURED GUTTERS, DOWNSPOUTS AND CAST IRON BOOTS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Pre-finished galvanized steel gutters and downspouts.
- B. Fastening.
- C. Precast concrete splash pads riprap at downspout outflows.
- D. Cast iron boots.

**1.2 SYSTEM DESCRIPTION**

- A. Rainwater collection and disposal system externally mounted and drained.

**1.3 SUBMITTALS**

- A. Submit the following in accordance with Section 013000, Submittals
  - 1. Catalog Data: Manufacturer's product specifications, standard details, installation instructions and general recommendations, as applicable to materials and finishes for each component and their complete installation.
  - 2. Shop Drawings: Complete shop drawings and erection details showing methods of erection, sections and details, flashings and all other accessories. Interface with all related work of other trades and proposed identification of component parts and finishes.
  - 3. Samples: One cross sectional sample of guttering and downspout, including clips, fasteners as applicable to project. Submit two color chip samples in color selected by Architect.
  - 4. Warranty: As specified herein.

**1.4 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with Section 016000, Product Requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope materials and components to ensure drainage.

- C. Prevent contact with materials causing discoloration or staining.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply gutter or downspout materials during inclement weather.
- B. Do not apply gutter or downspout materials to damp or frozen surfaces.

## 1.7 QUALITY ASSURANCE

- A. Perform work per SMACNA Architectural Sheet Metal Manual and NRCA Roofing and Waterproofing Manual.

## 1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

## 1.9 WARRANTY

- A. Furnish year manufacturer warranty for metal components against corrosion with an additional installers warranty for [5] years against fastener failure, water penetration at joints or failure to drain.

# **PART 2 PRODUCTS**

## 2.10 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Comply with Section 012500, Product Options and Substitutions.
- B. Product Description:
  - 1. Gutters, downspouts, conductor heads and scuppers: Sheet metal, profile as indicated on Drawings.

## 2.11 SHEET METAL MATERIALS

- A. Pre-Finished Galvalume Steel Sheet: ASTM A755 coil coated.
  - 1. Exposed Finish: Minimum three coat fluoropolymer coating with minimum 70 percent polyvinylidene fluoride resin.
  - 2. Unexposed Finish: Manufacturer's standard.
  - 3. Splash Pads: Precast concrete type, with standard profile indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.
  - 4. Pre-fab Kickout flashing where gutter abut a wall.
  - 5. Downspout, Boots and Shoes: Metal identical to rest of system.

## 2.12 FABRICATION

- A. Form sections as indicated in Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate trim, flashing, and other metal components from same material as metal gutter sections. Provide exposed metal surfaces with same finish as exposed face of metal roof panels.
- C. Fabricate strap ties of compatible material as gutters, to interlock with gutter.
- D. Fabricate connector/expansion clips of same material as gutter that interlock with gutter by mechanical fastener or welding.
- E. Form gutter and downspout sections in longest practical lengths or in single length sheets where possible.
  - 1. Gutters: Rectilinear in cross section unless otherwise indicated.
- F. Hem exposed edges on 1/2-inch miter.
- G. Provide expansion joints (slip joints) on gutters exceeding 50 feet in length
- H. Roof side gutter flange to extend continuously up fascia or wall and terminate under drip edge or gravel stop. Where this is not possible, flange to be lapped with flat sheet metal that begins under edge of roof sheathing or drip edge and laps over the sloped rear gutter flange. The rear gutter flange must be bedded, when applied on plumb fascias, in silicone sealant.
- I. Fabricate corners with 18 inch long legs. Weld mitered seam for rigidity, seal with sealant.
- J. Install gutter connections per manufacturer's warranty requirements. Connections may be:
  - 1. Soldered.
- K. Downspout collars on bottom of gutter trough must be soldered and sealed with sealant.

## 2.13 ACCESSORIES

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
  - 1. Anchoring Devices: [Per SMACNA requirements.
  - 2. Gutter Supports: Screws and ferrules.
  - 3. Downspout Supports: Brackets.
  - 4. Fabricate gutter and downspout accessories; seal watertight.



B. Fasteners: Screws

1. For installations on wood framed structures through screwing is required with [8]-inch long galvanized or anodized screws within ferrules. Fastening to be at rafter tail locations with screws to penetrate both fascia and rafter tail.
2. For fastening directly through gutter cross section, use screws of suitable length made of compatible material and finish as gutters and downspouts, with neoprene gaskets.

C. Primer: Zinc molybdate type.

D. Protective Backing Paint: Zinc molybdate alkyd.

E. Solder: ASTM B32, 50/50 type.

2.14 FACTORY FINISHING

- A. PVDF (polyvinylidene fluoride) Coating: Multiple coat, thermally cured, fluoropolymer system conforming to [AAMA 2604] [AAMA 2605].

2.15 SUPPLEMENTAL MATERIALS

A. Powder coated Cast iron boots with cleanouts

1. Provide cast iron boots tied into underground collection system.
2. Acceptable manufacturer: J.R. Hoe & Sons Inc., 101 Ironwood Rd., Middlesboro, KY 40965; 1-800-245-5521; [www.downspouts.com](http://www.downspouts.com)
3. 24" length O-Series offset boot.
4. Top Bell and outlet OD to match conductors.
5. Color: To be selected by architect
6. Accessories:
  - a. Rubber couplings
  - b. Mounting hardware to be painted to match boot.

**PART 3 EXECUTION**

3.1 EXAMINATION

- A. Verify surfaces are ready to receive gutters and downspouts.

3.2 PREPARATION

- A. Paint concealed [metal] [wood] surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil and bed with silicone sealant.

3.3 INSTALLATION

- A. Roll Formed Gutter: Join lengths with formed seams soldered watertight. Flash and seal gutters to downspouts and accessories.

- B. Install per manufacturer's instructions. If there is a conflict between Subcontract documents and manufacturer's instructions, comply with most stringent requirements.
- C. Install kickout flashing where gutters abut a wall.
- D. Slope gutters 1/8 inch per foot minimum, 1/4 inch per foot preferred.
- E. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
- F. Connect downspouts to boots at 8 inches above grade, seal connection watertight.
- G. Install gutters 3/4 inches below slope of roof at outside edge.
- H. Attach gutters to structure by both strap ties and by direct fastening through profile. Locate fasteners and strap ties a maximum of 24 inches on center.
- I. Locate downspouts per Drawings.
- J. Provide "open sided" downspouts to prevent gutter ice build-up.
- K. Strap fasten downspouts at maximum 30 inches on center.
- L. Do not locate downspouts with outflow creating an icing problem on pedestrian walkways.
- M. Set splash pans under downspouts when application puts outflow onto a flat roof below. Secure in place.
- N. Set splash pads under downspouts at grade and secure in place with soil or pins. Grade out flow soils to drainage area.
- O. Provide rip rap at downspout outflow, 6 inch nominal diameter stones secured in place where adjacent grade of soil exceeds 5 percent, or where volume and velocity of outflow will cause erosion.

**END OF SECTION**

## **SECTION 078413 FIRESTOPPING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Firestopping for through penetrations and joints in fire rated assemblies.
  - 2. Firestopping at top of fire rated walls.
  - 3. Firestopping of devices penetrating one face of fire rated partition that are not separated by minimum code required distance.

#### **1.2 SYSTEM DESCRIPTION**

- A. Firestopping Materials: ASTM E119 or ASTM E814 to achieve fire ratings as indicated on Drawings, but not less than 1-hour fire rating.
- B. Surface Burning: ASTM E84 with a maximum flame spread / smoke developed rating of 25/450.
- C. Firestopping interruptions to fire rated assemblies, materials, and components.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Firestopping Designs: Conform to assemblies listed with Underwriters Laboratories or Warnock Hersey. Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

#### **1.4 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  - 1. Submit data on product characteristics, performance and limitation criteria.
  - 2. Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings and to maintain fire resistance rating of adjacent assembly.
  - 3. Submit descriptions of tested designs listed in submitted schedule.
- C. Manufacturer's Installation Instructions: Submit preparation and installation instructions.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements and applicable code requirements. Certify applicator is approved by manufacturer.
- E. Engineering Judgments: For conditions not covered by UL or WH listed designs, provide judgments by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting fire protection requirements.

## 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of materials.
- D. Provide ventilation in areas to receive solvent cured materials.

## PART 2 PRODUCTS

### 2.1 FIRESTOPPING

- A. Manufacturers:
  - 1. Hilti USA
  - 2. 3M Fire Protection Products.
  - 3. Specified Technologies, Inc.
  - 4. Nelson
  - 5. Substitutions: Section 016000 - Product Requirements.
- B. Product Description: Listed as components of tested design, appropriate for the physical configuration of each penetration and as required by the fire resistance rating indicated and the provisions of Article: SYSTEM DESCRIPTION.
  - 1. Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.

### 2.2 FILL, VOID, AND CAVITY MATERIALS

- A. Fill, Void, and Cavity Materials: One or more of the following types, as appropriate for particular construction conditions:
  - 1. Silicone foam material, room temperature vulcanizing, 14 to 20 lb/cu ft density.
  - 2. Silicone sealant material, except on finished surfaces to be painted.
  - 3. Caulk type material.
  - 4. Putty type material.
  - 5. Composite sheet type material, 1/4 inch nominal thickness, foil-faced.
  - 6. Wrap strip type material, 1/4 inch nominal thickness, intumescent elastomeric.

- B. Packing Materials: One or more of the following types, as appropriate for particular construction conditions:
  - 1. Ceramic fiber blanket, 4 lb/cu ft density.
  - 2. Ceramic fiber insulation, minimum 1 inch thick, 8 lb/cu ft minimum density.
  - 3. Mineral wool batt insulation, 6.0 lb/cu ft minimum density.
- C. Foaming Materials: As required by tested design for particular construction conditions.

## 2.3 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
- B. Dam Material: Permanent, mineral fiber matting.
- C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.
- D. Identification plates.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify openings are ready to receive firestopping.
- C. Verify that penetrating elements are securely fixed and properly located; with a minimum of 1/2 inch space between penetrations and surfaces of openings unless otherwise required or permitted by tested design.

### 3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which may affect bond.
- C. Install backing materials to arrest liquid material leakage.

### 3.3 APPLICATION

- A. Install material at fire rated construction perimeters and openings which contain penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.

- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating
- D. Compress fibered material to maximum 40 percent of its uncompressed size.
- E. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.
- F. Remove dam or foaming material not required to remain as part of the system, after firestopping material has cured sufficiently to remain in place.
- G. Fasten installation plates adjacent to each fire proofing, fire penetrations and intumescent coatings.

### 3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing and Inspection Services.
- B. Inspect installed firestopping for compliance with specifications and submitted schedule.
- C. Inspect firestopping systems, minimum 48 hours after installation, for adhesion and set of sealant materials.
- D. Correct deficiencies and re-inspect to verify compliance with requirements.

### 3.5 CLEANING

- A. Section 017000 - Execution Requirements: Final cleaning.
- B. Clean adjacent surfaces of firestopping materials.
- C. Remove excess firestopping materials for neat appearance in areas left exposed to view in finished construction.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution Requirements: Protecting installed construction.
- B. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**

## **SECTION 079000 JOINT SEALERS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Sealants and joint backing.
  - 2. Precompressed foam sealers.
  - 3. Hollow gaskets.

#### **1.2 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Products Data:
  - 1. Submit data for sealant materials, performance, and substrate preparation.
  - 2. Indicate available colors and color match for each sealant type for selection.
- C. Samples: Submit two sets of samples, 3 inches long illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- E. Warranties: Submit certified signed manufacturers' warranties.

#### **1.3 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum (5) five years documented experience.

#### **1.4 ENVIRONMENTAL REQUIREMENTS**

- A. Section 016000 - Products Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

#### **1.5 COORDINATION**

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with sections referencing this section.

## 1.6 WARRANTY

- A. Section 017000 - Execution Requirements: Requirements for warranties.
- B. Provide five year manufacturer's warranty for installed sealants and accessories which fail to achieve airtight seal or watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.
- C. Provide ten year manufacturer's warranty for installed deck drain sealant which fails to achieve airtight seal or watertight seal, exhibits loss of adhesion or cohesion, and does not cure.

## PART 2 PRODUCTS

### 2.1 JOINT SEALERS

- A. Silicone Sealant Manufacturers:
  - 1. Pecora Corporation.
  - 2. General Electric Silicones.
  - 3. Dow Corning.
  - 4. Tremco Inc.
  - 5. Substitutions: Section 016000 - Products Requirements.
- B. Other Sealant Manufacturers:
  - 1. Pecora Corporation.
  - 2. Sonneborn Building Products.
  - 3. Tremco Inc.
  - 4. OSI
  - 5. Substitutions: Section 016000 - Products Requirements.
- C. Type A - Polyurethane Exterior Joints: ASTM C920, Type M, Grade NS, Class 25; Uses NT, M, A, and O; two component, chemical curing, nonstaining, nonbleeding, capable of continuous water immersion, color as selected:
  - 1. Tremco; Dymetric 511.
  - 2. Pecora; Dynatrol II.
  - 3. Sonneborn; NP 2.
  - 4. Applications: Use for exterior non-traffic bearing joints, except EIFS joints.
    - a. Control, expansion, and soft joints in masonry.
    - b. Joints between concrete and other materials.
    - c. Joints between metal frames and other materials.
    - d. Other exterior non-traffic bearing joints for which no other sealant is indicated.
    - e. Other traffic bearing joints for which no other sealant is indicated.
- D. Type D - Polyurethane Interior Joints: ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, O; single component, chemical curing, nonstaining, non-bleeding, capable of continuous water immersion, color as selected; manufactured by:
  - 1. Tremco; Dymonic.
  - 2. Pecora; Dynatrol 1.



3. Sonneborn; NP 1.
  4. Applications: Use for:
    - a. Interior wall and ceiling control joints.
    - b. Joints between interior surfaces and exterior wall components.
    - c. Other interior dynamic joints.
- E. Type E - Acrylic Interior Joints: ASTM C834; single component, solvent curing, nonstaining, nonbleeding, nonsagging; color as selected; manufactured by:
1. Tremco; Acrylic Latex.
  2. Pecora; AC-20.
  3. Sonneborn; Sonolac.
  4. OSI Quad
  5. Applications: Use for interior joints, except where sanitary sealant is required.
    - a. Interior wall and ceiling control joints.
    - b. Interior joints between door and window frames and wall surfaces.
    - c. Other interior joints for which no other type of sealant is indicated.
- F. Type F - Silicone Interior Sanitary Joints: ASTM C920; single component, solvent curing, non-sagging, nonstaining, fungus resistant, nonbleeding; color as selected; manufactured by:
1. General Electric; SCS 1700.
  2. Dow Corning; 786.
  3. Pecora; 898 Silicone Sanitary Sealant.
  4. Substitutions: Section 016000 - Product Requirements.
  5. Applications: Use for kitchens, bathrooms, toilet rooms, lockers, and other wet areas:
    - a. Joints between plumbing fixtures and floor and wall surfaces.
    - b. Joints between kitchen and bath countertops and wall surfaces.
    - c. Joints between lockers and toilet accessories and adjacent surfaces.
    - d. Joints between sanitary wall panels and adjacent or penetrating materials.

## 2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; oversized 30 to 50 percent larger than joint width; recommended by sealant manufacturer to suit application
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

### **3.2 PREPARATION**

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.
- D. Protect elements surrounding the Work of this section from damage or disfiguration.

### **3.3 INSTALLATION**

- A. Perform installation in accordance with ASTM C1193.
- B. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- C. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- D. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Tool joints concave, unless indicated otherwise on drawings.
- F. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
- G. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

### **3.4 CLEANING**

- A. Section 017000 - Execution Requirements: Final cleaning.
- B. Clean adjacent soiled surfaces.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 017000 - Execution Requirements: Protecting installed construction.

- B. Protect sealants until cured.

**END OF SECTION**

**SECTION 079500  
EXPANSION CONTROL**

**PART 1 – GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes:
- B. Scope of Work
  - 1. Interior expansion control systems
- C. Provide all labor, materials and services to perform operations in connection with furnishing, delivery, and installation of work related to this section.

**1.03 RELATED WORK**

- A. Related work includes but is not limited to:
  - 1. Cast-In-Place Concrete: Section 033000.
  - 2. Unit Masonry: Section 042200.
  - 3. Structural Steel: Section 051200.
  - 4. Cold Formed Metal Framing: Section 054100.
  - 5. Sheet Metal Flashing and Trim: Section 076200.
  - 6. Joint Sealants as Weather Seals: Section 079000
  - 7. Gypsum Wallboard: Section 092600.

**1.04 R REFERENCES**

- A. Work shall be performed following applicable Local, State, and Federal codes and regulations.
- B. Publications listed herein are part of this specification. See below for standards where applicable to the product listed:
  - 1. American Society for Testing and Materials (ASTM):
    - a. ASTM B221, "Standard Specifications for Aluminum and Aluminum-Alloy Extrusions."
    - b. ASTM B209, "Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
    - c. ASTM E1399 "Cyclic Movement and Measuring of Minimum/Maximum Joint Widths of Architectural Joint Systems."
    - d. ANSI/U.L. No. 263, UL2079 and ULCS115 Fire Rated Testing including hose stream test at full rated period. Underwriter's Laboratories shall classify adjacent substrate assemblies.
    - e. ASTM E1612, Standard Specification for Preformed Architectural Compression Seals for Buildings and Parking Structures.

**1.05 DEFINITIONS**

- A. Product Movement capabilities
  - 1. Product operating range defined as a percentage of the nominal joint width.
  - 2. Industry standard requirements: 25%+- operating range for thermal conditions. 50%+- operating range for seismic and windsway conditions.
- B. Product "Load" descriptions:
  - 1. Standard Loads: common applications with high volume pedestrian crossing. Applicable for typical office settings or other spaces where occasional rubber wheeled traffic (i.e.- mail carts, trolleys, light weight cleaning equipment and luggage) will be encountered. 500 lb. maximum.
  - 2. Moderate Loads: suggests applications where occasional heavier maintenance equipment with soft rubber tires (such as gurneys, light duty scissor lifts, motorized cleaning equipment) would be added to the Standard traffic definition. The systems in this category are comprised of heavier aluminum extrusions and thicker walled extruded rubber seals. 1000 lb maximum.
  - 3. Heavy Duty Concentrated Loads: reserved for project conditions where heavy loads (i.e.- vehicles, mobile medical equipment, coin carts, materials handling equipment) are common.

Capable of multi-directional movement and resistance to recurring lateral impact forces.  
Typical 2000 lb. maximum. \*7000 lb. (\*Specific models only).

#### **1.06 SYSTEM DESCRIPTION**

- A. Joint coverplate systems shall permit daily thermal expansion and contraction of building elements, minor foundation settlement, and common windsway movements of the structure without disengagement.
  - 1. Joint system details shall clearly indicate X-axis joint movement capabilities (horizontal contraction/ expansion). Y-axis joint movement (in-plane shear), and Z-axis movement (vertical shear) may be requested of the Manufacturer if applicable.
  - 2. Movement capabilities shall be clearly defined as a percentage of the nominal joint width or with distinct dimensions defined on product details.
- B. Joint Systems shall allow for seismic movement (if applicable), matching requirements as defined within the Project Specific Structural Specifications.
- C. Fire Rated Assemblies shall be tested by registered Third Party Testing Agencies in accordance with UL2079, ULC S115, or BS 476 classified systems. Expansion joint assembly fire rating shall match or exceed the fire rating of adjacent construction.

#### **1.07.0 QUALITY ASSURANCE**

- A. Architectural Joint Cover Manufacturer: Furnish horizontal and vertical systems from a Manufacturer with a minimum of ten (10) years of experience in the design, engineering and fabrication of expansion joint systems.
- B. Fire Rated Assembly Manufacturer: Furnish horizontal and vertical rated systems from a single Manufacturer to ensure compatibility. Intersection of/ or transition between dissimilar systems is not allowed unless reviewed and approved by AHJ.
- C. Installer: Contractor with not less than three (3) years of successful experience in the installation of systems similar to those required by Project.

#### **1.08 ACTION SUBMITTALS**

- A. Manufacturer's Specifications, technical data, installation instructions, and detail drawings for each proposed system.
- B. Listings/ Certifications of all Fire Rated Assemblies secured through Registered Third Party Testing Agency.
- C. Representative sample of specified systems 4" minimum length.

#### **1.09.1 DELIVERY AND STORAGE**

- A. Manufacturer to provide protective film on all exposed cover plate components.
- B. Deliver joint systems to jobsite in new, clean, unopened cartons or crates of sufficient size and strength to protect materials during transit.
- C. Inspect materials upon arrival. Store components in original containers in a clean, dry location. Ensure temperature or moisture sensitive components are stored in a tempered location.
- D. Contractor to provide temporary protective covers on all installed finished surfaces. Protection is required to guard against both surface abrasions as well as overloading of horizontal deck components by construction traffic.

#### **1.10 SEQUENCING**

- A. Submittals shall be completed and remitted to the Project Architect within 4 weeks after award of subcontract.
- B. Subcontract for the work of this section shall be planned to allow sufficient time for Manufacturer's production and delivery scheduling.

#### **1.11 WARRANTY**

- A. Standard JointMaster/InPro Corporation limited warranty against material and manufacturing defects for a period of not less than five (5) years when installed in accordance with Manufacturer's recommendations.

## **PART 2 – PRODUCTS**

### **2.01 MANUFACTURER**

- A. Manufacturer must be capable of providing a full range Interior and Exterior Architectural Joint Cover systems as well as a full compliment of expansion joint accessories.
- B. Manufacturer must be capable of providing project specific details accurate to the building construction type.
- C. Substitutions: Not permitted.
- D. Requests for substitutions will be considered in accordance with provisions of Section 016000.

### **2.02.1 MATERIALS**

- A. Aluminum: Alloy types of 6061-T6, 6063-T6, 6005A, or 5052-H32 sheet goods
  - 1. Floor systems: Mill finish standard
  - 2. Walls and Ceilings: Standard Class II Clear Anodized
- B. Stainless Steel: Alloy Type 304 for plates and strips.
  - 1. Brushed #4 surface finish standard
- C. Elastomeric Seals: Synthetic rubber seals comprised of a dual extrusion Santoprene rubber for heat welding of all transitions and seams for a monolithic, weathertight installation. EPDM and Neoprene substitutions are not allowed due to their lack of ability to meet this specific requirement.
  - 1. All Santoprene seals must be certified as low VOC as certified by UL Environmental GreenGuard Gold Certification
- D. Horizontal and Vertical Moisture Barrier (optional accessory): Min. 45 mil thick fabric reinforced EPDM with optional watertight drain assemblies.
- E. Horizontal and Vertical Insulated Vapor Barrier (optional accessory):
  - 1. Min. R Value of 15
  - 2. Must meet ASTM E1399 Cyclic movement requirements matching movement requirements specific to project.

### **2.03.01 INTERIOR FLOOR JOINT SYSTEMS**

- A. Single Seal joint systems
  - 1. Recessed and Surface Mount systems
  - 2. Joint range applications 1-3"
  - 3. Joint operating range 25%+- of total nominal joint width
  - 4. New and existing construction applications
  - 5. Santoprene Seal traits:
    - a. Dual durometer extruded Santoprene with Shore Hardnesses of 60 Shore A and 40 Shore D to ensure longevity of installation. Single durometer seals shall not be allowed.
    - b. Flat seal must maintain inherent dimensional stability and include structural spine inserts (where applicable) allowing for additional load resistance.
  - 6. Santoprene Color:
    - a. From manufacturer's standard offering.
    - b. Multiple color selections based on location and adjacent finish.
  - 7. Frames adaptable to multiple floor finishes
  - 8. Addresses Standard Loading conditions
  - 9. Surface Mount system 106.

### **2.03.02 INTERIOR WALL AND CEILING JOINT SYSTEMS**

- A. Single Flat Seal joint systems
  - 1. Recessed Mount framing systems
  - 2. Joint range applications 1-3"
  - 3. Joint operating range 25%+- of total nominal joint width
  - 4. New and existing construction applications
  - 5. Flat Santoprene Seal traits:

- a. Dual durometer extruded Santoprene with Shore Hardnesses of 60 Shore A and 40 Shore D to ensure longevity of installation. Single durometer seals shall not be allowed.
- b. Flat seal must maintain inherent dimensional stability and include structural spine inserts (where applicable) allowing for additional load resistance.
- 6. Santoprene Color:
  - a. From manufacturer's standard offering.
  - b. Multiple color selections based on location and adjacent finish.
  - c. Three (3) color selections for wall and ceiling.
- 7. Surface Mount system 113 Series

## **2.04 FABRICATION**

- A. Field assemble components provided in standard lengths with pre-packaged fasteners and accessories whenever possible.
- B. Fabricate special transitions and corner fittings as required. Miter and heat weld elastomeric seals for monolithic splices and transitions.

## **PART 3 – EXECUTION**

### **3.01 INSPECTION**

- A. Prior to starting work, verify that structural gap and blockout dimensions are in conformance with manufacturer's submittal data. Do not begin work until all unsatisfactory substrate conditions are resolved. See manufacturer for recommended tolerances.
- B. Carefully inspect installed work of other Trades and verify that such work is complete to allow the work of this section to commence.
- C. Schedule inspection of all Waterproofing measures and Fire Rated life safety product prior to installation of coverplate systems –or- provide allowance for removal of 10% of coverplate systems for inspection before final acceptance.

### **3.02 INSTALLATION**

- A. Joint systems: Install in accordance with manufacturer's instructions.
- B. Align work plumb, level and flush with adjacent surfaces. Mechanically anchor to substrate. Allowances should be made where actual structural gap at time of installation varies from nominal design gap. No shimming of frames is permitted.
- C. Coordinate with work of other Sections.
- D. If concrete blockouts (rebates) are required, ensure continuous support equal to surrounding substrate structural values.
- E. Fire Rated Assemblies: Where required, install to manufacturer's instructions.
- F. Moisture Barrier: Where required, install to manufacturer's instructions.

### **3.03 PROTECTION AND CLEANING**

- A. Protect the completed Expansion Control system work from damage during construction. Damage protection includes surface abrasion and overloading of coverplate by materials handling equipment and construction waste/debris.
- B. Protection from environmental factors required throughout installation process until Project Closeout. Protection includes but is not limited to rain events, moisture protection, exposure to emperature fluctuations or direct sunlight for temperature sensitive product offerings.
- C. Prior to project closeout, clean all exposed surfaces with a suitable cleaner. Manufacturer suggests Xylene for Santoprene seals, ensure non-solvent cleansers are not utilized throughout product lifespan.

**END OF SECTION**

## SECTION 081113

### HOLLOW METAL DOORS AND FRAMES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.

B. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
8. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
9. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
10. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
11. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
12. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
13. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

##### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.



- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
  - 1. Elevations of each door design.
  - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
  - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 4. Locations of reinforcement and preparations for hardware.
  - 5. Details of anchorages, joints, field splices, and connections.
  - 6. Details of accessories.
  - 7. Details of moldings, removable stops, and glazing.
  - 8. Details of conduit and preparations for power, signal, and control systems.
- D. Samples for Verification:
  - 1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.
  - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
  - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
    - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

#### 1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.6 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
  - 1. CECO Door Products (C).
  - 2. Curries Company (CU).
  - 3. Steelcraft (S).

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

### 2.3 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
  - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
  - 2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
  - 3. Manufacturers Basis of Design:
    - a. Curries Company (CU) - CM Series.
    - b. Curries Company (CU) - M Series.
- C. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

### 2.4 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick,

with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

## 2.5 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- C. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

## 2.6 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

## 2.7 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Frames:
  1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with loose wiring harness (not attached to open throat components or installed in closed mullion tubes) and standardized Molex™ plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
9. Electrical Knock Out Boxes: Factory weld 18 gauge electrical knock out boxes to frame for electrical hardware preps; including but not limited to, electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
  - a. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.
  - b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.
  - c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware".
  - d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.
10. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
11. Jamb Anchors: Provide number and spacing of anchors as follows:
  - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    - 1) Two anchors per jamb up to 60 inches high.

- 2) Three anchors per jamb from 60 to 90 inches high.
- 3) Four anchors per jamb from 90 to 120 inches high.
- 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
- b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
  - 1) Three anchors per jamb up to 60 inches high.
  - 2) Four anchors per jamb from 60 to 90 inches high.
  - 3) Five anchors per jamb from 90 to 96 inches high.
  - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
  - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
12. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
- D. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
  1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

## 2.8 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
  - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
  - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
  - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

- C. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

### 3.5 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

**END OF SECTION 081113**



## **SECTION 081416 FLUSH WOOD DOORS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Solid core doors with wood veneer faces.
  - 2. Factory finishing wood doors.
  - 3. Factory fitting wood doors to frames and factory machining for hardware.
- A. Standards and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ANSI A208.1 – Wood Particleboard.
  - 3. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
  - 4. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
  - 5. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
  - 6. UL 10C - Positive Pressure Fire Tests of Door Assemblies; UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
  - 7. Window and Door Manufacturers Association - WDMA I.S.1-A Architectural Wood Flush Doors.

#### **1.2 SUBMITTALS**

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, trim for openings, and WDMA I.S.1-A classifications. Include factory finishing specifications.
- B. Shop Drawings shall include:
  - 1. Indicate location, size, and hand of each door.
  - 2. Indicate dimensions and locations of mortises and holes for hardware.
  - 3. Indicate dimensions and locations of cutouts.
  - 4. Indicate requirements for veneer matching.
  - 5. Indicate location and extent of hardware blocking.
  - 6. Indicate construction details not covered in Product Data.
  - 7. Indicate doors to be factory finished and finish requirements.
  - 8. Indicate fire protection ratings for fire rated doors.
- C. Samples for Initial Selection: For factory finished doors.
  - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

2. Corner sections of doors, 8 by 10 inches, with door faces and edges representing actual materials to be used.
    - a. Provide samples for each species of veneer and core material.
    - b. Finish veneer faced door samples with same materials proposed for factory finished doors.
  3. Frames for light openings, 6 inches long, for each material, type, and finish required.
- D. Warranty: Provide sample of manufacturer's warranty.

### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors'.
- C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL10C.
  1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies provide manufacturer's construction label, indicating compliance to independent 3<sup>rd</sup> party certification agency's procedure, except for size.
  2. Temperature Rise Limit: Where required and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire test exposure.
  3. Smoke Control Door Assemblies: Comply with NFPA 105.
    - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for receiving, handling, and installing flush wood doors.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package pre-finished doors individually in plastic bags and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top rail with opening number used on Shop Drawings.

## 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

## 1.6 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in wood face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid Core Interior Doors: Life of installation.

## PART 2 - PRODUCTS

### 2.1 DOOR CONSTRUCTION – GENERAL

- A. WDMA I.S.1-A Performance Grade: Extra Heavy Duty; Aesthetic Grade: Premium.
- B. Fire Rated Doors: Provide construction and core as needed to provide fire ratings indicated.
  - 1. Category A Edge Construction: Provide fire rated door edge construction with intumescent seals concealed by outer stile (Category A) at 45, 60, and 90 minute rated doors. Comply with specified requirements for exposed edges.
  - 2. Pairs: Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
    - a. Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals.

### 2.2 CORE CONSTRUCTION

- A. Particleboard Core Doors:
  - 1. Particleboard: Wood fiber based materials complying with ANSI A208.1 Particleboard standard. Grade LD-2.
  - 2. Adhesive: Fully bonded construction using Polyurethane (PUR) glue.
  - 3. Blocking: As indicated under article "Blocking".
- B. Fire Resistant Composite Core Doors:

1. Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.
2. Blocking: As indicated under article "Blocking".
3. Edge Construction: At hinge stiles, provide laminated edge construction with improved screw holding capability and split resistance. Comply with specified requirements for exposed edges.

## 2.3 BLOCKING

### A. Non-Fire-Rated Doors:

1. Provide blocking as indicated below:
  - a. HB1: 5 inch in doors indicated to have closers and overhead stops.
  - b. HB4: Two 5 inch x 14 inch lock blocking, in doors indicated to have exit devices.
  - c. HB5: Two 5 inch x 14 inch corner blocking, in doors indicated to have flush bolts.

### B. Fire Rated Doors:

1. Provide blocking as indicated below:
  - a. HB1: 5 inch in doors indicated to have closers and overhead stops.
  - b. HB4: Two 5 inch x 14 inch lock blocking in doors indicated to have exit devices.
  - c. HB5: Two 5 inch x 14 inch corner blocking in doors indicated to have flush bolts.

## 2.4 VENEERED DOORS FOR TRANSPARENT FINISH

### A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ASSA ABLOY Wood Doors (GR): GPD Series.
2. Eggers Industries (EG): Premium Series.
3. Marshfield-Algoma (MF): Signature Series.

### B. Interior Solid Core Doors:

1. Grade: Premium.
2. Faces: Veneer grades as noted below; veneer minimum 1/50-inch (0.5mm) thickness at moisture content of 12% or less.
  - a. Plain Sliced Select White Maple, A grade faces.
3. Match between Veneer Leaves: Book match.
4. Assembly of Veneer Leaves on Door Faces:
  - a. Running Match.
5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
6. Transom Match: Continuous match.
7. Vertical Edges: Matching same species as faces. Wood or composite material, one piece, laminated, or veneered. Minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.

8. Horizontal Edges: Solid wood or structural composite material meeting the minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit sanded before applying face veneers.
10. At doors over 40% of the face cut-out for lights and or louvers, furnish engineered composite lumber core.

## 2.5 FABRICATION

- A. Factory fit doors to suit frame opening sizes indicated.
  1. Comply with requirements in NFPA 80 for fire rated doors.
  2. Undercut: As required per manufacturer's templates and sill condition.
- B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
  1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.

## 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Transparent Finish: Provide a clear protective coating over the wood veneer allowing the natural color and grain of the selected wood species to provide the appearance specified. Stain is applied to the wood surface underneath the transparent finish to add color and design flexibility.
  1. Finish: Meet or exceed WDMA I.S. 1A TR8 UV Cured Acrylated Polyester finish performance requirements.
  2. Staining:
    - a. As selected by Architect from manufacturer's full range.
  3. Sheen: Satin.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
  1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

A. Hardware: For installation, see Division 8 Section "Door Hardware."

B. Installation Instructions: Install doors and frames to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire rated doors in corresponding fire rated frames according to NFPA 80.

C. Factory Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

E. Field modifications to doors shall not be permitted, except those specifically allowed by manufacturer or fire rating requirements.

### 3.3 ADJUSTING

A. Operation: Re-hang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

**END OF SECTION**

**SECTION 083210  
CUSTOM WOOD FRAME WITH ACRYLIC PANEL DOORS**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Manually-operated interior sliding doors, including frame and glazing as well as sliding, locking and pull hardware.
- B. Related Sections:
  - 1. Division 06 Sections for wood framing and supports, and all blocking at head and jambs as required
  - 2. Division 09 Sections for wall and ceiling framing at head and jambs

**1.02 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications –Engaged in manufacturing of doors of similar type to those specified with 14 years successful experience

**1.03 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data including description of materials, components, hardware, and finishes.
- B. Shop Drawings: Indicate location, size, elevation, details of construction, and factory preparation requirements for each door type on vendor supplied shop drawings.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Delivery: Do not deliver doors to building until it is entirely enclosed, drywall, plaster and concrete work is completed and dry, humidity in the building is below 60% and temperature is between 45 and 90 Fahrenheit.
- B. Storage: Stack doors vertically at an angle of 10 degrees (or less) to the wall, on a level floor surface in a dry, well ventilated area. Keep doors in packaging while allowing air circulation. Do not stack or lean other objects against doors.
- C. Handling: Do not drag doors across one another. Do not drop or rest doors on corners or edges. Doors should be carried sideways and upright (not flat like a tabletop)
- D. Protection: Do not subject doors to abnormal heat (above 90F or below 45F, dryness, humidity (above 60% or below 20% humidity), or drastic changes in these conditions. Allow sufficient time for doors to acclimate before installation. Keep doors in original packaging until ready to be installed.

**1.05 WARRANTY**

- A. Factory Finished Door Warranty: Provide manufacturer's standard 1-year warranty.

**PART 2 – PRODUCTS**

**2.01 MANUFACTURERS**

- A. Acceptable Manufacturer:

RAYDOOR, Inc., New York, New York, USA  
Telephone: (212) 421-0641  
Fax: (646) 349-1856  
Website: [www.raydoor.com](http://www.raydoor.com)  
Email: [info@raydoor.com](mailto:info@raydoor.com)

- B. Product:  
Raydoor Sliding Walls and Doors

## 2.02 OPERATION

- A. Raydoor Sliding Doors: individual or series of individual doors, to be manually operated and top supported. Door stiles should overlap walls except in the instance that leading- edge strikes wall.

## 2.03 PANEL CONSTRUCTION

- A. All panels to be constructed of MDF substrate frame with central glazing layer of acrylic. Panels to show no mechanical fasteners or molding of any kind.
- B. Panel to be 2-1/4" thick and made from laminating 3 structural layers together in a high-pressure, patented TWINFRAME™ process. The 2 outer layers are made from 1" thick veneer, low-pressure laminate, or vinyl-wrapped MDF, the central core layer to be made of a 1/4" thick machine-able, semi structural layer of either acrylic, PETG resin, or veneered MDF (as specified by architect). The core layer and the outer frame layers are to be constructed such that the nominal width will be no more than +/-1/16". Assembly should be such that if translucent materials have been selected for the core layer, they are to permit light to emanate from the edge of the door. The bottom of the central core layer to be 7/8" higher than the outer frame layers with all three components justified at the top of the finished panel. This will create a 1/4"w x 7/8"h void at the bottom of the panel which will be used for guide operation (see sliding hardware, 2.04 B)
- C. Optional muntins to be made of same materials as selected frame and fastened through either side of glazing layer.
- D. Pre-fit and pre-machine doors at factory.
1. Installer to obtain accurate field measurements and verify dimensions before manufacturer proceeds with machining in factory.
  2. Manufacturer to machine doors for hardware requiring cutting of doors. For low-profile option, top of panels to received two mortises .
  3. Comply with accepted hardware schedules, door frame shop drawings and with hardware templates to ensure proper fit of doors and hardware.

## 2.04 PANEL FINISHES

- A. Panel finish: Finish shall be:
1. Wood Veneer on face, sides and back of MDF board, hand sanded, clear coated with pre-catalyzed satin lacquer or stained and then clear-coated or painted. Frames are butt-joined. Available with NAUF MDF.
- B. Glazing finish:
1. 1/4" acrylic (recyclable post-consumer use).

## 2.06 OPTIONS



A Track Hardware

1. Floor Guide, Grey.
2. Trackstops with retention and one screw adjustment
3. Soft open/soft close feature.

B. Lock and Pull Hardware

1. Flush bolt, 10"h x 3/4"w x 9/16"d with 13/32" diameter bolt and 1-1/2" throw, satin finish
2. ADA Bar Pull, 15-3/4" tall, in oil rubbed bronze.

C. Fascia

1. Low Profile RD. Wall mounted, finished to match panel finish.

**PART 3 – EXECUTION**

3.01 EXAMINATION

- A. Before installation, verify that frames are proper size and type for door and are installed as required for proper installation of doors.
- B. Notification: Notify General Contractor of unsatisfactory conditions in writing with copy to Architect.
- C. Acceptance: Beginning of work means acceptance of existing conditions by installer.

3.02 PREPARATION

- A. Conditioning: Condition doors to average humidity in installation area prior to hanging. Keep doors in packaging until ready to install.

3.03 INSTALLATION

- A. General: Install doors in accordance with manufacturer's recommendations.
  1. Installation: By skilled finish carpenters or factory authorized installers.
  2. Installer: Thoroughly familiar with the requirements of the manufacturer's door warranty as currently in effect and assure compliance with all provisions.
- B. Hanging:
  1. Fit for hardware as scheduled.
  2. Clean tracks and hang doors to be free of binding with hardware functioning properly. No greasing of hardware necessary.

3.04 ADJUSTING, CLEANING AND PROTECTION

- A. Adjustment: At completion of job, adjust doors and hardware as required and leave in proper operating condition (operating smoothly, easily and quietly throughout operational range).
- B. Clean partition surfaces upon completing installation to remove dust and other foreign materials according to manufacturer's written instructions
- C. Protection: Advise General Contractor of proper procedures required to protect installed wood doors from damages or deterioration until acceptance of entire

project.

**End of Section**

## **SECTION 084100 METAL-FRAMED STOREFRONTS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Aluminum-framed storefronts.
  - 2. Aluminum doors, frames, and hardware.
  - 3. Glass.

#### **1.2 SYSTEM DESCRIPTION**

- A. Aluminum-framed storefront system includes tubular aluminum sections with supplementary internal support framing, aluminum and glass entrances, shop fabricated, factory finished, glass and glazing, related flashings, anchorage and attachment devices.
- B. System Assembly: Site assembled.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
  - 1. As calculated in accordance with ASCE 7, as measured in accordance with ASTM E330; Exposure and basic wind speed as indicated on Drawings.
- B. Deflection: Limit mullion deflection to flexure limit of glass or 1/200 of span; with full recovery of glazing materials.
- C. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- D. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with AAMA 501.2 and ASTM E283.
- E. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- F. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch sp, 72 degrees F, 40 Percent RH without seal failure.

- G. Expansion / Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components and anchorage.
- H. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

#### 1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.
- C. Product Data: Submit component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- D. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, glass units, and glazing materials.
- E. Design Data: Indicate framing member structural and physical characteristics, calculations, dimensional limitations.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

#### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Accessibility Requirements: Conform to CABO A117.1.

#### 1.6 QUALIFICATIONS

- A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.
- B. Design structural support framing components under direct supervision of a professional engineer experienced in design of this Work and licensed at the place where the Project is located.

#### 1.7 PRE-INSTALLATION MEETING

- A. Section 013000 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this section.

## 1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Handle Products of this section in accordance with AAMA - Curtain Wall Manual #10.
- C. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not install sealants nor glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

## 1.10 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with installation of firestopping, components or materials.

## 1.11 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.
- B. Provide (5) five year manufacturer's warranty for glazed units.
- C. Warranty: Include coverage for complete system for failure to meet specified requirements, also color fading.
- D. Provide a (20) twenty year manufacturer's warranty to include coverage for aluminum finishes including color fading and finish degradation.

# PART 2 PRODUCTS

## 2.1 ALUMINUM-FRAMED STOREFRONTS

- A. Manufacturers:
  - 1. Kawneer; TriFab 400 Series.
  - 2. Vistawall.
  - 3. Tubelite.
  - 4. EFCO Corp.
  - 5. Substitutions: Section 016000 - Product Requirements.
- B. Product Description:
  - 1. Aluminum Frame: Dimensions as indicated on Drawings. Flush glazing stops; drainage holes; internal weep drainage system.

2. Mullions: Profile of extruded with internal reinforcement of aluminum or shaped steel structural section, unless indicated otherwise on Drawings.

## 2.2 ALUMINUM DOORS

- A. Manufacturers:
  1. Kawneer; 350 Swing Doors.
  2. Vistawall; 375 Doors.
  3. Tubelite; Medium Stile Doors.
  4. EFCO Corp.; D300 Doors.
  5. Substitutions: Section 01600 - Product Requirements.
- B. Product Description:
  1. Doors: 1-3/4 inches thick; 3-1/2 inch top rail, intermediate rail, and vertical stiles; 10 inch wide bottom rail; square glazing stops. Furnish intermediate rails, size and location indicated.

## 2.3 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Steel Sections: ASTM A36/A36M; shaped to suit mullion sections, galvanized to G60.
- C. Glass: Specified in Section 088000.
- D. Glazing Materials: Storefront manufacturer's standard types to suit application and to achieve weather, moisture, and air infiltration requirements, unless indicated otherwise on Drawings.
- E. Hardware: Provide manufacturer's standard door hardware for types of doors and applications indicated, and as specified below.
  1. Weatherstripping: Manufacturers standard type to suit application, unless indicated otherwise on Drawings and as specified in Section 08710.
  2. Remainder of Door Hardware: As specified in Section 08710.
  3. Finish: Exposed hardware to match hardware finishes specified in Section 08710.
  4. Lock Cylinders: Specified in Section 087100.
- F. Flashings: Minimum 0.032 inch thick aluminum, to match mullion sections where exposed.
- G. Firestopping: Specified in Section 078400.
- H. Vapor Retarder: Sheet EDPM, unless indicated otherwise on Drawings.
- I. Air Barrier: Sheet steel, galvanized, unless indicated otherwise on Drawings.
- J. Sealant and Backing Materials:

1. Sealant Used Within System (Not Used for Glazing): Manufacturer's standard materials to achieve weather, moisture, and air infiltration requirements.
2. Perimeter Sealant: Specified in Section 07900.

K. Fasteners: Stainless steel.

## 2.4 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Prepare components with internal reinforcement for door hardware.
- F. Reinforce framing members for imposed loads.

## 2.5 SHOP FINISHING

- A. Refer to Drawings for colors and finishes.  
Painted Finish: Provide painted finish Fluropon® (70% PVDF), AAMA 2605, Fluoropolymer Coating or approved equivalent at all frames and doors. No clear anodized finishes to be provided.

# PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.

## 3.2 INSTALLATION

- A. Install wall and window system in accordance with AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.

- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work as required.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent Work to form water tight dam.
- G. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install integral flashings and integral joint sealers.
- J. Set thresholds in bed of mastic and secure.
- K. Install hardware using templates provided. Refer to Section 087100 for installation requirements.
- L. Coordinate installation of glass with Section 08800; separate glass from metal surfaces.
- M. Seal perimeter joints in accordance with Section 079000.

### 3.3 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### 3.4 FIELD QUALITY CONTROL

- A. Inspection to monitor quality of installation and glazing.
- B. Test to AAMA 502 or 503.

### 3.5 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust operating hardware for smooth operation.

### 3.6 CLEANING

- A. Section 017000 - Execution Requirements: Final cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.



- C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

### 3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution Requirements: Protecting installed construction.
- B. Protect finished Work from damage.

**END OF SECTION**

**SECTION 085313**  
**TILT SH/DH VINYL WINDOWS**  
**JELD-WEN® Premium Vinyl Series**

**PART 1 GENERAL**

1.1 SECTION INCLUDES: Double-Hung Tilt Windows and fixed as indicated on drawings

1.2 REFERENCES

- A. American Architectural Manufacturer Association (AAMA):
- B. AAMA/WDMA/CSA 101/I.S.2 /A440 - North American Fenestration Standard/Specification for windows, doors, and skylights (NAFS). National Fenestration Rating Council (NFRC):
  - 1. NFRC 100 - Procedure for Determining Fenestration Thermal Properties.
  - 2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

1.3 SUBMITTALS

- A. Refer to Section 01 33 00 – Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Submit shop drawings indicating details of construction, flashings and relationship with adjacent construction.
- D. Selection Samples: For each factory-finished product specified, two complete sets of color chips representing manufacturer's full range of available finishes.
- E. Verification Samples: For each factory-finished product specified, two samples, minimum size 6 inches (150 mm) square, representing actual finishes.
- F. Quality Assurance Submittals:
  - 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
  - 2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
- G. Closeout Submittals: Refer to Section 01 70 00 Execution and Closeout Requirements Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum 2 years installing similar assemblies.
- B. Certifications: certification label indicating assemblies meet the design requirements.
- C. Mock-Up: Provide a mock-up for evaluation of installation techniques and workmanship.
  - 1. Mock-ups shall incorporate surrounding construction, including wall assembly fasteners, flashing, and other related accessories installed in accordance with manufacturer's approved installation methods.
  - 2. Manufacturer's rep to be present at mock-up.
  - 3. Do not proceed with remaining work until workmanship is approved by Architect.
  - 4. Modify mock-up as required to produce acceptable work.
  - 5. At Substantial Completion, approved mockups may become part of completed Work.

6. Demolish mockups and remove from site.
  - D. Pre-installation Meeting: Conduct pre-installation meeting on site with manufacturer's rep present two weeks prior to commencement of installation.
- 1.5 DELIVERY, STORAGE AND HANDLING
- A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.
  - B. Deliver and store assembly materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact. Protect from damage.
- 1.6 PROJECT CONDITIONS
- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by Manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
- 1.7 WARRANTY
- A. Manufacturer's Standard Warranty: Assemblies will be free from defects in materials and workmanship from the date of Manufacture for the time periods indicated below:
    1. Window Unit:
      - a. Commercial: **10 years.**
    2. Glazing:
      - a. Insulated Glass: **[Lifetime] [10 years]** against seal breakage.
      - b. Laminated and Special Glass: [5 years against delamination].
    3. Colored Exterior: **10 years.**

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: JELD-WEN, Inc.; 440 South Church Street, Suite 400, Charlotte, NC 28202; Toll Free Tel: 800-535-3936; Tel: 541-850-2606; Fax: 541-851-4333; Email: [architectural\\_inquiries@jeld-wen.com](mailto:architectural_inquiries@jeld-wen.com); Web: <http://www.jeld-wen.com>.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements.

### 2.2 VINYL WINDOWS – GENERAL

#### A. DESIGN REQUIREMENTS

1. Provide assemblies, including mulls, capable of complying with requirements indicated, based on testing manufacturer's window that are representative of those specified and that are of test size required by AAMA/WDMA/CSA 101/I.S.2/A440.
2. Test Size: In compliance with requirements of AAMA/WDMA/CSA 101/I.S.2/A440.
3. Structural Requirements: Provide assemblies, including mulls, complying with requirements indicated:
  - a. Double-hung Performance Grade PG 35 minimum
    1. Performance class LC light commercial.
  - b. Fixed performance grade PG 50
    1. Performance class LC light commercial

4. NFRC Requirements – Provide assemblies capable of complying with the following total window ratings:
    - a. Thermal Transmission (U-Factor), NFRC 10:
      1. Double-hung: 0.30
      2. Fixed: 0.27
      3. Gliding 0.3.0
    - b. Solar Heat Gain Coefficient (SHGC): NFRC 200.
      1. Double-hung: 0.28
      2. Fixed: 0.27
      3. Gliding: 0.30
    - c. Visible Transmittance (VT): NFRC 200.
      1. Double-hung: 0.52
      2. Fixed: 0.58
      - 3 Gliding: 0.53
  - B. Installation Accessories:
    1. Flashing: Refer to Section 07620 - Flashing and Sheet Metal.
    2. Sealants: OSI Sealants by Henkel Corporation.
    3. Sealants: Refer to Section 07900 - Joint Sealants.
    4. Sealants: Manufacturer recommended sealants to maintain watertight conditions.
  - C. Materials:
  - D. Finishes:
    1. Interior Finishes for Windows:
      - a. Standard Vinyl
        - 1) Finish: As selected by Architect
    2. Exterior Finishes for Windows:
      - a. Exterior Vinyl Colors:
        - 1) Finish: As selected by Architect.
      - b. Optional Pre-Painted Colors:
        - 1) Finish: As selected by Architect.
- 2.3 VINYL WINDOW ASSEMBLIES
- A. Basis of Design: Premium Vinyl Series vinyl window assemblies as manufactured by JELD-WEN, Inc.
    1. Window Type: Double-Hung Tilt windows and fixed.
  - B. Window Fabrication:
    1. Window Type: Single-Hung Tilt windows.
      - a. Frame: Fusion Welded Corners.
      - b. Sash: Fusion Welded Corners.
      - c. Glass: Mounted with silicone glazing compound and/or glazing tape.
    2. Window Type: Double-Hung Tilt windows.
      - a. Frame: Fusion Welded Corners.
      - b. Sash: Fusion Welded Corners.
      - c. Glass: Mounted with silicone glazing compound and/or glazing tape.
  - C. Frames:
    1. Jamb Depth: 3 1/4 inch (82.5mm)
  - D. Sashes:
    1. Sash Thickness:

- a. Single-Hung Tilt Windows: 1 9/32 (32.4mm) and Double-Hung Tilt Windows: 1 9/32 (32.4mm).
- E. Exterior Trim: Integral Nailing Fin (Standard) Pocket Replacement Block Frame Brickmould Retro Brickmould 5/8" Flange Nail Fin and Florida Flange (refer to drawings).
- F. Frame Accessories:
  - 1. Exterior:
    - a. Slope Sill Adapter.
    - b. J-Channel – Snap In (6813).
  - 2. Interior:
    - a. Groove Filler.
    - b. 1/2" Wall Return Accessory.
    - c. 11/16" Wall Return Accessory.
    - d. 3/4" Wall Return Accessory.
- G. Extension Jamb:
  - 1. Single-Hung Side Tilt Windows: 4-9/16 inch 6-9/16 inch (refer to drawings).
  - 2. Double-Hung Windows Tilt: 4-9/16 inch [6-9/16 inch (refer to drawings).
- H. Weatherstripping:
  - 1. Single-Hung Tilt Windows: .270 fin pile on Sash and .150 fin pile on frame and Double-Hung Tilt Windows: .270 fin pile on Sash and .150 fin pile on frame
- I. Window Hardware:
  - 1. Single-Hung Tilt Windows:
    - a. Balance: Block and Tackle System.
    - b. Lock: Mag-Lock®.
      - 1) Finish: As selected by Architect
    - c. Lock: Style Cam-Lock.
      - 1) Finish: As selected by Architect
    - d. Lock: WEN-Lock®- ADA Compliant
      - 1) Finish: As selected by Architect
    - e. Secondary Vent Stop.
    - f. Window Opening Control Device (ASTM F2090 Compliant).
  - 2. Double-Hung Tilt Windows:
    - a. Balance: Block and Tackle System.
    - b. Lock: Style Cam-Lock.
      - 1) Finish: As selected by Architect
    - c. Lock: Contoured Cam-Lock.
      - 1) Finish: As selected by Architect
    - d. Secondary Vent Stop.
    - e. Window Opening Control Device (ASTM F2090 Compliant).
- J. Glazing for Windows.
  - 1. Strength: Annealed glass, Laminated glass, Tempered glass (refer to drawings).
  - 2. Glazing Type: Insulated Glass
    - a. Description: Two panes of glass utilizing a continuous roll formed stainless steel and dual seal sealant.
    - b. Overall Nominal Thickness: 3/4 - 7/8 inch (19 – 22 mm).
    - c. Glass Coating: Low-E.
- K. Insect Screens
  - 1. Material: Charcoal fiberglass screen cloth (18 by 16 mesh) set in painted roll formed aluminum frame.
  - 2. Frame Finish: Color match frame extrusion.
- L. Grilles:

1. Simulated Divided Lites (SDL):
  - a. Exterior Muntins
    - 1) Material: Extruded aluminum contoured muntin permanently applied to exterior of insulating glass unit.
    - 2) Profile: Flat.
      - (a) Profile Width: 1 inch (25.4mm).
    - 3) Profile: Contour.
      - (a) Profile Width: As selected by architect
    - 4) Pattern: As scheduled and indicated on Drawings.
    - 5) Finish: Match exterior finish.
2. Grilles Between the Glass (GBG):
  - a. Material: Made of roll formed aluminum suspended within the air cavity.
  - a. Profile: Flat.
    - 1) Profile Width: As selected by architect.
  - b. Profile: Contour.
    - 1) Profile Width: As selected by architect.
  - c. Pattern: As scheduled and indicated on Drawings.
  - d. Finish: Color match window frame extrusion.
3. SDL/GBG Option
  - a. Material (Exterior): Extruded aluminum contoured muntin permanently applied to exterior of insulating glass unit.
  - b. Profile (Exterior): Contour.
    - 1) Profile Width: 7/8 inch (22mm).
  - c. Material (Interior): Made of roll formed aluminum suspended within the air cavity.
  - d. Profile (Interior): Contour.
    - 1) Profile Width: 1 inch (25.4mm).

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

- A. Install windows in accordance with manufacturer's installation guidelines and recommendations and approved mock-up

#### **3.2 EXAMINATION**

- A. Inspect window prior to installation.
- B. Inspect rough opening for compliance with window manufacturer recommendations. Verify rough opening conditions are within recommended tolerances.

#### **3.3 PREPARATION**

- A. Prepare windows for installation in accordance with manufacturer's recommendations.

#### **3.4 INSTALLATION**

- A. Insert window into rough opening:
  1. Shim side jambs straight.
  2. Inspect window for square, level and plumb.
  3. Fasten window through jamb, shim and into rough opening jamb.
  4. Test and adjust for smooth operation of window.
  5. Ensure weep holes are clear of debris for proper drainage.

#### **3.5 CLEANING**

- A. Clean the exterior surface and glass with mild soap and water.

#### **3.6 PROTECTION**

- A. Protect installed windows from damage.

**END OF SECTION**

## **SECTION 087100**

### **DOOR HARDWARE**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Sliding doors.
  - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical door hardware.
  - 3. Automatic operators.
  - 4. Cylinders specified for doors in other sections.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
  - 8. State Building Codes, Local Amendments.
- D. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
  - 1. ANSI/BHMA Certified Product Standards - A156 Series.
  - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
  - 3. UL 305 - Panic Hardware.



## 1.2 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  - 3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
  - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    - b. Complete (risers, point-to-point) access control system block wiring diagrams.
    - c. Wiring instructions for each electronic component scheduled herein.
  - 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
  - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

### 1.3 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Automatic Operator Supplier Qualifications: Power operator products and accessories are required to be supplied and installed through the Norton Preferred Installer (NPI) program. Suppliers are to be factory trained, certified, and a direct purchaser of the specified power operators and be responsible for the installation and maintenance of the units and accessories indicated for the Project.

- F. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
  - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- G. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- H. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
- I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - 3. Review sequence of operation narratives for each unique access controlled opening.
  - 4. Review and finalize construction schedule and verify availability of materials.
  - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- J. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

#### 1.5 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

#### 1.6 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.

3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

## 1.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

### 2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.

- d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
    2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
      - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
      - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
    3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
      - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
      - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
    4. Hinge Options: Comply with the following:
      - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
    5. Manufacturers:
      - a. Hager Companies (HA) - BB Series, 5 knuckle.
      - b. McKinney (MK) - TA/T4A Series, 5 knuckle.
      - c. dormakaba Best (ST) - F/FBB Series, 5 knuckle.
  - B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
    1. Manufacturers:
      - a. Hager Companies (HA).
      - b. Pemko (PE).
      - c. Dormakaba Best (ST).
  - C. Sliding and Folding Door Hardware: Hardware is to be of type and design as specified and should conform with ANSI/BHMA A156.14.
    1. Sliding Bi-Passing Pocket Door Hardware: Provide complete sets consisting of track, hangers, stops, bumpers, floor channel, guides, and accessories indicated.
    2. Bi-folding Door Hardware: Rated for door panels weighing up to 125 lb.
    3. Manufacturers:
      - a. Hager Companies (HA).
      - b. Johnson Hardware (JO).
      - c. Pemko (PE).

## 2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed

wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:
  - a. Architectural Builders Hardware (AH) - PT1000-EZ Series.
  - b. Securitron (SU) - EL-CEPT Series.
  - c. Dormakaba Best (ST) EPT-12C Series.
- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
  1. Provide one each of the following tools as part of the base bid contract:
    - a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
    - b. McKinney (MK) - Connector Hand Tool: QC-R003.
  2. Manufacturers:
    - a. Hager Companies (HA) - Quick Connect.
    - b. McKinney (MK) - QC-C Series.
    - c. Dormakaba Best (ST) - WH Series.

## 2.4 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
  1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
  2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
  3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
  4. Pulls, where applicable, shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
  5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
  6. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood (RO).



- c. Trimco (TC).

## 2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
  - 1. Manufacturers:
    - a. Corbin Russwin Hardware (RU).
    - b. No Substitution.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
  - 1. Threaded mortise cylinders with rings and cams to suit hardware application.
  - 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  - 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
  - 4. Tubular deadlocks and other auxiliary locks.
  - 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  - 6. Keyway: Match Facility Standard.
- C. Keying System: Each type of lock and cylinders to be factory keyed.
  - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
  - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
  - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- D. Key Quantity: Provide the following minimum number of keys:
  - 1. Change Keys per Cylinder: Two (2)
  - 2. Master Keys (per Master Key Level/Group): Five (5).
  - 3. Construction Keys (where required): Ten (10).
- E. Construction Keying: Provide construction master keyed cylinders.
- F. Key Registration List (Bitting List):
  - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
  - 2. Provide transcript list in writing or electronic file as directed by the Owner.



## 2.6 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
1. Heavy duty mortise locks shall have a ten-year warranty.
  2. Where specified, provide status indicators with highly reflective color and wording for “locked/unlocked” or “vacant/occupied” with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1” x 0.6” with a curved design allowing a 180-degree viewing angle with protective covering to prevent tampering.
  3. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - ML2000 Series.
    - b. Sargent Manufacturing (SA) - 8200 Series.
- B. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.
1. Heavy duty cylindrical locks shall have a seven-year warranty.
  2. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).
  3. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2” (3/4” at rated paired openings) throw brass or stainless steel latchbolt.
  4. Locks are to be non-handed and fully field reversible.
  5. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - CLX3300 Series.
    - b. Sargent Manufacturing (SA) - 10X Line.

## 2.7 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
  4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
  2. Strikes for Bored Locks and Latches: BHMA A156.2.

3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

## 2.8 ELECTROMAGNETIC LOCKING DEVICES

- A. Surface Electromagnetic Locks (Heavy Duty): Electromagnetic locks to be surface mounted type conforming to ANSI A156.23, Grade 2 with minimum holding force strength of 1,200 pounds. Locks to be capable of accepting between 12 to 24 volts direct current and be UL listed for use on fire rated door assemblies. Electromagnetic coils are to consume no more than 1.5W during normal operation. Locks are to have an integrated door position switch, tamper switch, and lock bond sensor. Locks are to have integrated motion sensor and/or security camera as indicated in the hardware sets. Locks to be capable of detecting door prop conditions and entering low power mode. Provide mounting accessories as needed to suit opening conditions. Power supply to be by the same manufacturer as the lock with combined products having a lifetime replacement warranty.
  1. Manufacturers:
    - a. Securitron (SU) - M680E Series.

## 2.9 ELECTRIC STRIKES

- A. Standard Electric Strikes: Electric strikes conforming to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.
  1. Manufacturers:
    - a. HES (HS) - 1500/1600 Series.
- B. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

## 2.10 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
  1. Exit devices shall have a five-year warranty.
  2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
  4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
  5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
  6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
  7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
  8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
  9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
  10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
  11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
    - b. Sargent Manufacturing (SA) - 80 Series.

## 2.11 ELECTROMECHANICAL EXIT DEVICES

- A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.
1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
4. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - ED5000 Series.
  - b. Sargent Manufacturing (SA) - 80 Series.

## 2.12 DOOR CLOSERS

### A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

### B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:
  - a. Corbin Russwin Hardware (RU) - DC6000 Series.
  - b. Norton Rixson (NO) - 7500 Series.

### C. Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam

and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.

1. Manufacturers:
  - a. Corbin Russwin (RU) - DC5000 Series.
  - b. Norton Rixson (NO) - 2800ST Series.

## 2.13 ELECTROHYDRAULIC DOOR OPERATORS

- A. General: Provide low energy operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.
  1. Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.
- B. Standard: Conforming to ANSI/BHMA A156.19.
- C. Performance Requirements:
  1. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
  2. Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.
- D. Configuration: Surface mounted or in-ground as required. Door operators to control single swinging and pair of swinging doors.
- E. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19. When not in automatic mode, door operator to function as manual door closer with fully adjustable opening and closing forces, with or without electrical power.
- F. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.
- G. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.
- H. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.

- I. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Norton Rixson (NO) - 6000 Series.

## 2.14 ARCHITECTURAL TRIM

### A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
  - a. Stainless Steel: 300 grade, .050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
  - a. Hiawatha, Inc. (HI).
  - b. Rockwood (RO).
  - c. Trimco (TC).

## 2.15 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  1. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood (RO).
    - c. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as

indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:
  - a. Norton Rixson (RF).

## 2.16 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
  1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
  1. National Guard Products (NG).
  2. Pemko (PE).
  3. Reese Enterprises, Inc. (RE).

## 2.17 ELECTRONIC ACCESSORIES

- A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O



switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:
  - a. Sargent Manufacturing (SA) - 3280 Series.
  - b. Securitron (SU) - DPS Series.

- B. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
2. Manufacturers:
  - a. Securitron (SU) - AQL Series.

## 2.18 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.19 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.



## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### **3.2 PREPARATION**

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

### **3.3 INSTALLATION**

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Power Operator products and accessories are required to be installed through current members of the manufacturer's "Power Operator Preferred Installer" program.
- D. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work

specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

### 3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

### 3.5 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

### 3.6 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

### 3.7 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
  - 1. Quantities listed are for each pair of doors, or for each single door.
  - 2. The supplier is responsible for handling and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RU - Corbin Russwin
4. SU - Securitron
5. SA - SARGENT
6. HS - HES
7. RO - Rockwood
8. RF - Rixson
9. NO - Norton
10. OT - Other

**Hardware Sets**

**Set: 1.0**

Doors: C123.2, C140

0 All Hardware	BY DOOR SUPPLIER		OT
----------------	------------------	--	----

**Set: 2.0**

Doors: UC

1 Folding Door Hdwe	HF2/100A		PE
2 Door Pull	Y 102-RKW Mtg-Type 1	US32D	RO

**Set: 3.0**

Doors: UB

1 Track	280A-SWT		PE
1 Sliding Door Lockset	SDL32D-ADA		PE
1 Flush Pull	RM780	US26D	RO
1 Pull	RM1200-8 Mtg-Type 1	US32D	RO

**Set: 4.0**

Doors: AL123, AL124

2	Continuous Hinge	CFM__HD1 X LAR		PE
2	Concealed Vert Rod Exit, Exit Only	ED5800 EO	630	RU
2	Door Pull	BF158 Mtg-Type 12HD	US32D	RO
2	Conc Overhead Stop	6-X36	630	RF
2	Drop Plate (TJ)	7786	689	NO
2	Door Closer	J7500	689	NO
1	Threshold	278x292AFGPK MSES25SS		PE
1	Gasketing	BY DOOR MFR		00
1	Rain Guard	346A		PE
2	Sweep (w/drip edge)	3452CNB		PE
2	Position Switch	DPS-M-BK		SU

**Set: 5.0**

Doors: C144, C145, C147

2	Continuous Hinge	CFM__HD1 PT X LAR		PE
2	Magnetic Lock	M680EBD	630	SU
1	Concealed Vert Rod Exit, Exit Only	ED5800 EO M92 MELR	630	RU
1	Concealed Vert Rod Exit, Nightlatch	ED5800 K157ET M92 MELR	630	RU
1	Mortise/ Rim Cylinder	Cylinder to match existing.	US32D	SA
2	Door Pull	BF158 Mtg-Type 12HD	US32D	RO
1	Automatic Opener	D6061-36 D	600 x 689	NO
1	Threshold	278x292AFGPK MSES25SS		PE
1	Rain Guard	346A		PE
2	Sweep (w/drip edge)	3452CNB		PE
22	ElectroLynx Harness (frame)	QC-C1500P		MK
2	ElectroLynx Harness (door)	QC-C*** (Length / Type as Required)		MK
1	Wiring Diagram	WD-SYSPK (Elevations and Point to Point)		SA
1	Digital Keypad	BY SECURITY		OT
2	Position Switch	DPS-M-BK		SU
2	Operator Wall Switch	700 (wave to open)		NO
1	Power Supply	AQL4-R8E1		SU
2	Electric Power Transfer	EL-CEPT	630	SU

Notes:

- Electronic Operation: Valid code retracts latchbolt; key retracts latchbolt. Free egress at all times. In case of power loss or fire alarm (if rated), door remains locked and latched.
- Elopement system locks magnetic locks.

**Set: 6.0**

Doors: C101.1

2	Continuous Hinge	CFM__HD1 PT X LAR		PE
2	Magnetic Lock	M680EBD	630	SU
1	Concealed Vert Rod Exit, Exit Only	ED5800 EO M92 MELR	630	RU
1	Concealed Vert Rod Exit, Nightlatch	ED5800 K157ET M92 MELR	630	RU
1	Mortise/ Rim Cylinder	Cylinder to match existing.	US32D	SA
2	Door Pull	BF158 Mtg-Type 12HD	US32D	RO
2	Conc Overhead Stop	6-X36	630	RF
2	Drop Plate (TJ)	7786	689	NO
2	Door Closer	J7500	689	NO
1	Threshold	278x292AFGPK MSES25SS		PE
1	Rain Guard	346A		PE
2	Sweep (w/drip edge)	3452CNB		PE
2	ElectroLynx Harness (frame)	QC-C1500P		MK
2	ElectroLynx Harness (door)	QC-C*** (Length / Type as Required)		MK
1	Wiring Diagram	WD-SYSPK (Elevations and Point to Point)		SA
1	Digital Keypad	BY SECURITY		OT
2	Position Switch	DPS-M-BK		SU
1	Power Supply	AQL4-R8E1		SU
2	Electric Power Transfer	EL-CEPT	630	SU

Notes:

- Electronic Operation: Valid code retracts latchbolt; key retracts latchbolt. Free egress at all times. In case of power loss or fire alarm (if rated), door remains locked and latched.
- Elopement system locks magnetic locks.

**Set: 7.0**

Doors: C134.2

1	Continuous Hinge	CFM__HD1 PT X LAR		PE
1	Rim Exit Device, Nightlatch	ED5200 N957ET M92 MELR	630	RU
1	Mortise/ Rim Cylinder	Cylinder to match existing.	US32D	SA
1	Conc Overhead Stop	6-X36	630	RF
1	Drop Plate (TJ)	7786	689	NO

1	Door Closer	J7500	689	NO
1	Threshold	278x292AFGPK MSES25SS		PE
1	Rain Guard	346A		PE
1	Sweep (w/drip edge)	3452CNB		PE
1	ElectroLynx Harness (frame)	QC-C1500P		MK
1	ElectroLynx Harness (door)	QC-C*** (Length / Type as Required)		MK
1	Wiring Diagram	WD-SYSPK (Elevations and Point to Point)		SA
1	Digital Keypad	BY SECURITY		OT
1	Position Switch	DPS-M-BK		SU
1	Power Supply	AQL4-R8E1		SU
1	Electric Power Transfer	EL-CEPT	630	SU

Notes:

- Electronic Operation: Valid code retracts latchbolt; key retracts latchbolt. Free egress at all times. In case of power loss or fire alarm (if rated), door remains locked and latched.

**Set: 8.0**

Doors: C101.2, C144.1, C147.1

6	Hinge, Full Mortise	TA2714	US26D	MK
2	Magnetic Lock	M680EBD	630	SU
2	Push Bar & Pull	BF15847 T1HD T5	US32D	RO
1	Automatic Opener	D6011-36	689	NO
1	Gasketing	BY DOOR MFR		00
2	Operator Wall Switch	700 (wave to open)		NO

Notes:

- Elopement system locks magnetic locks.

**Set: 9.0**

Doors: C145.1

2	Continuous Hinge	CFM__HD1 PT X LAR		PE
1	Fire Rated Surf Vert Rod, Dummy	ED5470B N950ET M55 M92 MELR	630	RU
1	Fire Rated Surf Vert Rod, Nightlatch	ED5470B N957ET M55 M92 MELR	630	RU
1	Mortise/ Rim Cylinder	Cylinder to match existing.	US32D	SA
2	Door Closer	R7500 (or) PR7500	689	NO
2	Kick Plate	K1050 10" high BEV CSK	US32D	RO
2	Wall/ Floor Stop	RM861 / RM850	US32D	RO
1	Gasketing	S88BL		PE

2 Astragal	297AS	PE
------------	-------	----

**Set: 10.0**

Doors: C112

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Entrance Lock	CLX3351 NZD	626	RU
1 Surf Overhead Stop	10-X36	630	RF
3 Silencer	608		RO

**Set: 11.0**

Doors: C103, C104, C107, C108, C116, C142

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Entrance Lock	CLX3351 NZD	626	RU
1 Door Closer	R7500 (or) PR7500	689	NO
1 Kick Plate	K1050 10" high BEV CSK	US32D	RO
1 Wall/ Floor Stop	RM861 / RM850	US32D	RO
1 Gasketing	S88BL		PE

**Set: 12.0**

Doors: C105

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Entrance Lock	CLX3351 NZD	626	RU
1 Door Closer	2800ST	689	NO
1 Kick Plate	K1050 10" high BEV CSK	US32D	RO
1 Gasketing	S88BL		PE

**Set: 13.0**

Doors: C111, C114, C122, C124.6

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Privacy Lock	ML2060 NSA V21	626	RU
1 Door Closer	R7500 (or) PR7500	689	NO
2 Kick Plate	K1050 10" high BEV CSK	US32D	RO
1 Gasketing	S88BL		PE

**Set: 14.0**

Doors: C106, C117.2, C143.3

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom Lock	CLX3357 NZD	626	RU
1	SMART Pac Bridge Rectifier	2005M3		HS
1	Electric Strike	1500C	630	HS
1	Door Closer	R7500 (or) PR7500	689	NO
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO
1	Wall/ Floor Stop	RM861 / RM850	US32D	RO
3	Silencer	608		RO
1	Card Reader	BY SECURITY		OT
1	Motion Sensor (REX)	BY SECURITY		OT
1	Position Switch	DPS-M-BK		SU
1	Power Supply	AQL4-R8E1		SU

Notes:

- Electronic Operation: Valid card releases electric strike; key retracts latchbolt. Free egress at all times. In case of power loss or fire alarm (if rated), door remains locked and latched.

**Set: 15.0**

Doors: C115, C117.1, C120, C121, C128, C130, C134.1, C137, C143.1

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom Lock	CLX3357 NZD	626	RU
1	SMART Pac Bridge Rectifier	2005M3		HS
1	Electric Strike	1500C	630	HS
1	Door Closer	R7500 (or) PR7500	689	NO
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO
1	Wall/ Floor Stop	RM861 / RM850	US32D	RO
1	Gasketing	S88BL		PE
1	Card Reader	BY SECURITY		OT
1	Motion Sensor (REX)	BY SECURITY		OT
1	Position Switch	DPS-M-BK		SU
1	Power Supply	AQL4-R8E1		SU

Notes:

- Electronic Operation: Valid card releases electric strike; key retracts latchbolt. Free egress at all times. In case of power loss or fire alarm (if rated), door remains locked and latched.

**Set: 16.0**

Doors: C118



3	Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1	Passage Latch	CLX3310 NZD	626	RU
1	SMART Pac Bridge Rectifier	2005M3		HS
1	Electric Strike	1500C	630	HS
1	Automatic Opener	6011	689	NO
2	Kick Plate	K1050 10" high BEV CSK	US32D	RO
1	Gasketing	S88BL		PE
1	Edge Guard (latch side)	306-RKW 42" CUTOOUT-1	US32D	RO
1	Edge Guard (hinge side)	306-RKW 42" CUTOOUT-2	US32D	RO
2	Operator Wall Switch	700 (wave to open)		NO

**Set: 17.0**

Doors: C129, C139

3	Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1	Storeroom Lock	CLX3357 NZD	626	RU
1	SMART Pac Bridge Rectifier	2005M3		HS
1	Electric Strike	1500C	630	HS
1	Door Closer	2800ST	689	NO
2	Kick Plate	K1050 10" high BEV CSK	US32D	RO
1	Gasketing	S88BL		PE
1	Edge Guard (latch side)	306-RKW 42" CUTOOUT-1	US32D	RO
1	Edge Guard (hinge side)	306-RKW 42" CUTOOUT-2	US32D	RO
1	Card Reader	BY SECURITY		OT
1	Motion Sensor (REX)	BY SECURITY		OT
1	Position Switch	DPS-M-BK		SU
1	Power Supply	AQL4-R8E1		SU

Notes:

- Electronic Operation: Valid card releases electric strike; key retracts latchbolt. Free egress at all times. In case of power loss or fire alarm (if rated), door remains locked and latched.

**Set: 18.0**

Doors: C109

1	Continuous Hinge	CFM__HD1 X LAR		PE
1	Passage Latch	CLX3310 NZD	626	RU
1	Magnetic Lock	M680EBD	630	SU
1	SMART Pac Bridge Rectifier	2005M3		HS
1	Electric Strike	1500C	630	HS

Kramer+Marks Architects  
Ambler, PA

Acts Granite Farms Estates  
WBC – Phase 2  
Media, PA 19063

1	Automatic Opener	6011	689	NO
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO
1	Wall/ Floor Stop	RM861 / RM850	US32D	RO
1	Gasketing	S88BL		PE
2	Operator Wall Switch	700 (wave to open)		NO

Notes:

- Elopement system locks magnetic locks.

**END OF SECTION 087100**

## **SECTION 088000 GLAZING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes glass:
  - 1. Glass and glazing for doors, windows, and glazed openings.
  - 2. Glass and glazing for storefront and curtain wall systems.
  - 3. Glass and glazing for skylights
  - 4. Glass and glazing materials and installation requirements are included in this section for other sections referencing this section.

#### **1.2 PERFORMANCE REQUIREMENTS**

- A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
  - 1. In conjunction with materials described in Section 07900.
  - 2. To utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
  - 3. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.
- B. Size glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
  - 1. As calculated in accordance with applicable code, as measured in accordance with ASTM E330.
- C. Limit glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

#### **1.3 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  - 1. Glass: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
  - 2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors where exposed.
- C. Samples:
  - 1. Glass: Submit three (3) samples 12 x 12 inch in size, illustrating each glass unit, coloration and design.
  - 2. Glazing Materials: Submit 4 inch long bead of glazing sealant and gaskets, color as selected.

- D. Manufacturer's Certificate: Certify sealed insulated and laminated glass, meets or exceeds specified requirements.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual , GANA Sealant Manual, GANA Laminated Glass Design Guide and SIGMA for glazing installation methods.

#### 1.5 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum five (5) years documented experience approved by manufacturer.

#### 1.6 PRE-INSTALLATION MEETING

- A. Section 013000 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week before starting Work of this section.

#### 1.7 ENVIRONMENTAL REQUIREMENTS\*

- A. Section 016000 - Product Requirements.
- B. Do not install glazing when ambient temperature is less than 50 degrees F.
- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### 1.8 WARRANTY

- A. Section 017000 - Execution Requirements: Product warranties and product bonds.
- B. Provide a five year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
- C. Provide a five year warranty to include coverage for delamination of laminated glass and replacement of same.

### **PART 2 PRODUCTS**

#### 2.1 GLAZING

- A. Manufacturers:
  - 1. Vitro (PPG) glass
  - 2. Slyline Design
  - 3. Technical Glass Products (fire rated glass)
  - 4. SAFTI (Fire rated glas)

## 2.2 COMPONENTS

- A. Flat Glass (Type FG): Minimum 1/4 inch unless otherwise indicated.
  - 1. Clear Float Glass (Type FG-CF): ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select.
  - 2. Clear Heat Strengthened Glass (Type FG-CH): ASTM C1048, Kind HS, heat strengthened, Condition A uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select.
  - 3. Low E Clear Float Glass (Type FG-EC): Clear float glass Type FG-CF, with low emissivity coating on Number 2 surface.
    - a. Visible light transmission: 73 percent.
    - b. Outdoor visible light reflectance: 12 percent.
    - c. Shading Coefficient: 0.47.
  - 4. Low E Clear Heat Strengthened Glass (Type FG-EHC): Clear heat strengthened glass Type FG-CH, with low emissivity coating on Number 2 surface.
    - a. Visible light transmission: 73 percent.
    - b. Outdoor visible light reflectance: 12 percent.
    - c. Shading Coefficient: 0.47.
- B. Safety Glass (Type SG): Conform to CPSC 16 CFR 1201, minimum thickness 1/4 inch unless otherwise indicated.
  - 1. Clear Tempered Glass (Type SG-CT): ASTM C1048, Kind FT Fully tempered, Condition A, uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; with horizontal tempering.
  - 2. Clear tempered decorative glass for aluminum sliding door
    - a. Low-iron PPG Starphire tempered safety glass
    - b. Skyline Design – Herringbone
    - c. Glass thickness: 1/2 inch
  - 3. Clear Laminated Glass (Type SG-CL): ASTM C1172, Kind LA, clear float glass (Type FG-CF)
    - a. Plastic Interlayer: Manufacturer's standard], minimum 0.030 inch thick.
  - 4. Laminated Bent Glass (Type BG-L): Clear laminated glass with plastic interlayer, Type SG-CL; conforming to ANSI Z97.1; bent to configuration as shown on Drawings.
- C. Fire Resistive Glass (Type FRG): Glazing materials to by types approved for use with specified materials in fire rated applications as indicated. Minimum 1/4 inch thick unless otherwise indicated.
  - 1. Fire-Resistive Ceramic Glazing (Type FRG-CC): Transparent polished both surfaces.
    - a. Technical Glass Products.
    - b. SAFTI; Superlite I.
    - c. Fire Rating: As indicated on Drawings.
    - d. Thickness: Manufacturer's standard 1/4 inch.
  - 2. Fire-Resistive Safety Ceramic Glazing (Type FRG-SC): Transparent polished both surfaces.
    - a. Technical Glass Products; Firelite NT.
    - b. SAFTI; Superlite I.-XL.
    - c. Fire Rating: As indicated on Drawings.

- d. Thickness: Manufacturer's standard 1/4 inch.
  - e. Safety Glazing: Comply with CPSC 16 CFR 1201 and ANSI Z91.1.
- D. Insulated Glass Units (Type IG): ASTM E774 and E773; with glass elastomer edge seal; Solarban 60 low E coating by PPG on surface 3, purge interpane space with dry hermetic air. Total unit thickness 1 1/4 inch.
- 1. Insulated Clear Vision Glass Units at skylight
    - a. Type: Solar Gray manufactured by PPG
    - b. Outer Pane: Clear float glass.
    - c. Inner Pane: Clear float glass.
  - 2. Insulated Glass Unit Edge Seal Material: Color to be selected by architect

## 2.3 ACCESSORIES

- A. Elastomeric Glazing Sealants: Materials compatible with adjacent materials including glass, laminated glass core, insulating glass seals, and glazing channels.
- 1. Silicone Glazing Sealant: ASTM C920, Type S, Grade NS, Class A and Use suitable for glazing application indicated; single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; color as selected.
    - a. Dow Corning; 795 Silicone Building Sealant.
    - b. Pecora; 864.
    - c. General Electric Silicones; SilPruf.
  - 2. Structural Silicone Glazing Sealant (Shop Assembled Curtain Wall Systems):
    - a. ASTM C920, Type M, Grade NS, Class A and Use suitable for glazing application indicated; two component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining. Provide high-modulus structural silicone glazing materials where sealant bonds glass to substrate.
      - 1) Tremco; Proglaze II.
      - 2) Pecora; 985 Silicone.
  - 3. Structural Silicone Glazing Sealant (Field Assembled Curtain Wall Systems):
    - a. ASTM C 920, Type S, Grade NS, Class A and Use suitable for glazing application indicated; neutral curing; non-bleeding, non-staining. Provide high-modulus structural silicone glazing materials where sealant bonds glass to substrate.
      - 1) Tremco; Proglaze SG.
      - 2) Pecora; 895 Silicone.
  - 4. Polysulfide Glazing Sealant: ASTM C920, Type M, Grade NS, Class and Use suitable for glazing application indicated; two component; chemical curing, non-sagging type; cured Shore A hardness of 15 to 25.
    - a. Type: As selected.
    - b. Color: As selected.
  - 5. Polyurethane Glazing Sealant: ASTM C920, Type S, Grade NS, Class and Use suitable for glazing application indicated; single component, chemical curing, non-staining, non-bleeding, Shore A Hardness Range 20 to 35.
    - a. Type: As selected.
    - b. Color: As selected.

6. Acrylic Sealant: ASTM C920, Type S, Grade NS, Class and Use suitable for glazing application indicated; single component, solvent curing, non-bleeding; cured Shore hardness of 15 to 25.
  - a. Type: As selected..
  - b. Color: As selected.
- B. Glazing Splines: ASTM C864 Option I, resilient silicone extruded shape to suit glazing channel retaining slot.
  1. Type: As selected.
  2. Color: As selected.
- C. Pre-Formed Glazing Tape: Size to suit application.
  1. Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color; Pecora; Dyna-Seal Butyl Glazing Tape.
    - a. Butyl Corner Sealant: ASTM C920 single component non-skinning butyl compatible with glazing tape; color to match tape; Pecora; BR96 Curtain Wall Sealant.
- D. Setting Blocks: ASTM C864 Option I Silicone, 80 to 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- E. Spacer Shims: ASTM C864 Option I Silicone, 50 to 60 Shore A durometer hardness, minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- F. Glazing Channels: Extruded aluminum, for concealed mounting.
  1. Glass Doors: 1 x 1 x 1 inch bottom double channel; 1 x 1 x 1 inch top double channel, clear anodized finish.
- G. Fire-Resistant Glazing Materials: Materials used to obtain required fire-resistant rating.
- H. Smoke Removal Unit Targets: Adhesive targets affixed to glass to identify glass units destined for removal for smoke control.
- I. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.
- J. Provide shop inspection and testing for safety and insulated glass.
- K. Test samples in accordance with ANSI Z97.1, ASTM E773, ASTM E546, and ASTM E576.
- L. Hardware:
  1. Plunger lock: Keyed alike, bolt throw ½ inch, with solid metal escutcheon, brushed stainless.

2. Rollers: Stainless steel ball bearing roller.
3. Stops: rubber
4. Cable/Rod shelf suspension: Nova Display (2) two KSI-009, 38GSH-1436 with associated hardware, CA4 and C1S-03.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify openings for glazing are correctly sized and within acceptable tolerance.
- C. Verify surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

### **3.2 PREPARATION**

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

### **3.3 INSTALLATION**

- A. Perform installation in accordance with GANA Glazing Manual.
  1. Glazing Sealants: Comply with ASTM C1193.
  2. Fire Rated Openings: Comply with NFPA 80.
- B. Exterior Dry Method (Tape and Gasket Spline Glazing):
  1. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with compatible butyl sealant.
  2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  3. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
  4. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
  5. Trim protruding tape edge.
- C. Exterior Wet/Dry Method (Preformed Tape and Sealant) Installation:
  1. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with compatible butyl sealant.
  2. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.



3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  4. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
  5. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line.
  6. Fill gap between glazing and stop with elastomeric glazing sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
  7. Apply cap bead of elastomeric glazing sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- D. Exterior Wet Method (Sealant and Sealant) Installation:
1. Place setting blocks at 1/4 points and install glazing pane or unit.
  2. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inches intervals, 1/4 inch below sight line.
  3. Fill gaps between glazing and stops with elastomeric glazing sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
  4. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### 3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing and Inspection Services.
- B. Monitor quality of glazing.

### 3.5 MANUFACTURER'S FIELD SERVICES

- A. Section 014000 - Quality Requirements: Manufacturers' field services.
- B. Glass and glazing product manufacturers to provide field surveillance of installation.
- C. Monitor and report installation procedures, and unacceptable conditions.

### 3.6 CLEANING

- A. Section 017000 - Execution Requirements: Final cleaning.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after Work is complete.
- D. Clean glass and adjacent surfaces.

### 3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution Requirements: Protecting installed construction.

- B. After installation, mark pane with an 'X' by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

**END OF SECTION**

## **SECTION 091110 NON-LOAD-BEARING STEEL FRAMING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. This Section includes non-load-bearing steel framing members for the following applications:
  - 1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
  - 2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

#### **1.2 SUBMITTALS**

- A. Product data sheets listing dimensions, load carrying capacity and standards compliance.
- B. 12 inch long samples of Main Tees and Cross Tees with integral couplings.

#### **1.3 PROJECT CONDITIONS**

- A. Environmental Requirements:
  - 1. Verify weather tightness of area receiving suspension system prior to installation.
  - 2. Wet trades work to be thoroughly dry and complete prior to installation.
  - 3. Installation to begin only when temperature and humidity conditions closely approximate interior conditions which will exist when area is complete and occupied.
  - 4. Heating and air conditioning systems to be operating prior to, during, and after installation.

#### **1.4 MAINTENANCE**

Furnish additional material equal to two (2) percent of ceiling area.

#### **1.5 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non- load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

### **PART 2 - PRODUCTS**

#### **2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL**

- A. Metal Framing Manufacturers:
  - 1. Current member of SSMA.
- B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized, unless otherwise indicated.

## 2.2 SUSPENSION SYSTEM COMPONENTS

- A. Manufacturer: Chicago Metallic double web Heavy duty fire rated ceiling a suspension system Fire Front 250
- B. Main Tees:
  - 1. Manufactured from (0.015) (0.020) inch thick steel  $15/16$  inch wide by  $1\frac{1}{2}$  inches high by (144) inches long with factory punched cross tee slots, hanger holes, and integral bayonet-style end couplings.
  - 2. Capped with (steel) (aluminum) capping affixed to  $15/16$  inch wide flange.
  - 3. Coated with factory applied (standard [architect select color] baked-on enamel paint) (reflective [chrome coat] [brass coat] anodized aluminum) finish.
  - 4. Manufactured with fire expansion reliefs.
- C. Cross Tees:
  - 1. Manufactured from (0.020) inch thick steel  $15/16$  inch wide by  $1\frac{1}{2}$  inch high by (24) inches long with factory punched cross tee slots, hanger holes, and integral snap-grid end couplings.
  - 2. Capped identical to main tees.
  - 3. Finish identical to main tees.
  - 4. Manufactured with fire expansion reliefs.
- D. Perimeter Treatment Components:
  - 1. Angle Moldings: Manufactured from 0.020 inch thick steel ( $15/16$ ) inch wide by  $15/16$  inch high by 120 or 144 inches long with (hemmed edges) (steel capped hemmed edges) (aluminum capped hemmed edges) finished identical to main tees and cross tees.
  - 2. Channel Moldings: Manufactured from 0.018 inch thick steel with factory applied standard white baked-on enamel paint finish. Note: Specifier to select from channels offered by Chicago Metallic.
  - 3. Shadow Line Moldings:
    - a. Manufactured from 0.010 inch thick steel with  $3/4$  inch by  $3/4$  inch flanges, ( $3/4$  inch by  $3/4$  inch) recess, and exposed hemmed edge. Finished with factory applied standard (white) baked-on enamel paint finish.

- b. Manufactured from 0.020 inch thick steel with  $\frac{3}{4}$  inch flange,  $\frac{1}{16}$  inch inside dimension,  $\frac{3}{8}$  inch x  $\frac{3}{4}$  inch recess, and hemmed edge. Finished with factory applied standard white with blacktone recess baked-on enamel paint finish.

## 2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES A. Framing Materials:

- 1. Studs and Tracks: ASTM C645; galvanized sheet steel, size as indicated on Drawings 'C' shape with the following minimum base metal thicknesses:
  - a. Studs with Tile Wall Finish: Minimum 30 mils (20 gage).
  - b. Other Studs: Minimum 30 mils (20 gage).
  - c. Studs and tracks with thicknesses equivalent to those specified are permitted, provided structural properties meet or exceed properties of studs with specified thickness.
- 2. Shaft Wall Studs and Accessories: Manufacturers standard shape for rating indicated.
- 3. Deep Leg Deflection Track: ASTM C645 top runner with 2 inch deep flanges.
- 4. Furring, Framing and Accessories: ASTM C645.
- 5. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

## 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
  - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), non-perforated.
  - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement,  $\frac{1}{8}$  inch thick, in width to suit steel stud size.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
  - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
  - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

### 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
  - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
  - 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
  - 3. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.4 INSTALLING SUSPENSION SYSTEMS

- A. Suspension System Components: Installed in accordance with U.L design number P202 & L006 guidelines.
- B. Main Tees: Installed 48 inches on center, by direct suspension from existing structure, with not less than 12 gage steel hanger wires, wrapped tightly 3 full turns, spaced 48 inches on center along component length.
- C. Cross Tees:

1. Installed perpendicular to main tees 24 inches on center to form 24 by 24 modules.
  2. Installed perpendicular to module forming cross tees 24 inches on center to form 24 24 modules.
  3. Installed adjacent to each unsupported side of recessed fixtures.
- D. Shadow Line Moldings: Installed on vertical surfaces, intersecting suspension components by appropriate method in accordance with industry accepted practice.
- E. Additional Hanger Wires: Wrapped tightly 3 full turns to structure and components at locations where imposed loads could cause deflection exceeding 1/360 span.

### 3.4 REPAIR

- A. Remove damaged components, replace with undamaged components. Clean with non-solvent based non-abrasive commercial cleaning solution.

### 3.5 INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. Install studs so flanges within framing system point in same direction.
1. Space studs as follows:
    - a. Single-Layer Application: 16 inches o.c., unless otherwise indicated on Drawings
    - b. Multilayer Application: 16 inches o.c., unless otherwise indicated on Drawings.
    - c. Tile backing panels: 16 inches o.c., unless otherwise indicated on Drawings.
- C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb, unless otherwise indicated.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance- rated assembly indicated.
  5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
  6. Curved Partitions:
    - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.
- D. Direct Furring:
1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

## END OF SECTION



## **SECTION 092600 GYPSUM BOARD ASSEMBLIES**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Metal stud wall framing.
  - 2. Metal channel ceiling framing.
  - 3. Gypsum board and joint treatment.
  - 4. Accessories.

#### **1.2 PERFORMANCE REQUIREMENTS**

- A. Conform to applicable code for fire rated assemblies as detailed on Drawings.

#### **1.3 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate special details associated with insulation and acoustic seals.
- C. Product Data: Submit data on metal framing, gypsum board, joint tape, and acoustic accessories.

#### **1.4 QUALITY ASSURANCE**

- A. Perform Work in accordance with ASTM C840, ASTM C1280, GA-214, GA-216, and GA-600.

#### **1.5 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum five (5) years documented experience.

#### **1.6 PRE-INSTALLATION MEETING**

- A. Section 013000 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this section.

## PART 2 PRODUCTS

### 2.1 GYPSUM BOARD ASSEMBLIES

- A. Metal Framing Manufacturers:
  - 1. Dale//Incor.
  - 2. Dietrich Industries.
  - 3. Superior Steel Studs Inc.
  - 4. Marino/Ware.
  - 5. Substitutions: Section 016000 - Product Requirements.
- B. Gypsum Board and Joint Treatment Manufacturers:
  - 1. United States Gypsum Company.
  - 2. Gold Bond Building Products.
  - 3. Georgia Pacific.
  - 4. Substitutions: Section 016000 - Product Requirements.
- C. Acoustic Insulation Manufacturers:
  - 1. Owens Corning; Thermafiber Sound Attenuation Fire Blanket (SAFB).
  - 2. CertainTeed; CertaSound Sound Attenuation Batts.
  - 3. Manville; Sound Shield Sound control Batts.
  - 4. Substitutions: Section 016000 - Product Requirements.

### 2.2 COMPONENTS

- A. Ceiling Suspension System Framing:
  - 1. Channels: Hot or cold rolled; G90 hot dipped galvanized steel channel; minimum 1-1/2 inches size and minimum 0.475 lb/ft in accordance with ASTM C754.
  - 2. Fasteners: ASTM C646.
  - 3. Hanger Wire: ASTM A641 soft temper, Class 1 galvanized steel, minimum 8 gage.
  - 4. Hanger Rods: Mild steel rod, with zinc coating, minimum 7/32 inches diameter.
  - 5. Angle Hangers: Minimum 7/8 x 7/8 inches, 16 gage ASTM A653 G90 galvanized steel formed angles with 5/16 inches diameter bolted connections.
  - 6. Anchorage Devices: Screws, clips, bolts, concrete inserts, and other devices of type and size to suit application; to rigidly secure materials in place. Size devices for 5x calculated load for concrete inserts and 3x calculated load for other devices.
  - 7. Adhesive: ASTM C557 or GA-216, as suitable for application.
- B. Ceiling Direct Attached Framing:
  - 1. Channels: Hat shaped; G90 hot dipped galvanized steel channel.
  - 2. Fasteners: ASTM C646.
- C. Gypsum Board Materials: Thickness as indicated on Drawings; maximum available length in place; ends square cut, tapered edges, unless specified otherwise.
  - 1. Standard Gypsum Board: ASTM C36.
  - 2. Fire Rated Gypsum Board: ASTM C36; fire rated type.

3. Moisture Resistant Gypsum Board: ASTM C630; standard and fire rated type as indicated on Drawings.

## 2.3 ACCESSORIES

- A. Acoustic Insulation: ASTM C665, Type I, unfaced semi rigid mineral fiber or fiberglass batt type, thickness indicated on Drawings, friction fit, with maximum flame/smoke properties of 25/450 in accordance with ASTM E84.
  1. Fire Rated Partitions: Insulation type as required by fire resistant design indicated on Drawings.
  2. Other Partitions: Insulation type as required by sound transmission test indicated on Drawings.
- B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board; type recommended by gypsum board manufacturer.
- C. Interior Finishing : GA 201 and GA 216
  1. Corner Beads: Clark Dietrich Metal or paper-faced metal.
  2. Edge Trim: Clark Dietrich Metal or paper-faced metal, profile to suit application.
  3. Control Joint: Clark Dietrich
    - a. Install fire rated control joint at fire rated assemblies.
  4. L-Bead: Clark Dietrich
- D. Joint Materials: ASTM C475; reinforcing tape, joint compound, adhesive, and water.
- E. Fasteners: ASTM C1002, Type S12.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

### 3.2 INSTALLATION

- A. Framing Materials:
  1. Studs and Tracks: ASTM C645; galvanized sheet steel, minimum 25 gage, size as indicated on Drawings, 'C' shape.
  2. Deep Leg Deflection Track: ASTM C 645 top runner with 2 inch deep flanges.
  3. Furring, Framing and Accessories: ASTM C645.
    - a. Hat shaped channels in conference room as indicated on Drawings.
  4. Fasteners: ASTM C1002.
  5. Anchorage to Substrate: Tie wire, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

- B. Metal Channel Ceiling Framing Installation:
1. Install in accordance with ASTM C754.
  2. Coordinate location of hangers with other work.
  3. Install ceiling framing independent of walls, columns, and above ceiling work.
  4. Install framing members at following spacings, unless indicated otherwise:
    - a. Wire Hangers: 4 feet on center.
    - b. Carrying Channels: 4 feet on center.
    - c. Rigid Furring Channels: 16 inches on center.
    - d. Metal Framing: 16 inches on center.
    - e. Diagonal Bracing: Maximum 4 feet bays.
    - f. Cross Framing: 4 feet on center.
  5. Reinforce openings in ceiling suspension system, which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
  6. Laterally brace entire suspension system.
- C. Ceiling Direct Attached Framing Installation:
1. Secure hat channels to bottom cord of trusses with screws; refer to Drawings for details.
- D. Acoustic Accessories Installation:
1. Comply with ASTM C919 and manufacturer's instructions to achieve STC ratings indicated on Drawings.
  2. Place acoustic insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
  3. Install acoustic sealant at gypsum board perimeter at following locations:
    - a. Metal Framing: One bead.
    - b. Base Layer: One bead.
    - c. Face Layer: One bead.
    - d. Seal partition face layer at openings for items penetrating partition.
  4. Close off sound flanking paths around or through gypsum board assemblies including sealing partitions above acoustic ceilings.
- E. Gypsum Board Installation:
1. Install gypsum board in accordance with GA-216 and GA-600.
  2. Erect single layer gypsum board vertical surfaces, with ends and edges occurring over firm bearing.
  3. Erect single layer gypsum board on ceilings, with ends and edges occurring over firm bearing and secure to ceiling furring channels.
  4. At stairwell and other walls extending for heights greater than one floor, install gypsum board horizontally with ends staggered and occurring over framing. Install horizontal control joint at floor lines.
  5. Use screws when fastening gypsum board to furring or framing.
  6. Double Layer Applications: Use gypsum-backing board for first layer, placed perpendicular to framing or furring members. Use fire rated gypsum-backing board for fire rated partitions and ceilings.
  7. Place second layer perpendicular to first layer. Offset joints of second layer from joints of first layer.
  8. Place control joints consistent with lines of building spaces as indicated.

9. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials and locations as indicated.
- F. Joint Treatment:
  1. Tape, fill, and sand exposed joints, edges, and corners in three coats to produce smooth surface ready to receive finishes in accordance with manufacturer's instructions.
- G. Finish Level:
  1. Paint: Level 4
  2. Wallcovering: Level 5

### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

**END OF SECTION**

**SECTION 093000**  
**SHEET MEMBRANE WATERPROOFING AND CRACK ISOLATION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Sheet membrane waterproofing for **tile and dimension stone** installations.
  - a. Sheet membrane bonded to tile substrate with NobleBond EXT or latex Portland cement mortar, thin-set mortar for shower floors **and walls**.
  - b. Sheet membrane bonded to tile substrate with NobleBond EXT or latex Portland cement mortar, thin-set mortar for walls at tub surrounds.
  - c. Sheet membrane loose-laid under thickset tile substrate for shower floors.
2. Sheet membrane waterproofing and water vapor retarder for **tile and dimension stone** installations.
3. Sheet membrane crack isolation for **tile and dimension stone** installations.
  - a. Sheet membrane bonded to tile substrate with latex Portland cement mortar for floors.
  - b. Sheet membrane bonded to tile substrate with adhesive for floors.

**1.2 REFERENCES**

- A. ANSI A108.13 - Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
- B. ANSI A108.17 - Installation of Crack Isolation Membranes.
- C. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
- D. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- G. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

- H. TCNA Handbook - TCNA Handbook for Ceramic, Glass, and Stone Tile Installation.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For each specified product.
- B. Shop Drawings:
  - 1. Include details of sheet membrane waterproofing installation with flashings and terminations.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

## PART 2 - PRODUCTS

### 2.1 SHEET MEMBRANE **WATERPROOFING AND CRACK ISOLATION**

- A. Sheet Membrane: ANSI A118.10; composite sheet membrane made from an alloy of non-plasticized Chlorinated Polyethylene (CPE) with non-woven fiber laminated to both sides.
  - 1. Basis of Design Manufacturer: Noble Company.
  - 2. Basis of Design Product: NobleSeal TS.
- B. Performance:
  - 1. Crack Isolation: "High performance" rating when tested to the "System Crack Resistance" portion of ANSI A118.12.



### 2.2 ACCESSORIES

- A. Bonding Mortar:
  - 1. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
- B. Bonding Adhesive: Type recommended by sheet membrane manufacturer to suit application [**with VOC less than LEED allowable limits**].
  - 1. Basis of Design Product: NobleBond 21.
- C. Mortar Bed:
  - 1. Portland Cement Mortar (Thickset): ANSI A108.02.
- D. Seam Sealant: Type recommended by sheet membrane manufacturer [**with VOC less than LEED allowable limits**].

1. Basis of Design Product: NobleWeld 100.
- E. Perimeter Sealant: Type recommended by sheet membrane manufacturer [**with VOC less than LEED allowable limits**].

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine **tile and stone** substrates, including **walls, floors, and framing** for unacceptable conditions affecting sheet membrane installation.
- B. Examine roughing-in for plumbing piping to verify actual locations of piping connections before sheet membrane installation.
- C. Correct unacceptable conditions before installing sheet membrane.

#### **3.2 PREPARATION**

- A. Examine, prepare, and test concrete floors for finish flooring installation in accordance with ASTM F710. Perform one [**moisture emission test in accordance with ASTM F1869**] [**relative humidity test in accordance with ASTM F2170**] and one alkalinity test for every 2,000 sf (185 sq m). Obtain instructions for corrective measures from flooring and adhesive manufacturers when test results are not within specified limits.
  1. Surface Tolerance: Maximum variation from plane of 3/16 inch (4.5 mm) in 10 feet (3000 mm).
    - a. Floor systems over which tile will be installed shall be in conformance with **IBC applicable building codes**.
  2. Moisture Emission Rate: Maximum 4 lb. per 1000 sq ft (1.4 kg 100 sq m) per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
  3. Relative Humidity: Maximum 85 percent.
  4. Alkalinity Range: pH of 7.0 to 9.0.
- B. When tested moisture emission rate exceeds specified maximum, consult membrane manufacturer, thin-set manufacturer, and tile manufacturer for acceptable mitigation methods and materials.

#### **3.3 INSTALLATION - SHEET MEMBRANE WATERPROOFING [AND VAPOR RETARDER]**

- A. Comply with ANSI A108.13, TCNA Handbook, and the manufacturer's instructions for installation of sheet membrane waterproofing.
- B. Bonded Installation for Thin-Set Applications:



1. Apply bonding [**mortar**] [**adhesive**] for full coverage of substrate.
  2. Install sheet membrane and fully embed into bonding material.
    - a. A carpet type roller may be used to embed sheet membrane on horizontal surfaces.
    - b. Hand roller or flat side of trowel can be used to embed sheet membrane on vertical surfaces.
  - C. Loose Laid Installation for Mortar Bed Applications:
    1. Loose lay sheet membrane on floor substrate.
  - D. If membrane is not wide enough, seam by overlapping sheets minimum 2 inches (50 mm), shingle fashion in direction of water drainage. Seal joints watertight.
  - E. Turn sheet membrane installed on floors up vertical surfaces minimum 2 inches (50 mm) higher than flood plane and bond to substrate.
    1. Shower Walls: When sheet membrane is turned up and terminated behind backer board, extend minimum 3 inches (75 mm) above finished dam or high point and fasten to substrate with no penetrations less than 2 inches (50 mm) above finished dam.
  - F. Extend sheet membrane over floor drains. Cut drain opening in sheet membrane and seal to drain body. Secure membrane with floor drain clamping ring.
  - G. Seal sheet membrane watertight to items penetrating sheet membrane.
- 3.4 INSTALLATION - SHEET MEMBRANE WATERPROOFING AND VAPOR RETARDER
- A. Comply with TCNA Handbook and the manufacturer's instructions for installation of sheet membrane waterproofing.
  - B. Apply continuous bead of seam sealant to framing flanges.
  - C. Overlap sheets minimum 2 inches (50 mm) shingle fashion in direction of water drainage. Seal joints watertight.
  - D. Seal sheet membrane watertight to items penetrating sheet membrane.
  - E. Install sheet membrane over framing and mechanically fasten to retain sheet membrane in place.
  - F. Install tile backer board and mechanically fasten to framing.
  - G. Seal fastener penetrations.
- 3.5 INSTALLATION - SHEET MEMBRANE CRACK ISOLATION

- A. Comply with ANSI A108.17, TCNA Handbook, and the manufacturer's instructions for installation of sheet membrane waterproofing.
- B. Apply bonding [**mortar**] [**adhesive**] for full coverage of substrate.
- C. Install sheet membrane and fully embed into bonding material.

### 3.6 FIELD QUALITY CONTROL

- A. Upon completion of sheet membrane waterproofing installation, plug drains, dam perimeter of waterproofing, and fill with water minimum 2 inches (50 mm) deep and maintain for 24 hours.
  - 1. Inspect waterproofing for leaks.
  - 2. Repair leaks and re-test until watertight.
- B. Prepare test and inspection reports. Indicate corrective measures required to make installation watertight.

### 3.7 PROTECTION

- A. Protect sheet membrane from pedestrian and vehicular traffic and prolonged exposure to sunlight.
- B. Keep sheet membrane clean until **tile and stone** finishes are installed.

## END OF SECTION



P.O. Box 350 · Grand Haven, MI 49417-0350 · 800-878-5788 · Fax: 231-799-8850 ·  
[www.noblecompany.com](http://www.noblecompany.com)

® Registered Trademark of Noble Company, Grand Haven, MI. ™ Trademark of Noble Company, Grand Haven, MI.

**SECTION 093113**  
**TILING AT INTERIOR WALLS**

**PART 1 – GENERAL**

**1.1 SECTION INCLUDES**

- A. Tile Backing Panels.
- B. Tile.
- C. Wall patch and render materials.
- D. Waterproof membrane materials.
- E. Setting materials.
- F. Crack Isolation materials.
- G. Grout materials.
- H. Flexible sealant.
- I. Tile sealers, cleaners and maintenance products.
- J. Mixes.
- K. Finishing and edge-protection profiles for walls.

**1.2 REFERENCES**

- A. ANSI A108 Series/A118 Series – American National Standard Specifications for Installation of Ceramic Tile.
- B. ANSI A108.19 – American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs.
- C. ANSI A136.1 – American National Standard Specifications for Organic Adhesives for Installation of Ceramic Tile.
- D. ANSI A137. 1 – American National Standard Specifications for Ceramic Tile.
- E. ANSI A137.3 – American National Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs.
- F. ANSI A138.1 – American National Standard Specifications for Green Squared Certification for Tiles and Installation Materials.
- G. TCNA (HB) – Handbook for Ceramic, Glass, and Stone Tile Installation; Tile Council of North America.
- H. ISO 13007 – International Standards Organization; classification for Grout and Adhesives.

**1.3 SUBMITTALS**

- A. Submit under provisions of Section 013000.
- B. Product Data:
  - 1. Manufacturer's technical information for each product specified.
  - 2. Flamespread information for each product specified.
- C. Samples: Color charts for selection of grout.
- D. Installation Instructions: Manufacturer's printed instructions for each product.
- E. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
  - 2. Full-size units of each type of trim and accessory.
  - 3. Metal tile accessories in 6-inch length, representing actual product, color and finish

**1.4 QUALITY ASSURANCE**

- A. To ensure warranty requirements and compatibility of products; please provide all tile grout, setting materials, additives, accessories, and factory-prepared dry-set mortars from the same manufacturer.
- B. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for the Project holds the International Masonry Institute's Foreman Certification.

#### 1.5 MAINTENANCE MATERIALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Tile and Trim Units: Furnish quantity of full-size units equal to 5 percent of amount installed for each type, composition, color, pattern, and size indicated.
  2. Grout: Furnish quantity of grout equal to 5 percent of amount installed for each type, composition, and color indicated.

#### 1.6 PRE-INSTALLATION CONFERENCE

- A. Convene one week prior to commencing work of this section.
- B. Require attendance of installation material manufacturer, tile supplier, tile installer and installers of related work. Review installation procedures and coordination required with related work.
- C. Meeting agenda includes but is not limited to:
  1. Tile and installation material compatibility.
  2. Grouting procedure.
  3. Maintenance and cleaning products and methods.
  4. Surface Preparation.
  5. Edge protection, transition and prefabricated movement joints.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
- B. Do not use frozen materials unless specifically allowed by manufacturer.
- C. Deliver and store materials on site at least 24 hours before work begins.
- D. Provide heated, dry and ventilated storage facilities on site.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.
- B. For interior applications:
  1. Do not begin installation until building is completely enclosed and HVAC system is operating and maintaining temperature and humidity conditions consistent with "after occupancy" conditions for a minimum of 2 weeks.
  2. Maintain continuous and uniform building temperatures of not less than 10°C (50°F) during installation.
  3. Ventilate spaces receiving tile in accordance with material manufacturer's instructions.
- C. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

### PART 2– PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: MAPEI Corporation, 1144 E. Newport Center Drive, Deerfield Beach, FL 33442; ASD. Toll Free Tel: 800-42-MAPEI; Tel: 954-246-8888; Fax: 954-246-8805; Email: [mapeitechsvcs@mapei.com](mailto:mapeitechsvcs@mapei.com); Web: [www.mapei.us](http://www.mapei.us).
- B. Substitutions: Submit under provisions identified in Section 012500.

1. Entire system should be provided by one manufacturer, unless noted otherwise below.

## 2.2 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C1325, Type A, in maximum lengths available to minimize end-to-end butt joints.
  1. Manufacturer: DensShield, or approved equal
  2. Thickness: As indicated in drawings.
  3. To be installed at any and all areas with wall tile specified, not on CMU substrate.
  4. At rated wall assemblies: Diamondback Tile Backer Type X.

## 2.3 TILE

- A. Acceptable manufacturers: Subject to conformity with the enclosed requirements, provide products as noted in the drawings.
  1. See Interior Design finish schedule.
- B. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
  1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- C. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- D. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- E. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- F. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

## 2.4 WALL PATCH & RENDER MATERIAL

- A. Quick-Setting, Fiber-Reinforced, Cementitious Patch and Render Mortar.
  1. Product: Subject to compliance with requirements, provide MAPEI, Planitop 330 Fast.

## 2.5 WATERPROOFING MEMBRANE

- A. Fluid-Applied Membrane: Advanced liquid-rubber; extremely quick-drying, premium waterproofing and crack isolation membrane, IAPMO-listed, exceeds ANSI A118.10 and ANSI A118.12 standards.
  1. Product: Subject to compliance with requirements, provide MAPEI, Mapelastic AquaDefense.
    - a. With MAPEI, Reinforcing Fabric.

## 2.6 SETTING MATERIALS

- A. Improved Modified Dry-Set Cement Mortar, Lightweight, Non-Sag, for Large and Heavy Tile – ANSI A118.4E, ANSI A118.11, ANSI A118.15E, or ISO 13007 C2ES2P2.
  1. Product: Subject to compliance with requirements, provide MAPEI, MAPEI Ultralite S2.
- B. Modified Dry-Set Cement Mortar for large and heavy tile thin-set applications, complying with ANSI A118.4, A118.11 and ISO 13007 C2TFS2.
  1. Product: Subject to compliance with requirements, provide MAPEI, MAPEI "Ultraflex LFT".

- C. Modified Dry-Set Cement Mortar for glass tile, glass mosaic, marble mosaic and light translucent natural stone complying with ANSI A118.4.
  - 1. Product: Subject to compliance with requirements, provide MAPEI, MAPEI Adesilex P10.

## 2.7 GROUT MATERIALS

- A. Polymer Ready-to-Use Tile Grout for grout joints from 1/16 inch to 1/2 inches (1.5 mm to 12 mm). Subject to compliance with requirements.
  - 1. Product: MAPEI, Flexcolor CQ at the following locations:
    - a. Toilet/Restrooms
    - b. Prep Kitchens
    - c. Residential Community Kitchens
  - 2. Product: MAPEI, Ultracolor Plus FA at the following locations:
    - a. Shower Areas, or other wet locations
  - 3. Color: See Interior Design finish schedule.

## 2.8 FLEXIBLE SEALANT

- A. Professional-grade, 100%-silicone sealant specifically formulated for heavy traffic expansion and movement joints, horizontal and vertical complying with ASTM standards; shore "A" hardness (ASTM C661), joint movement (ASTM C920), elongation at break (ASTM D412), flexibility (ASTM C734) and passes weatherability (Accelerated Weathering Tester QUV).
  - 1. Product: Subject to compliance with requirements, provide MAPEI, Mapesil T.
  - 2. To be installed at all joints, including, but not limited to floor/wall, wall/wall and wall/countertop joints.

## 2.9 CERAMIC TILE SEALERS, FINISHES, CLEANERS AND MAINTENANCE PRODUCTS

- A. Complete line of sealers, finishes, cleaners, grout haze removers, and maintenance products for use with ceramic tile and grout.
  - 1. MAPEI, UltraCare Stone, Tile & Grout Care Solutions, [www.mapei.us](http://www.mapei.us).

## 2.10 MIXES

- A. Proportion and mix materials in accordance with manufacturer's most current written instructions and applicable ANSI standards.

## 2.11 FINISHING AND EDGE-PROTECTION PROFILES FOR WALLS

- A. Description, Material and Finish: As indicated on Drawings.
  - 1. See Interior Design finish schedule.
- B. All exposed edges and outside corners to receive a metal edge trim.

# PART 3 – EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for conditions affecting performance of the work. Refer to ANSI A108.01; General requirements for sub-surfaces and preparations by other trades materials.
- B. Do not proceed with tilework until surfaces and conditions comply with requirements indicated in reference tile installation standard and manufacturer's printed instructions.
- C. When wall repair is needed prior to the installation of tile, use MAPEI Wall Repair Mortars in Part 2.
- D. Installation of setting materials indicates the acceptance of substrate.

### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Clean surfaces thoroughly prior to installation.
- D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.3 INSTALLATION

- A. Install tile in accordance with manufacturer's printed instructions and the applicable requirements of ANSI A108.19 for the materials being used.
- B. Waterproofing: Install necessary components to form a watertight installation. Dry film thickness (DFT) must be a minimum 20 mils after cure over substrate.
- C. Install tile using TCNA methods specified on the drawings.
- D. Install expansion and control joints in accordance with TCNA method EJ171.
- E. For large format tile, any tile larger than 15 inches on any side), install in thickset mortar with substrate flatness tolerance of 1/8 inch in 10 foot length, as per TCNA Handbook.
- F. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- G. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- H. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges. Confirm with designer prior to installation.
- I. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush. Face of field tile and accent tile are to be flush.
- J. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- K. Jointing Widths: Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar or excess grout. Refer to manufacturer's recommendation.
- L. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- M. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  - 2. Notify architect of any/all expansion joints prior to work commencing.

### 3.4 GROUTING

- A. Grout joints in accordance with manufacturer's instructions and ANSI A108.10 or ANSI A108.6.
- B. Clean standing water, dust, and foreign substances from joints to be grouted.
- C. Clean and dry tile surfaces.
- D. After grouting, remove all grout residues promptly.

### 3.5 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

### 3.6 PROTECTION

- A. Protect installed tile work and stone work from damages by other trades and general abuse until substantial work completion and acceptance.
- B. Refer to manufacturer's product data sheet for recommendations regarding protection.

**END OF SECTION**



**SECTION 093116  
TILING AT INTERIOR FLOORS OVER CONCRETE  
(CEMENTITIOUS SELF-LEVELING UNDERLAYMENT)**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Tile.
- B. Soundproofing materials.
- C. Surface preparation materials.
- D. Waterproof membrane materials.
- E. Crack isolation membrane materials.
- F. Tile setting mortars and adhesives.
- G. Grout for tile.
- H. Tile Sealers, Cleaners and Maintenance Products
- I. Mixes.
- J. Flexible Sealants
- K. Finishing and Edge-Protection Profiles for Walls and Floors.

**1.2 REFERENCES**

- A. ANSI A108 Series/A118 Series - American National Standards for Installation of Ceramic Tile.
- B. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.
- C. TCNA (HB) - Handbook for Ceramic, Glass and Stone Tile Installation; Tile Council of North America.
- D. ISO 13007 - International Standards Organization; classification for Grout and Adhesives.

**1.3 SUBMITTALS**

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Manufacturer's technical information for each product specified.
- C. Samples: Color charts for selection of grout.
- D. Installation Instructions: Manufacturer's printed instructions for each product.
- E. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
  - 2. Full-size units of each type of trim and accessory.
  - 3. Metal tile accessories in 6-inch length, representing actual product, color and finish.

**1.4 QUALITY ASSURANCE**

- A. To ensure warranty requirements and compatibility of products; please provide all tile grout, setting materials, additives, accessories, and factory-prepared dry-set mortars from the same manufacturer.
- B. Installer Qualifications:
  - 1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
  - 2. Installer's supervisor for the Project holds the International Masonry Institute's Foreman Certification.

**1.5 MAINTENANCE MATERIALS**

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 5 percent of amount installed for each type, composition, color, pattern, and size indicated.
  - 2. Grout: Furnish quantity of grout equal to 5 percent of amount installed for each type, composition, and color indicated.

#### 1.6 PRE-INSTALLATION CONFERENCE

- A. Convene one week prior to commencing work of this section.
- B. Require attendance of installation material manufacturer, tile supplier, tile installer and installers of related work. Review installation procedures and coordination required with related work.
- C. Meeting agenda includes but is not limited to:
  - 1. Tile and installation material compatibility.
  - 2. Grouting procedure.
  - 3. Maintenance and cleaning products and methods.
  - 4. Surface Preparation.
  - 5. Edge protection, transition and pre-fabricated movement joints.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
- B. Protect setting materials from freezing or overheating in accordance with manufacturer's instructions.
- C. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing or overheating.
- D. Do not use frozen materials unless specifically allowed by manufacturer.
- E. Deliver and store materials on site at least 24 hours before work begins.
- F. Provide heated, dry and ventilated storage facilities on site.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.
- B. For interior applications:
  - 1. Do not begin installation until building is completely enclosed and maintaining temperature and humidity conditions consistent with "after occupancy" conditions for a minimum of 2 weeks.
  - 2. Maintain continuous and uniform building temperatures of not less than 10°C (50°F) during installation.
  - 3. Ventilate spaces receiving tile in accordance with material manufacturer's instructions.
  - 4. Maintain temperatures at not less than 50 degrees F (10 degrees C) in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standards or manufacturer's written instructions.
- C. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations

## PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: MAPEI Americas U.S.A., 1144 E. Newport Center Rd., Deerfield Beach, FL 33442; ASD. Toll Free Tel: 800-42-MAPEI; Tel: 954-246-8888; Fax: 954-246-8801; Email: [mapeitechsvcs@mapei.com](mailto:mapeitechsvcs@mapei.com); Web [www.mapei.us](http://www.mapei.us)
- B. Substitutions: Submit under provisions identified in Section 012500.
  - 1. Entire system should be provided by one manufacturer, unless noted otherwise below.

## 2.2 TILE

- A. Acceptable manufacturers: Subject to conformity with the enclosed requirements, provide products as noted in the drawings.
  - 1. See Interior Design finish schedule.
- B. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
  - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- C. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- D. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- E. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- F. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

## 2.3 SOUNDPROOFING MATERIALS

- A. Sound mat membrane: Whisper Mat CS
  - 1. Requires Primer; Whisper Mat No. 6000 Primer

## 2.4 SURFACE PREPARATION MATERIALS

- A. Cementitious patching and skim-coating compound; MAPEI Mapecem Quickpatch.
- B. Cementitious Self-leveling underlayment, designed for leveling prior to floorcovering, MAPEI "Novoplan 2 Plus".
  - 1. Requires Primer; MAPEI, "Eco Prim Grip"

## 2.5 WATERPROOFING MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
  - 1. Product: Products from MAPEI.
- B. Fluid-Applied Membrane: Advanced liquid-rubber; extremely quick-drying, premium waterproofing and crack isolation membrane, IAPMO-listed, exceeds ANSI A118.10 and ANSI A118.12 standards.
  - 1. Product: Subject to compliance with requirements, provide MAPEI, Mapelastic AquaDefense.
    - a. With MAPEI, Reinforcing Fabric.

## 2.6 CRACK ISOLATION MEMBRANE

- A. Fluid-Applied Membrane: **Liquid-latex rubber or elastomeric polymer.** Flexible bonded crack-isolation membrane for use under tile that provides up to 1/8 inch (3 mm) protection from in-plane cracks: Fast-setting, flexible, thin, and load-bearing, ANSI A118.12.

- 1. Product: MAPEI, Mapelastic CI.

## 2.7 MORTAR MATERIALS

- A. Modified dry-set cement mortar for large and heavy tile thin-set applications, complying with ANSI A118.4, A118.11 and ISO 13007 C2TFS2; MAPEI "Ultraflex LFT".

## 2.8 GROUT MATERIALS

- A. Ready-to-Use Grout: Professional-grade, ready-to-use color consistent quartz aggregate, for use with grout joints 1/16" to 1/2" (1,5 to 12 mm). Subject to compliance with requirements.
  - 1. Product: MAPEI Flexcolor CQ at the following locations
    - a. Toilet/Restrooms
  - 2. Product: MAPEI Kerapoxy IEG at the following locations:
    - a. Prep Kitchens
  - 3. Product: MAPEI Ultracolor Plus FA at the following locations:
    - a. Shower Areas, or other wet locations
  - 4. Color: See Interior Design finish schedule.

## 2.8 MIXES

- A. Proportion and mix materials in accordance with manufacturer's most current written instructions and applicable ANSI standards.

## 2.9 FLEXIBLE SEALANT

- A. Professional-grade, 100%-silicone sealant specifically formulated for heavy traffic expansion and movement joints, horizontal and vertical complying with ASTM standards; slump (ASTM C639), tack-free time (ASTM C679,) shore "A" hardness (ASTM C661), joint movement (ASTM C920), elongation at break (ASTM D412), flexibility (ASTM C734) and passes weatherability (Accelerated Weathering Tester QUV), Product: MAPEI "Mapesil T".
  - 1. In addition, install at all floor/wall joints.

## 2.10 GROUT RELEASE

- A. Grout release: High-performance sacrificial coating that protects the tile surface from grout stains, improves cleanability and reduces the risk of grout haze or film residue, interior and exterior applications on all-natural stone; marble, limestone, sandstone, slate, granite and travertine, porcelain/ceramic tiles, masonry and quarry tiles.
  - 1. Product: MAPEI, UltraCare Grout Release.

## 2.11 PENETRATING STONE, TILE AND GROUT SEALERS

- A. Solvent-based Penetrating Sealer: Natural-look, providing maximum protection against most common stains. For use on interior and exterior natural stone such as marble, limestone, sandstone, slate, granite, travertine, unglazed porcelain and ceramic tiles, masonry, quarry tiles and cement grout. Can also be used as a pre-grouting sealer.

1. At Toilet/Restrooms, Locker Rooms, Pool Deck

- a. Product: MAPEI, UltraCare Penetrating SB Stone, Tile & Grout Sealer.

- B. Water-based Penetrating Sealer: Premium, natural-look, providing maximum protection for interior and exterior natural stone (marble, limestone, sandstone, slate, granite, travertine, etc.), unglazed ceramic tile, masonry. Can also be used as a pre-grouting sealer.

1. At Showroom and Service Drive

- a. Product: MAPEI, UltraCare Penetrating Plus SB Stone & Porcelain Tile Sealer

2.12 STONE, TILE AND GROUT MAINTENANCE, CLEANERS AND GROUT HAZE REMOVERS

- A. Neutral pH Cleaner: Highly concentrated, zero-VOC, for ceramic, porcelain and natural stone surfaces and prevent soap scum buildup and hard water deposits.  
1. Product: MAPEI, UltraCare Concentrated Tile & Grout Cleaner.
- B. High-Alkaline Cleaner: Highly concentrated and degreaser that quickly removes waxes, grease, oil, light soap scum, mildew and algae stains. For areas that have been neglected or subject to heavy use.  
1. Product: MAPEI, UltraCare Heavy-Duty Stone, Tile & Grout Cleaner.
- C. Sulfamic Acid Crystals: Cleaner and problem-solver for nonporous, acid-resistant tile and natural stone. Removes cured cement grout haze, mortar residue, rust stains and mineral deposits such as efflorescence.  
1. Product: MAPEI, UltraCare Sulfamic Acid Crystals.
- D. Epoxy Grout Haze Remover: Removes epoxy grout haze from tile, concrete and stone surfaces, water-based, and citrus scent.  
1. Product: MAPEI, UltraCare Epoxy Grout Haze Remover.

2.13 FINISHING AND EDGE-PROTECTION PROFILES FOR WALLS AND FLOORS

- A. Description, Material and Finish: As indicated on Drawings.  
1. See Interior Design finish schedule.
- B. All areas of floor transitions to receive a metal edge trim.

**PART 3 EXECUTION**

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for conditions affecting performance of the work. Refer to ANSI A108.01; General requirements for sub-surfaces and preparations by other trades materials.
- B. Do not proceed with tilework until surfaces and conditions comply with requirements indicated in reference tile installation standard and manufacturer's printed instructions.
- C. Underlayment, patching, leveling and rendering materials when needed, must be from the setting materials supplier for improved warranty and single-sourced responsibility.
- D. Installation of flooring materials indicates the acceptance of substrate.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Clean surfaces thoroughly prior to installation.
- D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.3 INSTALLATION

- A. Install tile in accordance with manufacturer's printed instructions and the applicable requirements of ANSI A108 Series for the materials being used.
- B. Install tile using TCNA methods.
- C. Install expansion and control joints in accordance with TCNA method.
- D. For large format tile, any tile larger than 15 inches on any side), install in thickset mortar with substrate flatness tolerance of 1/8 inch in 10 foot length, as per TCNA Handbook.
- E. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- G. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges. Confirm with designer prior to installation.
- H. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush. Face of field tile and accent tile are to be flush.
- I. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

### 3.1 GROUTING

- A. Grout joints in accordance with manufacturer's instructions and ANSI A108.10 or ANSI 108.6.
- B. Clean standing water, dust, and foreign substances from joints to be grouted.
- C. Clean and dry tile surfaces.
- D. After grouting, remove all grout residues and/or haze promptly.

### 3.2 ADJUSTING AND CLEANING.

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

### 3.3 PROTECTION

- A. Protect installed tile work from damages by other trades and general abuse until substantial work completion and acceptance.
- B. Refer to manufacturer's product data sheet for recommendations regarding protection.

**END OF SECTION**

**SECTION 093413**  
**TILING SHOWER RECEPTORS**  
**(Wood or Metal Studs, Fiber Cement or Cement Backer Board Walls, Mortar Bed Floor,**  
**Waterproof Membrane, Ceramic Tile)**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Tile setting mortars and adhesives.
- B. Grout for tile.
- C. Waterproofing membrane for tile.
- D. Tile.
- E. Finishing and Edge-Protection Profiles for Walls and Floors.

**1.2 REFERENCES**

- A. ANSI A108 Series/A118 Series - American National Standards for Installation of Ceramic Tile.
- B. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.
- C. TCNA (HB) - Handbook for Ceramic, Glass and Stone Tile Installation; Tile Council of North America.
- D. ISO 13007 - International Standards Organization; classification for Grout and Adhesives.
- E. CSAB79-08: Floor, Area and Shower Drains and Cleanouts.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Dynamic Coefficient of Friction on Walkway Surfaces: 0.42 minimum threshold per ANSI A137.1 AcuTest test protocol when used with slightly soapy water solution, in level interior spaces expected to be walked on when wet and 0.44 on sloped surfaces.
- B. Static Coefficient of Friction on Walkway Surfaces: Provide the following values as determined by ASTM C1028 for tile that doesn't meet DCOF AcuTest test protocol:
  - 1. Flat Dry Walking Surfaces: Minimum 0.6
  - 2. Flat Surfaces for Wet Tile: Minimum 0.42

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 013000.
- B. Product Data: Manufacturer's technical information for each product specified.
- C. Samples: Color charts for selection of grout.
- D. Installation Instructions: Manufacturer's printed instructions for each product.
- E. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
  - 2. Full-size units of each type of trim and accessory.
  - 3. Metal tile accessories in 6-inch length, representing actual product, color and finish.

**1.5 QUALITY ASSURANCE**

- A. To ensure warranty requirements and compatibility of products; please provide all tile grout, setting materials, additives, accessories, and factory-prepared dry-set mortars from the same manufacturer.
- B. Installer Qualifications:
  - 1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
  - 2. Installer's supervisor for the Project holds the International Masonry Institute's Foreman Certification.



3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

#### 1.6 MAINTENANCE MATERIALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Tile and Trim Units: Furnish quantity of full-size units equal to 5 percent of amount installed for each type, composition, color, pattern, and size indicated.
  2. Grout: Furnish quantity of grout equal to 5 percent of amount installed for each type, composition, and color indicated.

#### 1.7 PRE-INSTALLATION CONFERENCE

- A. Convene one week prior to commencing work of this section.
- B. Require attendance of installation material manufacturer, tile supplier, tile installer and installers of related work. Review installation procedures and coordination required with related work.
- C. Meeting agenda includes but is not limited to:
  1. Tile and installation material compatibility.
  2. Grouting procedure.
  3. Maintenance and cleaning products and methods.
  4. Surface Preparation.
  5. Edge protection, transition and pre-fabricated movement joints.

#### 1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
- B. Do not use frozen materials unless specifically allowed by manufacturer.
- C. Deliver and store materials on site at least 24 hours before work begins.
- D. Provide heated, dry and ventilated storage facilities on site.

#### 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.
- B. For interior applications:
  1. Do not begin installation until building is completely enclosed and HVAC system is operating and maintaining temperature and humidity conditions consistent with "after occupancy" conditions for a minimum of 2 weeks.
  2. Maintain continuous and uniform building temperatures of not less than 10°C (50°F) during installation.
  3. Ventilate spaces receiving tile in accordance with material manufacturer's instructions.
- C. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: MAPEI Americas U.S.A., 1144 E. Newport Center Rd., Deerfield Beach, FL 33442; ASD. Toll Free Tel: 800-42-MAPEI; Tel: 954-246-8888; Fax: 954-246-8801; Email: mapeitechsvcs@mapei.com Web: www.mapei.com.

- B. Acceptable Manufacturer: MAPEI, Inc. Canada, 2900 Francis-Hughes, Laval, PQ, Canada, H7L3J5. Toll Free Tel: 800-361-9309; Tel: 450-662-1212; Fax: 450-662-0444; Email: TServicesCA@mapei.com; Web: www.mapei.ca.
- C. Substitutions: Not permitted.

## 2.2 TILE

- A. Acceptable manufacturers: Subject to conformity with the enclosed requirements, provide products coming from one of the following manufacturers:
  - 1. See Interior Design finish schedule.
- B. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
  - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- C. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- D. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- E. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- F. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

## 2.3 ACCESSORIES

- A. Crack Isolation Membrane
  - 1. To be installed at all joints, including, but not limited to, floor-to-wall, wall-to-wall and wall-to-countertop.
- B. Premium, 100% silicone sealant; MAPEI, "Mapesil".
  - 1. To be installed at all joints, including, but not limited to, floor-to-wall, wall-to-wall and wall-to-countertop.

## 2.4 MORTAR BED

- A. Pre-blended, cement-based, polymer-modified thick-bed and render mortar that includes a blend of select aggregates requiring the addition of water only; MAPEI, "Modified Mortar Bed"

## 2.5 MORTAR MATERIALS

- A. Modified dry-set cement mortar, single-component, polymer-modified complying with ANSI A118.4, A118.11 and ISO 13007 C2TE; MAPEI "Ultraflex 2".

## 2.6 GROUT MATERIAL

- A. Grout: Fast-setting sanded polymer-modified grout, complying with ANSI A118.6, ANSI A118.7 and ISO 13007 CG2WAF, for joints between 1/16 inch and 1 inch (1,5 mm and 25 mm) wide; MAPEI "Ultracolor Plus FA".
  - 1. Color: See Interior Design finish schedule.

## 2.7 CERAMIC TILE, SEALERS, CLEANERS AND MAINTENANCE PRODUCTS

- A. Complete line of sealers, cleaners and maintenance products for use with ceramic tile and grout
  - 1. MAPEI "UltraCare Stone, Tile & Grout Care Solutions"  
<http://www.mapei.com/US-EN/products-subline.asp?IDLinea=143>

## 2.8 MIXES

- A. Proportion and mix materials in accordance with manufacturer's most current written instructions and applicable ANSI standards.

## 2.9 FINISHING AND EDGE-PROTECTION PROFILES FOR WALLS AND FLOORS.

- A. Description, Material and Finish:
  - 1. See Interior Design finish schedule.

# PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for conditions affecting performance of the work. Refer to ANSI A108.01; General requirements for sub-surfaces and preparations by other trades materials or TTMAC's Tile Specification Guide 09 30 00 Tile Installation Manual.
- B. Do not proceed with tilework until surfaces and conditions comply with requirements indicated in reference tile installation standard and manufacturer's printed instructions.
- C. Installation of flooring materials indicates the acceptance of substrate.

## 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Clean surfaces thoroughly prior to installation.
- D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

## 3.3 INSTALLATION

- A. Install tile in accordance with manufacturer's printed instructions and the applicable requirements of ANSI A108 Series for the materials being used.
- B. Install tile using TCNA or TTMAC methods specified on the drawings.
- C. Install expansion and control joints in accordance with TCNA method EJ171 (or TTMAC 301MJ method in Canada).
- D. For large format tile, any tile larger than 15 inches on any side), install in thickset mortar with substrate flatness tolerance of 1/8 inch in 10 foot length, as per TCNA Handbook.
- E. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- G. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges. Confirm with designer prior to installation.
- H. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush. Face of field tile and accent tile are to be flush.
- I. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

- J. Jointing Widths: Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar or excess grout. Refer to manufacturer's recommendation.
- K. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- L. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  - 2. Notify architect of any/all expansion joints prior to work commencing.

### 3.4 GROUTING

- A. Grout joints in accordance with manufacturer's instructions and ANSI A108.10 or ANSI 108.6.
- B. Clean standing water, dust, and foreign substances from joints to be grouted.
- C. Clean and dry tile surfaces.
- D. After grouting, remove all grout residues promptly.

### 3.5 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

### 3.6 PROTECTION

- A. Protect installed tile work from damages by other trades and general abuse until substantial work completion and acceptance.
- B. Refer to manufacturer's product data sheet for recommendations regarding protection.

**END OF SECTION**

**SECTION 095123**  
**ACOUSTICAL TILE CEILINGS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes:
  - 1. Acoustic panels.
  - 2. Exposed and concealed suspended metal grid ceiling system.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Suspension System: Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1:360.
- B. Surface Burning Characteristics: Maximum flame spread/smoke developed rating 25/450 when tested in accordance with ASTM E84.

**1.3 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
  - 1. Indicate grid layout and related dimensions, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.
  - 2. Indicate method of suspension where interference exists.
- C. Product Data:
  - 1. Submit data on metal grid system components and acoustic units.
  - 2. Flamespread information for each material specified.
- D. Samples:
  - 1. Submit two samples 6 x 6 inch in size illustrating material, edges, and finish of each type acoustic units.
  - 2. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.
- E. Manufacturer's Installation Instructions: Submit special procedures and perimeter conditions requiring special attention.

**1.4 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: full-size tiles equal to 4 percent of quantity installed of each type, pattern or color installed.
2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 4 percent of quantity installed of each type or color installed.

## 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 012500 – Substitution Procedures.
- B. Maintain uniform temperature of minimum 60 degrees F and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

## 1.7 SEQUENCING

- A. Section 011000 - Summary: Work sequence.
- B. Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install acoustic units after interior wet work is dry.

# PART 2 PRODUCTS

## 2.1 ACOUSTICAL PANELS

- A. Manufacturers:
  1. Armstrong World Industries.
  2. Substitutions: Submit under provisions identified in Section 012500 – Substitution Procedures.
- B. Acoustical Panels: See Interior Design finish schedule.
- C. Refer to drawing for additional information.

## 2.2 GRID

- A. Manufacturers:
  1. Armstrong World Industries.
  2. Substitutions: Section 012500 – Submit under provisions identified in Substitution Procedures.
- B. Grid: See Interior Design finish schedule.

- C. Accessories: Stabilizer bars, clips, splices, perimeter moldings, and hold down clips required for suspended grid system.
  - 1. Comply with applicable requirements in ASTM C635/C 635M.
- D. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

## 2.3 ACCESSORIES

- A. Acoustic Sealant: Non-hardening, non-skinning type.
- B. Gasket for Perimeter Moldings: Closed cell rubber sponge tape.
- C. Touch-up Paint: Type and color to match acoustic and grid units.
- D. Refer to drawings for any additional accessories.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify layout of hangers will not interfere with other work.

### 3.2 INSTALLATION

- A. Lay-In Exposed Grid Suspension System:
  - 1. Install suspension system in accordance with ASTM C636.
  - 2. Lay out system to balance grid design with edge units no less than 50 percent of acoustic unit size, unless noted otherwise in the drawings. Contact architect with any discrepancies.
  - 3. Install ceilings after major above-ceiling work is complete. Coordinate location of hangers with other work.
  - 4. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
  - 5. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.
  - 6. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
  - 7. Do not eccentrically load system, or produce rotation of runners.
  - 8. Perimeter Molding:
    - a. Install edge molding at intersection of ceiling and vertical surfaces into bed of acoustic sealant or with continuous gasket.
    - b. Use longest practical lengths. Miter corners.
    - c. Install at junctions with other interruptions.
  - 9. Install light fixture boxes in conformance with applicable code requirements and light fixture ventilation requirements.
  - 10. At areas with crown molding, grid to be installed to sit directly on crown molding and tie into wall beyond.
- B. Acoustic Panels:

1. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
2. Lay directional patterned units one way with pattern parallel to longest room axis. Fit border trim neatly against abutting surfaces.
3. Install units after above-ceiling work is complete.
4. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
5. Cutting Acoustic Units:
  - a. Cut to fit irregular grid and perimeter edge trim.
  - b. Cut edges to match factory finished edges of specified tile.
  - c. Cut tiles in conformance with manufacturer's recommendations.
  - d. All exposed cut edges to be painted as per manufacturer's recommendations.
6. Where bullnose corners or round obstructions occur, install preformed closures to match perimeter molding.
7. Install hold-down clips to retain panels tight to grid system within 20 feet of exterior door.
8. At areas with crown molding, acoustic tile to be cut short in front of face of crown molding. Cut edge to be painted.
9. No Teg Tabs (spacers) of any kind to be used. All tegular tile to be cut at perimeter for grid to sit flat at grid wall molding.

### 3.3 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

## END OF SECTION



**SECTION 096113  
FLOOR PREPARATION FOR LVT (LUXURY VINYL TILE)  
INTERIOR CONCRETE OR APPROVED APA-GRADE PLYWOOD**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Surface Preparation.
- B. Patch and Skim Coating Materials.
- C. Primer.
- D. Low-Emission Adhesive for Flooring.

**1.2 RELATED SECTIONS**

- A. Section 096516 – Resilient Sheet Flooring.
- B. Section 096519 – Resilient Tile Flooring.

**1.3 REFERENCES**

- A. Carpet and Rug Institute, Indoor Air Quality Adhesive Testing Program.

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 013000 - Administrative Requirements.
- B. Product Data: Manufacturer's technical information for each product specified.
- C. Installation Instructions: Manufacturer's printed instructions for each product.

**1.5 QUALITY ASSURANCE**

- A. Provide products meeting the Carpet and Rug Institute's low VOC emission criteria achieved through the Indoor Air Quality Adhesive Testing Program.

**1.6 DELIVERY, STORAGE AND HANDLING**

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
- B. Deliver and store materials in heated area on site at least 24 hours before commencement of work.
- C. Provide heated and dry storage facilities on site.

**1.7 PROJECT CONDITIONS**

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to materials from carbonation (carbon dioxide build-up).

- C. Maintain temperatures at not less than 50 degrees F (10 degrees C) during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standards or manufacturer's written instructions.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturer: MAPEI Corporation, 1144 E. Newport Center Drive, Deerfield Beach, FL 33442, USA; ASD. Toll-Free Tel.: 800-42-MAPEI; Tel.: 954-246-8888; Fax: 954-246-8805; Email: [mapeitechsvcs@mapei.com](mailto:mapeitechsvcs@mapei.com); Web: [www.mapei.com](http://www.mapei.com).
- B. Submit under provisions identified in Section 012500.
  - 1. Entire system should be provided by one manufacturer, unless noted otherwise below.

### **2.2 SUBFLOOR TREATMENT PRODUCTS**

- A. Concrete Substrate:
  - 1. Water-based adhesive remover to remove most latex-based adhesives from the surface of concrete subfloors; MAPEI, "Planiprep AR".
  - 2. Water-based stripping solution designed for preparing nonporous or chemically contaminated concrete surfaces; MAPEI, "Planiprep SA".
  - 3. Epoxy concrete subfloor treatment designed to penetrate and prepare concrete slabs that have been treated using Planiprep SA; MAPEI, "Planiprep ET".

### **2.3 BOND PROMOTING PRIMER**

- A. Concrete Substrate:
  - 1. Low-VOC, water-based acrylic primer; MAPEI, "Primer T".
- B. Wood Substrate:
  - 1. Low-VOC, water-based acrylic primer, MAPEI, "Primer T".

### **2.4 PATCHING AND SKIM COATING**

- A. Concrete Substrate:
  - 1. High-Performance, Fiber-Reinforced Skim Coating Compound; MAPEI, "Planiprep SC".
- B. Wood Substrate:
  - 1. High-Performance, Quick-Setting, Self-Leveling Underlayment; MAPEI, "Ultraplan 1 Plus".

### **2.5 SEALANT**

- A. Wood Substrate:

1. 100% Silicone, MAPEI, "Mapesil T".

## 2.6 ADHESIVES

- A. Specified resilient flooring manufacturer's recommended adhesive spec appropriate for substrate with highest moisture limit.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- B. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
  1. Supporting surfaces shall be structurally sound, dry, solid, stable, level, plumb and true to a tolerance in plane of 1/8 inch in 10 feet (3 mm in 3.1 m). Level substrates using materials recommended by adhesive manufacturer based on depth of surface defects requiring patching and toppings.
  2. Supporting surfaces shall be clean and free of dust, oil, grease, paint, tar, wax, curing compounds, sealers, form release agents, primers, free alkali, loosely bonded toppings, loose particles, old adhesive residues and substances that may prevent or reduce adhesion.
  3. Mechanically sand scarify the substrate to completely remove all paint, loosely bonded toppings, loose particles, old adhesive residues and substances that may reduce or prevent adhesion, except do not sand or remove any existing resilient floors or cutback adhesive that may contain asbestos fibers or crystalline silica.
  4. Turn off forced ventilation and floor heating systems prior to installation and protect work against drafts during installation and for a period of at least 48 hours after completion to prevent damage to substrates, installation products and flooring materials. Use indirect auxiliary heaters to maintain the temperature in the area at the recommended workable level. Vent temporary heaters to exterior to prevent carbonation.
  5. Comply with adhesive manufacturer's additional requirements for each type of substrate.

**END OF SECTION**

## **SECTION 096116**

### **FLOOR PREPARATION VCT (VINYL COMPOSITION TILE) INTERIOR CONCRETE**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Surface Preparation.
- B. Patch and Skim Coating Materials.
- C. Primer.
- D. Low-emission and Adhesive for flooring.

##### **1.2 RELATED SECTIONS**

- A. Section 096519 – Resilient Floor Tile.

##### **1.3 REFERENCES**

- A. Carpet and Rug Institute, Indoor Air Quality Adhesive Testing Program.

##### **1.4 SUBMITTALS**

- A. Submit under provisions of Section 013300 - Submittal Procedures.
- B. Product Data: Manufacturer's technical information for each product specified.
- C. Installation Instructions: Manufacturer's printed instructions for each product.

##### **1.5 QUALITY ASSURANCE**

- A. Provide products meeting the Carpet and Rug Institute's low VOC emission criteria achieved through the Indoor Air Quality Adhesive Testing Program.

##### **1.6 DELIVERY, STORAGE AND HANDLING**

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
- B. Deliver and store materials in heated area on site at least 24 hours before commencement of work.
- C. Provide heated and dry storage facilities on site.

##### **1.7 PROJECT CONDITIONS**

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to materials from carbonation (carbon dioxide build-up).

- C. Maintain temperatures at not less than 50 degrees F (10 degrees C) during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standards or manufacturer's written instructions.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturer: MAPEI Corporation, 1144 E. Newport Center Drive, Deerfield Beach, FL 33442, USA; ASD. Toll-Free Tel.: 800-42-MAPEI; Tel.: 954-246-8888; Fax: 954-246-8805; Email: [mapeitechsvcs@mapei.com](mailto:mapeitechsvcs@mapei.com); Web: [www.mapei.com](http://www.mapei.com).
- B. Submit under provisions identified in Section 012500.
  - 1. Entire system should be provided by one manufacturer, unless noted otherwise below.

### **2.2 SUBFLOOR TREATMENT PRODUCTS**

- A. Water-based adhesive remover to remove most latex-based adhesives from the surface of concrete subfloors; MAPEI, "Planiprep AR".
- B. Water-based stripping solution designed for preparing nonporous or chemically contaminated concrete surfaces; MAPEI, "Planiprep SA".
- C. Epoxy concrete subfloor treatment designed to penetrate and prepare concrete slabs that have been treated using Planiprep SA; MAPEI, "Planiprep ET".

### **2.3 BOND PROMOTING PRIMER**

- A. Low-VOC, water-based acrylic primer; MAPEI, "Primer T".

### **2.4 PATCHING AND SKIM COATING**

- A. High-Performance, Fiber-Reinforced Skimcoating Compound
  - 1. Product: MAPEI, Planiprep SC

### **2.5 ADHESIVES**

- A. Low Emission Resilient Tile Adhesives:
  - 1. Resilient flooring manufacturer's recommended adhesive spec appropriate for substrate with highest moisture limit.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- B. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
  - 1. Supporting surfaces shall be structurally sound, dry, solid, stable, level, plumb and true to a tolerance in plane of 1/8 inch in 10 feet (3 mm in 3.1 m). Level substrates using materials recommended by adhesive manufacturer based on depth of surface defects requiring patching and toppings.
  - 2. Supporting surfaces shall be clean and free of dust, oil, grease, paint, tar, wax, curing

compounds, sealers, form release agents, primers, free alkali, loosely bonded toppings, loose particles, old adhesive residues and substances that may prevent or reduce adhesion.

3. Mechanically sand scarify the substrate to completely remove all paint, loosely bonded toppings, loose particles, old adhesive residues and substances that may reduce or prevent adhesion, except do not sand or remove any existing resilient floors or cutback adhesive that may contain asbestos fibers or crystalline silica.
4. Turn off forced ventilation and floor heating systems prior to installation and protect work against drafts during installation and for a period of at least 48 hours after completion to prevent damage to substrates, installation products and flooring materials. Use indirect auxiliary heaters to maintain the temperature in the area at the recommended workable level. Vent temporary heaters to exterior to prevent carbonation.
5. Comply with adhesive manufacturer's additional requirements for each type of substrate.

**END OF SECTION**

**SECTION 096119**  
**FLOOR PREPARATION CARPET (NON-PVC & PVC-FREE BACKINGS) FLOORS**  
**INTERIOR CONCRETE OR APPROVED APA GRADE PLYWOOD**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Surface Preparation.
- B. Patch and Skim Coating Materials.
- C. Primer.
- D. Low-Emission Adhesive for Flooring.

**1.2 RELATED SECTIONS**

- A. Section 096813 - Tile Carpeting.
- B. Section 096816 – Sheet Carpeting.

**1.3 REFERENCES**

- A. Carpet and Rug Institute, Indoor Air Quality Adhesive Testing Program.

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 013000.
- B. Manufacturer's technical information for each product specified.
- C. Installation Instructions: Manufacturer's printed instructions for each product.

**1.5 QUALITY ASSURANCE**

- A. Provide products meeting the Carpet and Rug Institute's low VOC emission criteria achieved through the Indoor Air Quality Adhesive Testing Program.

**1.6 DELIVERY, STORAGE AND HANDLING**

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.
- B. Deliver and store materials in heated area on site at least 24 hours before commencement of work.
- C. Provide heated and dry storage facilities on site.

**1.7 PROJECT CONDITIONS**

- A. Vent temporary heaters to exterior to prevent damage to materials from carbonation (carbon dioxide build-up).

- B. Maintain temperatures at not less than 50 degrees F (10 degrees C) during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standards or manufacturer's written instructions.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturer: MAPEI Corporation, 1144 E. Newport Center Drive., Deerfield Beach, FL 33442, USA; ASD. Toll-Free Tel.: 800-42-MAPEI; Tel.: 954-246-8888; Fax: 954-246-8805; Email: [mapeitechsvcs@mapei.com](mailto:mapeitechsvcs@mapei.com); Web: [www.mapei.com](http://www.mapei.com).
- B. Acceptable Manufacturer: MAPEI Inc. Canada, 2900 Francis-Hughes, Laval, PQ, Canada
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements.

### **2.2 SUBFLOOR TREATMENT PRODUCTS**

- A. Water-based adhesive remover to remove most latex-based adhesives from the surface of concrete subfloors; MAPEI, "Planiprep AR".
- B. Water-based stripping solution designed for preparing nonporous or chemically contaminated concrete surfaces; MAPEI, "Planiprep SA".
- C. Epoxy concrete subfloor treatment designed to penetrate and prepare concrete slabs that have been treated using Planiprep SA; MAPEI, "Planiprep ET".

### **2.3 PATCHING AND SKIM COATING**

- A. High-Performance, Fiber-Reinforced Skimcoating Compound
  - 1. Product: MAPEI, Planiprep SC

### **2.4 BOND PROMOTING PRIMER**

- A. Low-VOC, water-based acrylic primer; MAPEI, "Primer T".

### **2.5 ADHESIVES**

- A. Low Emission Carpet Tile Adhesives:
  - 1. Manufacturer's recommended adhesive spec appropriate for substrate with highest moisture limit.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- B. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.



1. Supporting surfaces shall be structurally sound, dry, solid, stable, level, plumb and true to a tolerance in plane of 1/8 inch in 10 feet (3 mm in 3.1 m). Level substrates using materials recommended by adhesive manufacturer based on depth of surface defects requiring patching and toppings.
2. Supporting surfaces shall be clean and free of dust, oil, grease, paint, tar, wax, curing compounds, sealers, form release agents, primers, free alkali, loosely bonded toppings, loose particles, old adhesive residues and substances that may prevent or reduce adhesion.
3. Mechanically sand scarify the substrate to completely remove all paint, loosely bonded toppings, loose particles, old adhesive residues and substances that may reduce or prevent adhesion, except do not sand or remove any existing resilient floors or cutback adhesive that may contain asbestos fibers or crystalline silica.
4. Turn off forced ventilation and floor heating systems prior to installation and protect work against drafts during installation and for a period of at least 48 hours after completion to prevent damage to substrates, installation products and flooring materials. Use indirect auxiliary heaters to maintain the temperature in the area at the recommended workable level. Vent temporary heaters to exterior to prevent carbonation.
5. Comply with adhesive manufacturer's additional requirements for each type of substrate.

**END OF SECTION**

**SECTION 096513  
RESILIENT BASE AND ACCESSORIES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Resilient base.
  - 2. Resilient stair accessories.
  - 3. Resilient molding accessories.

**1.3 ACTION SUBMITTALS**

- A. Product Data:
  - 1. For each type of product.
  - 2. Flamespread data for each product specified.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.
- E. Product Schedule: For resilient base and accessory products see Interior Design finish schedule.

**1.4 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 85 deg F.

## 1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F, in spaces to receive resilient products during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 85 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.
- D. Maintain the ambient relative humidity between 40% and 60% during installation.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. FloorScore Compliance: Resilient base and stair accessories shall comply with requirements of FloorScore certification.

### 2.2 RESILIENT BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Johnsonite; A Tarkett Company.
- B. Style, height, thickness, color:
  - 1. See Interior Design finish schedule.
- C. Corners:
  - 1. Outside: Job-formed.
  - 2. Inside: Job-formed.

- D. Manufactured from a proprietary thermoplastic rubber formulation.
- E. Meets performance requirements for ASTM F 1861 Standard Specification for Resilient Wall Base, Type TP, Group I.
- F. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm<sup>2</sup> or greater, Class I.
- G. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials, Class A, Smoke <450.
- H. Flexibility: Does not crack, break, or show any signs of fatigue when bent around a 1 1/4" diameter cylinder when tested according to ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials protocols.
- I. Color Stability: Meets or exceeds ASTM F 1861 requirements for color stability when tested to ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols.
- J. Lengths: Coils in manufacturer's longest length.

## 2.3 RESILIENT MILLWORK WALL BASE

- A. Manufacturer:
  - 1. Johnsonite; A Tarkett Company
- B. Style, height, thickness and color:
  - 1. See Interior Design finish schedule.
- C. Corners:
  - 1. Outside: Job formed.
  - 2. Inside: Job formed.
- D. Millwork profiles replicate the look of finely milled wood.
- E. Manufactured from a proprietary thermoplastic rubber formulation.
- F. Meets performance requirements for ASTM F 1861 Standard Specification for Resilient Wall Base, Type TP, Group 1.
- G. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm<sup>2</sup> or greater, Class I.
- H. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials, Class B, Smoke less than 450.
- I. Lengths: Manufacturer's longest length.

## 2.4 RESILIENT STAIR ACCESSORIES

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Manufacturers:
  - 1. Johnsonite.
- C. Stair Treads: ASTM F 2169
- D. Separate Risers: Smooth, flat, in height that fully covers substrate; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
- E. Description: Rubber reducer strip or transition strips for resilient flooring.
- F. Profile and Dimensions: See Interior Design finish schedule.
- G. Locations: As indicated on drawings.
- H. Colors and Patterns: See Interior Design finish schedule.

## 2.5 RESILIENT MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Johnsonite; A Tarkett Company.
- B. Description: Rubber reducer strip or transition strips for resilient flooring.
- C. Style, height, thickness and color:
  - 1. See Interior Design finish schedule.

## 2.6 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
  - 1. Adhesives should be resilient product manufacturer's adhesive spec for highest moisture limit.
  - 2. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

3. Stair tread nose filler: Two-part epoxy compound recommended by resilient stair tread manufacturer to fill nosing substrates that do not conform to tread contours.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
  1. Installation of resilient products indicates acceptance of surfaces and conditions.

#### **3.2 PREPARATION**

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
  1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

#### **3.3 RESILIENT BASE INSTALLATION**

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
    - a. Rubber Thermoset Profiles: Form without producing discoloration (whitening) at bends.
    - b. Millwork Profiles: Miter corners to fit.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
    - a. Rubber Thermoset Profiles: Butt one piece to corner then scribe next piece.
    - b. Millwork Profiles: Miter corners to fit.

### 3.4 RESILIENT STAIR ACCESSORY INSTALLATION

- A. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
- B. Tightly adhere to substrates throughout length of each piece.
- C. Install to produce a flush joint between stair nosing and resilient flooring.

### 3.5 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

### 3.6 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum horizontal surfaces thoroughly.
  - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

## END OF SECTION

**SECTION 096516  
RESILIENT SHEET FLOORING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SECTION INCLUDES**

- A. Vinyl Sheet flooring

**1.3 ACTION SUBMITTALS**

- A. Product Data:
  - 1. For each type of product.
  - 2. Flamespread data for each product specified.
- B. Shop Drawings: For each type of sheet floor.
  - 1. Include sheet floor layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 2. Show details of special patterns.
- C. Samples: Full-size units of each color and pattern of sheet floor required. For each exposed product and for each color and texture specified, not less than 12 inches.
  - 1. For heat-welding bead, manufacturer's standard-size samples, but not less than 9 inches long, of each color required.
- D. Samples for Initial Selection: For each type of sheet floor indicated.
- E. Samples for Verification: Full-size units of each color, pattern and texture of product required in manufacturer's standard-size samples, but not less than 12 inches long.
  - 1. Welded-Seam Samples: For seamless-installation technique indicated and for each flooring product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch. Sample applied to a rigid backing and prepared by Installer for this project.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of sheet floor to include in maintenance manuals

**1.6 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective



covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full width for each type, color and pattern of flooring installed.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store flooring rolls upright.

## 1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive sheet floor during the following time periods:
  1. 48 hours before installation.
  2. During installation.
  3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during sheet floor installation.
- D. Close spaces to traffic for duration of time as per the manufacturer's recommendation after sheet floor installation.
- E. Install resilient sheet floor products after other finishing operations, including painting, have been completed.

# PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturer, product type, pattern, color, texture, backing and characteristics:
  1. See Interior Design finish schedule.
- B. Requests for substitutions will be considered in accordance with provisions of Section 016000.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing

identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
1. Adhesives shall be flooring manufacturer's adhesive spec for highest moisture limit.
  2. Adhesives shall have VOC levels, in grams per liter, less than or equal to the thresholds established by South coast Air Quality Management District Rule 1168.
  3. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
- D. Floor Polish: Provide and install protective, liquid floor-polish products recommended by floor tile manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of sheet floor.
- B. Refer to Section 096116 – Floor Preparation for VCT.
- C. Concrete Substrates:
1. Verify that substrates are dry and free of curing compounds, sealers and hardeners and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by flooring manufacturer.
  2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  3. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place

Concrete" for slabs receiving resilient flooring.

4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits are free of cracks, ridges, depressions, scale, and foreign deposits.
5. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
6. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation area. Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations.
  - a. Anhydrous Calcium Chloride Test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
  - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
  - c. Perform additional moisture tests recommended in writing by adhesive, carpet cushion and carpet manufacturers. Proceed with installation only after substrates pass testing.
7. Surface tolerance: Maximum variation from plane of 1/8 inch in 10 feet.
8. Surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

D. Wood Substrates:

1. Follow manufacturer's recommendations for relative humidity requirements.
2. Floors must be dry, clean and smooth.
3. Wood sub-floors and underlayment panels must be acclimated to within 3% and have an equilibrium moisture content of 14% or less.
4. Wood floors must be double construction with minimum thickness of 1-inch. The top layer of wood shall be 1/4"-inch APA underlayment grade plywood or other wood underlayment panel approved and warranted by resilient flooring manufacturer beneath specified resilient flooring.
5. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

E. Gypcrete Substrates:

1. Follow manufacturer's recommendations for relative humidity requirements.
2. Floors must be dry, clean and smooth.
3. Reference ASTM F2419 for National Standards for flooring installation procedures and recommendations over gypsum underlayment.

4. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface

- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive resilient tile installation.
- B. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- D. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by flooring manufacturer.
- E. Concrete Substrates:
  1. Grind high spots and fill low spots to produce a maximum 3/16-inch deviation in any direction when checked with a 10-foot straight edge.
  2. Existing concrete slabs to be properly prepped to meet manufacturer's minimum requirements to receive flooring. This includes, but is not limited to, moisture mitigation, leveling, diamond grinding, shot blasting or scarifying.
- F. Do not install sheet floor until it is the same temperature as the space where it is to be installed.
  1. At least 48 hours in advance of installation, move resilient sheet floor and installation materials into spaces where they will be installed.
- G. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet floor.

### 3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
  1. Maintain uniformity of flooring direction.
  2. Minimize number of seams; place seams in inconspicuous and low traffic areas, at least 6 inches away from parallel joints in flooring substrates.
  3. Match edges of flooring for color shading at seams.
  4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.

- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.
- H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Seamless Installation:
  - 1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless flooring. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.

#### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting sheet floor.
- B. Perform the following operations immediately after completing sheet floor installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect flooring from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.
  - 1. Apply maximum coats as per manufacturer's recommendation.
  - 2. Apply floor polish within 24-hours of installation and prior to any foot or rolling-load traffic occurs.
- E. Cover flooring until Substantial Completion.

#### END OF SECTION

**SECTION 096519  
RESILIENT TILE FLOORING**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Luxury Vinyl Tile.
- B. Vinyl Composition Tile.

**1.2 ACTION SUBMITTALS**

- A. Product Data:
  - 1. For each type of product.
  - 2. Flamespread data for each product specified.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 1. Show details of special patterns.
- C. Samples: Full-size units of each color and pattern of floor tile required

**1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.

**1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

**1.5 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color and pattern of floor tile installed.

**1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

**1.8 PROJECT CONDITIONS**

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less

than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
  2. During installation.
  3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for duration of time recommended by the manufacturer after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. FloorScore Compliance: Resilient tile flooring shall comply with requirements of FloorScore certification.
- C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

### **2.2 LUXURY VINYL TILE**

- A. Manufacturers:
1. See Interior Design finish schedule.
- B. Style, Color and Pattern.
1. See Interior Design finish schedule.

### **2.3 VINYL COMPOSITION TILE**

- A. Manufacturers:
1. See Interior Design finish schedule.
- B. Style, Color and Pattern.
1. See Interior Design finish schedule.

### **2.4 INSTALLATION ACCESSORIES**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient tile flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient flooring tile manufacturer for resilient flooring product and substrate conditions indicated.
  - 1. Adhesives should be resilient flooring manufacturer's adhesive spec for highest moisture limit.
  - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  - 3. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Floor Polish: Provide and install maximum coats of protective, liquid floor-polish products recommended by floor tile manufacturer.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Refer to Section 096113 – Floor Preparation for LVT .
- C. Refer to Section 096116 – Floor Preparation for VCT.
- D. Concrete Substrates: Prepare according to ASTM F 710 and the following.
  - 1. Verify that substrates are dry and free of curing compounds, sealers and hardeners and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by flooring manufacturer.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving resilient flooring.
  - 4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits are free of cracks, ridges, depressions, scale, and foreign deposits.
  - 5. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.



6. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation area. Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations.
    - a. Anhydrous Calcium Chloride Test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
    - c. Perform additional moisture tests recommended in writing by adhesive, carpet cushion and carpet manufacturers. Proceed with installation only after substrates pass testing.
  7. Surface tolerance: Maximum variation from plane of 1/8 inch in 10 feet.
  8. Surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- E. Wood substrates:
1. Follow manufacturer's recommendations for relative humidity requirements.
  2. Floors must be dry, clean and smooth.
  3. Wood sub-floors and underlayment panels must be acclimated to within 3% and have an equilibrium moisture content of 14% or less.
  4. Wood floors must be double construction with minimum thickness of 1-inch. The top layer of wood shall be 1/4"-inch APA underlayment grade plywood or other wood underlayment panel approved and warranted by resilient flooring manufacturer beneath specified resilient flooring.
  5. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- F. Gypcrete substrates:
1. Follow manufacturer's recommendations for relative humidity requirements.
  2. Floors must be dry, clean and smooth.
  3. Reference ASTM F2419 for National Standards for flooring installation procedures and recommendations over gypsum underlayment.
  4. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated

to receive resilient tile installation.

- B. Prepare substrates according to flooring manufacturer's written instructions to ensure adhesion of resilient products.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- D. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by flooring manufacturer.
- E. Do not install flooring until it is the same temperature as the space where it is to be installed.
  - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- F. Concrete Slabs:
  - 1. Grind high spots and fill low spots to produce a maximum 3/16-inch deviation in any direction when checked with a 10-foot straight edge.
  - 2. Existing concrete slabs to be properly prepped to meet manufacturer's minimum requirements to receive flooring. This includes, but is not limited to, moisture mitigation, leveling, diamond grinding, shot blasting or scarifying.
- G. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

### 3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  - 1. Lay tiles square with room axis in pattern indicated in drawings.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  - 1. Lay tiles square in pattern of colors indicated in drawings.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

- G. Install floor tiles on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Install flooring continuous to extend under any and all equipment.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove soil, adhesive and other blemishes from flooring surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
  - 4. Apply maximum quantity coats of protective, liquid floor-polish products recommended by floor tile manufacturer.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Substantial Completion.

### END OF SECTION

**SECTION 096723  
RESINOUS FLOORING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Resinous flooring systems.

**1.3 ACTION SUBMITTALS**

- A. Product Data:
  - 1. For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
  - 2. Flamespread data for each product specified.
- B. Samples for Initial Selection: For each type of exposed finish required.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous flooring component, from manufacturer.
- C. Material Test Reports: For each resinous flooring system.

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.

**1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.
  - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Pre-installation Conference: Conduct conference at Project site.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide Durex Coverings, Inc; Mosaix Floor with DX-420 Chemical Resistant Urethane Top Coat.

#### 2.2 MATERIALS

- A. VOC Content of Resinous Flooring: Provide resinous flooring systems, for use inside the weatherproofing system, that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

- 1. Resinous Flooring: 100 g/L.

#### 2.3 RESINOUS FLOORING

- A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, decorative-aggregate-filled, epoxy-resin-based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.
- B. System Characteristics:

1. Color and Pattern: As selected by Architect from manufacturer's full range.
2. Wearing Surface: Textured for slip resistance.
3. Overall System Thickness: 1/8 inch (3.2 mm).

C. Body Coats:

1. Resin: Epoxy.
2. Formulation Description: 100 percent solids.
3. Application Method: Self-leveling slurry with broadcast aggregates.
  - a. Thickness of Coats: 1/8 inch (3.2 mm).
  - b. Number of Coats: Two.
4. Aggregates: Colored quartz (ceramic-coated silica).

D. Topcoat: Sealing or finish coats.

1. Resin: Chemical Resistant Urethane.
2. Formulation Description: High solids.
3. Type: Clear.
4. Finish: Gloss
5. Number of Coats: One

## 2.4 ACCESSORIES

- A. Primer: Type recommended by manufacturer for substrate and body coats indicated.
- B. Waterproofing Membrane: Type recommended by manufacturer for substrate and primer and body coats indicated.
- C. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- D. Metal Cap for Integral Cove Base: Square metal cap approved by flooring manufacturer.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  1. Roughen concrete substrates as follows:
    - a. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
  2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's

written instructions.

3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) of slab area in 24 hours.
    - b. Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
    - c. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
  4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

### 3.2 APPLICATION

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
1. Integral Cove Base: 4 inches (100 mm) high.
- D. Apply self-leveling slurry body coats in thickness indicated for flooring system.
1. Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- E. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

### 3.3 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

**END OF SECTION**



**SECTION 096813  
TILE CARPETING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SECTION INCLUDES**

- A. Modular tufted carpet tile.

**1.3 ACTION SUBMITTALS**

- A. Submit under provisions of Section 013300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Include installation recommendations for each type of substrate.
  - 3. Include flamespread data for each product specified.
- C. Shop Drawings: Show locations of each type of carpet tile, color, tile installation and tile pattern. Show type, color and location of insets and borders. Transition details to other flooring. Show method of installation and recommended adhesive.
- D. Samples:
  - 1. Carpet Tile: Full-size Sample.
  - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
- B. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
- C. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

**1.6 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

#### 1.9 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

#### 1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
- B. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
- C. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber and delamination.
- D. Warranty Period: 10 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURERS

- A. Manufacturer, carpet type, pattern, color, backing and characteristics:
  1. See Interior Design finish schedule.
- B. Requests for substitutions will be considered in accordance with provisions of Section 016000.

#### 2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based

formulation provided or recommended by carpet tile manufacturer

- B. Adhesives: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
  - 1. Adhesives should be carpet tile manufacturer's adhesive spec for highest moisture limit.
  - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Refer to Section 096119 Floor Preparation for Carpet.
- C. Concrete Substrates: Prepare according to ASTM F 710 and the following.
  - 1. Verify that slab substrates are dry and free of curing compounds, sealers, hardeners and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by flooring manufacturer.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
  - 4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
  - 5. Alkalinity and Adhesion Testing: Perform tests after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 6. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation area. Provide written documentation of all test results to architect prior to proceeding with flooring installation. Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations.
    - a. Anhydrous Calcium Chloride Test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

- c. Perform additional moisture tests recommended in writing by adhesive and carpet manufacturers. Proceed with installation only after substrates pass testing.
- 7. Surface tolerance: Maximum variation from plane of 1/8-inch in 10-feet.
- 8. Surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- D. Wood substrates:
  - 1. Follow manufacturer's recommendations for relative humidity requirements.
  - 2. Floors must be dry, clean and smooth.
  - 3. Wood sub-floors and underlayment panels must be acclimated to within 3% and have an equilibrium moisture content of 14% or less.
  - 4. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- E. Gypcrete substrates:
  - 1. Follow manufacturer's recommendations for relative humidity requirements.
  - 2. Floors must be dry, clean and smooth.
  - 3. Reference ASTM F2419 for National Standards for flooring installation procedures and recommendations over gypsum underlayment.
  - 4. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Prepare substrates according to flooring manufacturer's written instructions to ensure adhesion of flooring products.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- D. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- E. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- F. Concrete Slabs:

1. Grind high spots and fill low spots to produce a maximum 3/16-inch deviation in any direction when checked with a 10-foot straight edge.
  2. Existing concrete slabs to be properly prepped to meet manufacturer's minimum requirements to receive flooring. This includes, but is not limited to, moisture mitigation, leveling, diamond grinding, shot blasting or scarifying.
- G. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

### 3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- G. Install tile parallel to walls and borders.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  2. Remove yarns that protrude from carpet tile surface.
  3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

### END OF SECTION

**SECTION 096816  
SHEET CARPETING**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Broadloom carpet

**1.2 SUBMITTALS**

- A. Product Data: For the following, including installation recommendations for each type of substrate:
  - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Include flamespread data for each product specified.
- C. Shop Drawings: Show locations of each type of carpet, color, installation, pile direction and seam locations, types and methods. Show type, color and location of insets and borders. Transition details to other flooring. Show method of installation and recommended adhesive.
- D. Samples:
  - 1. Carpet Sheet: 12" square Sample.
  - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.
  - 3. Carpet seam: 6" square Sample.
  - 4. Carpet seam seal: 6" square Sample.

**1.3 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with CRI 104.

**1.5 PROJECT CONDITIONS**

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.

**1.6 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Running Line Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 5 sq. yd.

## 1.7 WARRANTY

- 1. Warranty Period: Manufacturer's standard material guarantee, plus one (1) year minimum against faulty installation practice.
  - 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber and delamination.

## PART 2 - PRODUCTS

### 2.1 BROADLOOM CARPET

- A. Manufacturer, carpet type, pattern, color, backing and characteristics:
  - 1. Refer to Interior Design Finish Schedule.

### 2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer
- B. Adhesives: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended by carpet and carpet cushion manufacturers.
  - 1. Adhesive should be manufacturer's adhesive spec for highest moisture limit.
  - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with the Carpet and Rug Institute's CRI 104.
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- E. Carpet Seam Seal: All seams to be sealed with a premium grade seam sealant.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.

- B. Refer to 096119 Floor Preparation for Carpet.
- C. Concrete Substrates: Prepare according to ASTM F 710 and the following.
  - 1. Verify that slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by flooring manufacturer.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet.
  - 4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
  - 5. Alkalinity and Adhesion Testing: Perform tests after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 6. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas. Provide written documentation of all test results to architect prior to proceeding with flooring installation. Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations.
    - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 78 percent relative humidity level measurement.
    - c. Perform additional moisture tests recommended in writing by adhesive and carpet manufacturers. Proceed with installation only after substrates pass testing.
  - 7. Surface tolerance: Maximum variation from plane of 1/8-inch in 10-feet.
  - 8. Surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- D. Wood substrates:
  - 1. Follow manufacturer's recommendations for relative humidity requirements.
  - 2. Floors must be dry, clean and smooth.
  - 3. Wood sub-floors and underlayment panels must be acclimated to within 3% and have an equilibrium moisture content of 14% or less.
  - 4. Surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.



- E. Gypcrete substrates:
  - 1. Follow manufacturer's recommendations for relative humidity requirements.
  - 2. Floors must be dry, clean and smooth.
  - 3. Reference ASTM F2419 for National Standards for flooring installation procedures and recommendations over gypsum underlayment.
  - 4. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.
- B. Prepare substrates according to flooring manufacturer's written instructions to ensure adhesion of flooring products.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- D. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet and carpet cushion manufacturer.
- E. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- F. Concrete Slabs:
  - 1. Grind high spots and fill low spots to produce a maximum 3/16-inch deviation in any direction when checked with a 10-foot straight edge.
  - 2. Existing concrete slabs to be properly prepped to meet manufacturer's minimum requirements to receive flooring. This includes, but is not limited to, moisture mitigation, leveling, diamond grinding, shot blasting or scarifying.
- G. Broom and vacuum clean substrates to be covered immediately before installing carpet.

### 3.3 INSTALLATION

- A. General: Comply with CRI 104 and with carpet and carpet cushion manufacturer's written installation instructions.
  - 1. Direct-glue-down installation.
  - 2. Carpet with attached-cushion installation.
  - 3. Stretch-in installation.
  - 4. Stair installation.

- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- D. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves and similar openings.
- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- F. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

**END OF SECTION**

**SECTION 097200  
WALL COVERING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Vinyl wall covering.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.
  - 2. Include flamespread data for each product specified.
- B. Shop Drawings: Show location and extent of each wall covering type. Indicate seams and termination points.
- C. Samples for Verification: For each type of wall covering and for each color, pattern, texture, and finish specified, two (2) samples, 12"x12" in size.
  - 1. Wall covering Sample: From same production run to be used for the Work, with specified treatments applied.
- D. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For wall coverings to include in maintenance manuals.

## 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Wall covering Materials: For each type, color, texture, and finish, full width by length to equal to 5 percent of amount installed.

## 1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for installation.
  - 1. Build mockups for each type of wall covering on each substrate required. Comply with requirements in ASTM F 1141 for appearance shading characteristics.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Wall covering must be installed only under permanent lighting conditions
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall covering manufacturer for full drying or curing.

# PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Low-Emitting Materials: Wall covering system shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- a. Flame-Spread Index: 75 or less.
2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265.

## 2.2 VINYL WALL COVERING

- A. Manufacturers:
  1. See Interior Design finish schedule
- B. Description: Provide products in rolls from same production run and complying with the following:
  1. CFFA-W-101-D for Type II, Medium -Duty products.
  2. ASTM F 793 for strippable wall coverings.
    - a. Category: II, Decorative with Medium Serviceability.
- C. Width: 54 inches (1372 mm).
- D. Colors, Textures, and Patterns: Refer to Interior Design finish schedule.

## 2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, non-staining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall covering manufacturer.
  1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 099123 "Interior Painting" and recommended in writing by primer/sealer and wall covering manufacturers for intended substrate.
  1. Sherwin Williams: SW Multi-Purpose Primer
- C. Metal Primer: Interior ferrous metal primer complying with Section 099123 "Interior Painting" and recommended in writing by primer and wall covering manufacturers for intended substrate.
- D. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended in writing by wall covering manufacturer.
  1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Seam Tape: As recommended in writing by wall covering manufacturer.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
  - 1. Any and all walls to receive wall cover to be prepared to a Level 5 finish.
  - 2. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
  - 3. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall covering manufacturer.
  - 4. Metals: If not factory primed, clean and apply primer recommended in writing by primer/sealer manufacturer and wall covering manufacturer.
  - 5. Gypsum Board: Prime with primer as noted.
  - 6. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper and repair irregularities.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Remove any and all existing wall covering completely prior to installing new wall covering. After wall covering is removed, remove remaining adhesive with a good quality adhesive remover, then rinse the wall and allow to dry.
- G. Acclimatize wall covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

#### **3.3 WALL LINER INSTALLATION**

- A. Install wall liner, without gaps or overlaps. Form smooth wrinkle-free surface for finished installation. Do not begin wall covering installation until wall liner has dried.

### 3.4 WALL COVERING INSTALLATION

- A. Comply with wall covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut and install wall covering strips in roll number sequence consecutively. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
  - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Match pattern 72 inches above the finish floor.
- F. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- I. Temperature in the area to receive vinyl wall covering must be maintained between 60-80 degrees F and relative humidity at 50% or less, for at least six days prior to and after installation.
- J. When hanging non-matched textured patterns, reverse hang alternate strips. After 3 strips are hung, carefully inspect the wall covering. If the pattern effect is not acceptable, re-hang strip #2 without reversing. Approval from the architect/designer should be obtained at this point prior to proceeding.

### 3.5 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

**END OF SECTION**

**SECTION 097720  
FABRIC WRAPPED HOMASOTE**

**PART 1 - GENERAL**

**1.1 RELATED SECTIONS**

- A. Section 061000 – Rough Carpentry: Installation and requirements for wood substrates and structure.
- B. Section 092600 – Gypsum Board: Installation and requirements for wall assemblies.

**1.2 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C 209 - Test Methods for Cellulosic Fiber Insulating Board.
  - 2. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 3. ASTM D 1037 - Test Methods of Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
  - 4. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.
  - 5. UL listed, File R16381.
  - 6. ICC-ES Report ESR-1374.
- B. AATCC 16 – Colorfastness to light; American Association of Textile Chemists and Colorists.
- C. NFPA 701 – Standard Methods of Fire Tests for Flame Resistant Textiles and Films.
- D. UL Test No. 214 – Standard Tests for Flame Propagation of Fabrics and Films.

**1.3 SUBMITTALS**

- A. Submit under provisions of Section 013300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Samples: Two each of manufacturer's full range of fabric colors applied to substrate material; 7 by 7 inches.
- D. Closeout Submittals: Maintenance and Cleaning instructions.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Minimum 10 years experience in producing sound-deadening boards.

**1.5 DELIVERY, STORAGE, AND HANDLING**



- A. Store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Inspect the materials upon delivery to assure that specified products have been received. Report damaged material immediately to the delivering carrier and note such damage on the carrier's freight bill of lading.
- C. Store materials in a dry place, indoors, on raised platform protected from weather damage.

## 1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Acclimatize panels to existing moisture conditions and for not less than 24 hours before installation. Comply with manufacturer's recommendations for acclimatization.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Homasote Company; 932 Lower Ferry Road, West Trenton, NJ 08628. Tel: (800) 257-9491. Tel: (609) 883-3300. Fax: (609) 883-3497. Email: sales@homasote.com. Website: www.homasote.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.
- C. Substitutions: Not permitted.
- D. Provide all fabric-covered wall panels from a single manufacturer.

### 2.2 MATERIALS

- A. Homasote DesignWall440 Panel: Class C fire-rated Homasote 440 substrate; a molded, recycled post-consumer paper, cellulose fiber structural panel. Physical properties of substrate are as follows:
  - 1. Thickness: 1/2 inch, 4' x 8', 4' x 10'.
  - 2. Density: 26-28 pcf tested in accordance with ASTM C 209.
  - 3. Tensile Strength: When tested in accordance with ASTM C 209:
    - a. Parallel: 450-700 psi.
    - b. Transverse: 750-1000 psi.
  - 4. Hardness (Janka Ball): 230 lbs tested in accordance with ASTM D 1037.
  - 5. Water Absorption by Volume: When tested in accordance with ASTM C 209:
    - a. 2 hour immersion: 7 percent maximum.
  - 6. Expansion: 50 to 90 percent relative humidity, 0.25 percent in accordance with ASTM C 209.
  - 7. Thermal Resistance: When tested in accordance with ASTM C 209 per ASTM C 518:
    - a. R-value: 1.2 for 1/2 inch thick board.
  - 8. Noise reduction coefficient (NRC): 0.20
  - 9. Flame Spread: 76 to 200 tested in accordance with ASTM E 84, Class III or C.
  - 10. All sides to be primed prior to fabric being applied to homasote.

- B. Fabric: See Interior Design Finish Schedule
- C. Edge detail: Fabric wrapped along all edges and returned on to back of panel. Fabric adhered to all sides of the substrate.
  - 1. Provide metal edge trim as indicated on drawings.

## 2.3 ACCESSORIES

- A. Metal Frame Clips: Manufacturer's standard clip for securing panels to framing.
- B. Adhesive: APA approved panel adhesive.
- C. Adhesive: APA AFG-01 specification adhesive.
- D. Wall Panel Fasteners:
  - 1. Nails: Color coordinated or decorative for paneling. Length required penetrating wood framing 3/4 inch minimum.
  - 2. Screws:
    - a. General: 20 gauge or heavier, self-tapping drywall type steel screw.
    - b. Wood Framing: Coarse thread drywall type wood screw, length as required to penetrate framing 3/4 inch minimum.
    - c. Metal Framing: 22-25 gauge, drywall type steel screw.
    - d. Decorative exposed fasteners determined by architect/specifier.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates upon which work will be installed.
- B. Verify framing member spacing complies with manufacturer's requirements depending on substrates and installation methods.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Verify what environmental conditions are and will continue to be maintained in accordance with manufacturer's recommendations.
- E. Starting work by installer is acceptance of substrate and environmental conditions.

### 3.2 PREPARATION

- A. Follow manufacturer's instructions by separating and allowing panels to be exposed to environmental temperature and humidity conditions for not less than 24 hours before start of installation.
- B. Temporarily position DesignWall440 panels in place and request architects' approval, to ensure that desired appearance is obtained.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Install only clean dry panels. Do not install wet panels.
- C. Refer to manufacturer's installation instructions for proper procedures regarding the cutting and painting of the panel.
- D. Wall Panel Installation: Space panel joints 1/8 inch apart; 1/4 inch space at floors, ceilings, and window and door frames. Install gypsum wallboard or other wall finish panels first so that finish panel joints are staggered and do not coincide with DesignWall440 joints. Install in accordance with finish panel manufacturer's installation recommendations.

### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

### 3.5 CLEANING

- A. Comply with manufacturer's recommendations for panel cleaning procedures.
- B. Comply with manufacturer's recommendations for repairing damaged panels.
- C. Replace panels that cannot be repaired.

**END OF SECTION**

**SECTION 099123  
PAINTING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Wood.
  - 2. Gypsum board.
  - 3. Metal.
  - 4. Concrete Masonry Units, (CMUs)

**1.3 DEFINITIONS**

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
  - 2. Indicate VOC content.

- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8 inches square.
  - 2. Apply coats on Samples in steps to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: Furnish 5 percent, but not less than 1 gal. of each material, color, type and surface texture applied in the field.
  - 2. Label each original container(s) properly with color, sheen, texture, room locations, in addition to the manufacturer's label.
  - 3. All product to be from the same production run (batch mix) as material applied in the field.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

#### 1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Sherwin-Williams Company (The).

- B. Products: Subject to compliance with requirements, provide product listed in the Interior Painting Schedule for the paint category indicated.

## 2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: Refer to Interior Design finish schedule.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Fiber-Cement Board: 12 percent.
  - 2. Wood: 15 percent.
  - 3. Gypsum Board: 12 percent.
  - 4. Masonry (CMUs): 12 percent
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth, including areas that have been patched and repaired.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove loose and peeling paint, release agents, curing compounds, efflorescence, and chalk. Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F. The pH of surface should be between 6 and 9, unless the products to be used are designed to be used in high pH environments such as Loxon. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a patching compound such as ConSeal.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Drywall Substrates: Surface must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds.
- G. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
  1. SSPC-SP 2.
  2. SSPC-SP 3.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
  1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  2. Sand surfaces that will be exposed to view, and dust off.
  3. Prime edges, ends, faces, undersides, and backsides of wood.
  4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- L. All surfaces, new and existing, to be repaired, sanded, prepared and void of any and all imperfections properly to receive new finish.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed in equipment rooms:
    - a. Equipment, including panel boards and switch gear.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory-applied final finishes.
    - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  - 2. Paint the following work where exposed in occupied spaces. If there are any questions or conflicts, coordinate with architect.
    - a. Equipment, including panel boards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Other items as directed by Architect.



3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  1. Contractor shall touch up and restore painted surfaces damaged by testing.
  2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 INTERIOR PAINTING SCHEDULE

- A. Gypsum – ceilings and soffits- flat finish:
  1. Primer – ProMar ceiling paint primer
  2. 2 finish coats – ProMar ceiling paint flat
- B. Gypsum – walls and soffits - eggshell finish:
  1. Primer – ProMar 200 zero VOC primer
  2. 2 finish coats – ProMar 200 zero VOC eggshell
- C. Gypsum, below handrail and/or chair rail in Corridors and circulation – lo sheen:
  1. Primer – ProMar 200 zero VOC latex primer
  2. 2 finish coats – Scuff Tuff Interior Waterbased Enamel, lo sheen
- D. Gypsum – Air Purifying Paint (Toilet Rooms, Servery) - satin finish:
  1. Primer – ProMar 200 zero VOC latex primer
  2. 2 finish coats – SuperPaint Air Purifying Latex paint, satin (no substitutions)
- E. Gypsum – Sanitizing Paint (Clean & Soiled Utility) - satin finish:
  1. Primer – ProMar 200 zero VOC latex primer
  2. 2 finish coats – SuperPaint Sanitiing Latex paint, satin (no substitutions)

- F. Gypsum – semi-gloss finish – toilet room and bathroom walls and ceiling/soffits:
  - 1. Primer – ProMar 200 zero VOC primer
  - 2. 2 Finish Coats – ProMar 200 zero VOC semi-gloss
- G. Gypsum – Commercial kitchen ceilings – semi-gloss finish:
  - 1. Primer: ProMar 200 zero VOC primer
  - 2. 2 Finish Coats: ProIndustrial Pre-Catalyzed water-based Epoxy, semi-gloss
- H. Gypsum – walls to receive wall covering
  - 1. Primer – SW MultiPurpose Primer
- I. Wood painted – semi-gloss finish
  - 1. Primer – ProMar 200 zero VOC primer
  - 2. 2 finish coats – Solo Interior/Exterior Acrylic, semi-gloss
- J. Ferrous metal and non-ferrous metal – doors, frames and miscellaneous metals – semi-gloss
  - 1. Primer- ProIndustrial Pro-Cryl Universal Primer
  - 2. Finish Coats – ProIndustrial WaterBased Alkyd Urethane enamel, semi-gloss
- K. CMU – walls, existing – eggshell finish:
  - 1. Filler – Ex Bond Primer
  - 2. 2 Finish coats – ProIndustrial Waterbased Epoxy, eggshel
- L. Insulated Coverings – flat finish:
  - 1. Primer – ProMar 200 zero VOC Primer
  - 2. 2 Finish coats – ProMar 200 zero VOC, flat

**END OF SECTION**

**SECTION 099323**  
**INTERIOR STAINING AND TRANSPARENT FINISHING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes surface preparation and application of wood finishes.
  - 1. Interior Substrates:
    - a. Dressed lumber (finish carpentry).
- B. Related Requirements:
  - 1. Section 099123 "Interior Painting" for stains and transparent finishes on concrete floors.

**1.3 DEFINITIONS**

- A. Gloss Level 1: Not more than 5 units at 60° F and 10 units at 85° F, according to ASTM D 523.
- B. Gloss Level 4: 20 to 35 units at 60° F and not less than 35 units at 85° F, according to ASTM D 523.
- C. Gloss Level 5: 35 to 70 units at 60° F, according to ASTM D 523.
- D. Gloss Level 6: 70 to 85 units at 60° F, according to ASTM D 523.
- E. Gloss Level 7: More than 85 units at 60° F, according to ASTM D 523.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.
  - 1. Submit Samples on representative samples of actual wood substrates, 8 inches (200 mm) square
  - 2. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:

1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.
3. VOC content.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Stains and Transparent Finishes: 5 percent, but not less than 1 gallon of each material and color applied, properly labeled in original container(s).

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45° F.
  1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

#### 1.7 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95° F.
- B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5° F above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior finishes in snow, rain, fog, or mist.

### **PART 2 - PRODUCTS**

#### 2.1 MATERIALS, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
  1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction

- D. Low-Emitting Materials: Interior stains and finishes shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Stain Colors: See Interior Design finish schedule.

## 2.2 WOOD FILLERS

- A. Wood Filler Paste: MPI #91

## 2.3 PRIMERS AND SEALERS

- A. Alkyd, Sanding Sealer, Clear: MPI #102.

## 2.4 STAINS

- A. Stain, Semi-Transparent, for Interior Wood: MPI #90.

## 2.5 POLYURETHANE VARNISHES

- A. Varnish, Polyurethane, Moisture-Cured, Gloss (Gloss Level 6): MPI #31

## 2.6 SOURCE QUALITY CONTROL

- A. Testing of Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner will engage the services of a qualified testing agency to sample wood finishing materials. Contractor will be notified in advance and may be present when samples are taken. If materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying wood finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces before refinishing with complying materials if the two finishes are incompatible or produce results that, in the opinion of the Architect, are aesthetically unacceptable.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

- B. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- C. Maximum Moisture Content of Interior Wood Substrates: 9 percent, when measured with an electronic moisture meter.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with finish application only after unsatisfactory conditions have been corrected.
  - 1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
  - 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
  - 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
  - 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
- D. Interior Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
  - 3. Sand surfaces that will be exposed to view and dust off.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### 3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
  - 1. Use applicators and techniques suited for finish and substrate indicated.
  - 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.

3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

### 3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

### 3.5 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

- A. Wood substrates, non-traffic surfaces, including wood trim, architectural woodwork, doors
  1. Stain: MinWax Performance Series Wood Stain 250 VOC
  2. 2 Finish Coats: MinWax Fast Drying Polyurethane, satin finish

### END OF SECTION

## **SECTION 101900 CUBICLE CURTAINS**

### **PART 1 – GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.02 SUMMARY**

- A. This section includes the following:

- 1. Cubicle curtains
- 2. Curtain track
- 3. Curtain accessories

#### **1.03 PERFORMANCE REQUIREMENTS**

- A. Curtains: Provide curtain fabrics with the following characteristics:
  - 1. Fabrics are launderable to a temperature of not less than 160 deg F (71 deg C).
  - 2. Fabrics are flame resistant and are identical to those that have passed NFPA 701 when tested by a testing and inspecting agency acceptable to authorities having jurisdiction (AHJ).

#### **1.04.1 SUBMITTALS**

- A. Product Data:
  - a. Submit copies of manufacturer's detailed technical data for materials, fabrication, and physical appearance for curtain, track and accessories.
  - b. Submit flamespread data for each product specified.
- B. Shop Drawings: Show layout of track and types of cubicle curtains, sizes of curtains and number of carriers, splices and end caps.
- C. Samples for Verification: Provide samples of the following:
  - 1. Curtain Fabric: 12-inch square swatch or larger sample as required to show complete pattern repeat, from dye lot used for the work, with specified treatments applied.
  - 2. Mesh Top: Not less than 4 inches square, demonstrating manufacture's standard hemming around mesh perimeter with matching fabric.
- D. Cubicle Schedule: Use same room designations as indicated on drawings
- E. Maintenance Data: Provide fabric manufacturer's standard maintenance procedure documentation.

#### **1.04.2 PROJECT CONDITIONS**



- A. Environmental Limitations: Do not install cubicle track and curtains until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where cubicle track and curtains are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

#### 1.05 WARRANTY

- A. Provide copy of manufacturer's standard warranty.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Subject to compliance with the requirements listed, provide cubicle curtains from the following manufacturer:
  - 1. See Interior Design finish schedule.

#### 2.02 MATERIALS

- A. Cubicle Curtain:
  - 1. Fabric: Provide curtains with fabric that is to be opaque, washable, flame retardant and closely woven.
  - 2. Pattern & Color: See Interior Design finish schedule.
  - 3. Antimicrobial Treatment: Standard antimicrobial treatment applied to the selected cubicle curtain fabric.

#### 2.04 FABRICATION

- A. Cubicle Curtain:
  - 1. Type of Curtain:
    - a. See Interior Design finish schedule.
  - 2. Width: Equal to track length from which curtain is hung plus 10 percent, but not less than 12-inches.
  - 3. Length: Equal to floor-to-ceiling height minus 2 inches from finished ceiling at top and 12-inches minimum clear above finished floor.
  - 4. Mesh Top: Manufacturer's standard 1/2-inch holed mesh top, framed around perimeter with matching fabric as specified. Mesh height to be 21-inches.

5. Top Hem: Not less than 1-inch and not more than 1 ½-inch wide, triple thickness, reinforced with integral web and double stitched.
  - a. Grommets: 2 piece, rolled-edge, rustproof, nickel-plated brass and spaced not more than 6-inches o.c.
6. Bottom and Side Hems: Not less than 1-inch wide, reinforced, triple thickness and single stitched.
7. Seams: Not less than ½-inch wide, double turned and double stitched.
- B. Curtain Tieback: At each termination. Tieback to match curtain fabric, 1-inch wide, double stitched.
- C. Curtain Track: See Interior Design finish schedule.
- D. Accessories: Provide all carriers, hooks, splices, end caps and end gates as needed. Provide spacers at tegular ceiling tile conditions to ensure track sits flush with face of ceiling tile.

### **PART 3 – EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine areas and conditions in which the cubicle track system will be installed
  1. Complete all finishing operations, including painting, before beginning installation of cubicle tracking system materials.
  1. Verify that surfaces and above ceiling supports are ready to receive work.

#### **3.02 INSTALLATION**

- A. General: Locate the cubicle track as indicated on the approved detail drawing for the appropriate substrate
- B. Installation of Cubicle Curtain Track System:
  1. Install cubicle track, secure, rigid, and true to ceiling line.
  2. Slide carriers onto the track.
  3. Install end cap or stop device.
  4. Secure or suspend track to ceiling system. Install with mechanical fasteners or T-Grid clips.
  5. Install curtains on carriers ensuring smooth operation.

#### **3.04 CLEANING**

- A. At completion of the installation, remove any debris and clean surfaces in accordance with manufacturer's cleaning and maintenance instructions.

**END OF SECTION**

## **SECTION 102600 WALL AND DOOR PROTECTION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Abuse-resistant corner guards.
  - 2. Abuse-resistant end-wall guards.
  - 3. Abuse-resistant wall coverings.
  - 4. Flexible wall protection wall coverings.
  - 5. Door protection

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
  - 2. Include fire ratings of units recessed in fire-rated walls.
- B. Shop Drawings: For each type of wall and door protection showing locations and extent.
  - 1. Include plans, elevations, sections and attachment details with appropriate adhesives for specific project substrates.
- C. Samples for Initial Selection: For each type of impact-resistant wall/door-protection unit indicated, in each color and texture specified.
  - 1. Include Samples of accent strips and accessories to verify color selection.
- D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
  - 1. Corner and End-Wall Guards: 6 inches long. Include examples of top caps.
  - 2. Abuse-Resistant Wall Covering: 6 by 6 inches square.
  - 3. Flexible Wall Protection Wall Covering: 8 by 10 inches rectangle.
  - 4. Door Protection: 6 inches long
  - 5. Caulk: 2 inch long samples of all color options.
  - 6. Include Samples of trim pieces and accessories to verify color selection.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of corner guard and abuse-resistant wall covering.
- B. Material Certificates: For each type of exposed plastic material.
- C. Flamespread Data: For each type of corner guard and abuse-resistant wall covering.
- D. Sample Warranty: For special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.
  - 1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Wall-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, 96-inch-long units.
  - 2. Corner and End-Wall Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than 2, 48-inch long units.
  - 3. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
  - 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
  - 2. Keep plastic materials out of direct sunlight.
  - 3. Store plastic wall/door-protection components in original packaging for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg. F.
    - a. Store corner-guard covers in a vertical position.
    - b. Store wall-guard covers in a horizontal position.
    - c. Store door protection in a flat, horizontal position.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
    - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
  - 2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall-protection products of each type from single source from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 26-75.
  - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.

### 2.3 CORNER GUARDS

- A. Surface-Mounted, Plastic-Cover Corner Guards: Manufacturer's standard assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90-degree or 135-degree turn to match wall condition.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Construction Specialties, Inc.
    - b. InPro Corporation (IPC).
  - 2. Cover: Extruded rigid plastic, minimum 0.078-inch wall thickness; profile, height, color and texture as indicated on *INTERIOR DESIGN FINISH SCHEDULE*.
  - 3. Continuous Retainer: Minimum 0.060-inch-thick, one-piece, extruded aluminum.
  - 4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
  - 5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

- B. Surface-Mounted, Metal Corner Guards: Fabricated as one piece from formed or extruded metal with formed edges; with 90 or 135-degree turn, to match wall condition.
  - 1. Material: Stainless-steel sheet, 16-gauge, Type 304
    - a. Thickness: Minimum 0.625 inch
    - b. Finish: Directional satin, No. 4
  - 2. Wing Size: Nominal 3-1/2-inch by 3-1/2-inch
  - 3. Corner Radius: 3/16-inch
  - 4. Mounting: Adhesive

## 2.4 END-WALL GUARDS

- A. Surface-Mounted, Plastic-Cover End-Wall Guards: Manufacturer's standard assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Construction Specialties, Inc.
    - b. InPro Corporation (IPC).
  - 2. Cover: Extruded rigid plastic, minimum 0.078-inch wall thickness; profile, height, color and texture as indicated on Interior Design finish schedule.
  - 3. Continuous Retainer: Minimum 0.060-inch-thick, one-piece, extruded aluminum.
  - 4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
  - 5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

## 2.5 ABUSE-RESISTANT WALL COVERINGS

- A. Abuse-Resistant Sheet Wall Covering: Fabricated from rigid, plastic sheet wall-covering material.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Construction Specialties, Inc.
    - b. InPro Corporation (IPC).
  - 2. Size: 48 by 96 inches for sheet.
  - 3. Sheet Thickness: 0.040 inch.
  - 4. Color and Texture: SEE INTERIOR DESIGN FINISH SCHEDULE.
  - 5. Height: As indicated.
  - 6. Trim and Joint Moldings: Extruded rigid plastic that matches wall-covering color.
  - 7. Mounting: Adhesive.
- B. Abuse-Resistant Sheet Wall Covering: Fabricated from type 304 stainless steel alloy, 16-gauge.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Construction Specialties, Inc.

b. InPro Corporation (IPC).

2. Size: 48 by 96 inches for sheet.
3. Finish: #4 satin.
4. Texture: See Interior Design finish schedule.
5. Height: As indicated.
6. Accessories: Mechanical fasteners.
7. Mounting: Adhesive.

## 2.6 FLEXIBLE WALL PROTECTION WALL COVERINGS

### A. Abuse-Resistant Sheet Wall Covering

1. Manufacturers:
  - a. See Interior Design finish schedule.
2. Size: 48-inches
3. Thickness: varies 0.032" – 0.040"
4. Color, Texture and Pattern: See Interior Design finish schedule.

## 2.7 DOOR PROTECTION

### A. Abuse-Resistant Door Covering: Fabricated from rigid, plastic sheet wall-covering material.

1. Manufacturers:
  - a. See Interior Design Finish Schedule
2. Thickness: varies 0.040" – 0.060"
3. Color, Texture and Pattern: See Interior Design finish schedule.

## 2.8 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

## 2.9 ACCESSORIES

- A. Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
  1. Provide anchoring devices and suitable locations to withstand imposed loads.
  2. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches apart.
  3. Adjust end and top caps as required to ensure tight seams.
  4. Provide manufacturer recommended appropriate adhesive per product type that will properly adhere to substrate.
  5. For flexible wall protection wall covering, provide manufacturer recommended primer.

## 2.10 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances, fire rating, and other conditions affecting performance of the Work.
- B. Examine walls to which wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
  - 1. For wall protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dirt, dust, debris, and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- C. Remove mold, mildew, oil, grease, stains and marks.
- D. Repair wall irregularities.
- E. Ensure existing paint or primer has good adhesion to walls.
- F. NEVER apply primer over oil-based paint/primer.
- G. Remove existing wall coverings, including remaining adhesive.

### 3.3 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install corner guards and wall protection in locations and at mounting heights indicated on Drawings.



- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
  - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
  - 2. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches apart.
  - 3. Adjust end and top caps as required to ensure tight seams.
- D. Abuse-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation and as per the manufacturer's recommendation.
- E. Beadboard Rigid Vinyl Sheet: Install edge moldings, corners and divider bars as required for a complete installation and as per the manufacturer's recommendation.
- F. Flexible Wall Covering: Install wall covering as per the manufacturer's recommendation.
- G. Door Protection: Install rigid sheet door protection as per the manufacturer's recommendation
  - 1. At Fire-Rated doors: Install in accordance with applicable NFPA 80 and to UL requirements.
- H. Custom Door Frame Guards: Install door frame guard level and plumb in height indicated in drawings.
  - 1. Adhere to substrate with manufacturer's recommended nonflammable, high strength, low VOC adhesive. Smooth roll surface.

### 3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

### 3.5 PROTECTION

- A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

## END OF SECTION

## SECTION 102800

### TOILET AND BATH ACCESSORIES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

###### A. Toilet Accessories:

1. Toilet Paper Dispenser
2. Towel Bar
3. Mirror
4. Medicine Cabinet
5. Cabinet for Medicine
6. Hook
7. Shower Seat
8. Grab Bar
9. Pipe Insulation
10. Soap Dispenser
11. Paper towel Dispenser
12. Waste Receptacle
13. Toilet Seat Cover Dispenser
14. Sanitary Napkin Disposal
15. Rubber Glove Dispenser
16. Shower Shelf

##### 1.2 RELATED SECTIONS

- A. Section 092116 - Gypsum Board Assemblies.
- B. Section 093113 – Tiling at Interior Walls.

##### 1.3 REFERENCES

- A. Americans with Disabilities Act Accessibility Guidelines.
- B. American National Standards Institute (ANSI): A117 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- C. ASTM International (ASTM):
  1. ASTM A 240/A 240M - Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Steel Plate, Sheet, and Strip for Pressure Vessels.
  2. ASTM A 554 - Standard Specification for Welded Stainless Steel Mechanical Tubing.
  3. ASTM C 1503 - Standard Specification for Mirrors.
  4. ASTM F 446 - Standard Consumer Safety Specification for Grab bars and Accessories Installed in the Bathing Area.
- D. Fair Housing Amendments Act of 1988, Accessibility Guidelines, Federal Register Volume 56, Number 44.

##### 1.4 SUBMITTALS

- A. Submit under provisions of Section 013300.

- B. Product Data: Manufacturer's product data for products specified, indicating selected options and accessories.
- C. Shop Drawings:
  - 1. Plans: Locate each specified unit in project.
  - 2. Elevations: Indicate mounting height of each product.
  - 3. Details: Indicate anchoring and fastening details, required locations and types of anchors and reinforcement, and materials required for installation of specified products.
- D. Verification Samples: Two sample chips of each specified color and finish.
- E. Quality Assurance Submittals:
  - 1. Manufacturer's printed installation instructions for each specified product.
  - 2. Documentation of Manufacturer's Qualifications, specified in 1.5 of this Section.
- F. Closeout Submittals: Warranty, issued and executed by manufacturer, and countersigned by Contractor.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum five (5) years documented experience producing products specified.
- B. Source Limitations: To the greatest extent possible products shall be provided by a single manufacturer.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Ship products in manufacturer's standard protective packaging with vinyl coating on exposed surfaces.
- B. Storage and Protection: Store products in manufacturer's protective packaging until installation.

#### 1.7 SEQUENCING

- A. Supply locations, dimensions, and other pertinent details to installing Contractor for coordination of blocking, support and recess size and locations required for accessory installation.

#### 1.8 WARRANTY

- A. Manufacturer's standard warranty against defects in product workmanship and materials.
- B. Manufacturer's 15-year warranty against silver spoilage of mirrors.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Refer to toilet accessory schedules on architectural drawings.
- B. Requests for substitutions will be considered in accordance with provisions of Section 012500.

## 2.2 GENERAL

- A. Provide toilet accessories with attachment hardware and rough-in frames as required for a complete, operational installation.

## 2.3 TOILET ACCESSORIES

- A. Refer to toilet accessory schedules on architectural drawings.
- B. All waste receptacles to be fire resistant UL classified.

# PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Verification of Conditions:
  - 1. Prepared openings are sized and located in accordance with shop drawings.
  - 2. Reinforcement and anchoring devices are correct type and are located in accordance with shop drawings.
- B. Installer's Examination:
  - 1. Installer shall examine conditions under which construction activities are to be performed, then submit written notification if such conditions are unacceptable.
  - 2. Transmit two copies of installer's report to Architect within 24 hr of receipt.
  - 3. Installation activities before unacceptable conditions have been corrected are prohibited.
  - 4. Installation indicates installer's acceptance of conditions.

## 3.2 INSTALLATION

- A. Install toilet accessories plumb and level in accordance with shop drawings and manufacturer's printed installation instructions.
- B. Locate toilet accessories at heights and locations required for compliance with Americans with Disabilities Act.

## 3.3 CLEANING

- A. Remove manufacturer's protective vinyl coating from sight-exposed surfaces 24 hours before final inspection.
- B. Clean surfaces in accordance with manufacturer's recommendations.

## 3.4 PROTECTION OF INSTALLED PRODUCTS

- A. Protect products from damage caused by subsequent construction activities.
- B. Field repair of damaged product finishes is prohibited; replace products having damaged finishes caused by subsequent construction activities.

**END OF SECTION**

**SECTION 103000  
MANUFACTURED ELECTRIC FIREPLACES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Manufactured electric fireplaces.
- B. Accessories.

**1.2 RELATED SECTIONS**

- A. Section 061000 - Rough Carpentry: Wood framed rough opening and enclosure.

**1.3 REFERENCES**

- A. UL - Underwriters Laboratories Inc. Standards of Safety for Electrical Equipment.

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 013000.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- D. Manufacturer's warranty.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

**1.6 WARRANTY**

- A. Provide the manufacturers 2 year warranty on electrical and all components.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Acceptable Manufacturer: Dimplex North America, which is located at: 1367 Industrial road, Cambridge, ON N1R768, Canada, [www.dimplex.com](http://www.dimplex.com)
- B. Requests for substitutions will be considered in accordance with provisions of Section 016000.

**2.2 ELECTRIC FIREPLACES**

- A. General:
  - 1. Provide all components and accessories required for a complete, functional

- unit.
- 2. UL listed.
- B. Fireplace: Front view; Dimplex 42" Revillusion built-in Electric Firebox clean face. RBF 42 Standard, (4,915 btu/120V) heater.
  - 1. Venting: Non Venting.
  - 2. Heating: Louverless Circulating
  - 3. Liner: Traditional Smoked Brick color and pattern.
  - 4. Standard Features:
    - a. Fire on/off.
    - b. Ember bed on/off.
    - c. Two-speed selectable flame presentation.
    - d. Flame brightness, color and contrast.
    - e. On-demand forced-air heater.
    - f. Hand held remote control.
  - 5. Temper-proof single pane glass door.
  - 6. LED Split Oak log set and log grate.
  - 7. Black decorative raised profile trim.
- C. Fireplace: Opti-Myst Pro 1000 Built-in electric cassette CDFL1000. Standard (1,567 btu/120v)
  - 1. Venting: Non-venting
  - 2. Heating: None
  - 3. Standard Features:
    - a. Opti-Myst flame effect
    - b. Adjustable flame
    - c. Cracking sound effect
    - d. Hand held remote
  - 4. Plumb-kit continuous and water supply
  - 5. Plug-in kit

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify proper power supply and fuel source are available.

#### **3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and requirements of authorities having jurisdiction.
- B. Use manufacturer's guidelines for minimum clearances to combustibles, walls, and finishes.

- C. Anchor all components firmly in position for long life under hard use.
- D. Upon completion of installation, visually inspect all exposed surfaces. Touch up scratches and abrasions with touch up paint recommended by the manufacturer; make imperfections invisible to the unaided eye from a distance of 5 feet (1.5 m).

#### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

#### **END OF SECTION**

## **SECTION 105126 SOLID PLASTIC LOCKERS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. 12-inch Wide Four-Tier Plastic Lockers.

#### **1.2 REFERENCES**

- A. IBC - International Building Code.

#### **1.3 RELATED SECTIONS**

- A. Section 06100 (06 10 00) – Rough Carpentry: Wood ground and furring for anchoring lockers.

#### **1.4 SUBMITTALS**

- A. Submit under provisions of Section 013300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Prepared specifically for this project; show dimensions of lockers and interface with other products.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

#### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Manufacturer shall have a Quality System in place to ensure and be able to substantiate that manufactured units conform to requirements and match the approved design and must be ISO 9001:2015 certified.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Locker components shall be stored flat, if shipped unassembled, until assembly. All finishes shall be protected from soiling and damage during handling.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- D. Do not deliver plastic lockers to the site until the building is enclosed and HVAC systems are in operation. Deliver plastic lockers in manufacturer's original packaging. Store in an upright condition. Protect plastic lockers from exposure to



direct sunlight.

## 1.7 WARRANTY

- A. Manufacturer's standard warranty to repair or replace components of locker products that fail in materials or workmanship within 3 years from date of Substantial Completion.

## 1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

## 1.9 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Full-size locker doors, complete with specified door hardware. Furnish no fewer than one door of each type and color installed.
  - 2. Two (2) full-size units of hinges, pulls and shelf rests.

# PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Salsbury Industries, 18300 Central Avenue, Carson, CA 90746-4008; Toll Free Tel: 1-800-LOCKERS (1-800-562-5377); Fax: 1-800-562-5399; Email: [salsbury@lockers.com](mailto:salsbury@lockers.com); Website: [www.lockers.com](http://www.lockers.com).
- B. Substitutions: Not permitted.

## 2.2 LOCKERS

Double-tier, triple-tier, four-tier, five-tier, eight-tier and ten-tier 12-inch wide plastic lockers: Constructed of water resistant high grade Acrylonitrile Butadiene Styrene (ABS) plastic that combines strength and durability; includes stainless steel hinges and a stainless steel hasp for locking; can accommodate combination padlocks or key padlocks.

- A. 12-inch Wide Plastic Locker Series:
  - 1. 94000 series: Four-tier.
- B. Unit Width: 12-3/4 inches (324 mm).
- C. Unit Height:
  - 1. 73 inches (1,854 mm) with adjustable legs fully retracted.
  - 2. 74 inches (1,880 mm) with adjustable legs fully extended.
- D. Unit Depth: 18 inches (457 mm).

- E. Unit Assembly:
  - 1. Unassembled units (Knocked-down).
  - 2. Assembled units.
- F. Color:
  - 1. Door finish:
    - a. Color: Gray - standard.
    - b. Color: Tan - standard.
    - c. Color: Blue - standard.
  - 2. Body finish: Dark gray.

## 2.3 INTERIOR EQUIPMENT

- B. Standard Hardware Features:
  - 1. Stainless steel padlock hasp.
  - 2. Stainless steel door hinges.
  - 3. Coat rod (available with double-tier lockers only).

## 2.4 OPTIONAL EQUIPMENT

- A. Sloping hoods.
- B. Compartment shelf (not available for 10-tier units only).
- C. Padlocks:
  - 1. Combination padlocks.
  - 2. Keyed padlocks.
- D. Master keys: Master control key for combination padlocks.
- E. Engraved name/number plates.

## 2.5 CONSTRUCTION

- A. Locker Doors: Constructed of water resistant high grade Acrylonitrile Butadiene Styrene (ABS) plastic.
  - 1. Door: 1/4 inch (6.4 mm) thick ABS plastic.
  - 2. Single-Point Latch: Made of stainless steel, securely fastened to door.
- B. Locker Body: Constructed of water resistant high grade Acrylonitrile Butadiene Styrene (ABS) plastic. Frames assemble via an integral interlocking latching system.
- C. Hinges: Self-closing hinge: 0.074 inch (1.88 mm) thick sheet steel, double spun, full loop, tight pin, securely fastened to the door and locker body.
  - 1. Double-tier lockers: Four 2 inch (51 mm) high five-knuckle hinges.
  - 2. Triple-tier, four-tier & five-tier lockers: Two 2 inch (51 mm) high five-knuckle hinges.
  - 3. Eight-tier & ten-tier lockers: One 2 inch (51 mm) high five-knuckle hinge.
- D. Optional factory assembly of locker bodies.

## 2.6 MATERIALS

- A. High grade Acrylonitrile Butadiene Styrene (ABS) plastic formed under high pressure into solid plastic components.
- B. Stainless-Steel Sheet: ASTM A 666, Type 304.
- C. Fasteners: Tamper-Resistant Fasteners: Stainless steel torx-head screws.
  - 1. Locker Connectors: No. 10-24 sex bolt.
  - 2. Anchors: Type and size required for secure anchorage.
  - 3. Drilled-in-place Masonry Anchors: Minimum 1/4 by 1-3/4 inch (6 by 44 mm) screws.

## 2.7 LOCKER FABRICATION

- A. Locker box fabricated from interlocking injection moulded components made of Acrylonitrile Butadiene Styrene (ABS) plastic.
- B. Hardware Attachment: All hinges, handles, hasps and ABS components attached with tamper-resistant screws.
- C. Provide ventilated panels where indicated.
- D. Adjustable Legs: Set height from 73 inches (1,854 mm) to 74 inches (1,880 mm).
- E. Continuous Sloping Tops: Fabricated in lengths indicated, without visible fasteners at splice locations; and finished to match lockers.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

### 3.3 INSTALLATION

- A. Install in accordance with Salsbury Industries' installation instructions.
- B. Anchor the units to the wall studs through the locker back and to the floor.

### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

## END OF SECTION

## **SECTION 105230 FIRE EXTINGUISHERS AND CABINETS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Fire extinguishers.
  - 2. Fire extinguisher cabinets.
  - 3. Brackets for wall mounting.

#### **1.2 PERFORMANCE REQUIREMENTS**

- A. Conform to applicable code.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.
- C. Provide fire extinguisher cabinets classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

#### **1.3 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, location, and cabinet fire ratings.
- C. Product Data: Submit extinguisher operational features, color and finish, and anchorage details.
- D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

#### **1.4 OPERATION AND MAINTENANCE DATA**

- A. Section 017850 - Operation and Maintenance Data: Equipment manual submittals.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

#### **1.5 ENVIRONMENTAL REQUIREMENTS**

- A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.

- B. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

## **PART 2 PRODUCTS**

### **2.1 FIRE EXTINGUISHERS**

- A. Manufacturers:
  - 1. Potter-Roemer, ABC Multi-Purpose Dry Chemical Model 3010.
  - 2. Larsen's Manufacturing Company, Model MP10.
  - 3. J.L. Industries, Cosmic 10E.
  - 4. Substitutions: Section 01600 - Product Requirements.
- B. Fire Extinguisher: Multipurpose dry chemical type, UL 299, Steel tank, with pressure gage, 10 pound capacity, 4A-60B:C UL rating.
- C. Extinguisher Finish: Steel, enamel to manufacturer's standard red color.

### **2.2 FIRE EXTINGUISHER CABINETS – FIRE-RATED SEMI-RECESSED BUBBLE DOOR**

- A. Manufacturers:
  - 1. Potter-Roemer, Loma 7300 Series.
  - 2. Larsen's Manufacturing Company, Cameo C2409 Series.
  - 3. J.L. Industries, Clear VU 1500 Series.
  - 4. Substitutions: Section 01600 - Product Requirements.
- B. Cabinet: Cold rolled steel, 9 x 24 x 4 inch nominal box dimension, semi-recessed type, fire rated for installation in fire rated walls.
- C. Door and Frame: 18 gage thick steel, shop primed, with clear acrylic bubble, piano hinge and latch handle.

### **2.3 ACCESSORIES**

- A. Extinguisher Brackets for Wall Mounting (10 lb extinguisher): Formed steel, red enamel finish:
  - 1. Potter-Roemer, Model 3903.
  - 2. Larsen's Manufacturing Company, Model 846.
  - 3. J.L. Industries; MB846.
  - 4. Substitutions: Section 01600 - Product Requirements.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify rough openings for cabinet are correctly sized and located.
- C. Verify required fir-rating of cabinet matches the required rating of the assembly being installed in.

### 3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings, 48 inches from finished floor to top of extinguisher handle.
- B. Install wall brackets, 48 inches from finished floor to top of extinguisher handle.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets or on wall brackets as indicated on Drawings.
- E. Position cabinet signage as required by authorities having jurisdiction.

**END OF SECTION**



04/21/2023

**Project:**  
**LP-0221.6.2 GRANITE**  
**FARMS (ACTS)**

---

**From:**  
**VisionBuilders & Design**  
**Nidia Mora**  
**1515 Shopton Rd. Ste 104**  
**Charlotte, NC 28217**  
**704-405-3101**

**To:**



## Submittal Sheet

04/21/2023

### ITEM# 01 - VENTLESS FRYER (1 EA REQ'D)

MTI AUTOFRY MTI-10X

Autofry® Ventless Fryer, electric, countertop, 2.75 gallon / 10.41 liter oil capacity, 30-60 lb fry production per hour, fully automated & enclosed, programmable keypad, exhaust system with baffle filter, ANSUL® fire suppression, non-stick coated baskets, stainless steel construction, legs, 5.7kW, 208-240v/60/1-ph, 23.75 amps, cord, NEMA 6-30P, cULus, NSF, CE

#### ACCESSORIES

Mfr	Qty	Model	Spec
MTI	1		1 year parts and labor, 3 years electronic controls, 5 years frypot/chassis, standard
MTI	1		Dealer discounts for options applicable with purchase of an Autofry or Multi-chef (contact factory for details).

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	208-240	60	1	Cord & Plug		6-30P	23.75	5.7			





# MTI-10X/XL/XL-3 DATA SHEET

## No Hoods. No Vents. No Problem!

Take a look at how AutoFry makes deep frying as easy as 1, 2, 3!



1) Place food in entry chute and close to load in fryer



2) Select fry time on keypad or select programmable presets



3) Food is fried to perfection and automatically delivered to exterior receiving tray.



### HIGH CAPACITY

AutoFry is the only supplier with a complete range of automated ventless frying systems, from single basket to double basket units, and countertop to floor models. Customers with a high product demand choose a double basket AutoFry to keep up with their required output. Any other supplier would need two units to try to keep up with the demand, which means more kitchen space required, poor recovery time and higher purchase and service cost.



**Success Stories: Ikea** "We've sold 11,800 portions of fries to date (counting from Nov-Mar) and we haven't even started with combos yet, so there's still a lot of potential for growth!! The profit is great and the machine has paid back double to this time."



### HIGH RETURN ON INVESTMENT

Plug it in and count your profits.

#### Actual Profit Calculations from AutoFry Customer:

1.75 lbs of fries per chute - Single portion of fries is .25 lbs

Total production time (loading, frying, and salting): **4 minutes**

14 portions (2 chutes) per 4 minutes = **210 portions per hour**

Sale Price: \$2.00 Cost to you: \$0.55 Profit: \$1.45 **Profit per hour: \$304.50**

Please note that numbers are rounded down for calculating purposes. Actual profit may be much higher.



### CONSISTENT QUALITY

AutoFry provides great quality product from start up early in the morning through the last order at the end of day. Each AutoFry is built with SimpliFry technology, a revolutionary heat/time compensation intelligence that automatically adjusts cooking time based on the quantity of product being prepared. This means no matter how large or small the food input is, you can be sure the product is cooked to the same degree of perfection every time.



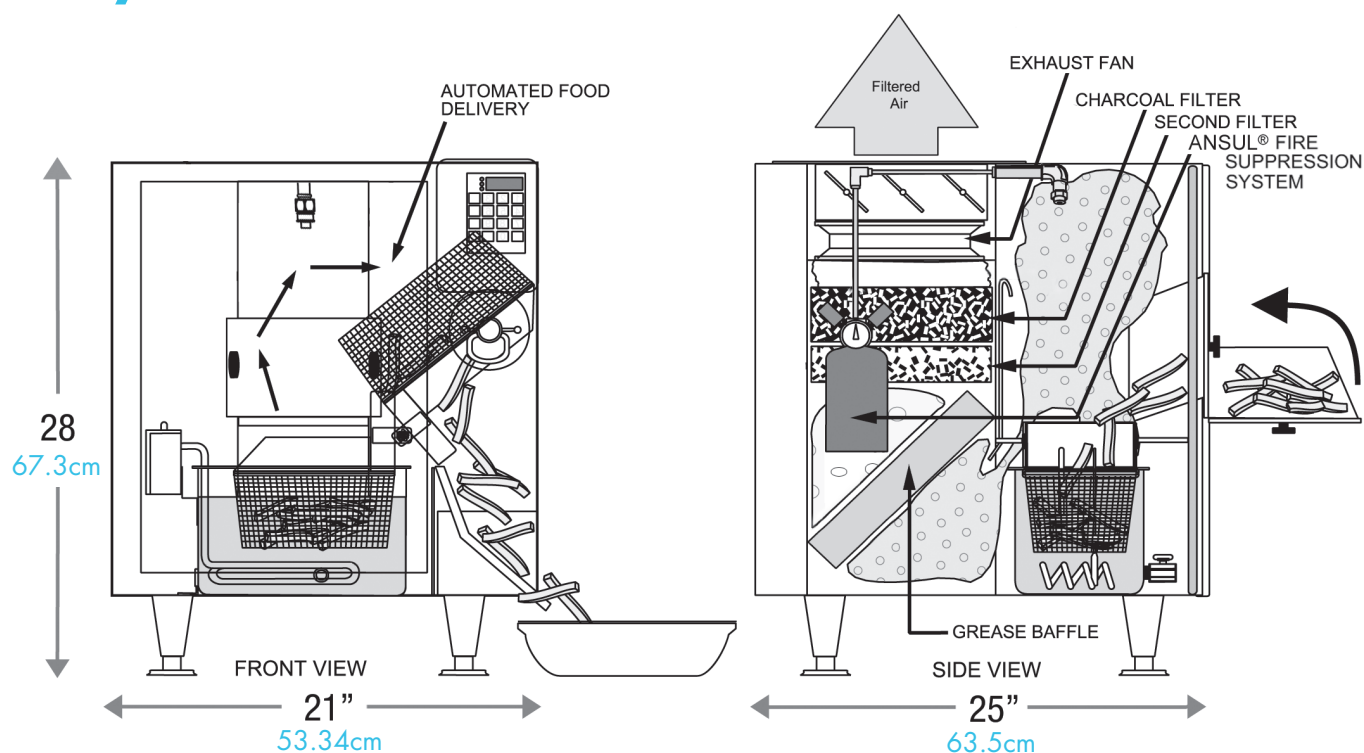
### EMPLOYEE SAFETY

One of the main reasons businesses choose AutoFry is for its unparalleled commitment to safety. The strategic location of the vent on top of the machine, allows air to vent out without chance of moisture build up around electrical plugs. Between our vent placement and additional ANSUL fire suppression system, AutoFry is the only machine on the market to put safety first, beyond just keeping employees safe from hot oil.



**Success Stories: French Fry Heaven** "After purchasing and testing several competitors' fry units, [we found] the steam was accumulating into water and running down the back of the interior cooking cavity wall and heating element and causing a "spark" to arch, and tripping the electrical breaker."

# AutoFry® MTI-10X/XL/XL3 SPECIFICATIONS



## ELECTRICAL

<b>MTI-10X</b> 	208-240 V / Single Phase   5.7 kW Total 23.75 AMP @ 240 V 30 AMP (Dedicated Service Required) 6' (1.83m) Power Cord w/NEMA Plug / 6-30P Plug
<b>MTI-10XL</b> 	208-240 V / Single Phase   7.2kW Total 30 AMP @ 240 V 50 AMP (Dedicated Service Required) 6' (1.83m) Power Cord w/NEMA Plug / 6-50P Plug
<b>MTI-10XL-3</b> 	208-240 V / 3 Phase   8.5 kW Total 20.44 AMP @ 240 V 30 AMP (Dedicated Service Required) 6' (1.83m) Power Cord w/NEMA plug / 15-30P Plug

## CAPACITY

Oil	2.75 gallons (10.41 liters)
Cooking	30-60 lbs. (13.6-27.2kg) French Fries/hour, frozen to done. Capacity will vary depending on french fry type.

## MACHINE

Dimensions	25"D x 21"W x 28"H (63.5cm Deep x 53.34cm Wide x 71.1cm High)
Clearances	0" = Sides 0" = Back 24" = Top (0cm = Sides 0cm = Back 61cm = Top)
Construction	16 Gauge Stainless Steel
Shipping Dims.	32" x 32" x 32" (81.28cm x 81.28cm x 81.28cm)
Shipping Weight	210 lbs. (95.25kg)



We reserve the right to change specifications appearing upon this brochure without notice and without incurring any obligation for the equipment.

## WARRANTY

1 Year Parts/Labor, 3 Years Electronic Controls, 5 Years Frypot/Chassis

## OPTIONS

MTI Illuminated Heat Lamp; 120 ACV 5.16 AMPS;  
AutoFilter Automatic Oil Filtration System

Rev 05/2016



Your Source for Ventless  
Kitchen Solutions



www.AutoFry.com  
www.MTIproducts.com



P: 800-348-2976  
F: 508-393-5718



10 Forbes Road  
Northborough, MA 01532



## Submittal Sheet

04/21/2023

### ITEM# 02 - REACH-IN UNDERCOUNTER FREEZER (1 EA REQ'D)

Turbo Air JUF-36S-N

J Series Side Mount Undercounter Freezer, one-section, 35-3/8"W x 23-5/8"D x 28-3/4"H, 5.66 cu. ft., front air intake, side mount self-contained compressor, (1) stainless steel door with recessed handle, (1) PE coated wire shelf, LED interior lighting, stainless steel exterior (galvanized steel back & bottom), aluminum interior & door liners with stainless steel floor, R290 Hydrocarbon refrigerant, 1/3 HP, 115v/60/1-ph, 2.8 amps, NEMA 5-15Pm, cETLus, ETL-Sanitation

#### ACCESSORIES

Mfr	Qty	Model	Spec
Turbo Air	1		Note: Contact factory representative for parts & accessories discounts
Turbo Air	1		2 year parts & labor warranty, standard
Turbo Air	1		Additional 3 year compressor warranty (5 year total), standard
Turbo Air	1		Non-Standard mounting options below:
Turbo Air	1	30265H0200	2-1/2" Caster with brake, 1/2" diameter & 13 TPI (sold by each)

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	2.8		1/3		

**REFRIGERATOR MANUFACTURER**  
**Turbo air**  
 more durable, efficient, beautiful

4184 E. Conant St.  
 Long Beach, CA 90808  
 Tel. 310-900-1000  
 Fax. 310-900-1077  
[www.turboairinc.com](http://www.turboairinc.com)

Project:

Model #:

Item #:

Available W/H:

Qty:

Approval:

AIA #:

SIS #:

CSI Section 11400

## Undercounter Freezer - Narrow

Side Mount Undercounters  
**J Series**

**Model : JUF-36S-N**



### FEATURES & BENEFITS

#### ■ Digital temperature control & monitor system

Keeps food products safe by maintaining constant temperatures. External digital display allows for easy monitoring.

#### ■ Hydrocarbon refrigerants (R-290)

With innovative and eco-friendly technology, Turbo Air brings you hydrocarbon refrigerators designed to meet DOE's Energy Conservation Standards in 2017 and to use EPA's SNAP Program approved HC refrigerants. Hydrocarbon refrigerants do not deplete the ozone layer and have very low contribution to global warming (ODP-0, GWP-3).

#### ■ Side mount compressor unit

With compressors positioned on the side of the unit, our refrigerators can now be serviced without being moved. Our front air intake feature also allows this model to be highly efficient in narrow spaces.

#### ■ Exterior & interior of the cabinet

The Turbo Air J series boasts a stainless steel exterior (galvanized steel back and bottom). Interior is stainless steel floor with AL sides, back and AL door liners. It guarantees the utmost in cleanliness and long product life. The J series adds a touch of style to the most refined setting.

#### ■ Ergonomically designed doors

Customers' fatigue fades away with easy grip handles and doors that open effortlessly. These features along with self-closing doors make this the ultimate choice in customer convenience.

#### ■ High-density polyurethane insulation

The entire cabinet structure and solid doors are foamed-in-place using high density, CFC free polyurethane insulation.

#### ■ Magnetic door gaskets

Magnetic door gaskets are of one-piece construction, removable without tools for ease of cleaning and replacement.

#### ■ Adjustable, heavy duty, PE (polyethylene) coated wire shelves

#### ■ LED interior lighting & fan control

Energy efficient LED lighting lights every corner, making items easy to find. Fan control function automatically shuts off the fan when the door is open, which prevents hot air from being drawn in, thus maintaining the cool inner temperature.

#### ■ Easy open front grille with condenser cleaning brush kit

Front grille cover is easily removable without any tools, which makes condenser cleaning easy and convenient at any time. Handy condenser cleaning brush is included inside the front grille cover.

#### ■ Freezer holds -10°F ~ 0°F for the best in frozen food preservation

NATURAL  
Refrigerant

ISO9001:2008

Intertek

Intertek

2 YEAR  
WARRANTY


Compressor  
5 YEAR  
WARRANTY  
(U.S.A. only)

Model	Swing Doors	CU./FT.	#of Shelves	HP	AMPS	Crated Weight (lbs.)	L x D x H† (inches)
JUF-36S-N	1	5.66	1	1/3	2.8	181	35 <sup>3</sup> / <sub>8</sub> x 23 <sup>5</sup> / <sub>8</sub> x 28 <sup>3</sup> / <sub>4</sub>

# Undercounter Freezer - Narrow

Side Mount Undercounters  
J Series

## Model : JUF-36S-N

ELECTRICAL DATA	
Voltage	115/60/1
Plug Type	 NEMA 5-15P
Full Load Amperes	2.8
Compressor HP	1/3
Cord Length (ft.)	9
Refrigerant	R-290
DIMENSIONAL DATA	
Net Capacity (cu. ft.)	5.66
Ext. Length Overall (in.)	35 3/8 (900mm)
Ext. Depth Overall (in.)*	23 5/8 (600mm)
Ext. Height Overall (in.)†	28 3/4 (730mm)
# of Doors	1
# of Shelves	1
Shelf Size (L x D) (in.)	19 1/2 x 16 1/4
Net Weight (lbs.)	145
Gross Weight (lbs.)	181

Design and specifications subject to change without notice.

Actual shipping weight may differ due to extra packing materials for product protection.

\* Depth does not include 1" for rear spacers.

† Height does not include 5" for caster height.

### ■ WARRANTY : 2 Year Parts and Labor Warranty Additional 3 Year Warranty on Compressor

### ■ STANDARD FEATURES

- Anti-corrosion coated evaporator
- Self-contained system
- 4" dia. swivel casters with locks on the front set

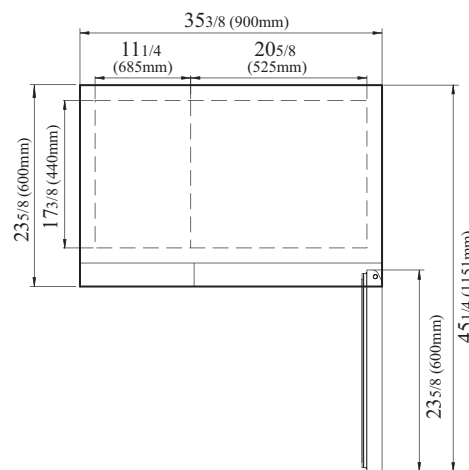
### ■ OPTIONAL ACCESSORIES

- 1" caster, 1/2" diameter & 13 TPI: S28R813660 (non-brake)
- 2.5" caster, 1/2" diameter & 13 TPI: 30265H0100 (non-brake), 30265H0200 (w/ brake)
- 5" caster, 1/2" diameter & 13 TPI: M726500100 (non-brake), M726500200 (w/ brake)
- Leveling leg, 1/2" - 13 TPI x 1.54": LFM1213566
- 6" ABS plastic leg: 30221M0200
- 6" stainless steel leg: 30221M0600
- Additional PE coated wire shelf: KW99000101
- Door lock: lead time applies. Please contact your sales representative for more details to order.

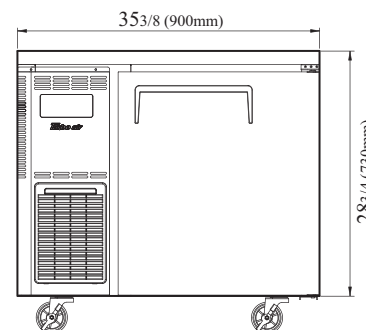
Ver.20220719

## PLAN VIEW

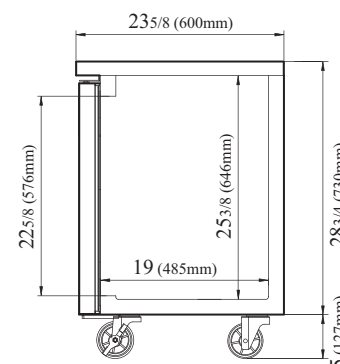
(unit : inch)



TOP VIEW



FRONT VIEW



SIDE VIEW



- Turbo Air : 800-627-0032 ■ GK : 800-500-3519
- Warranty : 800-381-7770 ■ AC : 888-900-1002

REFRIGERATOR MANUFACTURER  
**Turbo air**

GERMAN  
KNIFE

RADIANCE

REFRIGERATION SYSTEM  
**Turbo air**

**Texaking**

Continued product development may necessitate specification changes without notice.





## Submittal Sheet

04/21/2023

### ITEM# 03 - VENTLESS EXHAUST SYSTEM (1 EA REQ'D)

Wells WVU-72

Universal Ventless Hood, 72" cooking zone, vertical air discharge, 4-stage filtration: grease filter, pre-filter, HEPA filter and charcoal filter, (4) LED lights, stainless steel stand, self contained ANSUL® R-102 system, Certified Type-1 compliant, 1 HP, UL Classified, cULus Classified, US (NON-RETURNABLE Item) (For replacement filters, this model requires (2) Pre-filters (22618) & (2) HEPA Charcoal Filter Packs (WL0711)) (Note: field convertible to horizontal air discharge)

#### ACCESSORIES

Mfr	Qty	Model	Spec
Wells	1		OWNER RESPONSIBILITY: Before any Wells Mfg. Ventless unit can be powered up for the first time, the included UL300 Ansul fire suppression system must be charged with "Ansulex" and commissioned and tagged by a certified and locally licensed ANSUL Fire Suppression contractor. This commissioning is also the commencement of an agreement between the Ansul agent and the owner and cannot be consummated by Wells Mfg, its agents, dealers or service agencies. Cost will vary by individual Ansul agent and paid by the owner, not by Wells.
Wells	1		FOB: Factory, 265 Hobson Street, Smithville, TN 37166
Wells	1		NOTE: Before purchasing and installing this equipment, Wells Mfg recommends that operators apply for permits as required by local jurisdictional authorities. Required permits vary by jurisdiction and may include Electrical, Fire, Mechanical and Food Service. Permits are the responsibility of the operator and/ or its contractors.
Wells	1		Does not qualify for free freight
Wells	1		1 year parts and labor warranty, standard
Wells	1		Note: Must specify voltage and phase
Wells	1		208v/60/1-ph, 3.5 amps

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1									1		
2	208	60	1				3.5				



Job \_\_\_\_\_ Item No. \_\_\_\_\_

## Universal Ventless Hood

MODEL ☐ WVU-72

Model WVU-72  
(equipment sold separately)

### DESCRIPTION

Wells Universal hoods are Certified Type-1 compliant, UL710B approved recirculation hood systems and feature completely self-contained air filtration and fire-suppression systems. They do not require venting outside making it possible to cook in non-traditional locations or when traditional Type-1 hoods and ductwork are impractical, restricted or too expensive. Operators can mix and match various electric cooking equipment under the hood such as fryers, ovens, griddles, steamers and more - providing greater flexibility and through-put.

### SPECIFICATIONS

**Fire Protection** – Completely self contained ANSUL® R-102 system includes ANSUL® tank, nitrogen cartridge, ANSUL® sponanifier, piping, heat sensors, ANSUL® drops, nozzles, and movable manual pull station. Manual pull can be relocated to the egress position or an additional station can be added by an authorized ANSUL® representative. Front access for easy fire system maintenance. Fire protection system meets NFPA 96 Chapter 13. Fire protection system must be charged and certified by ANSUL® Authorized distributor after installation and before first use (operator's responsibility).

**Filtration** – Completely self-contained filtration process reduces emissions below that allowed in NFPA 96 and ANSI UL710B using the EPA 202 test method and includes stainless steel grease baffle filter with grease cup, fiberglass pre-filters, HEPA (High-Efficiency Particulate Air) filter/ carbon-charcoal filter pack. All filters are easily removable with out tools. Air flow sensors continually monitor air flow optimizing performance and grease removal while an interlock system will not allow cooking appliances to function if filters are missing, clogged or in the event of a fire.

**Cooking Appliances** – Only electrically heated appliances are acceptable for installation. Cooking equipment is optional from Wells or other manufacturers. Appliances must be installed as per manufacturers instructions and controlled through the hood equipment shut-off interface through a customer supplied contractor which will disable cooking equipment in the event of fire or hood malfunction. For size, temperature and KW limits see back page or manual.

**Exhaust and Air Flow** – Exhaust air may be horizontal or vertical. Hoods are shipped for vertical discharge and are field convertible for horizontal discharge. Typical airflow is 1,500 CFM. A minimum of 1,200 cubic feet of fresh air per minute is recommended both in and out of the cooking area to ensure the dilution of cooking aromas.

### STANDARD FEATURES

- ☐ Completely self-contained, 4-stage filtration system
- ☐ Completely self-contained fire protection system
- ☐ Interlock system will disable cooking appliances if filters are missing, clogged or in the event of a fire
- ☐ Airflow sensors continually monitor airflow for optimizing performance and grease removal
- ☐ Illuminated early-warning system to monitor filter replacement
- ☐ Completely self-contained filtration process reduces emissions below that allowed in NFPA 96 and ANSI UL710B using the EPA 202 test method
- ☐ Four LED lights producing 500 lumens each for improved visibility - light color temperature (cool white): 6000K
- ☐ Stainless steel construction for strength, durability and ease of cleaning
- ☐ Fits through a 36" wide door opening
- ☐ 6" to 8" adjustable legs (adjustable by 2" for leveling)
- ☐ Universal systems are movable making them ideal for leased properties
- ☐ Available in 208/240V, 1Ø
- ☐ **Limited one-year parts and one year labor warranty**

### OPTIONS & ACCESSORIES

- ☐ Pre-filters
- ☐ HEPA / carbon-charcoal filter packs

### CERTIFICATIONS



NSF/ANSI 2



UL710B

UL710B CATEGORY YZCT  
RECIRCULATING SYSTEM  
FILE NO. MH48408

2M-Z21323 REV G (08-22)



**Wells Manufacturing** • 265 Hobson Street, Smithville, Tennessee 37166 U.S.A.  
Phone : (800-264-7827) • www.wells-mfg.com • Printed in the U.S.A.

Specifications are subject to change without notice and are not intended for installation purposes. See installation instructions prior to installing the unit.

GENERAL LAYOUT DATA  
SANITATION

## MODEL WVU-72 UNIVERSAL VENTLESS HOOD SYSTEM



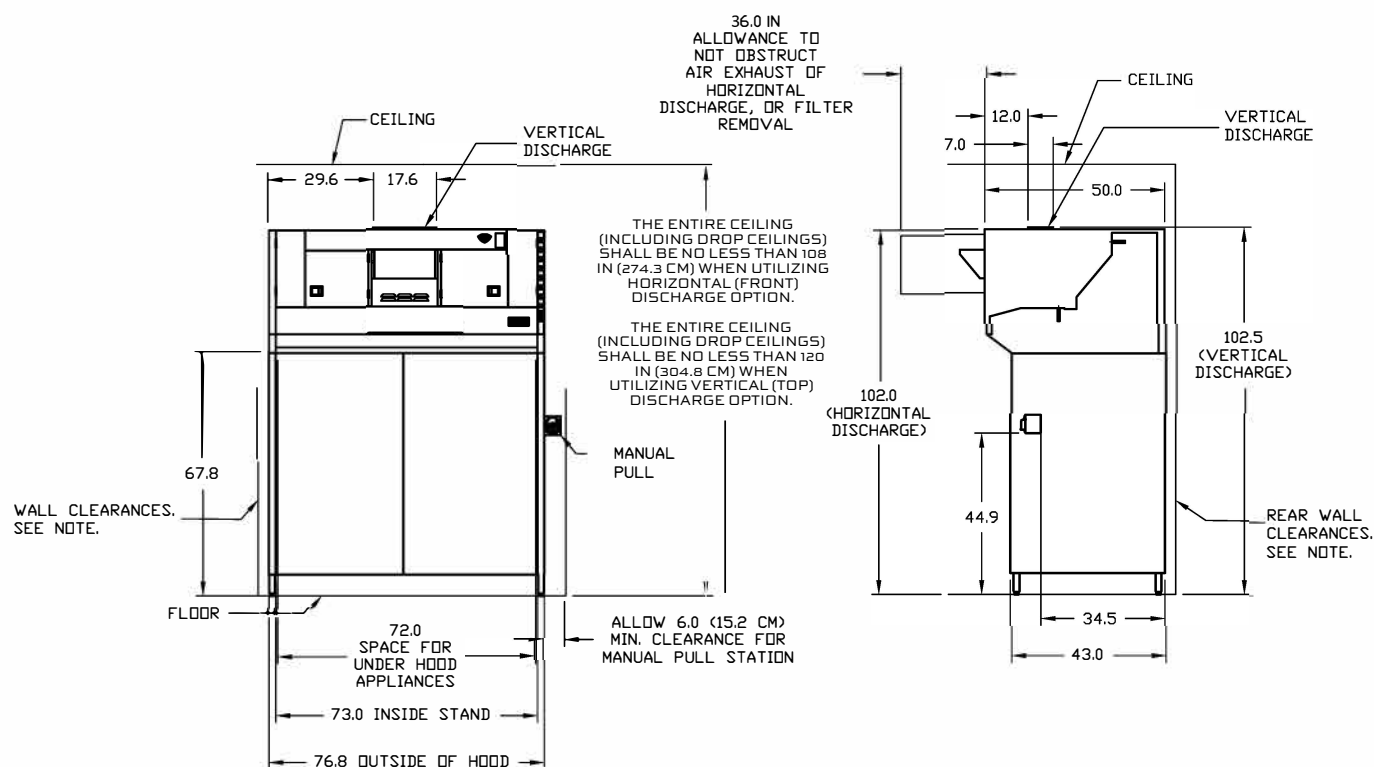
VOLTAGE AC 60 HZ	AMPS 1 PH.	HORSE POWER	TYPICAL AIRFLOW	MAX. GREASE EMISSIONS	CLEARANCES TO COMBUSTIBLES	UNDER HOOD LED LIGHTING
208/240	3.5	1.0	1500 CFM	.0029 LB/HR/FT	SEE DRAWING	2000 LUMENS

NSF/ANSI 2 UL710B

UL CAT. YZCT RECIRCULATING SYSTEM FILE NO. MH48408

SPECIAL ENVIRONMENTAL NOTICE: THE HOOD SYSTEM IS DESIGNED TO REDUCE EMISSIONS BUT WILL NOT COMPLETELY ELIMINATE COOKING AROMAS. AIR EXCHANGE AT THE INSTALLATION SITE MUST COMPLY WITH REQUIREMENTS OF THE LOCAL JURISDICTIONAL AUTHORITY. A MINIMUM OF 1200 CUBIC FEET OF FRESH AIR PER MINUTE INTO THE AREA IS RECOMMENDED TO ENSURE ADEQUATE DILUTION.

## HOOD SYSTEM INSTALLATION – STAND MOUNT – REGARDLESS OF EQUIPMENT UNDER HOOD.



## NOTE(S).

1. WALL CLEARANCES. REFERENCE NFPA 96, CLAUSE 4.2.1. AT LEAST 18 IN. (457 MM) TO COMBUSTIBLE MATERIALS, 3 IN. (76 MM) TO LIMITED-COMBUSTIBLE MATERIALS, AND 0 IN. (0MM) TO NONCOMBUSTIBLE MATERIAL.

Table: Weights and Shipping Information

Weights				Carton Dimensions						Crate Size	
Shipping Weight		Installed Weight		Width		Depth		Height			
Pounds	kg	Pounds	kg	Inches	mm	Inches	mm	Inches	mm	Cubic Feet	Cubic Meters
1632	740	850	386	120	3048	63	1600	53.5	1359	234	6.63

THE HOOD AND ALL UNDER HOOD APPLIANCES MUST BE INSTALLED IN ACCORDANCE WITH THE STANDARD FOR VENTILATION CONTROL AND FIRE PROTECTION OF COMMERCIAL COOKING OPERATIONS NFPA 96, THE NATIONAL ELECTRIC CODE NFPA 70 AND ALL LOCAL CODES WHERE APPLICABLE. ALL UNDER HOOD APPLIANCES MUST BE INSTALLED AS PER MANUFACTURER INSTRUCTIONS AND CONTROLLED BY THE HOOD EQUIPMENT SHUTOFF INTERFACE THROUGH A CUSTOMER SUPPLIED CONTACTOR. SEE THE INSTRUCTION MANUAL FOR INTERFACE CONNECTION OPTIONS. APPLIANCES MUST MEET EQUIPMENT PARAMETERS DESCRIBED ABOVE. ONLY ELECTRICALLY HEATED APPLIANCES ARE ACCEPTABLE FOR INSTALLATION. PRIOR TO OPERATION THE FIRE SUPPRESSION SYSTEM MUST BE CHARGED AND CERTIFIED BY AN ANSUL® AUTHORIZED DISTRIBUTOR. ADEQUATE SIDE CLEARANCE MUST BE PROVIDED FOR SUPPLY CONNECTION AND SUPPRESSION MANUAL PULL ACCESS. EXHAUST IS SHIPPED FOR HORIZONTAL DISCHARGE AND FIELD CONVERTIBLE FOR VERTICAL DISCHARGE.



**WELLS MANUFACTURING**  
265 HOBSON ST  
SMITHVILLE, TN 37166, USA

NOTE: SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

SK2846 REV D (08-22)



GENERAL LAYOUT DATA  
SANITATION

## MODEL WVU-72 UNIVERSAL VENTLESS HOOD SYSTEM

VOLTAGE AC 60 HZ	AMPS 1 PH.	HORSE POWER	TYPICAL AIRFLOW	MAX. GREASE EMMISSIONS	CLEARANCES TO COMBUSTIBLES	UNDER HOOD LED LIGHTING
208/240	3.5	1.0	1500 CFM	.0029 LB/HR/FT	SEE DRAWING	2000 LUMENS

NSF/ANSI 2 UL710B

UL CAT. YZCT RECIRCULATING SYSTEM FILE NO. MH48408

SPECIAL ENVIRONMENTAL NOTICE: THE HOOD SYSTEM IS DESIGNED TO REDUCE EMISSIONS BUT WILL NOT COMPLETELY ELIMINATE COOKING AROMAS. AIR EXCHANGE AT THE INSTALLATION SITE MUST COMPLY WITH REQUIREMENTS OF THE LOCAL JURISDICTIONAL AUTHORITY. A MINIMUM OF 1200 CUBIC FEET OF FRESH AIR PER MINUTE INTO THE AREA IS RECOMMENDED TO ENSURE ADEQUATE DILUTION.

## HOOD SYSTEM INSTALLATION – EQUIPMENT PLACEMENT REQUIREMENTS

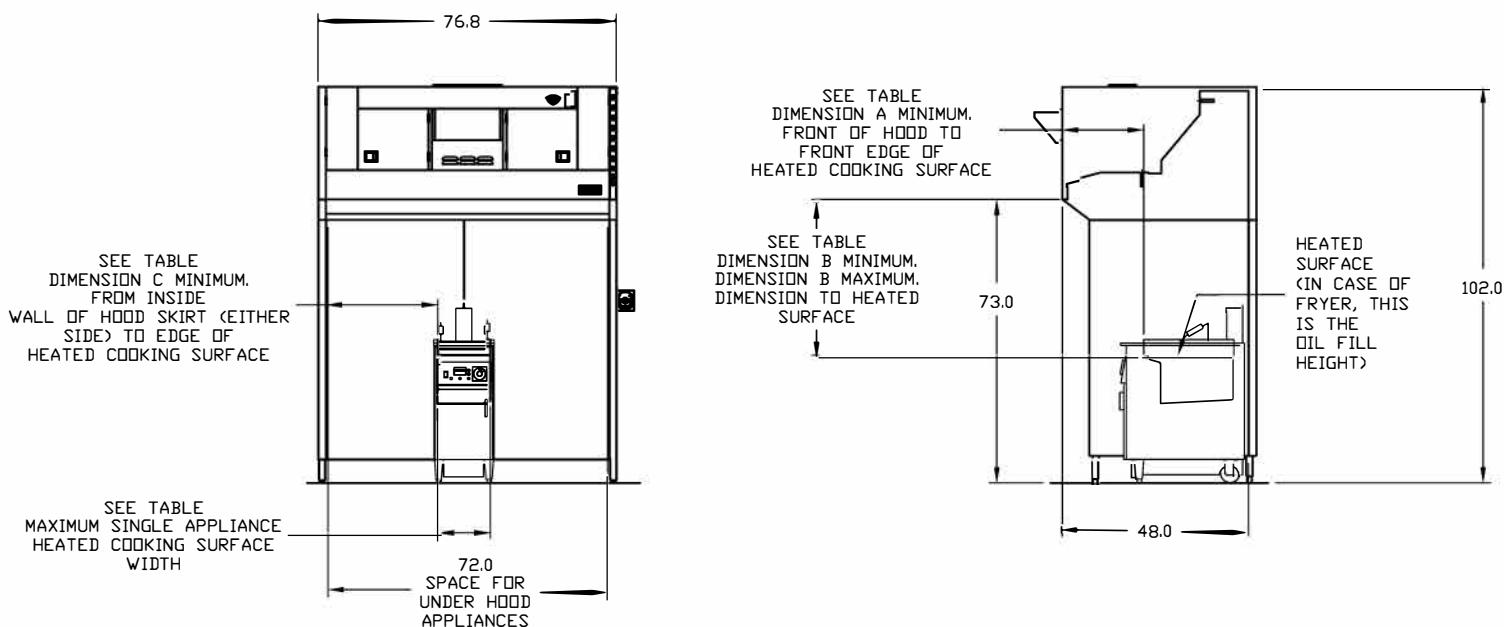


TABLE: APPLIANCE PLACEMENT REQUIREMENTS

APPLIANCE TYPE	MAXIMUM KW/FT	MAXIMUM COOKING TEMPERATURE (°F)	MAXIMUM SINGLE APPLIANCE HEATED COOKING SURFACE LENGTH (IN.)	DIMENSION A (IN.) MINIMUM	DIMENSION B (IN.) MINIMUM	DIMENSION B (IN.) MAXIMUM	DIMENSION C (IN.) MINIMUM
FRYER	16.9	400	18	24 (EDGE OF OIL)	37	42	0
GRIDDLE	5.5	450	36	21 (EDGE OF HEATED PLATE)	37	42	1
RANGE (2) / HOTPLATE	5.5	NA	48	18 (EDGE OF HEATED PLATEN)	37	42	1
WOK	7.0	NA	48	21 (EDGE OF HEATED SURFACE)	37	42	0
VERTICAL BROILER	7.0	NA	25	20 (EDGE OF HEATED SURFACE)	10	NA	0
OVEN	NA	575	48	6 (EDGE OF FRONT DOOR)	8	NA	0
BRAISING PAN / SKILLET (1)	4.5	550	48	14 (EDGE OF HEATED SURFACE)	37	42	0
CONVECTION OVEN	NA	575	48	6 (FRONT EDGE OF DOOR)	8	NA	0
STEAMER / COMBI OVEN	NA	575	48	6 (TOP EDGE OF DOOR)	20	NA	0
STEAM JACKETED KETTLE	16.9	450	48	14 (EDGE OF HEATED SURFACE)	30	42	0
SANDWICH GRILL (1)	4.5	550	36	18 (EDGE OF HEATED PLATEN)	30	42	0
CONVEYOR OVEN	4.5	NA	23	6 (EDGE OF HEATED SURFACE)	20	42	0

(1) LID OF THE APPLIANCE MUST NOT INTERFERE WITH SUPPRESSION NOZZLE DISCHARGE PATTERN.

(2) PLUS OVEN KW IF APPLICABLE

THE HOOD AND ALL UNDER HOOD APPLIANCES MUST BE INSTALLED IN ACCORDANCE WITH THE STANDARD FOR VENTILATION CONTROL AND FIRE PROTECTION OF COMMERCIAL COOKING OPERATIONS NFPA 96, THE NATIONAL ELECTRIC CODE NFPA 70 AND ALL LOCAL CODES WHERE APPLICABLE. ALL UNDER HOOD APPLIANCES MUST BE INSTALLED AS PER MANUFACTURER INSTRUCTIONS AND CONTROLLED BY THE HOOD EQUIPMENT SHUTOFF INTERFACE THROUGH A CUSTOMER SUPPLIED CONTACTOR. SEE THE INSTRUCTION MANUAL FOR INTERFACE CONNECTION OPTIONS. APPLIANCES MUST MEET EQUIPMENT PARAMETERS DESCRIBED ABOVE. ONLY ELECTRICALLY HEATED APPLIANCES ARE ACCEPTABLE FOR INSTALLATION. PRIOR TO OPERATION THE FIRE SUPPRESSION SYSTEM MUST BE CHARGED AND CERTIFIED BY AN ANSUL® AUTHORIZED DISTRIBUTOR. ADEQUATE SIDE CLEARANCE MUST BE PROVIDED FOR SUPPLY CONNECTION AND SUPPRESSION MANUAL PULL ACCESS. EXHAUST IS SHIPPED FOR HORIZONTAL DISCHARGE AND FIELD CONVERTIBLE FOR VERTICAL DISCHARGE.



WELLS MANUFACTURING  
265 HOBSON ST  
SMITHVILLE, TN 37166, USA

NOTE: SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

SK2846 REV D (08-22)



## Submittal Sheet

04/21/2023

### ITEM# 04 - CHEF BASE (1 EA REQ'D)

True Mfg. - General Foodservice TRCB-72

Refrigerated Chef Base, 72-3/8"W base, one-piece 300 series 18 gauge stainless steel top with V edge, (4) drawers (accommodates (2) 12" x 20" x 4" pans, NOT included), stainless steel front/sides, aluminum back, aluminum interior with stainless steel floor, 4" castors, 1/3 HP, 115v/60/1-ph, 9.9 amps, NEMA 5-15P, cULus, UL EPH Classified, CE, Made in USA

### ACCESSORIES

Mfr	Qty	Model	Spec
True Mfg. - General Foodservice	1		Self-contained refrigeration standard
True Mfg. - General Foodservice	1		Warranty - 5 year compressor (self-contained only), please visit <a href="http://www.Truemfg.com">www.Truemfg.com</a> for specifics
True Mfg. - General Foodservice	1		Warranty - 3 year parts & labor, please visit <a href="http://www.Truemfg.com">www.Truemfg.com</a> for specifics
True Mfg. - General Foodservice	1		4" Castors, standard

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	9.9		1/3		15.0



TRUE MANUFACTURING CO., INC.  
U.S.A. FOODSERVICE DIVISION

2001 East Terra Lane • O'Fallon, Missouri 63366-4434 • (636)240-2400  
Fax (636)272-2408 • Toll Free (800)325-6152 • Intl Fax# (001)636-272-7546  
Parts Dept. (800)424-TRUE • Parts Dept. Fax# (636)272-9471 • www.truemfg.com

Project Name: \_\_\_\_\_

Location: \_\_\_\_\_

Item #: \_\_\_\_\_ Qty: \_\_\_\_\_

Model #: \_\_\_\_\_

A/A #

SIS #

Model:  
**TRCB-72**

**Chef Base:**  
*Drawered Refrigerator*



## TRCB-72

- ▶ True's refrigerated chef bases are designed with enduring quality that protects your long term investment.
- ▶ Designed using the highest quality materials and components to provide the user with colder product temperatures, lower utility costs, exceptional food safety and the best value in today's food service marketplace.
- ▶ Oversized, environmentally friendly (R513A) forced-air refrigeration system holds 33°F to 38°F (.5°C to 3.3°C).
- ▶ Cabinet top is one piece, heavy duty reinforced stainless steel. Drip resistant "V" edge protects against spills. Supports up to 1084 lbs. (492 kg).
- ▶ All stainless steel front, top and sides. Corrosion resistant GalFan coated steel back.
- ▶ Each drawer accommodates two (2) full size 12"L x 20"W x 4"D (305 mm x 508 mm x 102 mm) food pans (sold separately).
- ▶ Heavy-duty stainless steel drawer slides and rollers. Removable without tools for easy cleaning.
- ▶ Foamed-in-place using a high density, polyurethane insulation that has zero ozone depletion potential (ODP) and zero global warming potential (GWP).

## ROUGH-IN DATA

Specifications subject to change without notice.  
Chart dimensions rounded up to the nearest 1/8" (millimeters rounded up to next whole number).

Model	Drawers	Cabinet Dimensions (inches) (mm)			HP	Voltage	Amps	NEMA Config.	Cord Length (total ft.) (total m)	Crated Weight (lbs.) (kg)
		W	D†	H*						
TRCB-72	4	72 <sup>3</sup> / <sub>8</sub> 1839	32 <sup>1</sup> / <sub>8</sub> 816	20 <sup>3</sup> / <sub>8</sub> 518	1/3 1/3	115/60/1 230-240/50/1	9.9 4.2	5-15P ▲	7 2.13	485 220

† Depth does not include 1" (26 mm) for rear bumpers.

\* Height does not include 5" (127 mm) for castors or 6" (153 mm) for optional legs.

▲ Plug type varies by country.



APPROVALS:

AVAILABLE AT:

Model:  
**TRCB-72**

## Chef Base: Drawered Refrigerator

**True**®

### STANDARD FEATURES

#### DESIGN

- True's commitment to using the highest quality materials and oversized refrigeration systems provides the user with colder product temperatures, lower utility costs, exceptional food safety and the best value in today's food service marketplace.

#### REFRIGERATION SYSTEM

- Factory engineered, self-contained, capillary tube system using environmentally friendly (CFC free) R513A refrigerant.
- Oversized, factory balanced refrigeration system with guided airflow to provide uniform product temperatures.
- Extra large evaporator coil balanced with higher horsepower compressor and large condenser; maintains cabinet temperatures of 33°F to 38°F (.5°C to 3.3°C) for the best in food preservation.
- Sealed, cast iron, self-lubricating evaporator fan motor(s) and larger fan blades give True chef base units a more efficient, low velocity, high volume airflow design. This unique design ensures faster temperature recovery and shorter run times in the busiest of food service environments.
- Condensing unit accessed from behind side grill; slides out for easy maintenance.

#### CABINET CONSTRUCTION

- Exterior - stainless steel front, top and sides. Corrosion resistant GalFan coated steel back.
- Interior - attractive, NSF approved, white aluminum liner. Stainless steel floor with coved corners.

- Insulation - entire cabinet structure and drawer facings are foamed-in-place using a high density, polyurethane insulation that has zero ozone depletion potential (ODP) and zero global warming potential (GWP).
- 4" (102 mm) diameter plate castors - locks provided on front set.
- Cabinet top is one piece, heavy duty reinforced 300 series stainless steel. Drip resistant "V" edge protects against spills. Supports up to 1084 lbs. (492 kg).

#### DRAWERS

- Stainless steel exterior drawer facings and liners. Stainless steel drawer frames.
- Each drawer fitted with 12" (305 mm) long recessed handle that is foamed-in-place with a sheet metal interlock to ensure permanent attachment.
- Heavy-duty stainless steel drawer slides and rollers. Removable without tools for easy cleaning.
- Magnetic drawer gaskets of one piece construction, removable without tools for ease of cleaning.
- Each drawer accommodates two (2) full size 12"L x 20"W x 4"D (305 mm x 508 mm x 102 mm) food pans (sold separately).
- Drawers support a wide variety of incremental pan size configurations.

#### MODEL FEATURES

- Evaporator is epoxy coated to eliminate the potential of corrosion.
- Exterior digital temperature display.
- NSF/ANSI Standard 7 compliant for open food product.

#### ELECTRICAL

- Unit completely pre-wired at factory and ready for final connection to a 115/60/1 phase, 15 amp dedicated outlet. Cord and plug set included.



115/60/1  
NEMA-5-15R

#### RECOMMENDED OPERATING CONDITIONS

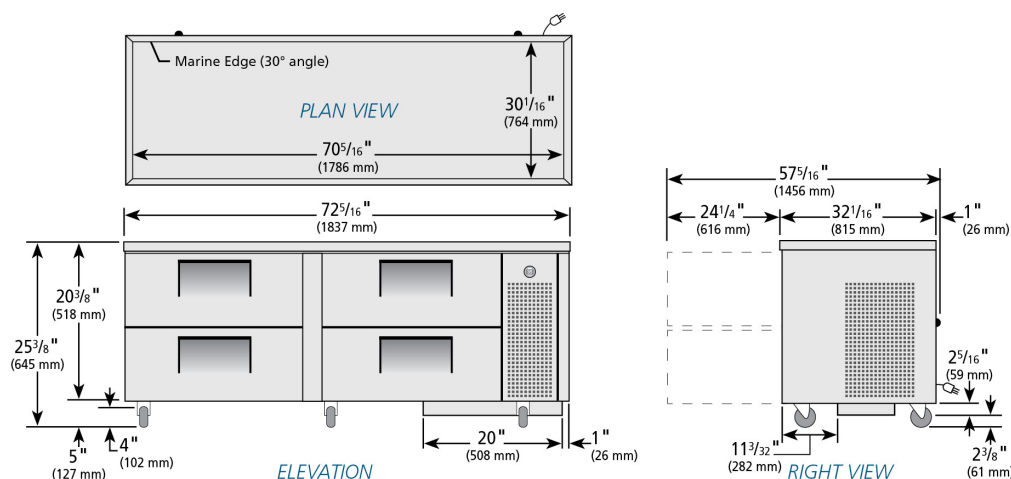
- Counter-top cooking equipment should be used in conjunction with the manufacturer supplied legs. Minimum clearance of 4" (102 mm) is required between bottom of cooking equipment heating element and the TRCB top. Failure to provide clearance voids manufacturer warranty.
- Installation of a heat shield is recommended for optimum performance (supplied by others).

#### OPTIONAL FEATURES/ACCESSORIES

Upcharge and lead times may apply.

- ☐ 230 - 240V / 50 Hz.
- ☐ 6" (153 mm) standard legs (1 set of 6 leg mounting plates required).
- ☐ 6" (153 mm) seismic/flanged legs (1 set of 6 leg mounting plates required).
- ☐ Heavy duty, 16 gauge top.
- ☐ Flat top (no marine edge).
- ☐ Additional size drawer divider bars.
- ☐ Drawer locks.

### PLAN VIEW



#### WARRANTY

Three year warranty on all parts and labor and an additional 2 year warranty on compressor. (U.S.A. only)

METRIC DIMENSIONS ROUNDED UP TO THE NEAREST WHOLE MILLIMETER

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



Model	Elevation	Right	Plan	3D	Back
TRCB-72	TFQY172E	TFQY135S	TFQY172P	TFQY1723	

**TRUE MANUFACTURING CO., INC.**

2001 East Terra Lane • O'Fallon, Missouri 63366-4434 • (636)240-2400 • Fax (636)272-2408 • Toll Free (800)325-6152 • Intl. Fax# (001)636-272-7546 • [www.truemfg.com](http://www.truemfg.com)



## Submittal Sheet

04/21/2023

### ITEM# 05 - GRIDDLE, ELECTRIC, COUNTERTOP (1 EA REQ'D)

Garland US Range ED-36G

Designer Series Griddle, electric, 36" W, countertop, 35-5/8" W x 18" cooking surface, smooth griddle plate, thermostatic control, grease drawer, stainless steel front and sides, 4" legs, 10.1 kW (Garland), CSA, NSF

#### ACCESSORIES

Mfr	Qty	Model	Spec
Garland US Range	1		One year limited parts and labor warranty, covers products purchased and installed in the USA only, standard
Garland US Range	1		208v/60/1-ph, 49 amps, standard direct

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	208	60	1	Direct			49.0				



# Designer Series Electric Griddles

Project \_\_\_\_\_  
 Item \_\_\_\_\_  
 Quantity \_\_\_\_\_  
 CSI Section 11400  
 Approved \_\_\_\_\_  
 Date \_\_\_\_\_

## Designer Series Electric Griddles

### Models

- ED-15G      • ED-24G      • ED-36G
- EDU-15G    • EDU-24G    • EDU-36G



Model ED-24G

### Standard Features

- Stainless steel front and sides
- Easy clean design with recessed protected controls.
- Heat-On indicator lamps
- Thermostat controlled one per foot of width. Dial settings off 100o-450o F (38o-232o C).
- Models with EDU prefix are "CE" approved
- 18" (457mm) deep cooking surface
- 4" (102mm) Stainless Steel legs.
- 1/2" (13mm) polished steel griddle with 2-5/8" (67mm) welded splash guard on sides and rear of plate
- Concealed grease drawer
- One-Year limited parts & labor warranty (USA & Canada only)

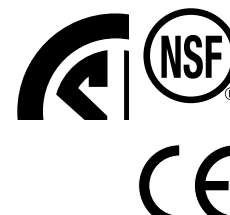
### Options & Accessories

- Stainless steel back and bottom
- Fully grooved griddle, add suffix U (i.e. GD-15GU) or grooved sections, add U1 for 12"(305mm) on left side and U2 for 24" (610mm) on left side

Note : Stands are available see form # CS24/CSDF

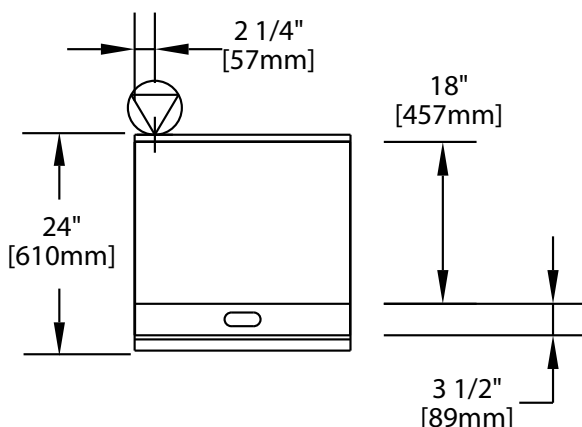
### Specifications

Electric designer series griddles in three widths: models ED-15G, 15" (381mm) wide; ED-24G, 24" (610mm) wide and ED-36G, 36" (914mm) wide. Designed as free standing or to be banked with other ED series equipment. 24" (610mm) deep x 13-3/4" (349mm) high, easy clean design with stainless steel front and sides. Thermostat controlled, with improved insulation underneath the elements allowing for better heat efficiency. Concealed grease drawer behind lower hinged panel. Fully grooved or grooved section griddle available. Models with EDU prefix are "CE" Approved.

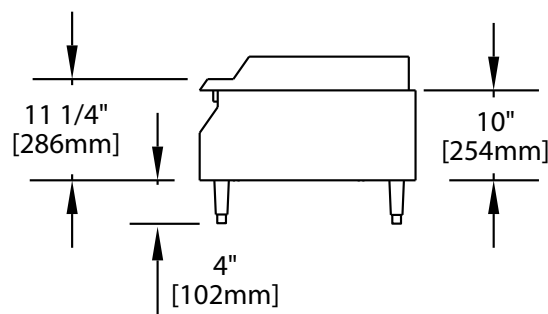
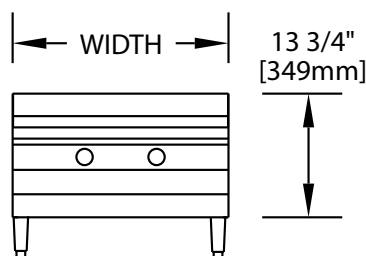




# Designer Series Electric Griddles



Garland products are not approved or authorized for home or residential use, but are intended for commercial applications only. Garland will not provide service, warranty, maintenance or support of any kind other than in commercial applications.



Models	Total kW Load				Nominal Amperes Per Line							
					North America				Export			
	North America		Export		Single Phase		Hi Line -3 Phase		Single Phase		Hi Line - 2 or -3 Phase	
	208V	240V	220V/ 380V	240V/ 415V	208V	240V	208V	240V	220V/ 380V	240V/ 415V	220V/ 380V	240V/ 415V
ED-15G, EDU-15G	3.4	3.4	3.4	3.4	17	14	N/A	N/A	16	14	N/A	N/A
ED-24G, EDU-24G	6.7	6.7	6.7	6.7	33	28	28	25	31	28	16	14
ED-36G, EDU-36G	10.1	10.1	10.1	10.1	49	42	28	25	46	42	16	14

Model	Overall Dimensions			Usable Cooking Surface		Cu. Ft.	Ship Wt. Lb/kg
	Height	Width	Depth	Width	Depth		
ED-15G	13-3/4" (349mm)	15" (381mm)	24" (610mm)	14-5/8" (371mm)	18" (457mm)	6	90/41
ED-24G	13-3/4" (349mm)	24" (610mm)	24" (610mm)	23-5/8" (600mm)	18" (457mm)	8	135/61
ED-36G	13-3/4" (349mm)	36" (914mm)	24" (610mm)	35-5/8" (876mm)	18" (457mm)	11	175/80

Installation Clearances	
Side	Rear
1" (25mm)	1.5" (38mm)

Welbilt reserves the right to make changes to the design or specifications without prior notice.

**Garland Commercial Ranges Ltd.**  
1177 Kamato Road,  
Mississauga, Ontario  
L4W 1X4 CANADA

**General Inquires 1-905-624-0260**  
USA Sales, Parts and Service 1-800-424-2411  
Canadian Sales 1-888-442-7526  
Canada or USA Parts/Service 1-800-427-6668

[www.garland-group.com](http://www.garland-group.com)  
6839  
12/18





## Submittal Sheet

04/21/2023

### ITEM# 06 - HOTPLATE, COUNTERTOP, GAS (1 EA REQ'D)

Southbend HDO-24

Hotplate, gas, countertop, 24", (4) 33,000 BTU open burners, manual controls, removable cast iron grates & crumb tray, stainless steel front, sides & 4" adjustable legs, 132,000 BTU, CSA, NSF (Note: Qualifies for Southbend's Service First™ Program, see Service First document for details)

#### ACCESSORIES

Mfr	Qty	Model	Spec
Southbend	1		Domestic Shipping, inside of North America (Contact factory for price)
Southbend	1		Standard one year limited warranty
Southbend	1		Specify Gas Type

#### GAS

	SIZE	MBTU	KW
1	3/4"	132.0	

#### STEAM

	INLET SIZE	RETURN SIZE	LB/HR	PSIG (min)	PSIG (max)
1					



Job: \_\_\_\_\_ Item# \_\_\_\_\_

HDO



## COUNTERTOP RANGE

### GAS MODULAR COUNTERTOP RANGES



Model HDO-36SU

- ☐ HDO-12
- ☐ HDO-24
- ☐ HDO-36
- ☐ HDO-48

#### Step-up Models:

- ☐ HDO-24SU
- ☐ HDO-36SU
- ☐ HDO-48SU

#### Standard Features

- Available in 12", 24", 36" and 48" (24", 36" and 48" step-up units also available)
- 33,000 BTU NAT (24,000 BTU LP) open top non-clogging burner
- Hi/Low burner controls
- Stainless steel front and sides
- 3/4" rear gas connection and pressure regulator
- 12" cast flush top grates
- 4" stainless steel legs
- Stainless steel, full width crumb tray
- One year limited Parts and Labor Warranty

#### OPTIONS & ACCESSORIES AT ADDITIONAL COST

- ☐ Stainless steel stand
- ☐ Casters for stand
- ☐ High performance WOK ring
- ☐ 2" high insulator base for mounting on refrigerated base
- ☐ Battery spark ignition

#### STANDARD CONSTRUCTION SPECIFICATIONS

**Exterior Finish:** Stainless steel front and sides. Rear and bottom panels are constructed of aluminized steel.

**Range Top:** Each burner is a 33,000 BTU NAT (24,000 BTU LP) cast iron non-clogging burner (available in step-up). Removable flush top grates. Center-to-center measurements between burners not less than 12", side-to-side or front-to-back. Removable one piece, full width crumb tray provided under burners.

**Gas Heat Control System:** Each burner is controlled by a gas valve for independent control of flame. One standing pilot services each burner. A 3/4" rear gas connection is standard.

**Legs:** Stainless steel 4" adjustable legs.

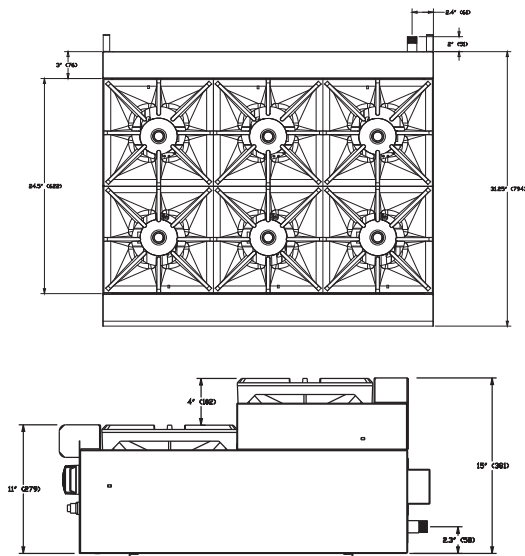


Approval Notes: \_\_\_\_\_

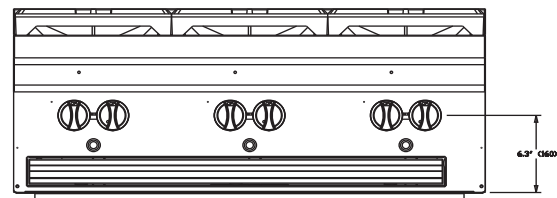
\_\_\_\_\_  
\_\_\_\_\_

Models: ☐ HDO-12 ☐ HDO-24 ☐ HDO-36 ☐ HDO-48 ☐ HDO-24SU ☐ HDO-36SU ☐ HDO-48SU

HDO



Dimensions shown in inches and (millimeters)



## DIMENSIONS

### SHIPPING CRATE DIMENSIONS & WEIGHT

MODEL	WIDTH	NUMBER OF BURNERS	CRATED WIDTH	CRATED DEPTH	CRATED WEIGHT	MODEL	WIDTH	NUMBER OF BURNERS	CRATED WIDTH	CRATED DEPTH	CRATED WEIGHT
HDO-12	12.125" (308)	2(33K/24K)	31" (788)	39" (991)	165 lbs (75 kg)	HDO-36/36SU	36.75" (933)	6(33K/24K)	55" (1398)	39" (991)	253 lbs (115 kg)
HDO-24/24SU	24.5" (622)	4(33K/24K)	31" (788)	39" (991)	209 lbs (94 kg)	HDO-48/48SU	49" (1245)	8(33K/24K)	55" (1398)	39" (991)	299 lbs (135 kg)

Dimensions shown in inches and (millimeters)

## UTILITY INFORMATION

**GAS:** Each unit has a 3/4" rear gas connection with a male NPT connector(female when regulator is added). Minimum supply pressure is 7" W.C. for natural gas and 11" W.C. for propane. All units require a regulated gas supply, pressure regulator included. If using a flexible hose gas connection, the I.D. of the hose must not be smaller than the connector on the unit and must comply with ANSI Z21.69, providing an adequate means of restraint to prevent undue strain on the gas connection.

MODEL	GAS (BTU/HR)	
	NATURAL	PROPANE
HDO-12	66,000	48,000
HDO-24/24SU	132,000	96,000
HDO-36/36SU	198,000	144,000
HDO-48/48SU	264,000	192,000

## MISCELLANEOUS

- If casters are used with flex hose, a restraining device should be used to eliminate undue strain on the flex hose.
- Minimum clearance from noncombustible construction is zero. Minimum clearance from combustible construction is 10" on sides and 6" on rear.
- Install under vented hood.
- Check local codes for fire and sanitary regulations.

### NOTICE:

Southbend has a policy of continuous product research and improvement. We reserve the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment.

## DISCLAIMER

- Oversized Cookware Use Policy** – "Oversized cookware is considered anything 12" in diameter or larger. Larger vessels may be used to straddle over open top grates (although efficiency may be lost when doing so). It is highly recommended when using oversized cookware that its use be limited to the rear portion of the range. IF oversized cookware is used on the front portion and hangs over onto the front rail, excessive heat may be driven and trapped in the front rail and can cause premature damage to the components housed there. This is easily avoided by never allowing cookware to overlap the front rail of the range. Electrical and other components housed in this area should see years of performance under normal intended use."

**INTENDED FOR COMMERCIAL USE ONLY.  
NOT FOR HOUSEHOLD USE.**





## Submittal Sheet

04/21/2023

### ITEM# 07 - MICROWAVE CONVECTION OVEN (2 EA REQ'D)

UNOX XASW-03HS-EDDS

SPEED.Pro™ Convection and Speed Baking Oven (3 PHASE), (3) 18" x 13" trays speed bake capacity, (1) 18" x 13" tray speed capacity, 3.5kW convection, 6.5kW microwave, 86°F to 500°F temperature range, safety thermostat, stackable, 9-baking steps, (24) quick programs, (896) memory programs, touch screen control panel, USB port, wifi & ethernet connectivity, LED interior light, solid pull down door, (3) TG305 trays & (1) TG360 SPEED.Plate tray included, stainless steel interior & exterior, 208-240v/60/3-ph, IPX3 (includes 6.5 ft cable and plug)

#### ACCESSORIES

Mfr	Qty	Model	Spec
UNOX	1	INSTALL FORM	End User Data & Installation Confirmation Form
UNOX	2		1 year parts and 1 year labor warranty standard
UNOX	2		208/240v/60/3-phase

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1								6.5			
2	208-240	60	3					3.5			

#### ELECTRICAL 1 REMARKS

Microwave 5.6-6.5kW

#### ELECTRICAL 2 REMARKS

Air heating 2.6-3.5kW



# XASW-03HS-EDDS

Project \_\_\_\_\_

Item \_\_\_\_\_

Quantity \_\_\_\_\_

Date \_\_\_\_\_

## Model

SPEED.Pro™

Baking speed oven

Electric

3 trays 18" x 13" (BAKE)

Drop down opening

1 tray 17-23/32" x 13" (SPEED)

6" Touch control panel



## Description

SPEED.Pro™ is the world's first and only speed baking oven: a convection oven and a speed baking oven in a single piece of equipment. Thanks to the large baking chamber of the SPEED.Pro™, you can use the Bake mode to bake up to 3 460 x 330 trays of bakery or pastry products, even frozen ones, obtaining perfectly uniform results. The Speed mode allows you to cook and regenerate food, in single or multiple portions, in record time thanks to the combination of controlled hot air flows, microwave technology and the special Speed.Plate baking tray that transmits heat by contact, perfectly toasting all bread-based products.

## Standard cooking features

### Manual cooking

- **Temperature:** 86 °F – 500 °F
- Up to 9 cooking steps
- 24 quick programs (12 Speed and 12 Bake)

### Programs

- 384 Bake programs
- 384 Speed programs
- **CHEFUNOX:** choose something to cook from the library and the oven will automatically set all the parameters (Bake)
- **SPEEDUNOX:** choose something to cook from the library and the oven will automatically set all the parameters (Speed)

### Key features

- High-resistance AISI 304 stainless steel cooking chamber
- Baking chamber with integrated tray supports
- Visual display of the baking status by means of multicoloured LEDs
- Crumb collection system integrated in the filter under the door
- Proximity door contact switch
- **Wi-Fi / USB data:** download/upload HACCP data
- **Wi-Fi / USB data:** download/upload programs

## Advanced and automatic cooking features

### Unox Intelligent Performance

- **ADAPTIVE.Cooking™:** automatically regulates the cooking parameters to ensure repeatable results
- **SMART.Preheating:** automatically sets the preheating temperature and duration
- **AUTO.Soft:** manages the heat rise to make it more delicate

### Unox Intensive Cooking

- **SPEED.Plus:** generates microwaves and distributes them evenly throughout the baking chamber
- **DRY.Plus:** rapidly extracts humidity from the cooking chamber
- **AIR.Plus:** multiple fans with reverse gear and 2 speed settings

### Data Driven Cooking

- Check and monitor in real-time the operating conditions of your ovens, create and share new recipes. Artificial intelligence transforms consumption data into useful information and allows you to increase daily profits

### App and web services

- Data Driven Cooking app & webapp
- Top Training app
- Combi guru app



"This product has been tested in accordance with the procedures and in compliance with the limits prescribed by EPA202."

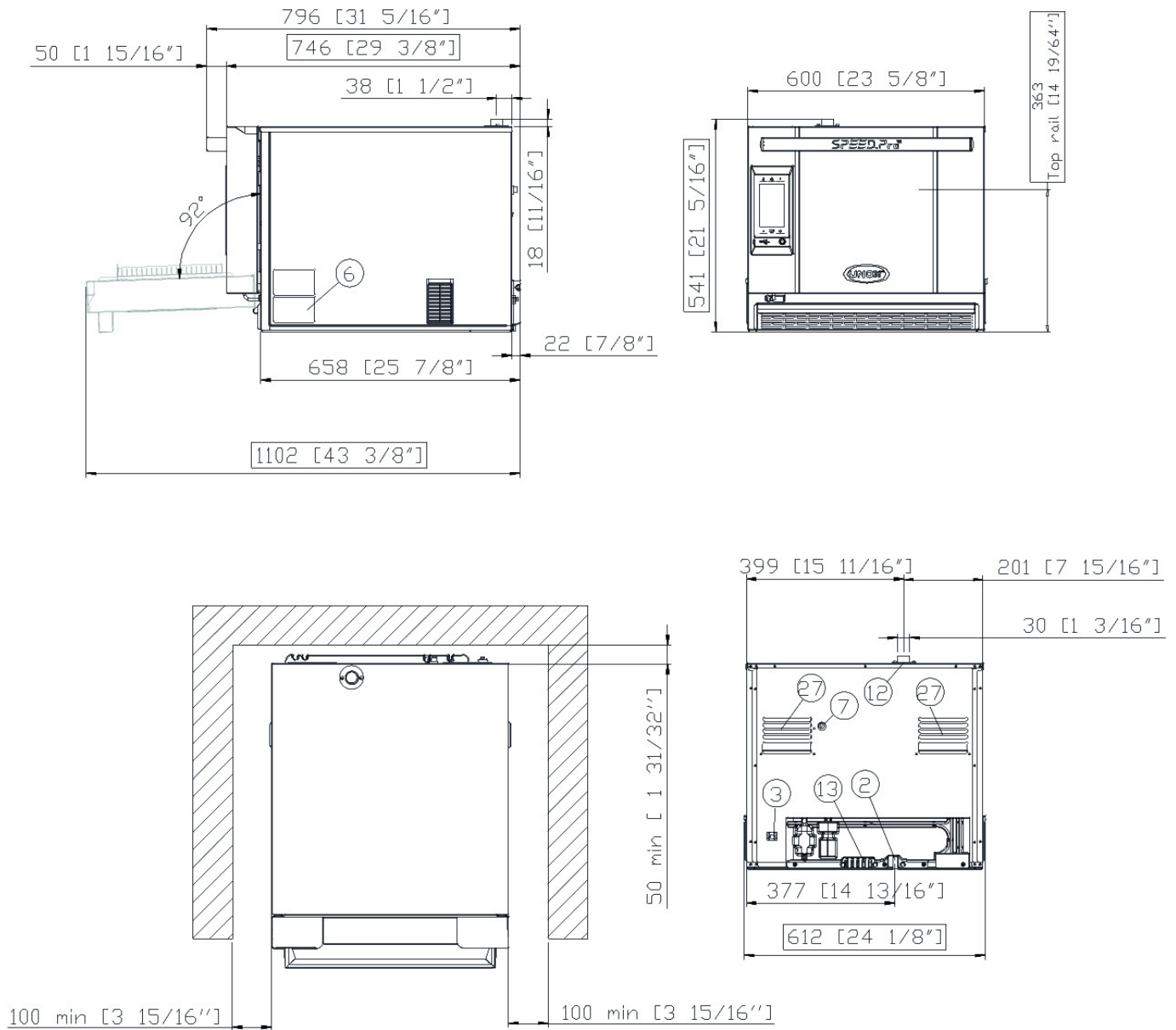


Views

Connection positions

Dimensions and weight

# XASW-03HS-EDDS



## Dimensions and weight

Width	23-5/8"	600 mm
Depth	31-3/8"	797 mm
Height	21-5/16"	541 mm
Net weight	197 lbs	89 kg
Tray pitch	2-15/16"	75 mm

## Connection positions

2	Terminal board power supply
3	Unipotential terminal
6	Technical data plate
7	Safety thermostat
12	Hot fumes exhaust chimney
13	Accessories connection

27	Cooling air outlet
----	--------------------



# XASW-03HS-EDDS

Power supply

Water connection

Installation requirements

Accessories

## Electrical power supply

### STANDARD

Voltage	240 V
Phase	~3PH+PE
Frequency	60 Hz
Total power	5.6-6.5 kW
Max Amp draw	17 A
Required breaker size	30 A
Powe cable requirements*	4 x AWG 10
Plug	NEMA 15-30P
OPTION A	
Voltage	208 V
Phase	~3PH+PE
Frequency	60 Hz
Total power	5.6-6.5 kW
Max Amp draw	17.1 A
Required breaker size	30 A
Powe cable requirements*	4 x AWG 10
Plug	NEMA 15-30P

\*Recommended size - observe local ordinance.

## Accessories

- **SPRAY&Rinse:** Practical spray detergent to manually clean all kinds of oven. It degreases and removes all kind of dirt
- **Baking Essentials:** special trays for BAKE mode
- **Speed Essentials:** special trays and spatulas for SPEED mode
- **Ethernet:** Connection board to keep the oven connected to Unox and DDC.App
- **Wi-Fi:** Connection board to keep the oven connected to Unox cloud, mandatory to extend the warranty

## Ventilation

Tested by Intertek for ventless operation.

### EPA 202 test (8 hr):

Product	Pepperoni Pizzas (150)
Ventless requirement	< 5.00 mg/m <sup>3</sup>
Result	Requirement met

Internal catalytic filtration to limit smoke, grease, and odor emissions.

## Installation requirements

Installations must comply with all local electrical systems, particularly as for minimum wire gauge required for field connection, hydraulic and ventilation supply.

Register to DDC Service to access data and product specifications.

[www.ddc.unox.com](http://www.ddc.unox.com)



# BAKERLUX SPEED.Pro™

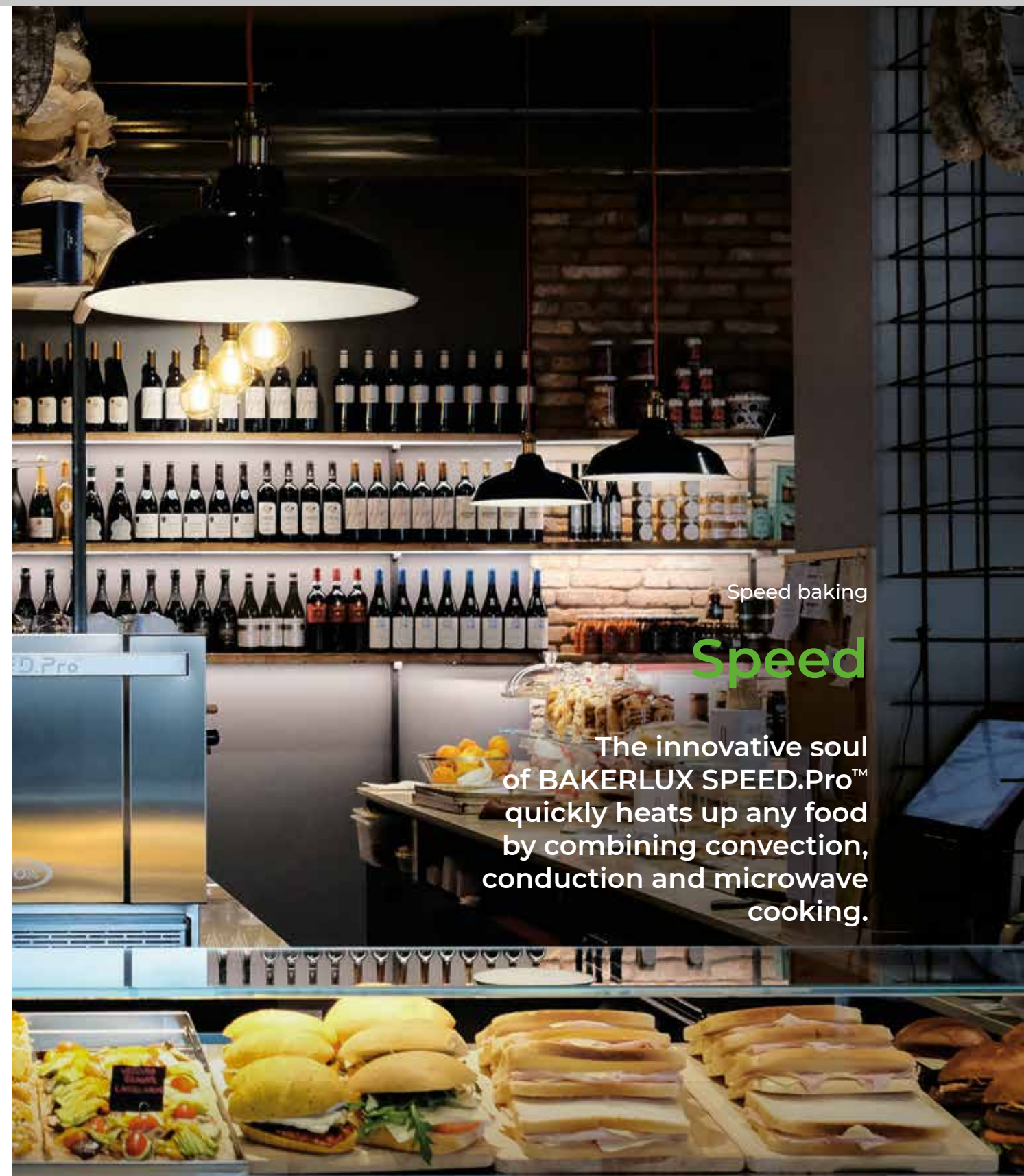
The first ever baking speed oven



# Index

BAKERLUX SPEED.Pro™	page	4
The formula	page	6
<b>Bake</b> mode	page	8
<b>Speed</b> mode	page	14
<hr/>		
SPEED.Pro™ panel	page	24
Unox Technologies	page	26
Data Driven Cooking	page	30
Technical Assistance	page	33
Technical data	page	36
Unox in the world	page	42

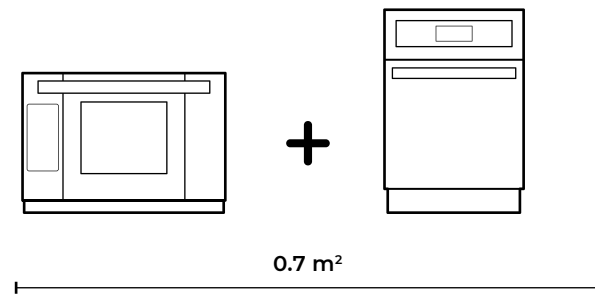






Maximum performance with the smallest footprint

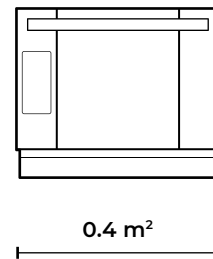
# The equation that multiplies your profit



2 in 1

Convection oven and speed oven.  
Two pieces of equipment, double the space,  
double the cost. How often do they actually work  
at the same time?

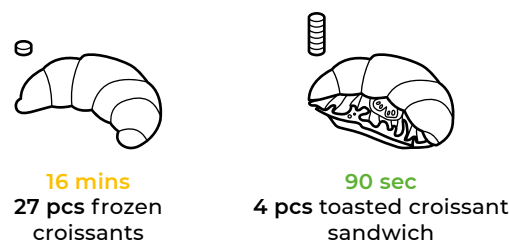
=



BAKERLUX SPEED.Pro™

BAKERLUX SPEED.Pro™ is the first ever  
baking speed oven: a convection oven and  
a speed oven in a single piece of equipment.  
Small footprint, maximum profit.

=



Profit x 3

Fill your baked goods once baked, then heat  
them up in a few seconds when the order  
comes in, serve them hot and fragrant:  
multiply your profit!

Maximum speed

## Triple cooking

**Convection**  
External golden  
browning



**Microwave**  
Fast internal  
heating



**Conduction**  
Crusty toasting  
by contact



BAKERLUX SPEED.Pro™

# Bake mode

The spacious baking chamber with the double-speed fan is ideal to grant fragrant and browned baked goods. Conquer your customer, diversify your offer, increase your profit.

Traditional excellence

# A flawless convection baking

What is the secret to a perfect result?

Convection baking requires perfect control of the air flows in every point of the baking chamber and the effective removal of any excess of humidity.

For BAKERLUX SPEED.Pro™ nothing has ever been so simple.

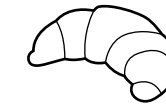


**Capacity**  
3 460 x 330 trays

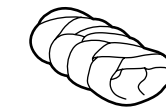
**Convection power**  
3.2 kW

**Fan speed**  
2750/1700 rpm\*

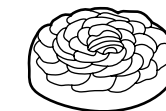
\*Data refers to the temperature of 180 °C



**27** croissants  
in 16 minutes



**27** mini strudels  
in 25 minutes



**36** Danish pastries  
in 20 minutes



**45** mini soft rolls  
in 16 minutes



**18** midi baguettes  
in 18 minutes



**3** focaccias  
in 14 minutes



## Pastry and Bakery

# Baking Essentials

## BAKE

Aluminium tray.



### Ideal for

Pastry;  
Cakes.

### Advantages

Aluminium tray for rapid heat exchange;  
Ultra low edge for maximum baking  
uniformity.

Art. **TG305** 460 x 330

## FORO.BAKE

Perforated aluminium pan.



### Ideal for

Pizza;  
Focaccia;  
Bread.

### Advantages

Increase the dough sweating during cooking;  
Ultra low edge for maximum baking  
uniformity.

Art. **TG310** 460 x 330

## FORO.BLACK

Non-stick perforated aluminium pan.



### Ideal for

Croissants;  
Frozen bread;  
Danish pastries and pastry.

### Advantages

Ultra low edge for maximum distribution of air  
flows;  
Baking paper not necessary.

Art. **TG330** 460 x 330

## BAGUETTE.GRID

Extra-light chromium plated grid - 5 channels.



### Ideal for

Frozen baguettes;  
Frozen midi-baguettes.

### Advantages

Maximizes the air circulation on every surface  
of the bread.

Art. **GRP310** 460 x 330

## PAN.FRY

Non-stick steel pan.



### Ideal for

Pizza;  
Quiche lorraine;  
Pre-fried foods.

### Advantages

20 mm depth.

Art. **TG350** 460 x 330

## STEEL.GRID

Non-stick stainless steel grid.



### Ideal for

Frozen pizzas;  
Frozen bread.

### Advantages

Maximizes the air circulation on every surface  
of the food.

Art. **GRP335** 460 x 330

BAKERLUX SPEED.Pro™

# Speed mode

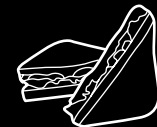
The plate for speed mode makes it possible to heat both single and multiple portions of food in seconds. Service times are halved, your profits doubled.

Innovative excellence

# Multi-portion speed baking



**250 gr** lasagna  
in 100 seconds



**4** toasted sandwiches  
in 75 seconds



**250 gr** chicken wings  
in 110 seconds



**4** club sandwiches  
in 125 seconds



**4** burritos  
in 90 seconds



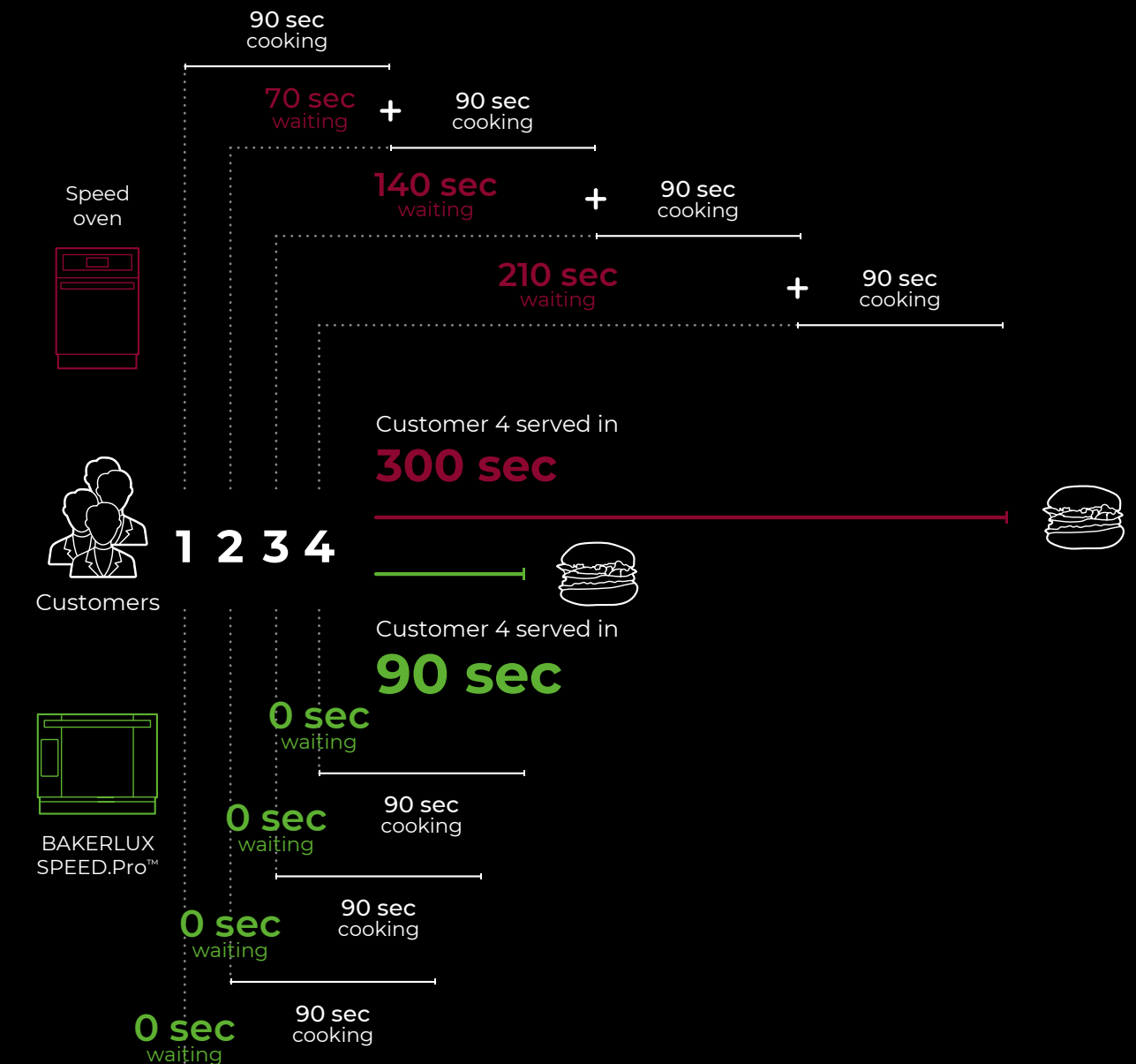
**9** croissant sandwich  
in 50 seconds

How much does it cost you to keep your customers waiting?

# Get rid of all waiting, multiply your earnings

The limited size of the pan of a traditional speed oven does not allow you to cook more than one sandwich at a time. This translates into prolonged waiting times at rush hours.

Thanks to BAKERLUX SPEED.Pro™ and the 450 x 330 mm surface of the special SPEED.Plane tray you can bake up to 4 or more sandwiches at the same time to never keep your customer waiting.





The plate that speeds up time

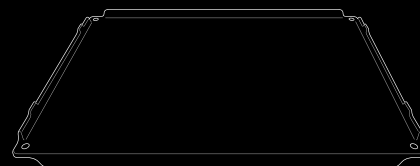
# SPEED.Plate

The SPEED.Plate plate accumulates heat during the preheat or when the oven is in stand-by mode and releases it quickly as soon as the food is put onto it. The non-stick coating makes it easy to clean.



## Flat side

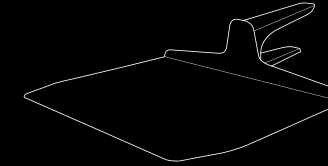
The flat surface quickly heats up and browns the bottom surface of the food and gives it an intense and uniform color. The side and rear lips make it easy to position the food and remove it.



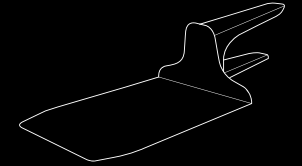
Art. **TG360** 450 x 330

## SPEED.Pro™ spatulas

Quickly unload products without any risk thanks to the ergonomic handle of our SAFE.Hand spatula which prevents any contact with hot surfaces.



Art. **XUC165**  
Technical details on page 41

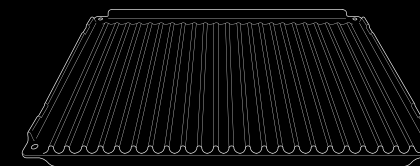


Art. **XUC166**  
Technical details on page 41



## Ribbed side

The ribbed side of the SPEED.Plate allows a more effective removal of humidity from the bottom surface of the product. Ideal for club sandwiches, breads without crust or deli.



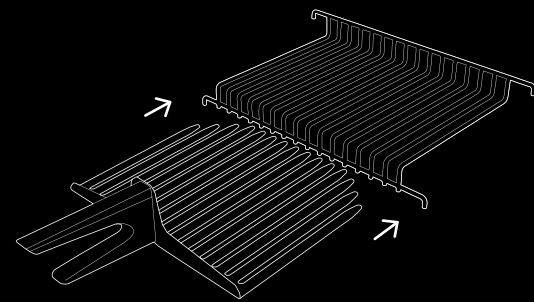
Art. **TG360** 450 x 330



Rapid marks

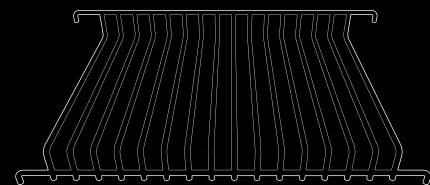
# SPEED.Grid

The SPEED.Grid grid allows you to obtain intense markings on every type of product. Combined with the special toothed scoop, it allows easy positioning and food extraction.



## Intense markings and ease of use

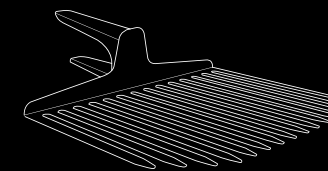
Quick to preheat, simple to use. The stainless steel SPEED.Grid quickly heats up food from which humidity needs to be taken out from its bottom surface, such as toast or white bread.



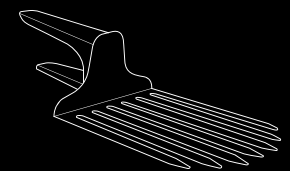
Art. **GRP360** 460 x 300

## SPEED.Pro™ spatulas

Quickly load and unload products without any risk thanks to the ergonomic handle of our SAFE.Hand spatula which prevents any contact with hot surfaces.



Art. **XUC167**  
Technical details on page 41



Art. **XUC168**  
Technical details on page 41

Invented to simplify your work

# Intelligent technology

The Unox technology applied to BAKERLUX SPEED.Pro™ ovens is designed to automatically manage the cooking and heating process of food and thus allows you to focus on what is most important to you.



## Bake interface

# Convection mode

The BAKE mode allows you to carry out convection baking programs made of several steps, store the most used programs or use the automatic CHEFUNOX programs.

Ideal for frozen bakery products, but also capable of cooking other types of food, it allows you to reduce the cooking process times by inserting one or more steps that combine convection and microwaves.

**Set**

Up to 9 baking steps for each program

**Programs**

384 programs memory

**CHEFUNOX**

Select what you want to bake and the result you are looking for



## Speed interface

# Speed mode

The SPEED mode allows you to quickly heat up any type of food, memorise the most used programs or use the SPEEDUNOX automatic processes.

The oven remains at working temperature even during the stand-by phases to always be ready and to heat up your dishes in seconds. ADAPTIVE.Cooking™ technology automatically adjusts the cooking process according to the actual food load.

**Set**

Up to 9 cooking steps for each program

**Programs**

384 programs memory

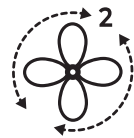
**SPEEDUNOX**

Select what you want to bake and the result you are looking for



Unox Technologies

# Performance with no compromises



AIR.Plus

## It conducts, unites, transforms.

It guarantees perfect air and heat distribution within the baking chamber, for uniform results at every point throughout every tray, for all trays.



DRY.Plus

## Extracting humidity for maximum flavour.

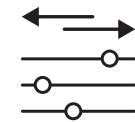
It extracts humidity from the baking chamber, thus helping the internal structure of the product to form properly and guaranteeing a texture that remains the same even hours after it has finished baking.



SPEED.Plus

## The cooking accelerator.

The combined work of a microwave generator, the geometry of the waveguides and of the cooking chamber and the high-speed fan with stirring function ensures the even distribution of the microwaves on each point of the plate.



ADAPTIVE.Cooking™

## Perfect results. Every time.

By registering changes in humidity and temperature, the oven automatically adjusts the cooking process to the actual food-load to deliver an identical and perfect result every time.



SMART.Preheating

## Intelligent preheating.

Combining the analysis of previous cooking processes with the requirements of the next one, the oven automatically sets the best temperature and preheating time to guarantee maximum repeatability of results throughout the day, therefore reducing waiting time.



AUTO.Soft

## Gentle cooking function.

When activated, the oven automatically regulates the rise in temperature to make it more gentle and guarantee an optimal heat distribution on each pan in the oven. The best for delicate and heat-sensitive foods.



Designed by your desires

## Services

**Our promise is your  
guarantee of solid  
performance. Stay focused  
on your goals knowing  
that we are always  
by your side.**

Anton Bodyashkin - Ugli Restaurant - Russia





Data Driven Cooking

**Create.  
Understand.  
Improve.**

The Data Driven Cooking Artificial Intelligence transforms the consumption data of your oven into useful information that allows you to increase your daily profit.

Data will be always accessible by smartphone or PC

## An ecosystem to be discovered

Create and share



**Your recipes in all your ovens.**

Create your recipe book and synchronise it with all your ovens with just one click, keeping all your kitchens or stores up to date. You may create it directly from one of your ovens or from your PC.

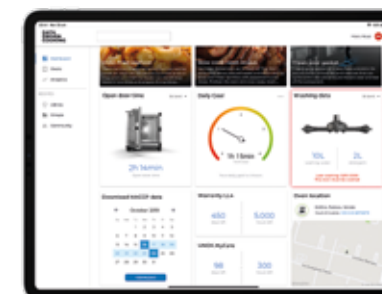
Understand



**Monitor and improve your performance.**

DDC.Stats gives you full control over energy, water, and detergent consumption and over your cooking times and oven usage. Compare the performances, detect anomalies and get useful information to improve the efficiency of the ovens in your network.

360° Assistance



**Let DDC.Coach train you.**

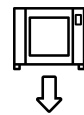
DDC.Coach is a digital assistant that provides you with advice based on the actual use of your ovens. This allows you to take full advantage of their potential. Capitalise on the abilities of your ovens and maximise the return on your investment!

After-sales services

# Technical Assistance

Installation

## The right partner next to your kitchen



### A global Service network

A perfect installation is essential to guarantee the correct functioning of your BAKERLUX SPEED.Pro™ oven and eliminate interruptions in your daily work. We focus on you, so you can focus on what matters to you.

Find the authorised Service Centers nearest to your kitchen.

Maintenance

## Don't stop your kitchen

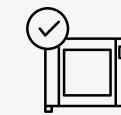


### The quickest on site Service

When connected to the internet, your oven communicates directly with our Service Team, so we can intervene as soon or even before maintenance is required. Keeping your oven in optimal condition is Unox' priority: our technicians are at your disposal to provide you the best online and on-site support.

LONG.Life warranty

## A promise of reliability



### A choice made to last

Passion does not allow any distraction and to deal with the unexpected you need reliable assistants by your side. Thanks to Unox and its LONG.Life program, you will have the assistance of our specialised technicians and 12 month warranty covering labour and spare parts. All our products are designed to last a long time, assure you the best possible technology and allow you to face any challenge. Thus you will have to worry only about fostering your success.

\*Check the Warranty Conditions for your country at [unox.com](http://unox.com)

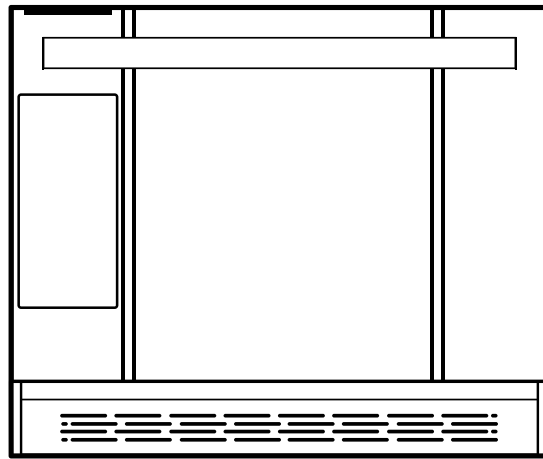
Data sheet, features and accessories

# The first ever baking speed oven



# BAKERLUX SPEED.Pro™

## Technical details



600 x 797 x 541 mm  
w x d x h

**XESW - 03HS - EDDN**

capacity 3 460 x 330

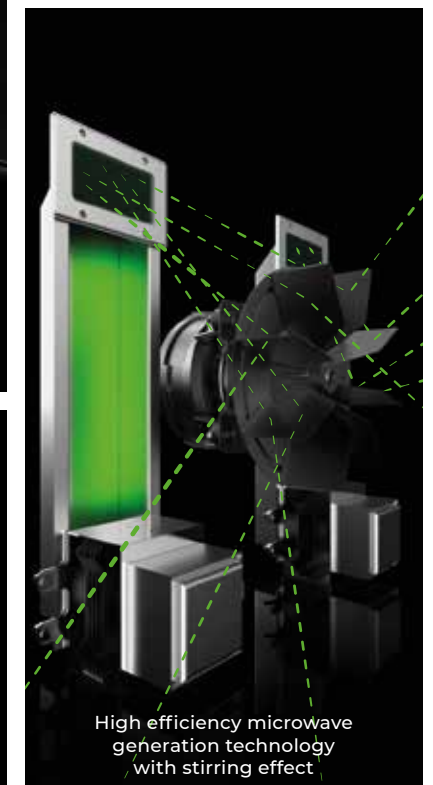
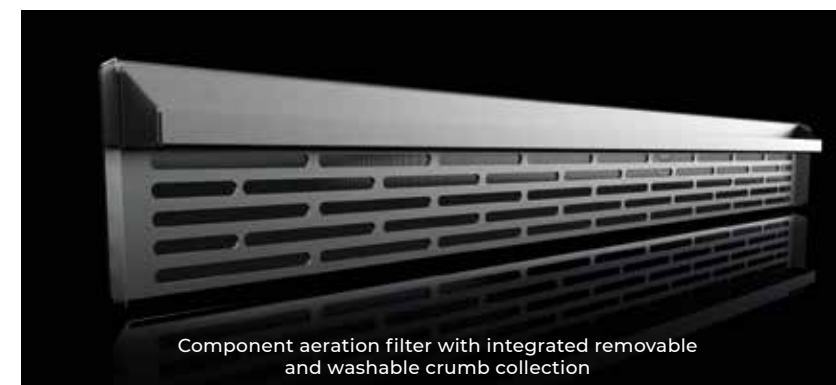
pitch 75 mm

frequency 50 Hz

voltage 380-415 V 3 PH+N+PE

power 6.5 kW

weight 88 kg



Note  
All BAKERLUX SPEED.Pro™ ovens have SPEED.Plato and 3 BAKE trays included.

Solutions that maximise your investment

# Increase your Possibilities

Configurations



## **SPEED.Pro™ + SPEED.Pro™**

Use the side-by-side positioning or stacking kits to install multiple units in minimal space.



## **LIEVOX + SPEED.Pro™ + SHOP.Pro™ MASTER**

For the most demanding customers, the prover allows you to exploit the full potential of BAKERLUX SPEED.Pro™ as a baking oven.



## **SPEED.Pro™ + EVEREO®**

Combined with EVEREO®, SPEED.Pro™ allows you to create a retail shop capable of quickly serving any type of food.

Configurations

SPEED.Pro™

39

SPEED.Pro™

38

Features

UNOX INTELLIGENT PERFORMANCE

- ADAPTIVE.Cooking™: automatically adjusts the cooking parameters to ensure repeatable results
- SMART.Preheating: automatically sets temperature and preheating duration
- AUTO.Soft: manages the rise in temperature to make it more delicate

UNOX INTENSIVE COOKING

- DRY.Plus technology: extracts humidity from the baking chamber
- AIR.Plus: fan with reversing gear and 2 adjustable speeds
- SPEED.Plus: generates microwaves and distributes them evenly throughout the baking chamber

DATA DRIVEN COOKING

- Wi-Fi connection
- Ethernet connection
- ddc.unox.com: monitor the usage in real time, create and send recipes from your pc to your ovens
- DDC.Stats: analyse, compare and improve your oven usage and consumption data
- DDC.App: monitor your connected ovens in real time from your smartphone
- DDC.Coach: it analyzes the way you use the oven and suggests you new personalised recipes

MANUAL BAKING

- Convection cooking from 30 °C to 260 °C
- Convection cooking + microwave from 30 °C
- Maximum preheating temperature 260°C

ADVANCED AND AUTOMATIC COOKING

- PROGRAMS: save up to 896 programs with their name, image or handwritten signature
- CHEFUNOX: choose what to cook from the library and the oven will automatically set all the parameters
- SPEEDUNOX: choose what to cook from the library and the oven will automatically set all the parameters for the speed mode
- 9 baking steps
- 24 quick programs (12 SPEED and 12 BAKE)

AUXILIARY FUNCTIONS

- Preheating temperature up to 260 °C - adjustable by the user for each program
- End of cooking time display
- Holding cooking mode «HOLD» and continuous functioning «INF»
- Visualisation of the nominal value of baking chamber temperature
- Temperature units shown in °C or °F

PERFORMANCE AND SAFETY

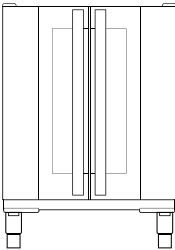
- Protek.SAFE™: electrical power absorption related to the real needs
- Protek.SAFE™: Cool external surfaces

TECHNICAL DETAILS

- Rounded stainless steel AISI 304 cooking chamber
- Baking chamber with integrated tray supports
- Visual display of the baking status by means of multicoloured LEDs
- Control panel with water resistance certification - IPX3
- Crumb collection system integrated in the filter under the door
- Heavy duty structure with innovative materials
- 2 speed fan system with high performance round heating elements
- Drop down door opening
- Proximity door contact switch
- Autodiagnosis system for problems or brake down
- Safety thermostat

Accessories

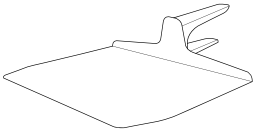
PROOFERS



**LIEVOX**  
8 460 x 330  
600 x 711 x 750 mm - w x d x h  
**Art. XEKPT-08HS-C**

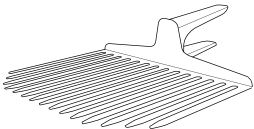
**LIEVOX WITH BOILER**  
8 460 x 330  
600 x 711 x 750 mm - w x d x h  
**Art. XEKPT-08HS-B**

SPATULA



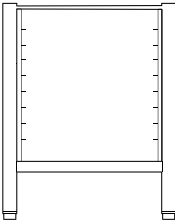
**FLAT SPATULA**  
Non-stick aluminum spatula  
for SPEED.Plate  
365 x 477 x 92 mm - w x d x h  
**Art. XUC165**

Non-stick aluminum spatula  
for SPEED.Plate  
165 x 427 x 92 mm - w x d x h  
**Art. XUC166**

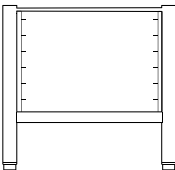


**COMB SPATULA**  
Aluminum spatula for SPEED.Grid  
365 x 477 x 92 mm - w x d x h  
**Art. XUC167**  
Aluminum spatula for SPEED.Grid  
165 x 427 x 92 mm - w x d x h  
**Art. XUC168**

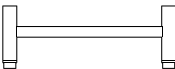
STAND



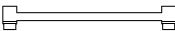
**HIGH STAND**  
594 x 546 x 738 mm - w x d x h  
**Art. XWKRT-08HS-H**



**INTERMEDIATE STAND**  
594 x 546 x 559 mm - w x d x h  
**Art. XWKRT-06HS-M**



**LOW STAND**  
594 x 546 x 355 mm - w x d x h  
**Art. XWKRT-00HS-L**

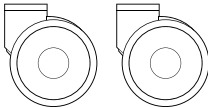


\*Mandatory for oven positioning  
on the floor

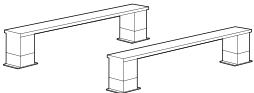
FLOOR POSITIONING

594 x 546 x 150 mm - w x d x h  
**Art. XWKRT-00HS-F**

WHEELS AND FEET

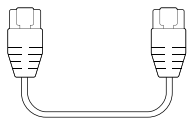


**WHEELS KIT**  
2 wheels with brake - 2 wheels  
without brake - safety chains  
**Art. XUC012**



**FEET KIT**  
2 brackets with feet for oven  
positioning on a table  
**Art. XUC025**

CONNECTION

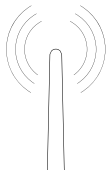


**ACCESSORIES  
FOR THE OVENS  
CONNECTION**  
Ethernet connection kit  
**Art. XEC011**

CLEANING AGENTS



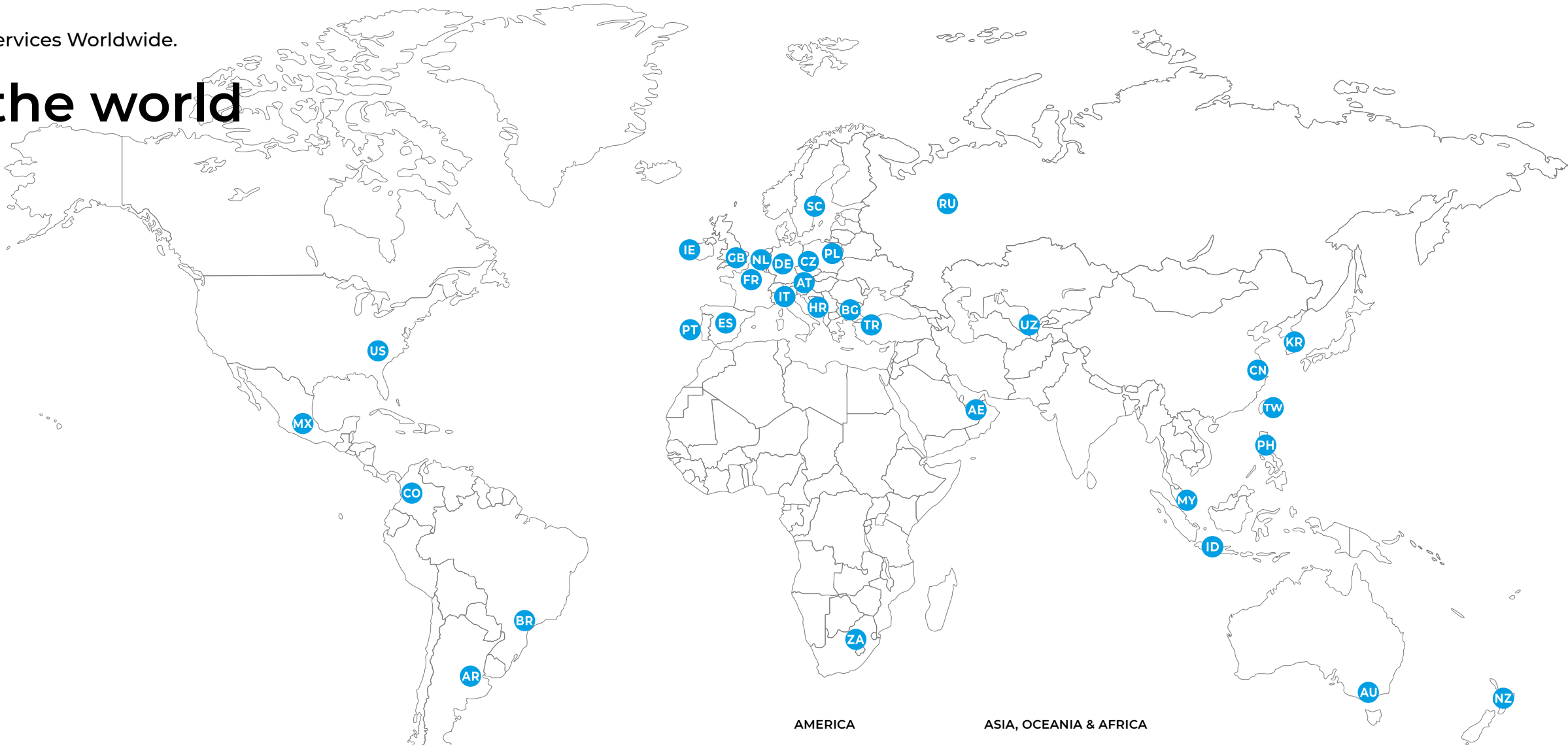
**SPRAY&Rinse**  
Spray detergent  
**Art. DB1044**



**ACCESSORIES  
FOR THE OVENS  
CONNECTION**  
Wifi connection kit  
**Art. XEC012**

Global company. Best Services Worldwide.

# Unox in the world



Contacts

Contacts

INTERNATIONAL

UNOX S.p.a

Via Majorana, 22  
35010 - Cadoneghe (PD) - Italy  
E-mail: [info@unox.com](mailto:info@unox.com)  
Tel: +39 049 8657511

EUROPE

IT - ITALIA

UNOX S.p.a  
E-mail: [info@unox.it](mailto:info@unox.it)  
Tel: +39 049 8657511

DE - DEUTSCHLAND

UNOX DEUTSCHLAND GMBH  
E-mail: [info.de@unox.com](mailto:info.de@unox.com)  
Tel: +49 2951 98760

FR - FRANCE, BELGIUM & LUXEMBOURG

UNOX FRANCE s.a.s.  
E-mail: [info.fr@unox.com](mailto:info.fr@unox.com)  
Tel: +33 4 78 17 35 39

PT - PORTUGAL

UNOX PORTUGAL  
E-mail: [info.pt@unox.com](mailto:info.pt@unox.com)  
Tel: +351 918 228 787

ES - ESPAÑA

UNOX PROFESIONAL ESPAÑA S.L.  
E-mail: [info.es@unox.com](mailto:info.es@unox.com)  
Tel: +34 900 82 89 43

GB - UNITED KINGDOM

UNOX UK Ltd.  
E-mail: [info@unoxuk.com](mailto:info@unoxuk.com)  
Tel: +44 1252 851 522

IE - IRELAND

UNOX IRELAND  
E-mail: [info.ie@unox.com](mailto:info.ie@unox.com)  
Tel: +353 (0) 87 32 23 218

SC - SCANDINAVIAN COUNTRIES

UNOX SCANDINAVIA AB  
E-mail: [info.se@unox.com](mailto:info.se@unox.com)  
Tel: +46(0)790 75 63 64

AT - ÖSTERREICH

UNOX ÖSTERREICH GMBH  
E-mail: [info.de@unox.com](mailto:info.de@unox.com)  
Tel: +43 800 880 963

RU - РОССИЯ, ПРИБАЛТИКА И СТРАНЫ СНГ

UNOX РОССИЯ  
E-mail: [info.ru@unox.com](mailto:info.ru@unox.com)  
Tel: +7 (499) 702 - 00 - 14

CZ - ČESKÁ REPUBLIKA

UNOX DISTRIBUTION s.r.o.  
E-mail: [info.cz@unox.com](mailto:info.cz@unox.com)  
Tel: +420 241 940 000

HR - HRVATSKA

UNOX CROATIA  
E-mail: [narudzbe@unox.com](mailto:narudzbe@unox.com)  
Tel: +39 049 86 57 538

BG - БЪЛГАРИЯ

UNOX BULGARIA  
E-mail: [info.bg@unox.com](mailto:info.bg@unox.com)  
Tel: +359 2 419 05 00

PL - POLSKA

Unox Polska Sp.zo.o.  
E-mail: [info.pl@unox.com](mailto:info.pl@unox.com)  
Tel: +48 665 232 000

TR - TÜRKİYE

Unox Turkey Profesyonel mutfak ekipmanları endüstri ve ticaret limited şirketi  
E-mail: [info.tr@unox.com](mailto:info.tr@unox.com)  
Tel: +90 530 176 62 03

NL - NETHERLANDS

UNOX NETHERLANDS B.V.  
E-mail: [info.nl@unox.com](mailto:info.nl@unox.com)  
Tel: +31 6 27 21 14 10

US - U.S.A. & CANADA

UNOX Inc.  
E-mail: [info.usa@unox.com](mailto:info.usa@unox.com)  
Tel: +1 800 489 8669

CO - COLOMBIA

UNOX COLOMBIA  
E-mail: [info.co@unox.com](mailto:info.co@unox.com)  
Tel: +57 350 65 88 204

BR - UNOX BRASIL

SERVICOS LTDA.  
E-mail: [info.br@unox.com](mailto:info.br@unox.com)  
Tel: +55 11 98717-8201

AR - ARGENTINA

UNOX ARGENTINA  
E-mail: [info.ar@unox.com](mailto:info.ar@unox.com)  
Tel: +54 911 37 58 43 46

MX - MEXICO

UNOX MEXICO, S. DE R.L. DE C.V.  
E-mail: [info.mx@unox.com](mailto:info.mx@unox.com)  
Tel: +52 55 8116-7720

## ASIA, OCEANIA & AFRICA

ZA - SOUTH AFRICA

UNOX SOUTH AFRICA  
E-mail: [info.sa@unox.com](mailto:info.sa@unox.com)  
Tel: +27 845 05 52 35

AE - U.A.E.

UNOX MIDDLE EAST DMCC  
E-mail: [info.uae@unox.com](mailto:info.uae@unox.com)  
Tel: +971 4 554 2146

UZ - UZBEKISTAN

UNOX PRO LLC  
E-mail: [info.uz@unox.com](mailto:info.uz@unox.com)  
Tel: +998 90 370 90 10

CN - 中华人民共和国

UNOX TRADING (SHANGHAI) Ltd. CO.  
电子邮件: [info.china@unox.com](mailto:info.china@unox.com)  
电话: +86 21 56907696

MY - MALAYSIA & SINGAPORE

UNOX (ASIA) SDN. BHD  
E-mail: [info.asia@unox.com](mailto:info.asia@unox.com)  
Tel: +603-58797700

PH - PHILIPPINES

UNOX PHILIPPINES  
E-mail: [info.asia@unox.com](mailto:info.asia@unox.com)  
Tel: +63 9173108084

ID - INDONESIA

UNOX INDONESIA  
E-mail: [info.asia@unox.com](mailto:info.asia@unox.com)  
Tel: +62 81908852999

KR - 대한민국

UNOX KOREA CO. Ltd.  
이메일: [info.asia@unox.com](mailto:info.asia@unox.com)  
전화: +82 2 69410351

TW - TAIWAN, HONG KONG & MACAU

UNOX TAIWAN  
E-mail: [info.tw@unox.com](mailto:info.tw@unox.com)  
Tel: +886 928 250 536

AC - OTHER ASIAN COUNTRIES

UNOX (ASIA) SDN. BHD  
E-mail: [info.asia@unox.com](mailto:info.asia@unox.com)  
Tel: +603-58797700

AU - AUSTRALIA

UNOX AUSTRALIA PTY Ltd.  
E-mail: [info@unoxaustralia.com.au](mailto:info@unoxaustralia.com.au)  
Tel: +61 3 9876 0803

NZ - NEW ZEALAND

UNOX NEW ZEALAND Ltd.  
E-mail: [info@unox.co.nz](mailto:info@unox.co.nz)  
Tel: +64 (0) 800 76 0803

SPEED.Pro™

SPEED.Pro™



INVENTIVE SIMPLIFICATION

[unox.com](http://unox.com)



LI1944A0 printed on 03-2020

All images used are for illustrative purposes only.

All features indicated in this catalogue may be subject to change and could be updated without notice.



## End User Data & Installation Confirmation

To ensure a smooth installation process and technical service support, UNOX, Inc must obtain the following information, upon order placement, concerning the end user of the equipment. Shipment will be delayed if this form is not returned to the Orders Team at [orders.usa@unox.com](mailto:orders.usa@unox.com). ***This form can be completed by the Equipment Dealer or End User.***

**Please return completed form to UNOX, Inc. with purchase order.**

\_\_\_\_\_  
\*End User Name/Name of Business

\_\_\_\_\_  
\*End User Phone

\_\_\_\_\_  
\*Street Address

\_\_\_\_\_  
\*City, State, and Zip Code

\_\_\_\_\_  
\*Contact Name for Survey and Installation

\_\_\_\_\_  
\*Contact phone for Survey and Installation

\_\_\_\_\_  
Dealer PO Number

\_\_\_\_\_  
\*Contact Email

\*Equipment Dealer Name, Email & Phone #: \_\_\_\_\_

\*New Construction?    Yes    No    Estimated date site ready for pre-installation site inspection: \_\_\_\_\_

*NOTE: All utilities should be in place prior to inspection. Any questions related to utility placement should be directed to Unox Technical Service Support at (800) 489-8669 x3.*

\*Indicates required field

**Please select the appropriate box below:**

☐ I/We have purchased UNOX Long.Life4 for the above end user location. An UNOX certified installation is included with the purchase of Long.Life4. The UNOX Certified Installation information sheet has been received and I/we fully understand what is included with the standard installation. I/We further acknowledge that site inspection and installation requests must be received at least ten (10) business days prior to desired date of service to allow for scheduling. It is understood that the UNOX Long.Life4 includes a parts warranty extension as outlined in the UNOX warranty policy. This warranty extension requires that the unit is connected to UNOX via an Internet connection within 30 days of installation. I/We understand that all UNOX equipment must be installed by qualified appliance installers. I/We understand that all gas powered UNOX ovens require calibration at the installation site prior to unit operation. This calibration must be performed by qualified gas technician and requires the use of a gas combustion analyzer. This service will be performed by the UNOX installer at the time of installation.

☐ I/We decline UNOX Long.Life4 and the UNOX Installation. I/We understand that by declining this service, UNOX, Inc. will not warranty service calls related to improper installation. I/we understand that an Installation Manual is delivered with every new UNOX oven. An electronic version of the manual is available by contacting UNOX at (800) 489-8669. I/We understand that all UNOX equipment must be installed by qualified appliance installers. I/We understand that all gas powered UNOX ovens require calibration at the installation site prior to unit operation. This calibration must be performed by qualified gas technician and requires the use of a gas combustion analyzer. This service is not provided by UNOX unless Long.Life4 is purchased. Customers who choose not to purchase Long.Life4 are responsible to ensure equipment is calibrated by a qualified gas technician.

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

***Submittal Sheet***

04/21/2023

**ITEM# 08 - WELD-IN SINK (1 EA REQ'D)**

Eagle Group FDI-10-14-5-1

Weld-In Sink, one compartment, 10" wide x 14" front-to-back x 5" deep bowl, welded 20/304 stainless steel construction, deep-drawn seamless bowl, 3-1/2" basket drain, 1" outside flanges, NSF

**ACCESSORIES**

Mfr	Qty	Model	Spec
Eagle Group	1	313834	Backflow Preventer



Profit from the Eagle Advantage®

## Specification Sheet

### Short Form Specifications

Eagle (One-, Two-, Three-, Four-Compartment) Deep-Drawn Seamless Welded-In Sink, model \_\_\_\_\_.

Sinks are heavy gauge type 304 stainless steel. 1" outside flanges. On units of two or more bowls, space is 2" between bowls. Provided with 3½" basket drain.



### Options / Accessories

- ☐ P-trap
- ☐ Tail piece
- ☐ Lever drains

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com • www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC Division: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-2065 • e-mail: quotes@eaglegrp.com

Item No.: \_\_\_\_\_  
Project No.: \_\_\_\_\_  
S.I.S. No.: \_\_\_\_\_

## Seamless Welded-In Sinks with Deep-Drawn Construction

### MODELS:

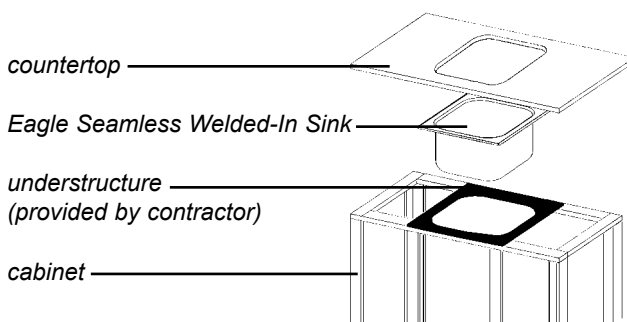
- |   |   |   |
|---|---|---|
| <input type="checkbox"/> FDI-10-14-5-1    | <input type="checkbox"/> FDI-10-14-9.5-2  | <input type="checkbox"/> FDI-16-19-13.5-3 |
| <input type="checkbox"/> FDI-10-14-9.5-1  | <input type="checkbox"/> FDI-12-14-9.5-2  | <input type="checkbox"/> FDI-18-24-13.5-3 |
| <input type="checkbox"/> FDI-12-14-9.5-1  | <input type="checkbox"/> FDI-14-16-9.5-2  | <input type="checkbox"/> FDI-22-22-13.5-3 |
| <input type="checkbox"/> FDI-12-20-6.5-1  | <input type="checkbox"/> FDI-16-19-8-2    | <input type="checkbox"/> FDI-24-24-13.5-3 |
| <input type="checkbox"/> FDI-14-16-9.5-1  | <input type="checkbox"/> FDI-16-19-13.5-2 | <input type="checkbox"/> FDI-10-14-9.5-4  |
| <input type="checkbox"/> FDI-14-16-6-1    | <input type="checkbox"/> FDI-18-24-13.5-2 | <input type="checkbox"/> FDI-12-14-9.5-4  |
| <input type="checkbox"/> FDI-16-19-8-1    | <input type="checkbox"/> FDI-22-22-13.5-2 | <input type="checkbox"/> FDI-14-16-9.5-4  |
| <input type="checkbox"/> FDI-16-19-13.5-1 | <input type="checkbox"/> FDI-24-24-13.5-2 | <input type="checkbox"/> FDI-16-19-8-4    |
| <input type="checkbox"/> FDI-18-24-13.5-1 | <input type="checkbox"/> FDI-10-14-9.5-3  | <input type="checkbox"/> FDI-16-19-13.5-4 |
| <input type="checkbox"/> FDI-20-20-5-1    | <input type="checkbox"/> FDI-12-14-9.5-3  | <input type="checkbox"/> FDI-18-24-13.5-4 |
| <input type="checkbox"/> FDI-22-22-13.5-1 | <input type="checkbox"/> FDI-14-16-9.5-3  | <input type="checkbox"/> FDI-22-22-13.5-4 |
| <input type="checkbox"/> FDI-24-24-13.5-1 | <input type="checkbox"/> FDI-16-19-8-3    | <input type="checkbox"/> FDI-24-24-13.5-4 |

### Design and Construction Features

- For NSF-approved welded fabrication.
- Deep-drawn seamless construction.
- Large radius bowl construction.
- Outside flanges are 1" (25mm) on all units.
- On units with two or more sink bowls, space between bowls is 2" (51mm).
- Type 304 stainless steel all-welded construction.

### For Undermount...

An understructure is secured atop cabinet, then the sink's flanges are secured between understructure and countertop.



### Certifications / Approvals



EG20.18 Rev. 02/20

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Eagle Foodservice Equipment, Eagle MHC, and SpecFAB® are divisions of Eagle Group. ©2020 by the Eagle Group





Profit from the Eagle Advantage®

Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

## One-Compartment Sinks

model #	inside bowl dimensions width x length x depth in. mm		overall dimensions width x length in. mm		gauge	drain diameter in. mm		weight lbs. kg	
FDI-10-14-5-1	14" x 10" x 5"	356 x 254 x 127	16" x 12"	406 x 305	20	3½"	89	9	4.1
FDI-10-14-9.5-1	14" x 10" x 9½"	356 x 254 x 241	16" x 12"	406 x 305	18	3½"	89	11	5.0
FDI-12-14-9.5-1	14" x 12" x 9½"	356 x 305 x 241	16" x 14"	406 x 356	20	3½"	89	13	5.8
FDI-12-20-6.5-1	20" x 12" x 6½"	508 x 305 x 165	22" x 14"	559 x 356	20	2"	51	14	6.4
FDI-14-16-9.5-1	16" x 14" x 9½"	406 x 356 x 241	18" x 16"	457 x 406	20	3½"	89	14	6.4
FDI-14-16-6-1	16" x 14" x 6"	406 x 356 x 152	18" x 16"	457 x 406	20	3½"	89	14	6.4
FDI-16-19-8-1	20" x 16" x 8"	508 x 406 x 203	21¼" x 18"	552 x 457	18	3½"	89	23	10.4
FDI-16-19-13.5-1	20" x 16" x 13½"	508 x 406 x 343	21¼" x 18"	552 x 457	18	3½"	89	25	11.3
FDI-18-24-13.5-1	24" x 18" x 13½"	610 x 457 x 343	26" x 20"	660 x 508	18	3½"	89	37	16.8
FDI-20-20-5-1	20" x 20" x 5"	508 x 508 x 127	22" x 22"	559 x 559	20	3½"	89	19	8.6
FDI-22-22-13.5-1	22" x 22" x 13½"	559 x 559 x 343	24" x 24"	610 x 610	18	3½"	89	39	17.6
FDI-24-24-13.5-1	24" x 24" x 13½"	610 x 610 x 343	26" x 26"	660 x 660	18	3½"	89	41	18.6

## Two-Compartment Sinks

model #	inside bowl dimensions width x length x depth in. mm		overall dimensions width x length in. mm		gauge	drain diameter in. mm		weight lbs. kg	
FDI-10-14-9.5-2	14" x 10" x 9½"	356 x 254 x 241	16" x 24"	406 x 610	18	3½"	89	19	8.6
FDI-12-14-9.5-2	14" x 12" x 9½"	356 x 305 x 241	16" x 28"	406 x 711	20	3½"	89	21	9.5
FDI-14-16-9.5-2	16" x 14" x 9½"	406 x 356 x 241	18" x 32"	457 x 813	20	3½"	89	25	11.3
FDI-16-19-8-2	20" x 16" x 8"	508 x 406 x 203	21¼" x 36"	552 x 914	18	3½"	89	43	19.5
FDI-16-19-13.5-2	20" x 16" x 13½"	508 x 406 x 343	21¼" x 36"	552 x 914	18	3½"	89	50	22.7
FDI-18-24-13.5-2	24" x 18" x 13½"	610 x 457 x 343	26" x 40"	660 x 1016	18	3½"	89	73	33.1
FDI-22-22-13.5-2	22" x 22" x 13½"	559 x 559 x 343	24" x 48"	610 x 1219	18	3½"	89	75	34.0
FDI-24-24-13.5-2	24" x 24" x 13½"	610 x 610 x 343	26" x 52"	660 x 1321	18	3½"	89	81	36.7

## Three-Compartment Sinks

model #	inside bowl dimensions width x length x depth in. mm		overall dimensions width x length in. mm		gauge	drain diameter in. mm		weight lbs. kg	
FDI-10-14-9.5-3	14" x 10" x 9½"	356 x 254 x 241	16" x 36"	406 x 914	18	3½"	89	27	12.2
FDI-12-14-9.5-3	14" x 12" x 9½"	356 x 305 x 241	16" x 42"	406 x 1067	20	3½"	89	30	13.6
FDI-14-16-9.5-3	16" x 14" x 9½"	406 x 356 x 241	18" x 48"	457 x 1219	20	3½"	89	36	16.3
FDI-16-19-8-3	20" x 16" x 8"	508 x 406 x 203	21¼" x 54"	552 x 1372	18	3½"	89	63	28.6
FDI-16-19-13.5-3	20" x 16" x 13½"	508 x 406 x 343	21¼" x 54"	552 x 1372	18	3½"	89	75	34.0
FDI-18-24-13.5-3	24" x 18" x 13½"	610 x 457 x 343	26" x 60"	660 x 1524	18	3½"	89	101	45.8
FDI-22-22-13.5-3	22" x 22" x 13½"	559 x 559 x 343	24" x 72"	610 x 1829	18	3½"	89	113	51.3
FDI-24-24-13.5-3	24" x 24" x 13½"	610 x 610 x 343	26" x 78"	660 x 1981	18	3½"	89	123	55.8

## Four-Compartment Sinks

model #	inside bowl dimensions width x length x depth in. mm		overall dimensions width x length in. mm		gauge	drain diameter in. mm		weight lbs. kg	
FDI-10-14-9.5-4	14" x 10" x 9½"	356 x 254 x 241	16" x 48"	406 x 1219	18	3½"	89	35	15.9
FDI-12-14-9.5-4	14" x 12" x 9½"	356 x 305 x 241	16" x 56"	406 x 1422	20	3½"	89	39	17.6
FDI-14-16-9.5-4	16" x 14" x 9½"	406 x 356 x 241	18" x 64"	457 x 1626	20	3½"	89	47	21.3
FDI-16-19-8-4	20" x 16" x 8"	508 x 406 x 203	21¼" x 72"	552 x 1829	18	3½"	89	83	37.6
FDI-16-19-13.5-4	20" x 16" x 13½"	508 x 406 x 343	21¼" x 72"	552 x 1829	18	3½"	89	100	45.4
FDI-18-24-13.5-4	24" x 18" x 13½"	610 x 457 x 343	26" x 80"	660 x 3032	18	3½"	89	129	58.5
FDI-22-22-13.5-4	22" x 22" x 13½"	559 x 559 x 343	24" x 96"	610 x 2438	18	3½"	89	151	68.6
FDI-24-24-13.5-4	24" x 24" x 13½"	610 x 610 x 343	26" x 104"	660 x 2642	18	3½"	89	163	73.9

Specifications subject to change without prior notice.

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com • www.eaglehmhc.com

Foodservice Division: Phone 800-441-8440

MHC Division: Phone 800-637-5100

Printed in U.S.A.  
©2020 by Eagle Group

Rev. 02/20

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.



Profit from the Eagle Advantage®

## Specification Sheet

### OUR BEST



T&S faucet #313293



crossbraced legs  
with stainless steel  
feet



lever drain  
(with Sink Kit B for  
Spec-Master® Sinks)



twist handle drain  
(with Sink Kit D for  
Spec-Master® Sinks)



stainless steel sink cover

polyboard sink cover

## Sink Accessories/Replacements —Sink Kits, Miscellaneous

### SINK KITS FOR 314, 412, AND 414 SERIES SINKS

All kits include stainless steel crossbraced legs, gussets, feet and T&S faucet #313293.

add

suffix #	Kit #	description
-CLF	A	s/s crossbraced legs, gussets, feet, T&S faucet
-CLFD	B	s/s crossbraced legs, gussets, feet, T&S faucet, lever drain
-CLFDO	C	s/s crossbraced legs, gussets, feet, T&S faucet, lever drain with overflow
-CLFDT	D	s/s crossbraced legs, gussets, feet, T&S faucet, twist handle drain, twist handle bracket
-CLFDOT	E	s/s crossbraced legs, gussets, feet, T&S faucet, twist handle drain with overflow, twist handle bracket

### SINK KITS FOR SPEC-MASTER® FN SERIES SINKS

Includes T&S faucet #313293.

add

suffix #	Kit #	description
-F	A	T&S faucet
-FD	B	T&S faucet, lever drain
-FDO	C	T&S faucet, lever drain with overflow
-FDT	D	T&S faucet, twist handle drain, twist handle bracket
-FDOT	E	T&S faucet, twist handle drain with overflow, twist handle bracket

### SINK COVERS

For 314, 412, 414, and FN Series sinks only.

#### POLYBOARD

#### STAINLESS

model #	model #	fits sink bowl size
313207	321555	14" x 10" (356 x 254mm)
351584	351585	16" x 20" (483 x 508mm)
335377	346175	20" x 18" (508 x 457mm)
326267	305428	20" x 20" (508 x 508mm)
313204	321557	22" x 22" (559 x 559mm)
326268	326270	24" x 18" (610 x 457mm)
313205	321558	24" x 24" (610 x 610mm)
326269	326271	28" x 20" (711 x 508mm)

#### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: quotes@eaglegrp.com

#### Certifications / Approvals



(fabricated to NSF-applicable standards)

#### AUTOQUOTES



Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Eagle Foodservice Equipment, Eagle MHC, SpecFAB®, and Retail Display are divisions of Eagle Group. ©2013 by the Eagle Group

EG20.51A Rev. 02/13



Profit from the Eagle Advantage®

Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

## Sink Accessories/Replacements—Sink Kits, Miscellaneous



flanged bullet foot

### LEG COMPONENTS

model #	description
300315	19" (483mm) stainless steel leg for utility sinks
300692	stainless steel bullet feet
313835	flanged bullet feet
300293	plastic bullet feet



P-trap



tail piece



anti-siphon  
vacuum breaker



backflow  
preventer

### PLUMBING COMPONENTS

model #	description
300789	p-trap, nickel-plated
300791	tail piece for 1.5" (38mm) IPS connection, nickel-plated
313832	anti-siphon vacuum breaker
313834	backflow preventer



lever drain



twist handle drain



control bracket

### DRAINS

model #	description	MAX. fLOW RATE gal. per minute	gal. per hour
300720	lever handle drain with 1.5" or 2" (38 or 51mm) NPS connection	27	1620
300721	lever handle drain with 2" (51mm) NPS connection	32	1920
300722	lever handle drain with 2" (51mm) NPS connection and overflow	32	1920
341189*	twist handle drain with 1.5" or 2" (38 or 51mm) NPS connection	27	1620
336002*	twist handle drain with 2" (51mm) NPS connection	32	1920
341190*	twist handle drain with 2" (51mm) NPS connection and overflow	32	1920
369653	rotary drain, nickel-plated solid brass, with 1.5" or 2" (38 or 51mm) NPS connection	40	2400
300287	crumb cup strainer with 1.5" (38mm) outlet	18	1080

\* Twist handle bracket, for use with twist handle drain, should be ordered as sink option "-TB" at time of sink order.

### CONTROL BRACKET

Requires custom mounting.

model #	description
309796	3" x 5" (76 x 127mm), extra heavy duty

#### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.

Printed in U.S.A.  
 ©2013 by Eagle Group

Rev. 02/13



### Submittal Sheet

04/21/2023

#### ITEM# 09 - HOT / COLD FOOD WELL UNIT, DROP-IN, ELECTRIC (1 EA REQ'D)

Atlas Metal WCM-HP-3

Hot/Cold Drop In Unit, 3-pan size, single tank with thermostat switch for hot or cold operation, holds (3) 12" x 20" pans, with self-contained refrigeration system & immersion type heating element, 3-pan size, stainless steel top & inner liner, galvanized outer liner

#### ACCESSORIES

Mfr	Qty	Model	Spec
Atlas Metal	1		NOTE: Contact Atlas Metal direct for freight quote: FreightQuotes@Atlasfoodserv.com
Atlas Metal	1		A 3/4" diameter drain & valve, separator channels are provided, units are wired to prevent simultaneous operation, water must be used for hot mode operation
Atlas Metal	1		120v/60/1-ph, 16.7 amps, 2.0 kW, NEMA L5-30P, standard
Atlas Metal	1		120v/60/1-ph, 4.2 amps, 1/5 HP, NEMA L5-30P, standard

### ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	120	60	1	Cord & Plug		L5-30P	16.7	2			
2	120	60	1	Cord & Plug		L5-30P	4.2		1/5		

### WATER

	HOT SIZE	HOT AFF	HOT GPH	COLD SIZE	COLD AFF	FILTERED SIZE	FILTERED AFF	CONDENSER INLET SIZE	CONDENSER OUTLET SIZE
1									

### WASTE

	INDIRECT SIZE	DIRECT SIZE
1	3/4"	



# ATLAS METAL

1135 N.W. 159th DRIVE, MIAMI, FLORIDA 33169

TEL 305.625.2451

TOLL FREE 800.762.7565

FAX 305.623.0475

WWW.ATLASFOODSERV.COM

SALES@ATLASFOODSERV.COM

Project: \_\_\_\_\_  
Item No.: \_\_\_\_\_  
Quantity: \_\_\_\_\_

## DROP-IN SERVING EQUIPMENT



WCM-HP-3

## HOT/COLD PAN

Dual Temp.

Hot or Cold Service  
(For Hot Mode)

Water Must Be Used

☐ WCM-HP-2

☐ WCM-HP-3

☐ WCM-HP-4

☐ WCM-HP-5

☐ WCM-HP-6

### SPECIFICATIONS

**TOP:** Constructed of 18 gauge, type 304 stainless steel, die stamped with a raised perimeter bead. There shall be a solid vinyl gasket under the beaded edge to form a seal to the counter top, thus preventing seepage or marring of the counter top. Embossed mounting lugs are provided along the inner surface of the top to hold a full set of removable separator channels in place.

**LINER:** The inner liner shall be 18 gauge, type 304 stainless steel, one piece construction, all welded, ground and polished to a uniform finish. All corners are covered with a minimum 1/4" radius. The liner has copper tubing firmly soldered to the exterior sides. A 3/4" dia. drain with strainer, 4" copper nipple, and valve is provided.

**INSULATION:** The pan is fully insulated with high density fiberglass, 1-3/8" thick on all sides, 1-1/2" thick on the bottom and enclosed with a 22 gauge galvanized steel outer case.

**HEATING ELEMENT:** An immersion type heating element is provided in the bottom of the pan along with a perforated stainless steel sheath cover. A thermostat control is included. **Please note: the element must be submerged in water to operate properly.**

**REFRIGERATION SYSTEM:** The compressor housing shall be fabricated from 14 gauge galvanized angles and bolted to the base of the unit. A fully self-contained condensing unit is provided with a hermetically sealed compressor and a thermostat control. The system is fully charged with CFC free refrigerant and ready to operate.

**NOTE:** Proper ventilation must be provided in counter.

**ELECTRICAL:** The unit is pre-wired with a hot/cold selector switch that prevents dual operation, with the required thermostat controls and pilot light. The unit is provided with a 6' long, 3-wire cord and a twist lock plug.

*Specifications subject to change without notice.*

### STANDARD FEATURES

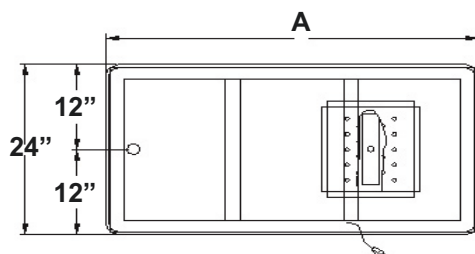
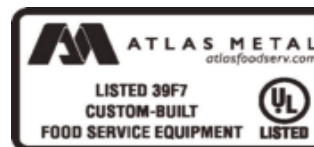
- Dual Temp. - a hot serving unit becomes a refrigerated cold pan at the flip of a switch
- Fully insulated for energy savings
- Factory applied gasket - makes installation a snap and seals units to the counter top, thus eliminating seepage
- Accommodates standard 12" X 20" pans with the use of separator channel(s), or fractional size pans with the use of optional adapter bars.
- 1-Year Parts & Labor Warranty
- NSF Certified; UL Listed

### ACCESSORIES

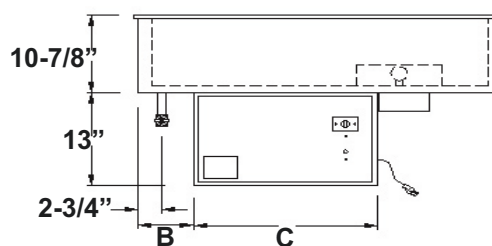
- **5YW** - 5-Year Compressor Warranty
- Stainless Steel adapter bars (pg DI-51-52)
- Stainless Steel adapter plates (pg DI-51-52)
- **CP** - Cover Plate with handles, S/S
- **RSHP** - Remote Switch for counter mounting
- **RDVE** - Rear Drain Valve Extension
- **AF** - Automatic water fill
- **\* 220 Volt - 50 Cycle Compressor**

\*Please see Operation & Installation Manual for ALL operation and maintenance details.

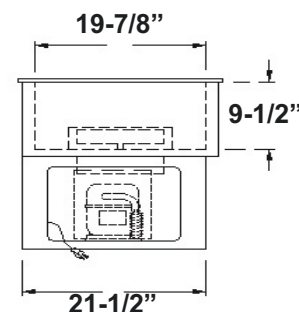
\* Units with these accessories are not currently UL listed.



PLAN VIEW



ELEVATION



END VIEW

MODEL	"A"	PAN SIZE	ELECTRICAL CHARACTERISTICS		NEMA CONFIGURATION	SHIP WT. (LBS.)
			HOT OPERATION	COLD OPERATION		
WCM-HP-2	29-3/4" (75.5cm)	19-7/8" X 25-1/2" X 9-1/2" (50.4 X 64.7 X 24.1cm)	16.7 amps. - 2KW - 120V	2.4 amps. - 120V - 1/5 HP	L5-30P	189 (85.7kg)
WCM-HP-3	43-1/2" (110.4cm)	19-7/8" X 39-1/4" X 9-1/2" (50.4 X 99.6 X 24.1cm)	16.7 amps. - 2KW - 120V	2.4 amps. - 120V - 1/5 HP	L5-30P	219 (99.3kg)
WCM-HP-4	57-1/4" (145.4cm)	19-7/8" X 53" X 9-1/2" (50.4 X 134.6 X 24.1cm)	14.4 amps. - 3KW - 208V 12.5 amps. - 3KW - 240V	7.5 amps. - 120V - 1/4 HP 7.5 amps. - 120V - 1/4 HP	L14-30P L14-30P	255 (115.7kg)
WCM-HP-5	71" (180.3cm)	19-7/8" X 66-3/4" X 9-1/2" (50.4 X 169.5 X 24.1cm)	19.3 amps. - 4KW - 208V 16.7 amps. - 4KW - 240V	9.8 amps. - 120V - 1/3 HP 9.8 amps. - 120V - 1/3 HP	L14-30P L14-30P	268 (121.6kg)
WCM-HP-6	84-3/4" (215.2cm)	19-7/8" X 80-1/2" X 9-1/2" (50.4 X 204.4 X 24.1cm)	19.3 amps. - 4KW - 208V 16.7 amps. - 4KW - 240V	9.8 amps. - 120V - 1/3 HP 9.8 amps. - 120V - 1/3 HP	L14-30P L14-30P	336 (152.4kg)

\* Units are wired to prevent simultaneous operation in the hot and cold mode. Numeral following the model letters denotes the 12" x 20" pan capacity.

COUNTER CUT-OUT REQUIRED	
2	23-1/4" X 28-3/4" (59 X 73cm)
3	23-1/4" X 42-1/2" (59 X 107.9cm)
4	23-1/4" X 56-1/4" (59 X 142.8cm)
5	23-1/4" X 70" (59 X 177.8cm)
6	23-1/4" X 83-3/4" (59 X 212.7cm)

	B	C
WCM-HP-2	4-3/8" (11cm)	14" (35.5cm)
WCM-HP-3	6-1/2" (16.5cm)	21-1/2" (54.6cm)
WCM-HP-4	6-1/2" (16.5cm)	21-1/2" (54.6cm)
WCM-HP-5	6-1/2" (16.5cm)	21-1/2" (54.6cm)
WCM-HP-6	6-1/2" (16.5cm)	21-1/2" (54.6cm)

REMOTE REFRIGERATION MODEL	LESS COMP. SHIP WT. (LBS.)
WCM-HPX-2	148 (67.1kg)
WCM-HPX-3	178 (80.7kg)
WCM-HPX-4	208 (94.3kg)
WCM-HPX-5	222 (100.7kg)
WCM-HPX-6	290 (131.5kg)

### WCM-HPX - HOT/COLD PAN WITHOUT COMPRESSOR

Units include Hot/Cold Pan,  
Thermostat, Cap Tube & Drier (for hook up in  
field by others)

### COMPRESSORS FOR REMOTE INSTALLATIONS

**2029-07JP** - 1/5 HP for WCM-HPX-2, & 3  
**2029-17JP** - 1/4 HP for WCM-HPX-4  
**2029-27JB** - 1/3 HP for WCM-HPX-5 & 6

**RSHP** - Remote Control Panel is required to operate unit.



***Submittal Sheet***

04/21/2023

**ITEM# 10 - SPARE NO.**

<Spare No.>



## Submittal Sheet

04/21/2023

### ITEM# 11 - WARMING DRAWER, FREE STANDING (1 EA REQ'D)

Alto-Shaam 500-2D

Halo Heat® Warming Drawer, free standing, two drawer, digital controller, (1) 12" x 20" pan, (50) rolls or (34) baked potatoes capacity per drawer, drawer can adapt to hold optional oversize pan, adjustable thermostat, stainless steel exterior, EcoSmart®, cULus, UL EPH Classified, CE, EAC

#### ACCESSORIES

Mfr	Qty	Model	Spec
Alto-Shaam	1		NOTE: Subject to Manufacturer's Terms & Conditions. See Documents Section
Alto-Shaam	1		120v/50/60/1-ph, 5.3 amps, .64 kW, NEMA 5-15P, standard
Alto-Shaam	2		Non-vented drawers, standard
Alto-Shaam	1	15379	Caster Stand Assembly, 5" heavy-duty casters, for 500-1D; 500-2D; 500-3D

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	120	60	1	Cord & Plug		5-15P	5.3	0.64			



ALTO-SHAAM.

Item no. \_\_\_\_\_

# 500-1D

# 500-2D

# 500-3D

## Drawer Warmers



500-1D



500-3D



500-2D



- Halo Heat . . . a controlled, uniform heat source that gently surrounds foods for better appearance, taste, and longer holding life.
- Product moisture is retained without adding water.
- Digital control senses temperature drops faster, providing quick heat recovery time.
- Can be built into cabinets or counters. Built-in trim kits are available.
- Stackable design.

### Short Form Spec

Alto-Shaam drawer warmer is constructed with a non-magnetic stainless steel exterior and removable stainless steel drawer rail supports. Each drawer includes one (1) full-size (GN 1/1) 12" x 20" x 6" (305mm x 508mm x 152mm) stainless steel pan. The warmer is controlled by an ON/OFF power switch; up and down arrow buttons with a temperature range of 60°F to 200°F (16°C to 93°C); heat indicator light; temperature display button, and digital display.

- ☐ **Model 500-1D:** One drawer warmer
- ☐ **Model 500-2D:** Two drawer warmer
- ☐ **Model 500-3D:** Three drawer warmer

### Factory Installed Options

- Electrical Choices
  - ☐ 120V
  - ☐ 208-240V
  - ☐ 230V
- Drawer Choices (order per drawer)
  - ☐ Non-Vented, Standard
  - ☐ Vented, Optional (5014559)
- Pan Choices - One (1) per drawer supplied
  - ☐ Full-size (GN 1/1), Standard (PN-25088)  
12" x 20" x 6" (305mm x 508mm x 152mm)
  - or -
  - ☐ Oversize, Optional (PN-2123)  
15" x 20" x 5" (381mm x 508mm x 127mm)

### Additional Features

- Stack units without additional hardware
- Individual or stacked units can be mounted on:
  - ☐ 3" (76mm) Casters and Caster Stand Assembly
  - ☐ 5" (127mm) Casters and Caster Stand Assembly
  - ☐ 6" (152mm) Leg Stand Assembly

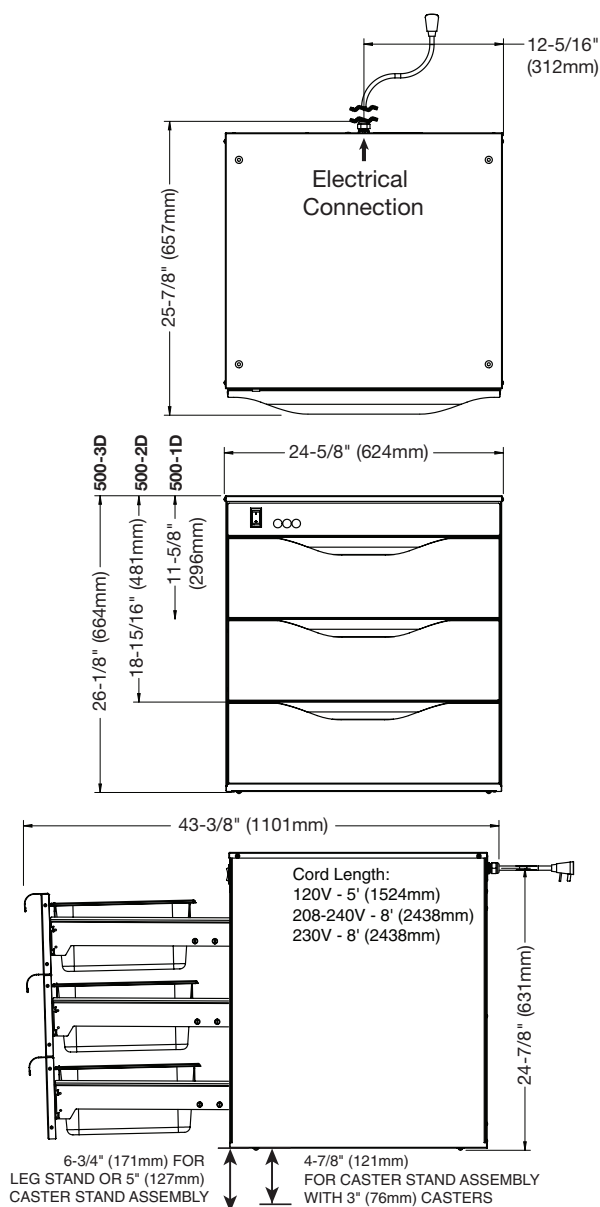


W164 N9221 Water Street • P.O. Box 450 • Menomonee Falls, Wisconsin 53052-0450 • U.S.A.  
 Phone: 262.251.3800 800.558.8744 U.S.A./CANADA Fax: 262.251.7067 800.329.8744 U.S.A. only  
[www.alto-shaam.com](http://www.alto-shaam.com)



# 500-1D, 500-2D, 500-3D

## Drawer Warmers



### Dimensions H x W x D

#### 500-1D exterior:

11-5/8" x 24-5/8" x 25-7/8" (296mm x 624mm x 657mm)

#### 500-2D exterior:

18-15/16" x 24-5/8" x 25-7/8" (481mm x 624mm x 657mm)

#### 500-3D exterior:

26-1/8" x 24-5/8" x 25-7/8" (664mm x 624mm x 657mm)

#### Cut out dimensions: (for units with built-in trim)

Add 3/4" (19mm) to unit height and 1-1/2" (38mm) to unit width

### Electrical

V	Ph	Hz	A	kW		
120	1	50/60	5.3	0.64		NEMA 5-15P 15A, 125V plug
208-240	1	50/60	2.7	0.64		NEMA 6-15P 15A, 250V plug
230	1	50/60	2.6	0.59		Plugs rated 250V
CEE 7/7		CH2-16P		BS 1363		AS/NZS 3112

### Product Capacity - per drawer

#### Full-size Pan (GN 1/1):

12" x 20" x 6" (305 x 508 x 152mm)  
36 lbs (16 kg) maximum

#### Oversize Pan:

15" x 20" x 5" (381 x 508 x 127mm)  
41 lbs (19 kg) maximum

### Weight (Est.)

	500-1D	500-2D	500-3D
<b>Net:</b>	80 lb (36 kg)	115 lb (52 kg)	150 lb (68 kg)
<b>Ship:</b>	90 lb (41 kg)	125 lb (57 kg)	165 lb (75 kg)
<b>Carton dimensions:</b> (L x W x H)			
	30" x 27" x 16" (762mm x 686mm x 406mm)	30" x 27" x 23" (762mm x 686mm x 584mm)	30" x 27" x 30" (762mm x 686mm x 762mm)

### Installation Requirements

Drawer warmer must be installed level, and must not be installed in any area where it may be affected by steam, grease, dripping water, high temperatures, or any other severely adverse conditions.

### Clearance Requirement (for ventilation)

Minimum: 3" (76mm) at the back, 2" (51mm) at the top, and 1" (25mm) at both sides. On-site venting for proper airflow must also be provided for built-in counter installations.

### Accessories

Built-in Trim Kit		Caster Stand Assembly	
<input type="checkbox"/> 500-1D	5015147	<input type="checkbox"/> with 5" (127mm) casters	15379
<input type="checkbox"/> 500-2D	5015149	<input type="checkbox"/> with 3" (76mm) casters	5010920
<input type="checkbox"/> 500-3D	5015153	<input type="checkbox"/> Leg Stand Assembly	15380
		Perforated Pan Grid	
		<input type="checkbox"/> 15" x 20" (381mm x 508mm)	1231
		<input type="checkbox"/> 12" x 20" (305mm x 508mm)	16642



W164 N9221 Water Street • P.O. Box 450 • Menomonee Falls, Wisconsin 53052-0450 • U.S.A.  
Phone: 262.251.3800 800.558.8744 U.S.A./Canada Fax: 262.251.7067 800.329.8744 U.S.A. only  
www.alto-shaam.com



## Submittal Sheet

04/21/2023

### ITEM# 12 - CONVEYOR TOASTER (1 EA REQ'D)

Star QCS3-950H

Holman QCS® Conveyor Toaster, electric, 950 slices/hr., horizontal conveyor, analog speed control, standby switch, independent controls for top & bottom quartz sheathed heater elements, 3" opening x 14" W belt (3 slices) with loading rack, stainless steel construction with smooth cool touch exterior, cULus, UL EPH Classified, Made in USA

#### ACCESSORIES

Mfr	Qty	Model	Spec
Star	1		1 year parts & labor warranty, standard
Star	1		(QCS3-950H-208V) 208v/50/60/1-ph, 3.2 kW, 15.9 amps, NEMA 6-20P, standard

### ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	208	50/60	1	Cord & Plug		6-20P	15.9	3.2			



Job \_\_\_\_\_ Item No. \_\_\_\_\_

## Star® High Volume Conveyor Toasters

□QCS3-950H □QCS3-1000 □QCS3-1300 □QCS3-1400BH □QCS3-1600B



QCS3-1400BH

### DESCRIPTION

Star delivers high quality, reliable toasters. QCS3 conveyor toasters maximize productivity and power. Star's forced convection system keeps the toaster cool- to-the-touch and extends the life of critical components. The forced convection increases productivity by circulating pre-heated air into toasting chamber. Heavy-duty motor, drive chain and conveyor speed control for superior reliability. Toast bread, bagels, English muffins and more!

### SPECIFICATIONS

14" wide belt can accommodate three (3) slices of bread side-by-side. Analog controls offer belt speed adjustment, standby mode, and intensity settings for both the top and bottom heating elements. Heavy-duty motor, drive chain and conveyor speed control for superior reliability. Conveyor belt tension system for smooth and quiet operation. High performance quartz infrared heaters for superior toasting performance and reliability. Units are easy to disassemble with one-piece cover for cleaning and service. Toasters are furnished with 1" adjustable legs and 4' cord. NEMA 6-20P plug standard for 208 & 240V applications UP TO 3200 Watts. NEMA 6-30P plug standard for 208 & 240V applications OVER 3200 Watts.

### WARRANTY

These units come with a one [1] year warranty for parts and labor.

### FEATURES

- Forced convection system keeps the toaster cool-to-the-touch and increases productivity by circulating pre-heated air into toasting chamber
- Quartz infrared heaters provide faster, more consistent heating than traditional heating elements
- Long lasting, heavy-duty metal knobs and 1" non-skid heavy-duty rubber feet
- Variable speed and top/bottom heat control
- Power saver switch that reduces electricity consumption by 75%
- Extended conveyor belt for easy loading and large warming area for higher production
- Safe load-up area with full width coated front burn guard and cool-to-the-touch exterior
- Heated holding area to keep toast at the perfect temperature
- Hi-limit switch prevents toaster from overheating protecting critical component parts

### TOASTING CAPACITY

MODEL	DESCRIPTION	SLICES PER HOUR
QCS3-950H	3.0" Opening BUN TOASTER	950
QCS3-1000	1.5" Opening COMPACT TOASTER	1,000
QCS3-1300	1.5" Opening COMPACT TOASTER	1,300
QCS3-1400BH	3.0" Opening - VARIABLE BAGEL/ BREAD TOASTER*	1,400
QCS3-1600B	3.0" Opening BAGEL TOASTER	1,600

### CERTIFICATIONS



### STAR MANUFACTURING INTERNATIONAL INC.

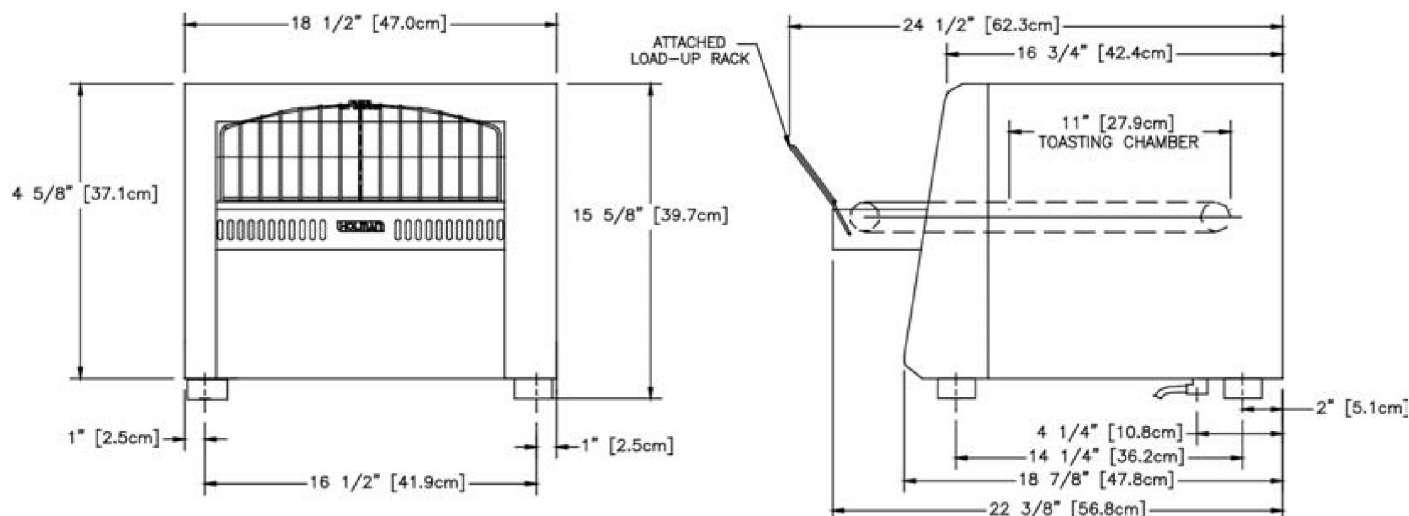
10 Sunnen Drive • Saint Louis, Missouri 63143  
Telephone 800 264 7827 • Fax 314 781 5445  
www.star-mfg.com

Printed in the U.S.A. • 2M-Z2xxxx • Rev - • 2.2017  
Specifications are subject to change without notice  
and are not intended for installation purposes.



## Star® High Volume Conveyor Toasters

□QCS3-950H □QCS3-1000 □QCS3-1300 □QCS3-1400BH □QCS3-1600B



MODEL	DESCRIPTION	HEIGHT in. (mm)	WIDTH in. (mm)	DEPTH in. (mm)	VOLTS¹	HZ 1 PHASE	AMPS	WATTS	NEMA PLUG	APPROX. SHIP WEIGHT
QCS3-950H	3.0" Opening BUN TOASTER	15.63 (397.0)	18.5 (469.9)	22.38 (569.5)	208 240 220	60 60 50	15.9 13.8 14.9	3,200 3,200 3,200	6-20 6-20 CEE7/7	68 lb. (149.6 kg)
QCS3-1000	1.5" Opening COMPACT TOASTER	15.63 (397.0)	18.5 (469.9)	22.38 (569.5)	208 240 220	60 60 50	15.9 13.8 14.9	3,200 3,200 3,200	6-20 6-20 CEE7/7	68 lb. (149.6 kg)
QCS3-1300	1.5" Opening COMPACT TOASTER	15.63 (397.0)	18.5 (469.9)	22.38 (569.5)	208 240 220	60 60 50	17.8 15.5 16.9	3,600 3,600 3,600	6-30 6-30 CEE7/7	68 lb. (149.6 kg)
QCS3-1400BH*	3.0" Opening - VARIABLE BAGEL/ BREAD TOASTER*	15.63 (397.0)	18.5 (469.9)	22.38 (569.5)	208 240 230	60 60 50	15.8 13.8 14.8	3,400 3,400 3,400	6-30 6-30 CEE7/7	68 lb. (149.6 kg)
QCS3-1600B	3.0" Opening BAGEL TOASTER	15.63 (397.0)	18.5 (469.9)	22.38 (569.5)	208 240 220	60 60 50	17.8 15.5 16.9	3,600 3,600 3,600	6-30 6-30 CEE7/7	68 lb. (149.6 kg)

<sup>1</sup>Specify 208V, 240V or 230V Service when ordering

\* QCS3-1400BH: 3400W of power is applied evenly between top and bottom elements, like a standard toaster. A toggle switch in the lower left corner converts the unit to 3400W of TOP HEAT ONLY.

Due to periodic changes in designs, methods, procedures, policies and regulations, the specifications contained in this sheet are subject to change without notice. While Star Manufacturing exercises good faith efforts to provide information that is accurate, we are not responsible for errors or omissions in information provided or conclusions reached as a result of using the specifications. By using the information provided, the user assumes all risks in connection with such use.



**STAR MANUFACTURING INTERNATIONAL INC.**

10 Sunnen Drive • Saint Louis, Missouri 63143

Telephone 800 264 7827 • Fax 314 781 5445

www.star-mfg.com

Printed in the U.S.A. • 2M-Z2xxxx • Rev - • 2.2017

Please refer to the owner's manual for information regarding installation or use.



### Submittal Sheet

04/21/2023

#### ITEM# 13 - MEGA TOP SANDWICH / SALAD PREPARATION REFRIGERATOR (1 EA REQ'D)

Turbo Air PST-48-18-D2R(L)-N-GL

PRO Series Mega Top Sandwich/Salad Prep Table with Glass Lid, two-section, 48-1/4"W x 34-5/8"D x 32-1/8"H, self-contained refrigeration with self-cleaning condenser, 15.0 cu. ft., capacity, 18-pan top opening with hood, (2) drawers & (1) door, 6-1/4" deep cutting board with side rail, digital temperature control & monitor system, cold bunker system, stainless steel interior & exterior (galvanized bottom), LED interior lighting & fan control, R290 Hydrocarbon refrigerant, 1/5 HP, 115v/60/1-ph, 6.5 amps, cord with NEMA 5-15P, cETLus, ETL-Sanitation, Made in USA (contact sales for lead time)

#### ACCESSORIES

Mfr	Qty	Model	Spec
Turbo Air	1		Note: Contact factory representative for parts & accessories discounts
Turbo Air	1		3 year parts & labor warranty, standard
Turbo Air	1		7 year compressor warranty (self-contained only)
Turbo Air	1		Must specify door & drawers positions
Turbo Air	1		1/6 size, 4" deep condiment pan & pan dividers included, standard
Turbo Air	1		Caster Set, swivel, locking front wheels, standard

#### ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	6.5		1/5		



**REFRIGERATOR MANUFACTURER**  
**Turbo air**  
 more durable, efficient, beautiful

4184 E. Conant St.  
 Long Beach, CA 90808  
 Tel. 310-900-1000  
 Fax. 310-900-1077  
[www.turboairinc.com](http://www.turboairinc.com)

Project:

Model #:

Item #:

Available W/H:

Qty:

Approval:

AIA #:

SIS #:

CSI Section 11400

## Mega Top Unit - Drawers / Glass lid

Food Prep Tables  
**PRO Series**

### FEATURES & BENEFITS

#### Self-Cleaning Condenser

The accumulation of dust in the condenser can cause the failure or breakdown of refrigerators. Refrigerators run normally until they reach a certain level of accumulation. At some point, when they are over the limit, their performance drops quickly resulting in damage to, or disposal of the stored products inside. The Self-Cleaning Condenser device keeps the condenser clean and prevents system failure by automatically brushing daily.

#### Digital temperature control & monitor system

Keeps food products safe by maintaining constant temperatures. External digital display allows for easy monitoring.

#### Hydrocarbon refrigerants (R-290)

With innovative and eco-friendly technology, Turbo Air brings you hydrocarbon refrigerators designed to meet DOE's Energy Conservation Standards in 2017 and to use EPA's SNAP Program approved HC refrigerants. Hydrocarbon refrigerants do not deplete the ozone layer and have very low contribution to global warming (ODP-0, GWP-3).

#### Stainless steel cabinet construction

The PRO series model boasts a stainless steel interior (Aluminum door liner) and a **22 gauge** stainless steel exterior (galvanized steel bottom). It guarantees the utmost in cleanliness and long product life. The PRO series adds a touch of style to the most refined setting.

#### High-density polyurethane insulation

The entire cabinet structure and solid doors are foamed-in-place using high density, CFC free polyurethane insulation.

#### Cold Bunker system

Our innovative forced air system allows cold air to flow all around the food pan area, covering not only underneath the pan, but also the front, top and the rear. This unique air flow creates a cold air-shield around the pan, which maintains the food temperature at under 41°F (NSF requirement) even when the lids are opened. In addition, the compartment isolates pans from the reach-in area to prevent food spillage.

#### Lifetime guaranteed heavy duty handles

#### Built to maintain NSF standard temperatures in 100°F ambient

#### 6-1/4" deep, 1/2" thick high-density Polyethylene cutting board included with convenient side rail

#### Refrigerator holds 33°F ~ 39°F for the best in food preservation



PST-48-18-D2L-N-GL

PST-48-18-D2R-N-GL

#### Patented Self-Cleaning Condenser



This product is equipped with a fine mesh filter to the front of the condenser to catch dust, and a rotating brush that moves up and down daily to remove excess buildup outward and away.

- Each top drawer accommodates up to 6" deep, one (1) full size pan or two (2) 1/3 size pans with two (2) 1/6 size pans or six (6) 1/6 size pans. And each bottom drawer accommodates up to 6" deep, two (2) 1/3 size pans or four (4) 1/6 size pans (drawer pans not included)

- PST-48-18-D2R-N-GL: (Left) Drawer + (Right) Right hinged door
- PST-48-18-D2L-N-GL: (Right) Drawer + (Left) Left hinged door

NATURAL  
Refrigerant




Model	Swing Doors	Drawers	CU./FT.	#of Shelves	#of Pans	HP	AMPS	Crated Weight (lbs.)	L x D* x H† (inches)
PST-48-18-D2R(L)-N-GL	1	2	15	1	18	1/5	6.5	302	48 1/4 x 34 5/8 x 32 1/8

# Mega Top Unit - Drawers / Glass lid

Food Prep Tables  
PRO Series

## Model : PST-48-18-D2R(L)-N-GL

ELECTRICAL DATA	
Voltage	115/60/1
Plug Type	 NEMA 5-15P
Full Load Amperes	6.5
Compressor HP	1/5
Cord Length (ft.)	10
Refrigerant	R-290
DIMENSIONAL DATA	
Ext. Length Overall (in.)	48 1/4 (1225mm)
Ext. Depth Overall (in.)*	34 5/8 (880mm)
Ext. Height Overall (in.)†	32 1/8 (814mm)
# of Doors	1
# of Drawers	2
# of Shelves	1
Shelf Size (L x D) (in.)	21 x 17
# of Pans	18
Net Capacity (cu. ft.)	15
Net Weight (lbs.)	290
Gross Weight (lbs.)	302

Design and specifications subject to change without notice.

Actual shipping weight may differ due to extra packing materials for product protection.

\* Depth does not include 1" for cutting board and 1-1/4" for rear spacers.

† Height does not include 5" for caster height.

■ **WARRANTY :** 3 Year Parts and Labor Warranty  
Additional 4 Year Warranty on Compressor

### STANDARD FEATURES

- Anti-corrosion coated evaporator
- Self-contained system
- 4" dia. swivel casters with locks on the front set
- 1/6 size, 4" deep condiment pans included (top of cabinet)

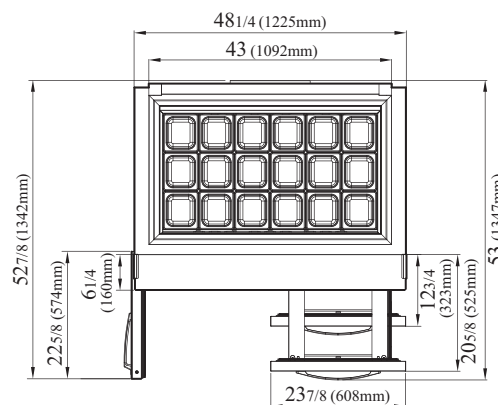
### OPTIONAL ACCESSORIES

- 1" caster, 1/2" diameter & 13 TPI: S28R813660 (non-brake)
- 2.5" caster, 1/2" diameter & 13 TPI: 30265H0100 (non-brake), 30265H0200 (w/ brake)
- 5" caster, 1/2" diameter & 13 TPI: M726500100 (non-brake), M726500200 (w/ brake)
- Leveling leg, 1/2" - 13 TPI x 1.54": LFM1213566
- 6" ABS plastic leg: 30221M0200
- 6" stainless steel leg: 30221M0600

Ver.20220916

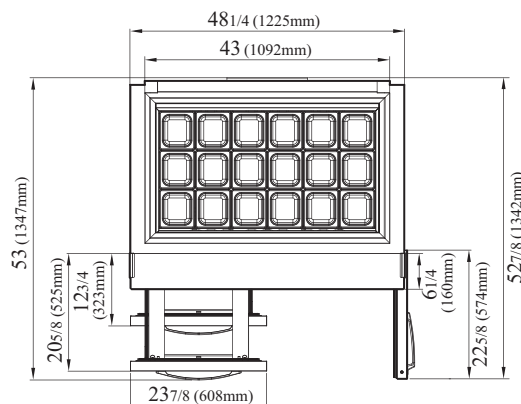
## PLAN VIEW

(unit : inch)



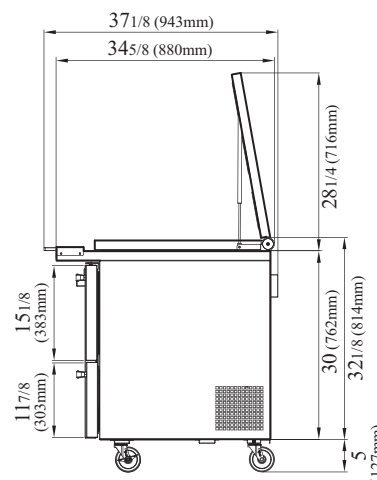
PST-48-18-D2L-N-GL

### TOP VIEW



PST-48-18-D2R-N-GL

### TOP VIEW



SIDE VIEW



- Turbo Air : 800-627-0032 ■ GK : 800-500-3519
- Warranty : 800-381-7770 ■ AC : 888-900-1002



Continued product development may necessitate specification changes without notice.





## Submittal Sheet

04/21/2023

### ITEM# 14 - INDUCTION RETHERMALIZER (1 EA REQ'D)

Vollrath 74110110

Mirage® Induction Soup Rethermalizer, 11 quart, dry use, temperature control in °F or °C, (4) soup presets, stir indicator LED, solid state controls with locking function, includes: induction ready inset & inset cover, natural & black finish, 800W, 6.7 amps, cord with NEMA 5-15P, 120v/50/60/1-ph, cULus, NSF, FCC, imported (cover not NSF) (Refer to vollrathfoodservice.com for full warranty policy)

#### ACCESSORIES

Mfr	Qty	Model	Spec
Vollrath	1		Requires use of included Vollrath induction-ready inset - failure to use these insets may damage the unit & will void the warranty

### ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	120	50/60	1	Cord & Plug		5-15P	6.7	.8			



Outperform every day.™

**Project:**

**Item Number:**

**Quantity:**

Mirage® Induction Countertop Rethermalizer

The Vollrath Company, L.L.C.

## MIRAGE® INDUCTION COUNTERTOP RETHERMALIZER



### DESCRIPTION

Mirage® Induction Countertop Rethermalizers use innovative induction technology to run dry (without a water bath), improve food quality and minimize food waste; while using a fraction of the energy. They are shipped complete with an induction-ready inset and slotted hinged cover.

### PERFORMANCE CRITERIA

The Mirage® Induction Countertop Rethermalizer are designed to take a container of cooked food from a chilled state (below 40.0° F [4.4° C]) through the HACCP “danger zone” of 165° F (73.9° C) in less than 90 minutes. The performance standard is measured using the NSF mixture chilled to 35° F (1.7° C). The electric unit will raise the temperature of this product above 165° F (73.9° C) in less than 90 minutes. The temperature will be maintained above 150° F (65.6° C) when the food product and pan or inset are used with a standard pan or inset cover, and the food product is stirred regularly.

### AGENCY LISTINGS



This device complies  
with Part 18 FCC Rules.

Cover is  
not NSF.

Due to continued product improvement, please consult  
[www.vollrath.com](http://www.vollrath.com) for current product specifications.

### ITEMS

- 7470110 7 Qt. Induction Rethermalizer, Natural (US/CAN)**
- 7470140 7 Qt. Induction Rethermalizer, Red (US/CAN)**
- 74110110 11 Qt. Induction Rethermalizer, Natural (US/CAN)**
- 74110140 11 Qt. Induction Rethermalizer, Red (US/CAN)**

### FEATURES

- 800 watt 3D induction coil heats food evenly and efficiency.
- Dry use. Heat is transferred directly to the induction-ready inset, which eliminates the need to monitor and refill water levels.
- Sensors monitor the temperature at three points on the inset to activate the Stir Indicator LED which notifies the operator to stir the food to maintain temperature and quality.
- Sensors reduce food waste and make clean-up easier by preventing food from burning in near-empty insets.
- Advanced solid state controls with highly visible white LEDs include: temperature control in °F and °C; four presets - broth soups, crème soups, chili, mac and cheese; rethermalize mode; stirring indicator; and a locking function that prevents untrained operators from changing settings.
- Maximum temperature setting of 190°F.
- Includes cover — item 47488 for 7 Qt. or 47490 for 11 Qt., and inset — item 88184 for 7 Qt. or item 88204 for 11 Qt. Covers and insets are also sold separately.
- Requires use of included Vollrath induction-ready inset.
- Meets NSF4 Performance Requirements for rethermalization and hot food holding equipment.
- 6' power cord plugs into any NEMA 5-15R 15 or 20 amp 120V receptacle.

### WARRANTY

- All models shown come with Vollrath's standard warranty against defects in materials and workmanship. For full warranty details, please refer to [www.Vollrath.com](http://www.Vollrath.com).

### CLEARANCE AND ENVIRONMENT REQUIREMENTS

- Failure to use Vollrath induction-ready insets may damage the unit and will void the warranty.
- All models require unrestricted intake and exhaust air ventilation for proper operation of the controls. The maximum intake temperature must not exceed 110°F (43°C). Temperatures are measured in ambient air while all appliances in the kitchen are in operation.
- Countertop models require a minimum clearance of 4 inches (10.2 cm) at the rear and 1 inch (2.5 cm) at the bottom.

Approvals	Date



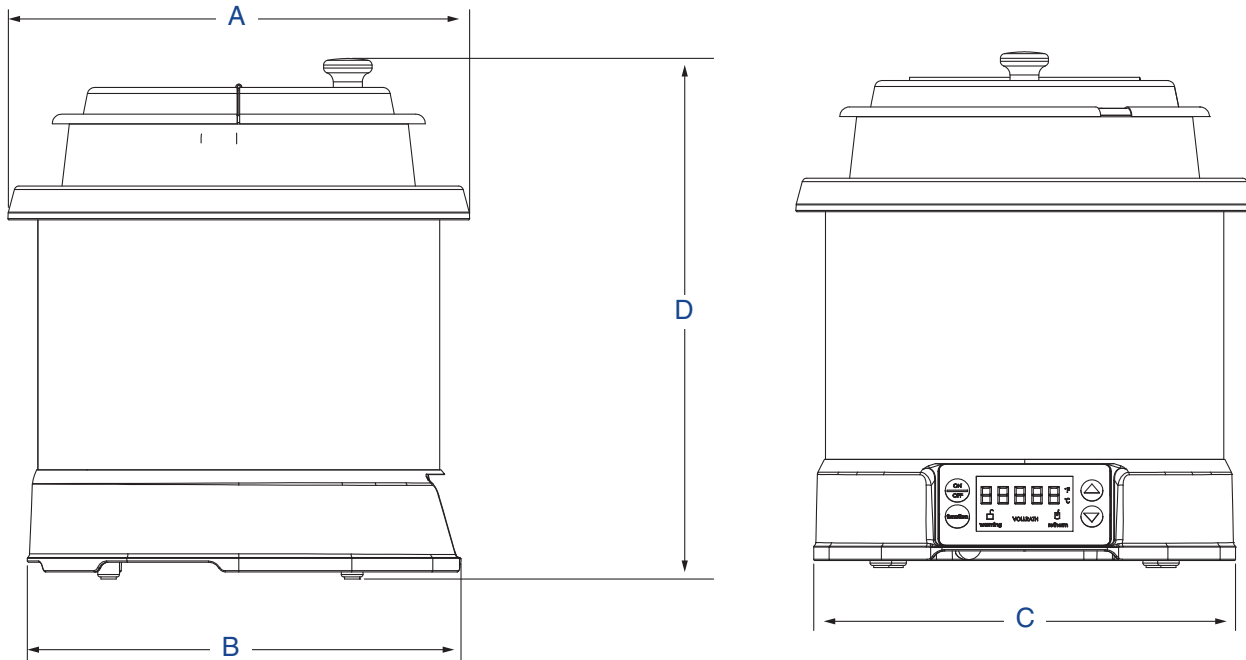
Outperform every day.™

[www.vollrath.com](http://www.vollrath.com)

#### The Vollrath Company, L.L.C.

1236 North 18th Street  
Sheboygan, WI 53081-3201 U.S.A.  
Main Tel: 800.624.2051 or 920.457.4851  
Main Fax: 800.752.5620 or 920.459.6573  
Customer Service: 800.628.0830  
Canada Customer Service: 800.695.8560

Technical Services  
[techservicereps@vollrathco.com](mailto:techservicereps@vollrathco.com)  
Induction Products: 800.825.6036  
Countertop Warming Products: 800.354.1970  
All Other Products: 800.628.0832

**MIRAGE® INDUCTION COUNTERTOP RETHERMALIZER****DIMENSIONS** (shown in inches (cm))**SPECIFICATIONS**

Item No.	Capacity QT (L)	Color	Dimensions				Voltage	Watts	Amps	Hz	Plug
			(A) Rim	Base		(D) Height					
				(B) Depth	(C) Width						
7470110	7	Natural	11 <sup>7</sup> / <sub>8</sub>	11 <sup>3</sup> / <sub>16</sub>	11	13 <sup>1</sup> / <sub>2</sub> (34.2)	120	800	6.7	50/60	NEMA 5-15P
7470140	(6.6)	Red	(30.3)	(30.2)	(27.9)						
74110110	11	Natural	13 <sup>7</sup> / <sub>8</sub>	13 <sup>3</sup> / <sub>16</sub>	13						
74110140	(10.4)	Red	(35.3)	(35.2)	(33)						

**Receptacle**

120V

NEMA  
5-15R

Outperform every day.™

[www.vollrath.com](http://www.vollrath.com)**The Vollrath Company, L.L.C.**

1236 North 18th Street  
 Sheboygan, WI 53081-3201 U.S.A.  
 Main Tel: 800.624.2051 or 920.457.4851  
 Main Fax: 800.752.5620 or 920.459.6573  
 Customer Service: 800.628.0830  
 Canada Customer Service: 800.695.8560

Technical Services  
[techservicereps@vollrathco.com](mailto:techservicereps@vollrathco.com)  
 Induction Products: 800.825.6036  
 Countertop Warming Products: 800.354.1970  
 All Other Products: 800.628.0832

## Countertop Rethermalizers

- Ships with induction-ready inset and hinged cover
- Set temperature in F° or C° for soup, cream soup, mac & cheese, or chili
- **REFERENCE OUR SERVING SYSTEMS & COMPONENTS CATALOG FOR DROP-IN STYLES**



NACUFS IICE INDUSTRY  
INNOVATION AND CREATIVE  
EXCELLENCE AWARD



ITEM #	DESCRIPTION	COLOR	DIMENSIONS IN (CM)	FREQUENCY	VOLTAGE	WATTS	AMPS	PLUG	CASE LOT
7470110	7 qt induction rethermalizer	Silver	11½ x 13½ (30.3 x 34.2)	50/60Hz	120	800	6.7	5-15P	1
7470140	7 qt induction rethermalizer	Red	11½ x 13½ (30.3 x 34.2)	50/60Hz	120	800	6.7	5-15P	1
74110110	11 qt induction rethermalizer	Silver	13¾ x 13½ (35.3 x 34.2)	50/60Hz	120	800	6.7	5-15P	1
74110140	11 qt induction rethermalizer	Red	13¾ x 13½ (35.3 x 34.2)	50/60Hz	120	800	6.7	5-15P	1
REPLACEMENT INSET ITEM #	REPLACEMENT INSET	REPLACEMENT COVERS	DESCRIPTION						
88184	7 qt induction inset	47488	Hinged inset cover, fits 7 qt inset						
88204	11 qt induction inset	47490	Hinged inset cover, fits 11 qt inset						
88184NS*	7¼ qt nonstick induction inset	88184NS*	7¼ qt nonstick induction inset						
88204NS*	11 qt nonstick induction inset	88204NS*	11 qt nonstick induction inset						



\*Nonstick insets are made to order; call Vollrath for minimums and lead time.

For 7 quart International models with 220-240V, change the fifth digit to "2" for Schuko, "3" for UK, "4" for China, or "5" for Australia (e.g., Schuko 7470110 to 7470210)  
For 11 quart International models with 220-240V, change the sixth digit to "2" for Schuko, "3" for UK, "4" for China, or "5" for Australia (e.g., Schuko 74110110 to 74110210)

## NEW Contemporary Hinged Inset Lids

### IMPROVED INSET COVER DESIGN

- Welded handle is permanently attached and stays secured to cover
- Handle serves as kickstand, keeping cover open for easy access to food
- No friction-fit tabs to lose
- Design of handle dissipates heat, keeping it cooler to the touch
- Fits most 7-quart and 11-quart insets
- Large opening for easy access



ITEM #	DESCRIPTION	OVERALL DIAMETER: IN (CM)	HEIGHT: IN (CM)	CASE LOT
47493	Hinged inset lid – 7¼ qt	9¾ (25.3)	2¾ (7)	1
47494	Hinged inset lid – 11 qt	11½ (30)	2¾ (7)	1

### DROP-IN PRODUCTS



REFERENCE OUR  
SERVING SYSTEMS  
& COMPONENTS  
CATALOG FOR  
DROP-IN STYLES.



### KOOL-TOUCH® LADLES WITH HIGH TEMPERATURE JUST GOT COOLER

- Kool-Touch® Handles are color safe up to 225°F (107.2°C)
- Fully functional to 350°F (176.6°C)
- Insulated coating permanently bonded to utensil – will not slip or peel
- Provides cool, comfortable grip

See page 143-144 for product details.





## Submittal Sheet

04/21/2023

### ITEM# 15 - UNDERCOUNTER REFRIGERATOR (1 EA REQ'D)

Turbo Air MUR-48-N

M3 Series Undercounter Refrigerator, two-section, 12.2 cu. ft., self-contained rear mount refrigeration system with self-cleaning condenser, (2) swing doors, (2) adjustable heavy duty PE coated wire shelves, stainless steel top, front & sides, (galvanized steel back & bottom) aluminum interior, stainless steel floor, LED interior lighting & fan control, R290 Hydrocarbon refrigerant, 1/5 HP, 115v/60/1-ph, 2.5 amps, NEMA 5-15P, cETLus, ETL-Sanitation

#### ACCESSORIES

Mfr	Qty	Model	Spec
Turbo Air	1		Note: Contact factory representative for parts & accessories discounts
Turbo Air	1		3 year parts & labor warranty, standard
Turbo Air	1		Additional 2 year compressor warranty (5 year total), standard
Turbo Air	1		Self-cleaning condenser device equipped, standard
Turbo Air	1		Caster Set, swivel, locking front wheels, standard

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	2.5		1/5		

**REFRIGERATOR MANUFACTURER**  
**Turbo air**  
 more durable, efficient, beautiful

4184 E. Conant St.  
 Long Beach, CA 90808  
 Tel. 310-900-1000  
 Fax. 310-900-1077  
[www.turboairinc.com](http://www.turboairinc.com)

Project:	
Model #:	
Item #:	
Available W/H:	Qty:
Approval:	
AIA #:	SIS #:
CSI Section 11400	

## Undercounter Refrigerator

Undercounters  
 M3 Series

### Patented Self-Cleaning Condenser



This product is equipped with a fine mesh filter to the front of the condenser to catch dust, and a rotating brush that moves up and down daily to remove excess buildup outward and away.

**Model : MUR-48-N**



### FEATURES & BENEFITS

#### Self-Cleaning Condenser

The accumulation of dust in the condenser can cause the failure or breakdown of refrigerators. Refrigerators run normally until they reach a certain level of accumulation. At some point, when they are over the limit, their performance drops quickly resulting in damage to, or disposal of the stored products inside. The Self-Cleaning Condenser device keeps the condenser clean and prevents system failure by automatically brushing daily.

#### Digital temperature control & monitor system

Keep food products safe by maintaining constant temperatures. External digital display allows for easy monitoring.

#### Hydrocarbon refrigerants (R-290)

With innovative and eco-friendly technology, Turbo Air brings you hydrocarbon refrigerators designed to meet DOE's Energy Conservation Standards in 2017 and to use EPA's SNAP Program approved HC refrigerants. Hydrocarbon refrigerants do not deplete the ozone layer and have very low contribution to global warming (ODP-0, GWP-3).

#### Stainless steel exterior

The Turbo Air M3 model boasts a stainless steel exterior (galvanized steel back and bottom). Interior is stainless steel floor with AL sides and back. It guarantees the utmost in cleanliness and long product life. The M3 model adds a touch of style to the most refined setting.

#### Adjustable, heavy duty, PE (polyethylene) coated wire shelves

#### High-density polyurethane insulation

The entire cabinet structure and solid doors are foamed-in-place using high density, CFC free polyurethane insulation.

#### Ergonomically designed doors

Customers' fatigue fades away with easy grip handles and doors that open effortlessly. These features along with self-closing doors make this the ultimate choice in customer convenience. ABS sheet door liners resist water condensation with thermal efficiency.

#### Magnetic door gaskets

Magnetic door gaskets are of one-piece construction, removable without tools for ease of cleaning and replacement.

#### LED interior lighting & fan control

Energy efficient LED lighting lights every corner, making items easy to find. Fan control function automatically shuts off the fan when the door is open, which prevents hot air from being drawn in, thus maintaining the cool inner temperature.

#### Refrigerator holds 33°F ~ 38°F for the best in food preservation

NATURAL  
 Refrigerant

ISO9001:2008

Intertek

Intertek

5 YEAR  
 WARRANTY


Compressor  
 5 YEAR  
 WARRANTY  
 (U.S.A. only)

Model	Swing Doors	CU./FT.	#of Shelves	HP	AMPS	Crated Weight (lbs.)	L x D x H† (inches)
MUR-48-N	2	12.2	2	1/5	2.5	246	48 1/4 x 30 x 30

# Undercounter Refrigerator

Undercounters  
M3 Series

## Model : MUR-48-N

ELECTRICAL DATA	
Voltage	115/60/1
Plug Type	 NEMA 5-15P
Full Load Amperes	2.5
Compressor HP	1/5
Cord Length (ft.)	9
Refrigerant	R-290
DIMENSIONAL DATA	
Net Capacity (cu. ft.)	12.2
Ext. Length Overall (in.)	48 1/4 (1225mm)
Ext. Depth Overall (in.)*	30 (762mm)
Ext. Height Overall (in.)†	30 (762mm)
# of Doors	2
# of Shelves	2
Shelf Size (L x D) (in.)	21 x 17
Net Weight (lbs.)	229
Gross Weight (lbs.)	246

Design and specifications subject to change without notice.

Actual shipping weight may differ due to extra packing materials for product protection.

\* Depth does not include 1" for rear spacers.

† Height does not include 5-5/8" for caster height.

### ■ WARRANTY : 3 Year Parts and Labor Warranty Additional 2 Year Warranty on Compressor

### ■ STANDARD FEATURES

- *Anti-corrosion coated evaporator*
- *Self-contained system*
- *Standard 4" dia. swivel casters with locks on the front set*
- *Door locks standard*

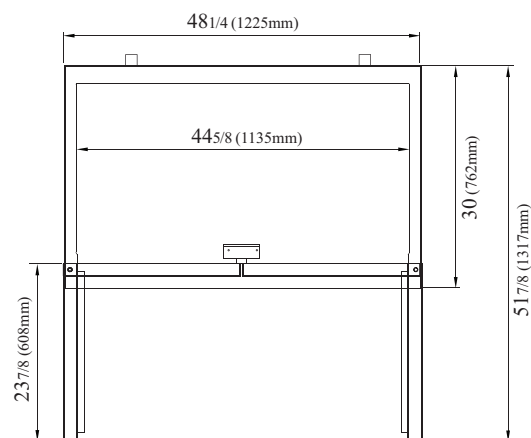
### ■ OPTIONAL ACCESSORIES

- 1" caster, 1/2" diameter & 13 TPI: S28R813660 (non-brake)
- 2.5" caster, 1/2" diameter & 13 TPI: 30265H0100 (non-brake), 30265H0200 (w/ brake)
- 5" caster, 1/2" diameter & 13 TPI: M726500100 (non-brake), M726500200 (w/ brake)
- Leveling leg, 1/2" - 13 TPI x 1.54": LFM1213566
- 6" ABS plastic leg: 30221M0200
- 6" stainless steel leg: 30221M0600
- Additional PE coated wire shelf: WM77800100
- Back splash guard: TU-48B
- Single overshef, stainless steel, 48-3/8" W: TSOS-4S
- Double overshef, 18/304 stainless steel, 48-1/8" W: TSOS-4R

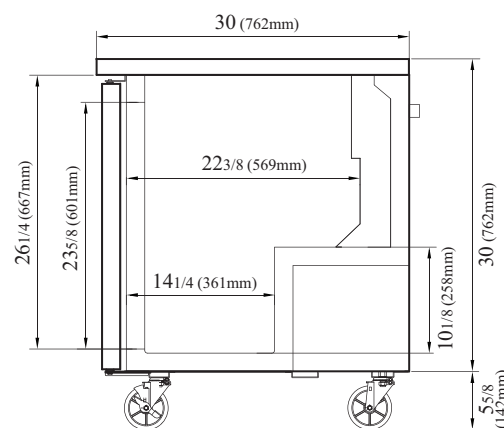
Ver.20210722

## PLAN VIEW

(unit : inch)



TOP VIEW



SIDE VIEW



- Turbo Air : 800-627-0032
- GK : 800-500-3519
- Warranty : 800-381-7770
- AC : 888-900-1002



Continued product development may necessitate specification changes without notice.





## Submittal Sheet

04/21/2023

### ITEM# 16 - DROP-IN ICE BIN (1 EA REQ'D)

Perlick DI18IC

Ice Chest, drop-in, 20"W x 19-1/4"D, 35 lb. ice capacity, includes 2-piece stainless steel sliding cover, 1/2" drain, stainless steel top & interior, galvanized exterior, NSF (18-5/8"W x 17-7/8"D cutout required)

#### WATER

	HOT SIZE	HOT AFF	HOT GPH	COLD SIZE	COLD AFF	FILTERED SIZE	FILTERED AFF	CONDENSER INLET SIZE	CONDENSER OUTLET SIZE
1									

#### WASTE

	INDIRECT SIZE	DIRECT SIZE
1	1/2"	



## PRODUCT SPECIFICATION SHEETS ► Commercial ► Underbar ► Ice Chests

**DROP-IN PLACE ICE CHEST***Standard Depth With and Without Cold Plate*

COMPONENT



JOB	
AREA	
ITEM NO.	
MODEL NO.	

MODELS	
Non-Cold Plate	Cold Plate
DI17IC	
DI18IC	
DI24IC	DI24IC10
DI30IC	DI30IC10
DI36IC	DI36IC10

**KEY PRODUCT FEATURES AND BENEFITS**

- All stainless for durable easy to clean surfaces
- Fully insulated to reduce ice melt in warm climates
- Eco-friendly foam insulation is efficient and has zero impact on global warming or ozone depletion

**Quick Features:**

- Fully insulated with highly efficient eco-friendly polyurethane foam
- Built with stainless steel to maximize the lifespan
- Boldly innovative cold plate design increases thermo efficiency to instantly chill your soft drink to the right temperature
- Highly efficient cold plates instantly chill your soft drinks to the correct temperature
- Available with or without a cold plate to suit your bartender's needs

MODEL NUMBERS - DI17IC, DI18IC, DI24IC, DI24IC10, DI30IC, DI30IC10, DI36IC, DI36IC10

## PRODUCT SPECIFICATION SHEETS ► Commercial ► Underbar ► Ice Chests



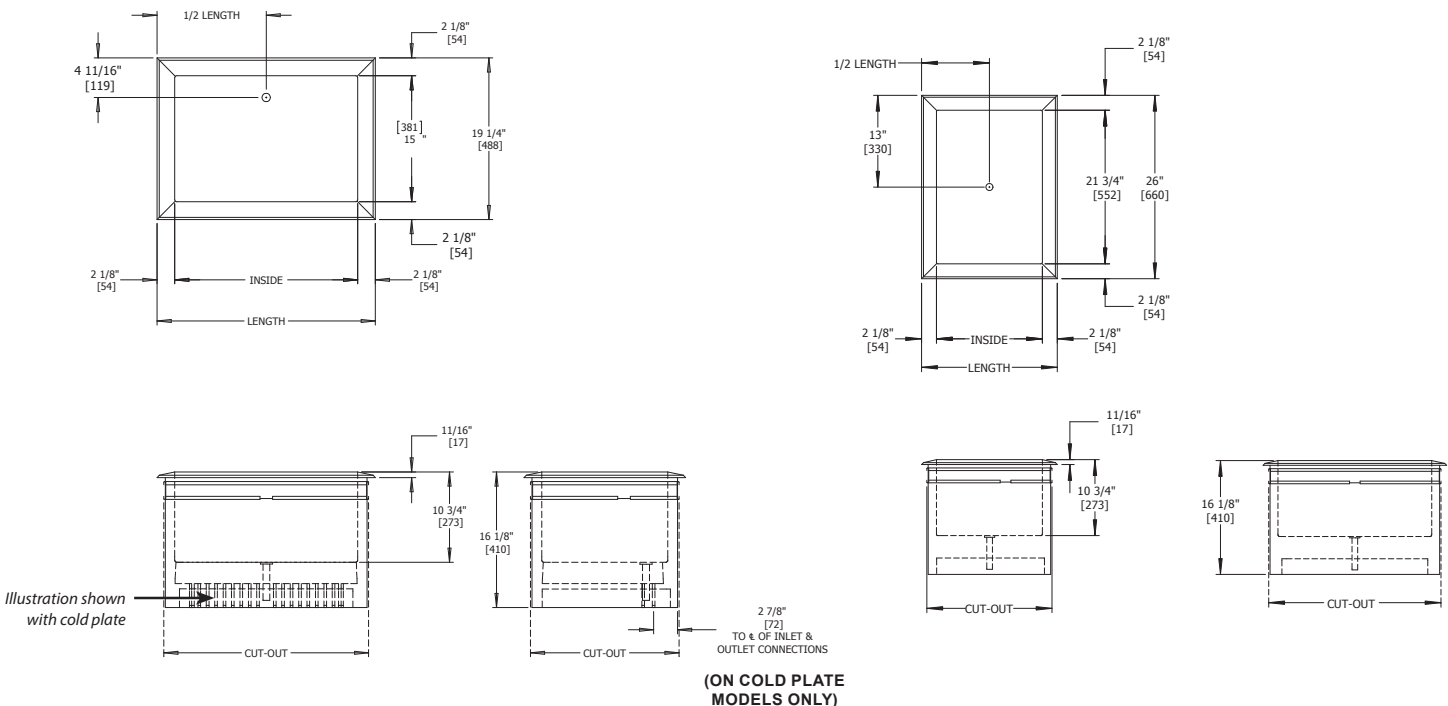
# **DROP-IN PLACE ICE CHEST** *Standard Depth With and Without Cold Plate*

MODEL NUMBERS - D1171C, D1181C, D1241C, D1241C10, D1301C, D1301C10, D1361C, D1361C10

MODEL NOS.						
MODEL TYPE:	Non-Cold Plate Models	D1171C	D1181C	D1241C	D1301C	D1361C
	Cold Plate Models	NA	NA	D1241C10	D1301C10	D1361C10
DIMENSIONS:	Outside (Length x Width)	19" x 26"	20" x 19-1/4"	26" x 19-1/4"	32" x 19-1/4"	38" x 19-1/4"
	Inside (Length x Width)	15" x 21-3/4"	15-3/4" x 15"	21-3/4" x 15"	27-3/4" x 15"	33-3/4" x 15"
	Cut-Out Size, Inches	17-7/8" x 24-5/8"	18-5/8" x 17-7/8"	24-5/8" x 17-7/8"	30-5/8" x 17-7/8"	36-5/8" x 17-7/8"
	Ice Capacity, lb/kg	80 (36.3)	55 (36.3)	80 (36.3)	100 (45.4)	120 (54.4)
	Ship Weight With Cold Plate lb/kg	N/A	N/A	80 (36.3)	86 (39)	92 (41.7)
	Ship Weight Without Cold Plate lb/kg	28 (12.7)	28 (12.7)	33 (15)	39 (17.7)	45 (20.4)
MATERIALS	Top	Stainless steel				
	Front & Sides	Galvanized steel				
	Back & Bottom	Galvanized steel				
	Covers	Stainless steel, two-piece, included with all Drop In Ice Chests				
	Insulation	Eco-friendly foamed-in-place polyurethane				
MECHANICALS	Plumbing	Drain connection- 1-1/2" NPS male				
	Cold Plate	Cast aluminum plate concealed under ice chest liner. Cold plate has 2 full-length circuits and 8 half-length circuits. <b>Connections</b> - 5/16" O.D. stainless steel tubing with swaged end to accept standard 1/4" I.D. beverage tubing				
OPERATING SPECIFICATIONS	Cold Plate	Each full circuit will deliver four 6 oz. drinks per minute at 40° continuously, or 40 oz. every three minutes in a single draw (flow rate 2 oz./sec, 75° product)				

## **D1171C**

(Sets in place with narrow edge to the front)





## Submittal Sheet

04/21/2023

### ITEM# 17 - DRIP TROUGH (1 EA REQ'D)

Perlick C21379A

Drip Tray Trough, drop-in, 14-1/16"W x 7-5/8"D, removable louvered glass rack, 1/2" drain, stainless steel construction

#### WATER

	HOT SIZE	HOT AFF	HOT GPH	COLD SIZE	COLD AFF	FILTERED SIZE	FILTERED AFF	CONDENSER INLET SIZE	CONDENSER OUTLET SIZE
1									

#### WASTE

	INDIRECT SIZE	DIRECT SIZE
1	1/2"	

**PRODUCT SPECIFICATION SHEETS** ► Beverage Dispensing ► Top Mounted Drainer

**DRIP PANS**
*Top Mounted, Angled, Recessed, Cutout and Spacesaver*

**5020 shown**

**C21379A shown**

**C18635A shown**

JOB	
AREA	
ITEM NO.	
MODEL NO.	

MODELS
Top-Mounted
Angled
Recessed
Cutout
Spacesaver

**KEY PRODUCT FEATURES AND BENEFITS**

- Keep your bar clean and dry with Perlick drainers
- Liquid automatically flows out of the drainer ensuring a clean and hygienic bar space
- Removable glass rack makes it quick and easy to clean

**Quick Features:**

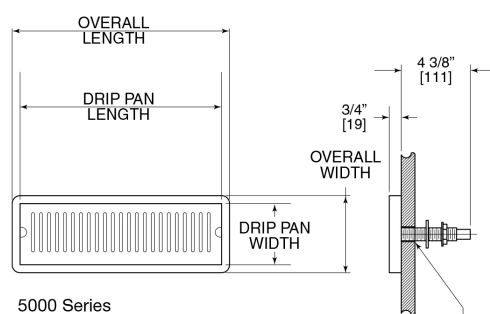
- Drip pans equipped with a four-inch, 1/2" O.D. drain socket and a removable glass rack
- All-stainless steel construction
- 1/2" O.D. drain socket
- Removable glass rack
- Stainless steel and tarnish free brass finishes

## PRODUCT SPECIFICATION SHEETS ► Beverage Dispensing ► Top Mounted Drainer

**DRIP PANS***Top Mounted, Angled, Recessed, Cutout and Spacesaver***TOP MOUNTED**

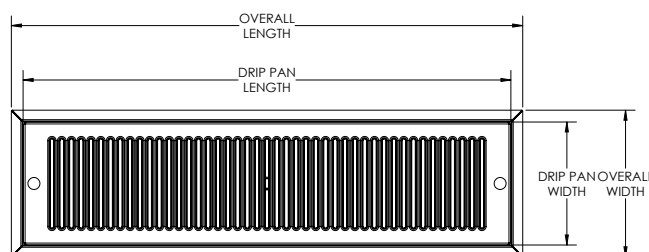
5000 SERIES MODEL NUMBERS	Stainless Steel	5015	5020	5025	5028	5030	5034	5036	5124	5130
	Tarnish-Free Brass	5015TF	5020TF	5025TF	5028TF	5030TF	N/A	N/A	N/A	N/A
OVERALL LENGTH (mm)		5-3/8" (137)	13-3/4" (349)	19" (483)	24" (610)	37" (940)	47-1/16" (1195)	59-7/8" (1521)	40-1/16" (1017)	48-5/8" (1235)
DRIP PAN LENGTH (mm)		4-3/8" (111)	12-3/4" (324)	18" (457)	23" (584)	36-1/8" (918)	46-3/16" (1173)	59" (1499)	39-3/16" (995)	47-3/4" (1213)
OVERALL WIDTH (mm)		5-3/8" (137)	4-7/8" (124)	4-7/8" (124)	4-7/8" (124)	4-7/8" (124)	4-15/16" (125)	4-15/16" (125)	7-7/16" (189)	7-7/16" (189)
DRIP PAN WIDTH (mm)		4-3/8" (111)	3-7/8" (98)	3-7/8" (98)	3-7/8" (98)	3-7/8" (98)	4-1/16" (103)	4-1/16" (103)	6-9/16" (166)	6-9/16" (166)
DRIP PAN and GLASS RACK		Stainless steel or tarnish-free brass					Stainless steel			
PLUMBING		Equipped with 9/16" I.D. waste drain and universal drain tubes. Use with 1/2" N.P.T. pipe fittings or 1390D 1/2" I.D. flexible drain tube.								

18000 SERIES MODEL NUMBERS	Stainless Steel	C18635A	C18640A	C18645A	C18650A	C18655	C18660	C18663	C18665
	Tarnish-Free Brass	C18635ATF	C18640ATF	C18645ATF	C18650ATF	C18655TF	N/A	N/A	N/A
OVERALL LENGTH (mm)		8-3/4" (222)	14-3/16" (360)	20-3/4" (527)	26-3/4" (679)	33" (838)	46-9/16" (1182)	52-7/16" (1332)	59-3/4" (1517)
DRIP PAN LENGTH (mm)		7-7/16" (179)	12-7/8" (327)	19-7/16" (494)	25-1/2" (648)	31-3/4" (787)	45-5/16" (1151)	51-3/16" (1300)	58-1/2" (1486)
OVERALL WIDTH (mm)		7-3/4" (197)	7-3/4" (197)	7-3/4" (197)	7-3/4" (197)	7-3/4" (197)	7-3/4" (197)	7-3/4" (197)	7-3/4" (197)
DRIP PAN WIDTH (mm)		6-1/2" (165)	6-1/2" (165)	6-1/2" (165)	6-1/2" (165)	6-1/2" (165)	6-1/2" (165)	6-1/2" (165)	6-1/2" (165)
DRIP PAN and GLASS RACK		Stainless steel or tarnish-free brass						Stainless steel	
PLUMBING		Equipped with 1/2" I.D. brass drain tube with 1/2" NPSM thread and machined end to accept 1/2" I.D. flexible drain tube.							

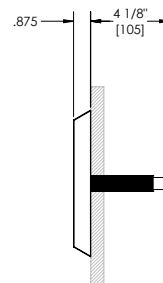


5000 Series

TO INSTALL DRIP PAN,  
DRILL 15/16" (24) DIA. HOLE  
THRU COUNTER TOP.



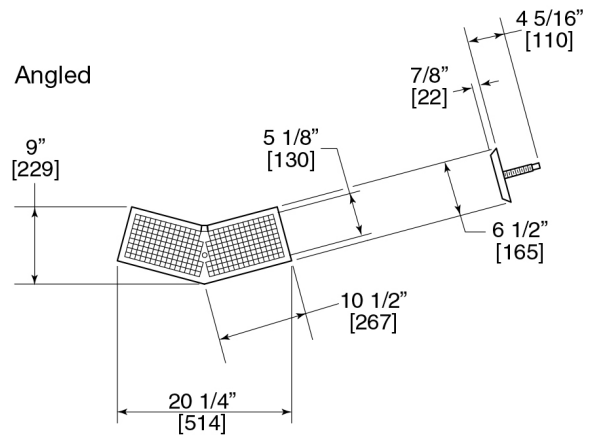
18000 SERIES



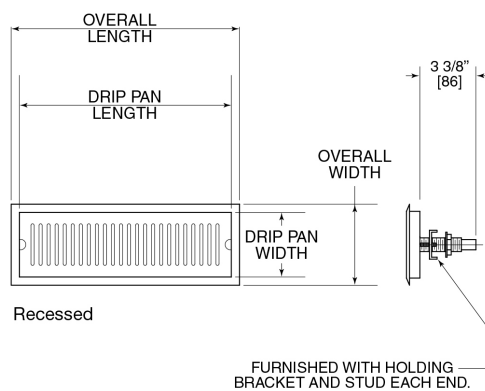
**PRODUCT SPECIFICATION SHEETS** ► Beverage Dispensing ► Top Mounted Drainer

**DRIP PANS**
*Top Mounted, Angled, Recessed, Cutout and Spacesaver*
**ANGLED**

MODEL NUMBERS	Stainless Steel	57120
	Tarnish-Free Brass	57120TF
OVERALL LENGTH (mm)	20-1/4" (511)	
OVERALL WIDTH (mm)	9" (229)	
DRIP PAN and GLASS RACK	Stainless steel or tarnish-free brass. Plastic grid-style glass rack glass rack.	
PLUMBING	Equipped with 1/2" I.D. brass drain tube with 1/2" NPSM thread and machined end to accept 1/2" I.D. flexible drain tube.	

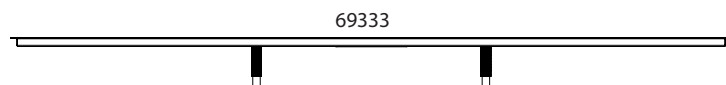
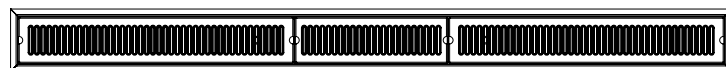

**RECESSED**

MODEL NUMBERS	Stainless Steel	C11988A	C21379A	C32257	C32357A	58979	69324	69327	69330	69333
	Tarnish-Free Brass	C11988ATF	C21379ATF	C32257TF	C32357ATF	58979TF				
OVERALL LENGTH (mm)		8-5/8" (219)	14-1/16" (357)	20-5/8" (524)	19-1/4" (488)	37-5/16" (948)	46-1/2" (1,181)	59-5/8" (1,514)	47-5/16" (1,202)	60-1/8" (1,527)
DRIP PAN LENGTH (mm)		7-7/16" (179)	12-7/8" (327)	19-7/16" (494)	19-7/16" (494)	36-1/8" (918)	45-5/16" (1,151)	58-7/16" (1,459)	46-1/8" (1,172)	58-15/16" (1,497)
OVERALL WIDTH (mm)		7-5/8" (194)	7-5/8" (194)	7-5/8" (194)	5-1/8" (130)	5-1/8" (130)	7-3/4" (197)	7-3/4" (197)	5-3/16" (132)	5-3/16" (132)
DRIP PAN WIDTH (mm)		6-7/16" (164)	6-7/16" (164)	6-7/16" (164)	4" (102)	3-7/8" (98)	6-9/16" (167)	6-9/16" (167)	4" (102)	4" (102)
DRIP PAN and GLASS RACK	No. 4 finish, type 302 stainless steel or tarnish-free brass.									
PLUMBING	Equipped with 1/2" I.D. brass drain tube with 1/2" NPSM thread and machined end to accept 1/2" I.D. flexible drain tube.									



Recessed

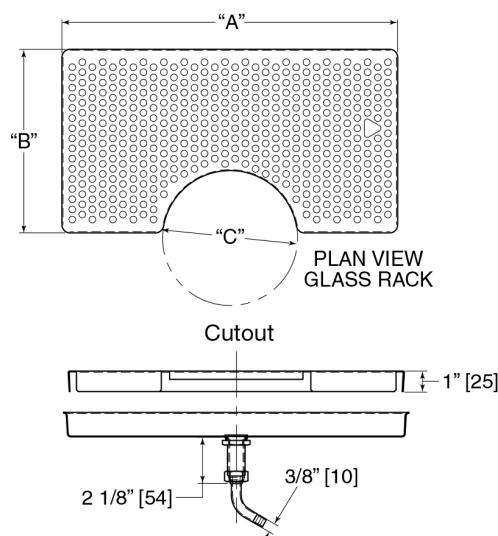
FURNISHED WITH HOLDING BRACKET AND STUD EACH END.



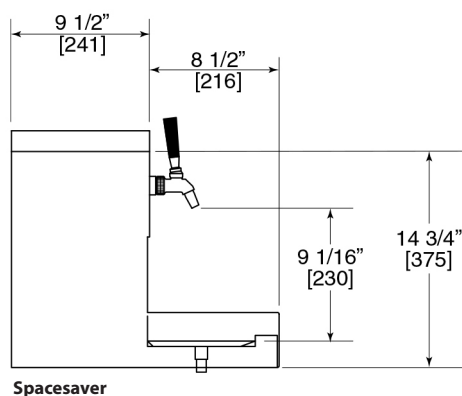
**PRODUCT SPECIFICATION SHEETS** ► Beverage Dispensing ► Top Mounted Drainer

**DRIP PANS**
*Top Mounted, Angled, Recessed, Cutout and Spacesaver*
**CUTOUT**

MODEL NUMBERS	Stainless Steel	62303SS		
	Tarnish-Free Brass	62302	62303	62304
DIMENSIONS "A" (mm)		8-5/8" (219)	14-1/16" (357)	20-3/4" (527)
DIMENSIONS "B" (mm)		7-7/16" (179)	12-7/8" (327)	19-7/16" (494)
DIMENSIONS "C" (mm)		7-5/8" (194)	7-5/8" (194)	5-1/8" (130)
DRIP PAN and GLASS RACK	Brass or stainless steel. Stainless steel glass rack.			
PLUMBING	Chrome plated brass drain and 3/8" elbow hose coupling.			


**SPACESAVER DRIP PANS**

MODEL NUMBERS	Stainless Steel	3713-1	3721-1
LENGTH (mm)		12-7/8" (327)	21-1/8" (537)
DEPTH (mm)		8-7/8" (225)	8-7/8" (225)
HEIGHT (mm)		14-3/4" (325)	14-3/4" (375)
DRIP PAN and GLASS RACK	Stainless steel.		
PLUMBING	Equipped with 1/2" I.D. brass drain tube with 1/2" NPSM thread and machined end to accept 1/2" I.D. flexible drain tube.		


**Spacesaver**

***Submittal Sheet***

04/21/2023

**ITEM# 18 - SODA GUN (1 EA REQ'D)**

Provided by Vendor TBD



***Submittal Sheet***

04/21/2023

**ITEM# 19 - TEA BREWER (1 EA REQ'D)**

Provided by Vendor TBD



***Submittal Sheet***

04/21/2023

**ITEM# 20 - SPARE NO.**

<Spare No.>

***Submittal Sheet***

04/21/2023

**ITEM# 21 - TEA URN (1 EA REQ'D)**

Provided by Vendor TBD

***Submittal Sheet***

04/21/2023

**ITEM# 22 - BAG IN BOX ASSEMBLY (1 EA REQ'D)**

Provided by Vendor TBD

***Submittal Sheet***

04/21/2023

**ITEM# 23 - CO2 CYLINDER TANK (2 EA REQ'D)**

Provided by Vendor TBD

***Submittal Sheet***

04/21/2023

**ITEM# 24 - CARBONATOR (1 EA REQ'D)**

Provided by Vendor TBD

***Submittal Sheet***

04/21/2023

**ITEM# 25 - COFFEE BREWER (1 EA REQ'D)**

Provided by Vendor TBD

***Submittal Sheet***

04/21/2023

**ITEM# 26 - DROP-IN SINK (1 EA REQ'D)**

Eagle Group SR14-16-9.5-1

Self-Rimming Drop-In Sink, one compartment, 14" wide x 16" front-to-back x 9-1/2" deep bowl, 4" OC deck mount faucet with gooseneck spout (302004), includes basket drain, 20/304 stainless steel construction, NSF

**ACCESSORIES**

Mfr	Qty	Model	Spec
Eagle Group	1		Faucet hole punched on 4" centers, standard
Eagle Group	1		Standard faucet





Profit from the Eagle Advantage®

## Specification Sheet

### Short Form Specifications

Eagle Countertop Self Rimming Drop-In Sink, model \_\_\_\_\_ . Sinks are type 304 stainless steel, deep-drawn and self rimming. Faucet holes are punched on 4" centers. Positive holddown clamping tabs for top mount. Faucet and drain included.



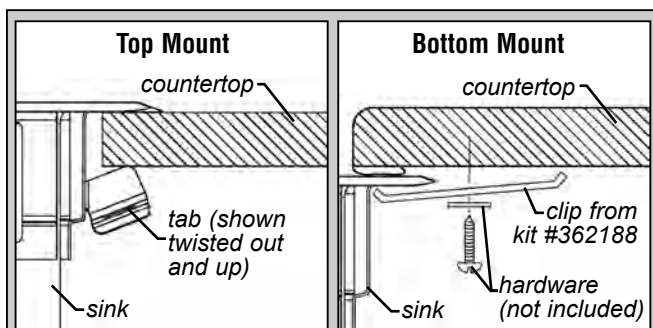
SRU14-10-5-1



SR10-14-9.5-2



SR10-14-9.5-3



**For Top Mount:** Positive holddown clamping twist-tabs designed for up to 1" (25mm)-thick countertops. FOR COUNTERTOPS THICKER THAN 1", CONTACT FACTORY.

**For Bottom Mount:** Kit sold separately—see back page.

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our **SpecFAB®** Division.

Phone: 302-653-3000 • Fax: 302-653-2065 • e-mail: quotes@eaglegrp.com

Item No.: \_\_\_\_\_  
Project No.: \_\_\_\_\_  
S.I.S. No.: \_\_\_\_\_

## Countertop Drop-In Sinks with Self Rim Design\*

### MODELS:

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> SR10-14-5-1    | <input type="checkbox"/> SR18-24-13.5-1 | <input type="checkbox"/> SR16-19-13.5-2 |
| <input type="checkbox"/> SR10-14-9.5-1  | <input type="checkbox"/> SR19-16-8-1    | <input type="checkbox"/> SR18-24-13.5-2 |
| <input type="checkbox"/> SR12-14-9.5-1  | <input type="checkbox"/> SR19-16-13.5-1 | <input type="checkbox"/> SR22-22-13.5-2 |
| <input type="checkbox"/> SR14-10-5-1    | <input type="checkbox"/> SR20-12-6.5-1  | <input type="checkbox"/> SR24-24-13.5-2 |
| <input type="checkbox"/> SRU14-10-5-1   | <input type="checkbox"/> SR22-22-13.5-1 | <input type="checkbox"/> SR10-14-9.5-3  |
| <input type="checkbox"/> SR14-10-9.5-1  | <input type="checkbox"/> SR24-18-13.5-1 | <input type="checkbox"/> SR12-14-9.5-3  |
| <input type="checkbox"/> SR14-12-9.5-1  | <input type="checkbox"/> SR24-24-13.5-1 | <input type="checkbox"/> SR14-16-9.5-3  |
| <input type="checkbox"/> SR14-16-9.5-1  | <input type="checkbox"/> SR10-14-9.5-2  | <input type="checkbox"/> SR16-19-8-3    |
| <input type="checkbox"/> SR16-14-9.5-1  | <input type="checkbox"/> SR12-14-9.5-2  | <input type="checkbox"/> SR16-19-13.5-3 |
| <input type="checkbox"/> SR16-19-8-1    | <input type="checkbox"/> SR14-16-9.5-2  | <input type="checkbox"/> SR18-24-13.5-3 |
| <input type="checkbox"/> SR16-19-13.5-1 | <input type="checkbox"/> SR16-19-8-2    |   |

### Design and Construction Features

- Sinks can be mounted onto top or bottom of countertop. For bottom mount, order kit #362188 (see back page).
- Heavy gauge type 304 series stainless steel coved bowls with large radius.
- All sinks feature 3½" (89mm)-diameter drain hole in the center of the bowl.
- Crumb cup strainer assembly features 4½" (114mm)-diameter top flange and 1½" (38mm) NPS outlet.
- All sinks feature deck-mounted faucet on 4" (102mm)\*\* centers; one-compartment sinks with 10" x 14" (254 x 356) and 14" x 16" (356 x 406mm) bowls include faucet with gooseneck spout.
- Self rimming.
- Deep-drawn.
- 18 or 20 gauge\*\*\* industrial grade construction and quality.

\* Not intended for NSF installation into stainless steel worksurface. Please consult factory if need arises.

\*\* To order sinks with faucet holes punched on 8" (203mm) centers, add suffix "-8CL". Example: SR10-14-9.5-2-8CL

\*\*\* Varies per model sink. Refer to charts on back page.

### Options / Accessories

- ☐ Faucets (see back page)
- ☐ Electronic-eye faucets<sup>Δ</sup> (add suffix "-FE")
- ☐ P-trap (#300789)

<sup>Δ</sup> Electronic-Eye Faucets are available for One-Compartment Sinks only.

### Certifications / Approvals



AutoQuotes





Profit from the Eagle Advantage®



NOTE: width = front-to-back, length = side-to-side

 Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

**One-Compartment Sinks** — Furnished with a #302004 faucet with gooseneck spout, except where noted.

model #	inside bowl dimensions width x length x depth in. mm		overall dimensions width x length in. mm		cutout for top mount width x length in. mm		cutout for bottom mount width x length in. mm		weight lbs. kg	18 or 20 gauge
SR10-14-5-1	14" x 10" x 5"	356 x 254 x 127	19" x 12 1/2"	483 x 324	17 1/2" x 11 1/4"	448 x 286	14 1/8" x 10 1/8"	376 x 275	10 4.5	20
SR10-14-9.5-1	14" x 10" x 9 1/2"	356 x 254 x 241	18 1/2" x 12 1/2"	480 x 324	17 1/2" x 11 1/4"	445 x 286	14 1/8" x 10 1/8"	376 x 275	12 5.4	18
SR12-14-9.5-1	14" x 12" x 9 1/2"	356 x 305 x 241	19" x 14 1/2"	483 x 375	17 1/2" x 13 1/4"	448 x 337	14 3/8" x 12 3/8"	321 x 314	14 6.4	20
SR14-10-5-1	10" x 14" x 5"	254 x 356 x 127	15" x 16 1/2"	381 x 426	13 3/8" x 15 1/4"	346 x 387	10 13/16" x 14 1/16"	275 x 376	10 4.5	20
SRU14-10-5-1	10" x 14" x 5"	254 x 356 x 127	15" x 16 1/2"	381 x 426	13 3/8" x 15 1/4"	346 x 387	n/a		12 5.4	20
SR14-10-9.5-1	10" x 14" x 9 1/2"	254 x 356 x 241	15" x 16 1/2"	381 x 422	13 3/8" x 15 1/4"	346 x 384	10 13/16" x 14 1/16"	275 x 376	12 5.4	18
SR14-12-9.5-1	12" x 14" x 9 1/2"	305 x 356 x 241	17" x 16 1/2"	432 x 426	15 3/8" x 15 1/4"	397 x 387	12 3/8" x 14 1/8"	314 x 365	14 6.4	20
SR14-16-9.5-1	16" x 14" x 9 1/2"	406 x 356 x 241	21" x 16 1/2"	533 x 425	19 3/8" x 15 1/4"	499 x 387	16 3/8" x 14 3/8"	422 x 372	23 10.4	20
SR16-14-9.5-1	14" x 16" x 9 1/2"	356 x 406 x 241	19" x 18 1/2"	483 x 476	17 1/2" x 17 1/4"	448 x 438	14 3/8" x 16 3/8"	372 x 422	23 10.4	20
SR16-19-8-1	20" x 16" x 8"	508 x 406 x 203	24 3/4" x 18 1/2"	629 x 470	23 3/4" x 17"	594 x 432	20 3/4" x 16 3/4"	524 x 422	26 11.8	18
SR16-19-13.5-1	20" x 16" x 13 1/2"	508 x 406 x 343	24 3/4" x 18 1/2"	629 x 470	23 3/4" x 17"	594 x 432	20 3/4" x 16 3/4"	524 x 422	28 12.7	18
SR18-24-13.5-1	24" x 18" x 13 1/2"	610 x 457 x 343	28 3/4" x 20 1/2"	730 x 521	27 3/4" x 19"	695 x 483	24 3/4" x 18 3/4"	626 x 473	32 14.5	18
SR19-16-8-1*	16" x 20" x 8"	406 x 508 x 203	20 3/4" x 22 1/2"	527 x 572	19 3/4" x 21"	492 x 533	16 3/4" x 20 3/4"	422 x 524	24 10.9	18
SR19-16-13.5-1*	16" x 20" x 13 1/2"	406 x 508 x 343	20 3/4" x 22 1/2"	527 x 572	19 3/4" x 21"	492 x 533	16 3/4" x 20 3/4"	422 x 524	25 11.3	18
SR20-12-6.5-1	12" x 20" x 6 1/2"	305 x 508 x 165	17" x 22 3/4"	432 x 578	15 3/8" x 21 1/4"	397 x 540	12 3/8" x 20 3/8"	310 x 511	28 12.7	20
SR22-22-13.5-1*	22" x 22" x 13 1/2"	559 x 559 x 343	27" x 24 3/4"	686 x 629	25 3/4" x 23 3/4"	651 x 591	see template **		34 15.4	18
SR24-18-13.5-1*	18" x 24" x 13 1/2"	457 x 610 x 343	22 3/4" x 26 1/2"	578 x 673	21 3/4" x 25"	543 x 635	18 3/8" x 24 3/8"	473 x 626	32 14.5	18
SR24-24-13.5-1*	24" x 24" x 13 1/2"	610 x 610 x 343	28 3/4" x 26 1/2"	730 x 673	27 3/4" x 25"	695 x 635	24 13/16" x 24 1/16"	627 x 627	36 16.3	18

\* #SRU14-10-5-1 features an upturn on sides and rear; \*These sinks utilize a #300490 faucet with 12" (305mm) swivel spout; \*\* Template included with sink.

**Two-Compartment Sinks** — Furnished with a #300490 faucet with 12" (203mm) spout, except where noted.

model #	inside bowl dimensions width x length x depth in. mm		overall dimensions width x length in. mm		cutout for top mount width x length in. mm		cutout for bottom mount width x length in. mm		weight lbs. kg	18 or 20 gauge
SR10-14-9.5-2*	14" x 10" x 9 1/2"	356 x 254 x 241	18 1/2" x 24 3/4"	480 x 629	17 1/2" x 23 1/4"	445 x 591	14 13/16" x 23"	376 x 584	25 11.3	18
SR12-14-9.5-2	14" x 12" x 9 1/2"	356 x 305 x 241	19" x 28 3/4"	483 x 730	17 1/2" x 27 1/4"	448 x 692	14 3/8" x 26 3/8"	365 x 676	27 12.2	20
SR14-16-9.5-2	16" x 14" x 9 1/2"	406 x 356 x 241	21" x 32 3/4"	525 x 832	19 3/8" x 31 1/4"	499 x 794	16 3/8" x 30 3/8"	422 x 778	42 19.1	20
SR16-19-8-2	20" x 16" x 8"	508 x 406 x 203	24 3/4" x 36 1/4"	527 x 921	23 3/4" x 34 3/4"	594 x 883	20 3/4" x 34 3/4"	524 x 870	48 21.8	18
SR16-19-13.5-2	20" x 16" x 13 1/2"	508 x 406 x 343	24 3/4" x 36 1/4"	527 x 921	23 3/4" x 34 3/4"	594 x 883	20 3/4" x 34 3/4"	524 x 870	52 23.6	18
SR18-24-13.5-2	24" x 18" x 13 1/2"	610 x 457 x 343	28 3/4" x 40 3/4"	730 x 1022	27 3/4" x 38 3/4"	695 x 984	24 3/4" x 38 3/4"	626 x 978	56 24.9	18
SR22-22-13.5-2	22" x 22" x 13 1/2"	559 x 559 x 343	27" x 48 3/4"	686 x 1238	25 3/4" x 47 3/4"	651 x 1200	see template **		57 25.9	18
SR24-24-13.5-2	24" x 24" x 13 1/2"	610 x 610 x 343	28 3/4" x 52 3/4"	730 x 1324	27 3/4" x 50 3/4"	695 x 1286	24 13/16" x 50 3/4"	630 x 1276	64 29.0	18

\* Model #SR10-14-9.5-2 utilizes a #301248 faucet with 8" (203mm) swivel spout; \*\* Template included with sink.

**Three-Compartment Sinks** — Furnished with a #300490 faucet with 12" (305mm) spout, except where noted.

model #	inside bowl dimensions width x length x depth in. mm		overall dimensions width x length in. mm		cutout for top mount width x length in. mm		cutout for bottom mount width x length in. mm		weight lbs. kg	18 or 20 gauge
SR10-14-9.5-3	14" x 10" x 9 1/2"	356 x 254 x 241	18 1/2" x 36 3/4"	480 x 933	17 1/2" x 35 1/4"	445 x 895	14 13/16" x 35"	376 x 889	37 16.8	18
SR12-14-9.5-3	14" x 12" x 9 1/2"	356 x 305 x 241	19" x 42 3/4"	483 x 1086	17 1/2" x 41 1/4"	448 x 1031	14 3/8" x 40 3/8"	331 x 1032	39 17.6	20
SR14-16-9.5-3	16" x 14" x 9 1/2"	406 x 356 x 241	21" x 48 3/4"	533 x 1238	19 3/8" x 47 1/4"	498 x 1200	16 3/8" x 46 3/8"	422 x 1184	66 29.9	20
SR16-19-8-3	20" x 16" x 8"	508 x 406 x 203	24 3/4" x 54"	629 x 1372	23 3/4" x 52 1/2"	594 x 1334	20 3/4" x 52 1/2"	524 x 1327	72 32.7	18
SR16-19-13.5-3	20" x 16" x 13 1/2"	508 x 406 x 343	24 3/4" x 54"	629 x 1372	23 3/4" x 52 1/2"	594 x 1334	20 3/4" x 52 1/2"	524 x 1327	77 34.9	18
SR18-24-13.5-3*	24" x 18" x 13 1/2"	610 x 457 x 343	28 3/4" x 60"	730 x 1524	27 3/4" x 58 3/4"	695 x 1486	24 3/4" x 58 3/4"	626 x 1480	82 37.2	18

\* These sinks utilize a #301440 faucet with 14" (356mm) swivel spout.

**Optional Deck Mount Faucets**
**description**

gooseneck faucet, 4" (102mm) center, for single bowls	#313306 T&S faucet
8" (203mm) spout, 4" (102mm) center, for single and double bowls	
12" (305mm) spout, 4" (102mm) center, for triple bowls	
14" (356mm) spout, 8" (203mm) center, for triple bowls	
8" (203mm) spout, 4" (102mm) center, for single and double bowls, w/spray arm	
8" (203mm) spout, 8" (203mm) center, for single and double bowls, w/spray arm	
12" (305mm) spout, 8" (203mm) center, for triple bowls, w/spray arm	
14" (356mm) spout, 8" (203mm) center, for triple bowls, w/spray arm	

\* Faucets with spray arm require special faucet holes.

Standard model #	T&S model #
302004	313308
301248	313306
300490	313303
301440	313307
—	377430
—	303560*
—	303561*
—	303562*

**Bottom-Mount Kit**

 One kit per one-compartment sink,  
 two kits per two-compartment sink,  
 three kits per three-compartment sink.

description	model #
8 undermount clips per kit	362188



EAGLE GROUP • 100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065 • www.eaglegrp.com

Foodservice Division: Phone 800-441-8440 • MHC/Retail Display Divisions: Phone 800-637-5100

 Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.

 Printed in U.S.A.  
 ©2017 by Eagle Group  
 Rev. 08/17



## Submittal Sheet

04/21/2023

### ITEM# 27 - ICE CREAM DIPPING CABINET (1 EA REQ'D)

Master-Bilt DC-2S

Ice Cream Dipping Cabinet, dip (3) 3 gallon, store (1) 3 gallon, cold-wall evaporator, painted galvanized steel exterior, galvanized steel interior, stainless steel top with anti-condensate heater, flip lid, temperature range 10° to -10°F, 1/4 hp, 115v/60/1-ph, 2.1 amps, 9' cord, NEMA 5-15P, cULus, NSF

#### ACCESSORIES

Mfr	Qty	Model	Spec
Master-Bilt	1		Pricing is valid for 60 days upon receipt of purchase order AND approved drawing (if applicable). Order must ship per our current standard lead time or pricing will be subject to change. All shipments will be FOB Hudson, WI or New Albany, MS.
Master-Bilt	1		2 year parts and labor warranty on cabinet, standard
Master-Bilt	1		5 year compressor part warranty, standard
Master-Bilt	1		White exterior finish, standard

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	2.1		1/4		



ITEM NO. \_\_\_\_\_  
 PROJECT \_\_\_\_\_  
 LOCATION \_\_\_\_\_  
 DATE \_\_\_\_\_ QTY. \_\_\_\_\_

## DC SERIES

### Conventional Ice Cream Storage/Dipping Cabinets

#### MODELS

- ☐ DC-2S    ☐ DC-8D  
☐ DC-4S    ☐ DC-10D  
☐ DC-4D    ☐ DC-12D  
☐ DC-6D



DC-8D

DC-2S



#### FEATURES

##### CONSTRUCTION

- Seamless stainless steel top
- 24 gauge painted galvanized steel cabinet
- Galvanized steel interior
- Equipped with leveling legs to correct for unlevel flooring situations
- Floor drain with garden hose fitting
- Galvanized steel inner liner
- Anti-condensate heaters under stainless top cap
- 2-1/4" foamed-in-place "zero ODP" urethane insulation

##### LIDS

- Stainless steel
- Hinged with handles
- Heavy-duty replaceable gasket

##### REFRIGERATION

- Refrigerant: R290
- Self-contained, factory tested refrigeration system
- Cold wall evaporator
- Force draft hermetic condensing unit
- Temperature range: 10° to -10°F (-12° to -23°C)
- R-factor (insulation efficiency rating): 19.40

##### WARRANTY

- Standard limited two year parts and labor
- Additional three year coverage on compressor part

#### OPTIONS

- ☐ Add suffix "SE" for all-stainless exterior  
☐ Lid locks (less lock)  
☐ Legs  
☐ Casters  
☐ Additional lids  
☐ Load level shelves  
☐ Dipper well



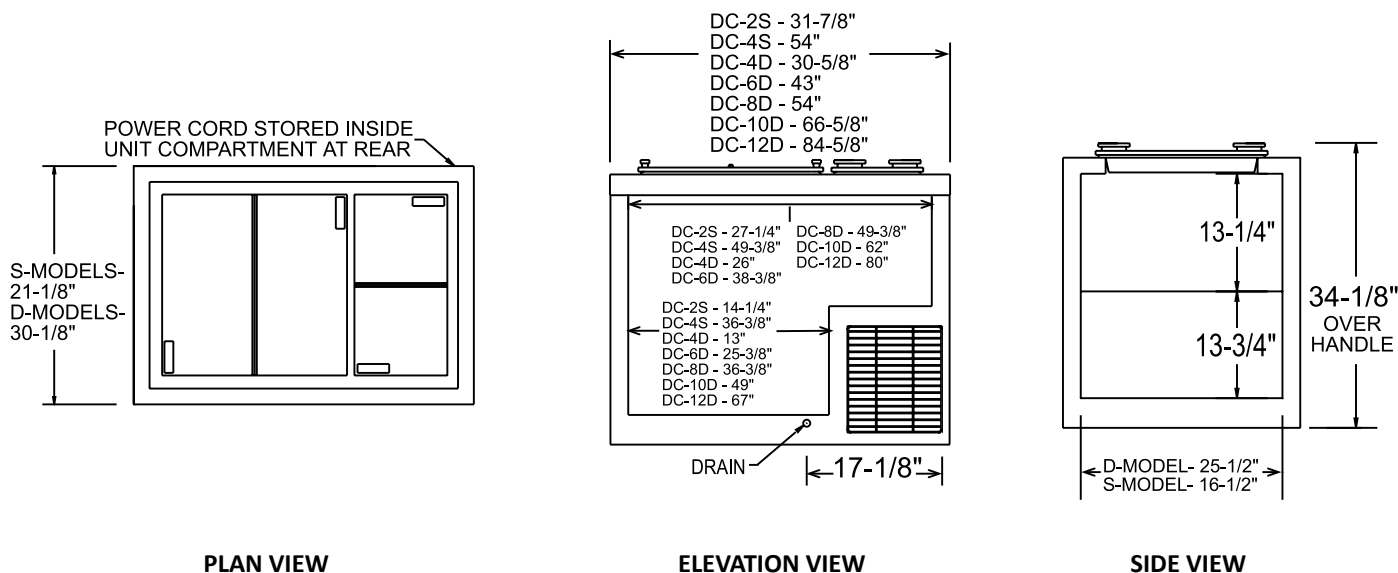
## DC SERIES

## CONVENTIONAL ICE CREAM STORAGE/DIPPING CABINETS

## TECHNICAL SPECIFICATIONS

Models	DC-2S	DC-4D	DC-4S	DC-6D	DC-8D	DC-10D	DC-12D
Crated Weight (lbs) (kg)	220 (100)	220 (99)	280 (125)	275 (124)	365 (164)	430 (194)	490 (221)
Crated Height (in) (mm)	40 (1016)	40 (1016)	40 (1016)	45 (1143)	45 (1143)	50 (1270)	45 (1143)
Crated Width (in) (mm)	36 (914)	45 (1143)	60 (1524)	60 (1524)	70 (1778)	80 (2032)	104 (2642)
Crated Depth (in) (mm)	24 (610)	40 (1016)	24 (610)	40 (1016)	40 (1016)	40 (1016)	40 (1016)
Interior Height (in) (mm)	27 (686)	27 (686)	27 (686)	27 (686)	27 (686)	27 (686)	27 (686)
Interior Display Width (in) (mm)	27-1/4 (692)	26 (660)	49-3/8 (1254)	38-3/8 (975)	49-3/8 (1254)	62 (1575)	80 (2032)
Interior Storage Width (in) (mm)	14-1/4 (362)	13 (330)	36-3/8 (924)	25-3/8 (645)	36-3/8 (924)	49 (1245)	67 (1702)
Can Capacity Display*	3	5	6	8	11	14	18
Can Capacity Storage*	1	2	4	5	8	11	15
Interior Depth (in) (mm)	16-1/2 (419)	25-1/2 (648)	16-1/2 (419)	25-1/2 (648)	25-1/2 (648)	25-1/2 (648)	25-1/2 (648)
Overall Height (in) (mm)	34-1/8 (867)	34-1/8 (867)	34-1/8 (867)	34-1/8 (867)	34-1/8 (867)	34-1/8 (867)	34-1/8 (867)
Overall Width (in) (mm)	31-7/8 (800)	30-5/8 (778)	54 (1372)	43 (1092)	54 (1372)	66-5/8 (1692)	84-5/8 (2149)
Overall Depth (in) (mm)	21-1/8 (537)	30-1/8 (765)	21-1/8 (537)	30-1/8 (765)	30-1/8 (765)	30-1/8 (765)	30-1/8 (765)
Gross Cubage (CuFt) (L)	5.2 (147)	7.6 (215)	11.0 (28)	12.5 (31)	17.3 (43)	22.0 (55)	29.1 (73)
Condensing Unit Size	1/4 HP	1/4 HP	1/4 HP	1/4 HP	1/3 HP	1/3 HP	1/3 HP
Refrigerant	R290	R290	R290	R290	R290	R290	R290
Electrical Characteristics	115/60/1	115/60/1	115/60/1	115/60/1	115/60/1	115/60/1	115/60/1
NEMA Plug Configuration	5-15P	5-15P	5-15P	5-15P	5-15P	5-15P	5-15P
Total Amp Draw	2.1	2.7	3.2	3.2	3.6	5.4	5.9

\*Can capacities in 9-1/2" diameter, 3 gallon cans



**DC SERIES****CONVENTIONAL ICE CREAM STORAGE/DIPPING CABINETS****LISTINGS****HOOKUP**

Via plug in, 9 foot long, flexible 3 wire 14/3 cord with molded plug. Ten amp 115V service is recommended.

**BID SPECIFICATIONS**

Item no. DC-\_\_\_\_\_  
Provide\_\_\_\_\_( )  
Conventional Ice Cream Storage/  
Dipping Cabinet(s), Master-Bilt model  
DC-\_\_\_\_\_.

Cabinet will feature painted finish  
on exterior with galvanized steel  
interior. Cabinet to have flip lids,  
seamless stainless steel top, 24 gauge

steel walls, galvanized steel inner  
liner with cold wall evaporator, anti-  
condensate heaters under stainless  
steel top, 2-1/4" foamed-in-place  
"zero ODP" urethane insulation and  
baked-on polyester enamel finish.  
Standard leveling legs provided to  
correct for unlevel flooring situations.

The refrigeration system will

be self-contained and use R290  
refrigerant. The temperature range  
will be 10° to -10°F (-12° to -23°C).

Cabinet to have standard limited  
two year parts and labor with  
additional three year coverage on  
compressor part.

Cabinet to be UL, C-UL and NSF  
listed.

**NOTE: Cabinet designed for optimum performance in air-conditioned area at 75°F ambient and 55% relative humidity.  
All specifications within this publication subject to change without notice.**





## Submittal Sheet

04/21/2023

### ITEM# 27.1 - DIPPER WELL (1 EA REQ'D)

Server Products 87770

CW-DI, CONSERVEWELL™ DROP-IN UTENSIL HOLDER WITH COUNTDOWN TIMER, keeps utensils above 140°F, features LED display, programmable countdown timer and adjustable alarm volume, drops into most existing dipper well counter cut-outs, 3-3/8"H above countertop, cool touch thermal composite unit, with 5" dia. x 5-1/2" deep stainless steel inset, for use with plastic handled utensils and non-gel-filled dishers, 100 watts, 120v/60/1-ph, 1 amp, cord, NEMA 5-15P, cULus, NSF

#### ACCESSORIES

Mfr	Qty	Model	Spec
Server Products	1		2 Year warranty

### ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	120	60	1	Cord & Plug		5-15P	1	.1			

# SAVE WATER. SERVE BETTER.

## CONSERVEWELL™ UTENSIL HOLDER

Holds serving utensils above 140° F, keeping them safe against bacteria growth - environmentally smart and economically sound alternative to traditional dipper well perpetual-flow sinks

Available with or without timer, which helps ensure timely water changeouts with programmable countdown function

Drops into most existing counter cut-outs for perpetual flow dipper wells

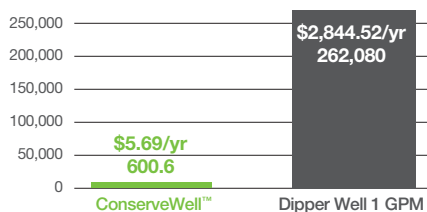


9 foot 110V power cord allows for above or below counter plug-in

Cool touch thermal composite material safeguards servers

Includes (1) stainless steel inset; finger indents at sides make inset refills or cleaning quick and easy

### GALLONS PER YEAR\*



\*52 weeks at 7 days per week at 12 hours per day.  
Average water and sewer rate of \$9.48 per 1,000 gal.



**CONSERVEWELL™**  
Model CW-DI

### Application

- Replace a traditional dipper well perpetual-flow sink to save water, energy and money
- Drop into a serving station to keep utensils clean and handy

### Fast Facts

Environmentally friendly method of rinsing and protecting utensils against bacteria growth versus traditional dipper wells; one unit can save over 250,000 gallons of water per year.

The ConserveWell™ keeps serving utensils above 140° F, keeping them safe while saving water, energy and money.

Unit drops into most existing counter cut-outs for perpetual flow dipper wells. Features a cool touch material for easy handling.

CONSERVEWELL™ UTENSIL HOLDER Model CW-DI



1.800.558.8722  
ConserveWell-NotDipperWell.com





# CLEAN HAS NEVER BEEN MORE GREEN.

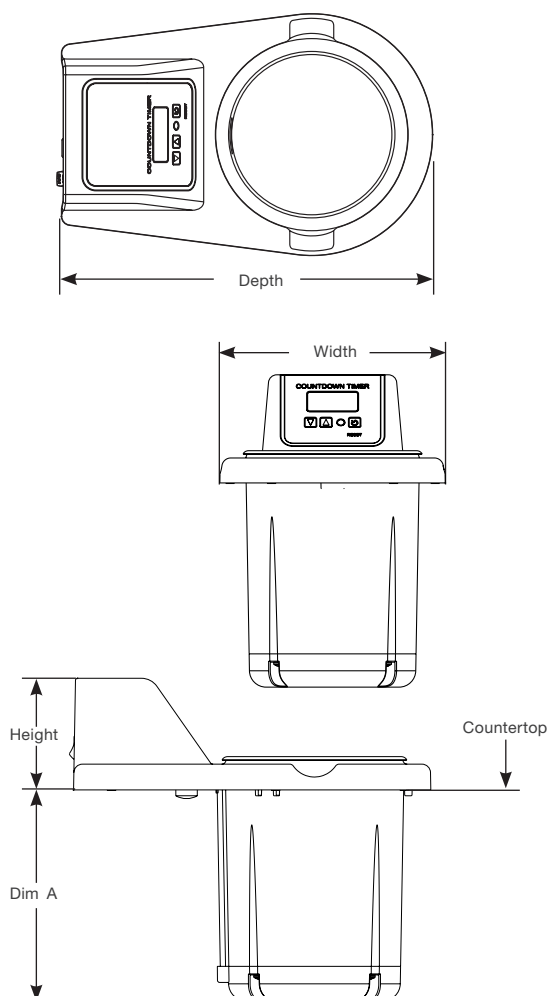
## CONSERVEWELL™ Model CW-DI

### Specifier Statement

Unit will be a Server Products Model CW-DI ConserveWell™ designed to hold utensils above 140° F as an alternative to a perpetual-flow dipper well. Thermal composite housing is cool-to-touch, includes (1) stainless steel inset and is sold with or without a countdown timer. NSF listed. C-UL-US listed. Two-year warranty. Made in the USA. Ships FOB Richfield, WI 53076.

### ConserveWell™ Product Codes

- ☐ ConserveWell™ with Timer CW-DI 87770  
☐ ConserveWell™ without Timer CW-DI 87760



### Specifications

Part Number	Dimensions (height x width x depth)	Dim A	Cut Out Dimensions	Weight	Electrical
87770	3 3/8" x 6 25/32" x 10 13/32"	6"	Fits 5 1/2" to 6 1/2" openings	6 lbs	120V
87760	8.57 x 17.22 x 26.44 cm	15.24 cm		2.7 kg	100W 1A



Plug is NEMA 5-15P with 108" (274.3 cm) cord



US LISTED



2 YEAR WARRANTY

### Related Item

Another option to replace a traditional dipper well perpetual-flow sink is the ConserveWell™ that mounts on almost any wall or vertical surface. Unit comes standard with (2) 1/8-size pans 150 mm deep. This unit is also available with or without a timer.

- ☐ ConserveWell™ Wall Mount with Timer CW 87750  
☐ ConserveWell™ Wall Mount without Timer CW 87740



CW 87750



CW 87740



# Making the world a better place, one drop at a time.

Access to pure, clean water is a privilege we don't take for granted. That's why we designed the ConserveWell® Utensil Holder to reduce water waste — the responsible replacement for continuous-flow dipper wells.

## 2 YEAR WARRANTY

All Server products are backed by a two-year warranty.

- Utensils are safely held above 135°F to protect against bacteria growth
- Programmable countdown timer helps ensure timely water changeouts (also available without timer)
- Drop-in models fit existing counter cutouts of most continuous-flow dipper wells
- Not recommended for utensils with gel-filled handles; see our application guide for suggestions



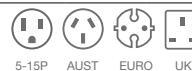
## Drop-In Holders

model/item	description	vessel	dimensions (HxWxD)	plug	voltage	watts	weight
<a href="#">a CW DI 87770</a>	utensil holder with countdown timer	4 1/2" dia	3 3/8" x 6 13/16" x 10 7/16"	5-15P	120 AC	100	7 lb
<a href="#">87845</a>		11.4 cm dia	8.6 x 17.3 x 26.4 cm	Aust	230 AC		3.1 kg
<a href="#">87844</a>				Euro			
<a href="#">87846</a>				UK			
<a href="#">CW DI 87760</a>	utensil holder; no timer	4 1/2" dia	3 3/8" x 6 13/16" x 10 7/16"	5-15P	120 AC	100	7 lb
<a href="#">87848</a>		11.4 cm dia	8.6 x 17.3 x 26.4 cm	Aust	230 AC		3.1 kg
<a href="#">87847</a>				Euro			
<a href="#">87849</a>				UK			



## Wall-Mount Holders

model/item	description	pans	dimensions (HxWxD)	plug	voltage	watts	weight
<a href="#">CW 87750</a>	utensil holder with countdown timer	(2) 3 1/3" x 6"	10 5/8" x 15 1/4" x 5 1/4"	5-15P	120 AC	400	16 lb
<a href="#">87948</a>		(2) 8.4 x 15.2 cm	27 x 38.7 x 13.3 cm	Aust	230 AC		6.8 kg
<a href="#">87947</a>				Euro			
<a href="#">87949</a>				UK			
<b>b</b> <a href="#">CW 87740</a>	utensil holder; no timer	(2) 3 1/3" x 6"	7 5/16" x 15 1/4" x 5 1/4"	5-15P	120 AC	400	12 lb
<a href="#">87945</a>		(2) 8.4 x 15.2 cm	18.6 x 38.7 x 13.3 cm	Aust	230 AC		5.4 kg
<a href="#">87944</a>				Euro			
<a href="#">87946</a>				UK			





## **SERVER PRODUCTS LIMITED WARRANTY**

**SCOPE OF WARRANTY.** Server Products Inc. (“Server Products”) warrants that, for a period of two (2) years from the date of purchase (the “Warranty Period”), the equipment manufactured by it will be free from defects in workmanship and materials provided the equipment is used in the manner and in the environment for which they were manufactured.

**DISCLAIMERS AND LIMITATIONS.** OTHER THAN AS SET FORTH ABOVE, SERVER PRODUCTS SPECIFICALLY DISCLAIMS ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE OR USE. This warranty does not extend to repairs or alterations undertaken without the prior written consent of Server Products or for goods that are misused, abused or neglected or if the goods are not properly stored, maintained, installed or operated. SERVER PRODUCTS SHALL NOT BE LIABLE FOR INCIDENTAL, SPECIAL, INDIRECT, EXEMPLARY, PUNITIVE OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE GOODS OR ARISING OUT OF ANY BREACH OF THIS WARRANTY; INCLUDING BUT NOT LIMITED TO DAMAGE TO PROPERTY OR LOSS OF PROFITS OR REVENUE.

**CLAIMS ADMINISTRATION.** All warranty claims must be made by calling our customer service department for a return authorization during the Warranty Period and any alleged defective unit must be returned to Server Products factory, freight prepaid. Upon receipt of any defective unit, Server Products, at its option, may either: (i) replace any equipment proved to be defective, (ii) remedy or repair such defect or (iii) refund the purchase price of the defective equipment in the form of a credit applicable to future purchases. Server Products obligation and Buyer’s sole remedy will be limited to these options. In the case of units or parts purchased by Server Products from a third-party supplier, Server Products’ obligation and Buyer’s sole remedy against Server Products or Server Product’s suppliers shall not exceed the settlement which Server Products is able to obtain from its supplier.



## Submittal Sheet

04/21/2023

### ITEM# 28 - WIRE SHELVING (4 EA REQ'D)

Metro 2130NK3

Super Erecta® Shelf, wire, 30"W x 21"D, Metroseal™ Green epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, plastic split sleeves are included in each carton, NSF

#### ACCESSORIES

Mfr	Qty	Model	Spec
Metro	4	74UPK3	Super Erecta® SiteSelect™ Post, 73-7/8"H, for use with stem casters, Metroseal 3 Green epoxy coated corrosion-resistant finish with Microban® antimicrobial protection
Metro	8	5PC	Super Erecta® Stem Caster, swivel, 5" dia., 1-1/4" face, 300 lb. capacity, corrosion resistant, polyurethane flat wheel tread, polymer horn, includes bumper
Metro	4	5PCB	Super Erecta® Stem Caster, swivel (with foot operated brake), 5" dia., 1-1/4" face, 300 lb. capacity, corrosion resistant, polyurethane flat wheel tread, polymer horn, includes bumper



We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

# Super Erecta® Shelf Wire Shelving



- **Unique Design:** The open wire design of these shelves minimizes dust accumulation and allows free circulation of air, greater visibility of stored items and greater light penetration.
- **Durable Construction:** Super Erecta shelves and posts are constructed of heavy-gauge carbon steel or Type 304 stainless steel.
- **Choice of Finishes:** Super Erecta Brite™ and chrome-plated for dry storage; Metroseal™ Epoxy (green or gray), and Type 304 stainless steel for corrosive environments; and attractive epoxy color options for merchandising applications.
- **Metroseal:** Proprietary rust-resistant finish is a durable epoxy coating over a protective zinc substrate. Metroseal contains Microban® antimicrobial product protection which continuously fights the growth of bacteria, mold, and mildew that cause stains and odors. 12-year limited warranty against rust and corrosion.
- **Versatile:** Super Erecta® Shelf wire shelving can adapt to your changing needs. By using various accessories, hundreds of shelving configurations become possible.
- **Fast, Secure Assembly:** SiteSelect® Posts have a double groove visual guide feature every 8" (203mm), circular grooves at 1" (25mm) increments, and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
- **Adjustability:** Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
- **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
- **Shelf Accessibility:** Shelves can be loaded/unloaded easily from all sides. This open construction allows maximum use of storage cube.
- **Adjustable Feet:** Bolt levelers compensate for surface irregularities.

**Note:** Stainless stationary posts are equipped with stainless steel leveling feet.



Super Erecta Chrome Wire



PROTECTION THAT LIVES ON  
**MICROBAN**

Super Erecta with Metroseal



Gray Metroseal Epoxy  
Finish with Microban



Green Metroseal Epoxy  
Finish with Microban



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

L02-006e  
Printed in U.S.A. 6/20

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2020 InterMetro Industries Corp.



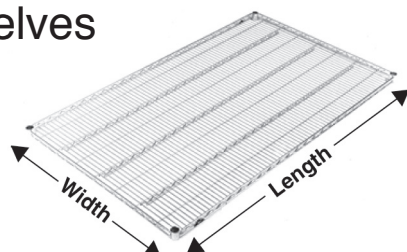
**Super Erecta® Shelf Wire Shelving**

**10.01**



# Super Erecta® Shelf Wire Shelving

## Wire Shelves



Aluminum Split Sleeve

- See spec sheet 10.14 for epoxy color options.
- Plastic split sleeves are included with each shelf  
Replacements are available: Cat. No. **9985** (bag of 4)
- Aluminum split sleeves are recommended for abusive mobile applications. Sleeves with stainless C-rings must be used for cart wash applications (exceeding 200°F/93°C) and for all autoclave applications.  
Cat. No. **9986Z** (bag of 4 with zinc C-rings)  
Cat. No. **9986S** (bag of 4 with stainless steel C-rings)
- Weight capacity (evenly distributed) per shelf  
800 lbs. (363kg) for lengths of 18" to 48" (457 to 1219mm)  
600 lbs. (272kg) for lengths of 54" (1370mm) or longer
- Weight capacity (evenly distributed) per unit.  
Stationary shelving units have a maximum load capacity (evenly distributed) of 2,000 lbs. (907kg). Mobile units have a maximum capacity of three times the caster load rating up to but not exceeding 1,000 lbs. (453kg) total. Consult the Metro catalog for caster load ratings.

Cat. No. Super Erecta Brite	Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No. Metroseal Gray (K4) with Microban	Cat. No. Stainless	Nominal Width/Length		Approx. Pkd. Wt.	
					(in.)	(mm)	(lbs.)	(kg)
1424BR	1424NC	1424NK3	1424NK4	1424NS	14x24	355x610	5.3	2.4
1430BR	1430NC	1430NK3	1430NK4	1430NS	14x30	355x760	6.3	2.8
1436BR	1436NC	1436NK3	1436NK4	1436NS	14x36	355x914	7.5	3.4
1442BR	1442NC	1442NK3	1442NK4	1442NS	14x42	355x1066	8.3	3.8
1448BR	1448NC	1448NK3	1448NK4	1448NS	14x48	355x1219	9.4	4.3
1460BR	1460NC	1460NK3	1460NK4	1460NS	14x60	355x1524	11.8	5.4
1472BR	1472NC	1472NK3	1472NK4	1472NS	14x72	355x1829	14.4	6.5
-	1818NC	1818NK3	1818NK4	-	18x18	457x457	5.3	2.4
1824BR	1824NC	1824NK3	1824NK4	1824NS	18x24	457x610	6.1	2.7
1830BR	1830NC	1830NK3	1830NK4	1830NS	18x30	457x760	7.1	3.2
1836BR	1836NC	1836NK3	1836NK4	1836NS	18x36	457x914	8.2	3.7
1842BR	1842NC	1842NK3	1842NK4	1842NS	18x42	457x1066	9.3	4.2
1848BR	1848NC	1848NK3	1848NK4	1848NS	18x48	457x1219	10.7	4.9
1854BR	1854NC	1854NK3	1854NK4	1854NS	18x54	457x1370	11.9	5.4
1860BR	1860NC	1860NK3	1860NK4	1860NS	18x60	457x1524	13.4	6.1
1872BR	1872NC	1872NK3	1872NK4	1872NS	18x72	457x1829	14.6	6.6
2124BR	2124NC	2124NK3	2124NK4	2124NS	21x24	530x610	10.1	4.6
2130BR	2130NC	2130NK3	2130NK4	2130NS	21x30	530x760	10.5	4.8
2136BR	2136NC	2136NK3	2136NK4	2136NS	21x36	530x914	10.7	4.9
2142BR	2142NC	2142NK3	2142NK4	2142NS	21x42	530x1066	11.5	5.2
2148BR	2148NC	2148NK3	2148NK4	2148NS	21x48	530x1219	11.9	5.4
2154BR	2154NC	2154NK3	2154NK4	2154NS	21x54	530x1370	12.9	5.8
2160BR	2160NC	2160NK3	2160NK4	2160NS	21x60	530x1524	13.4	6.1
2172BR	2172NC	2172NK3	2172NK4	2172NS	21x72	530x1829	14.4	6.5
2424BR	2424NC	2424NK3	2424NK4	2424NS	24x24	610x610	6.5	3.0
2430BR	2430NC	2430NK3	2430NK4	2430NS	24x30	610x760	8.3	3.8
2436BR	2436NC	2436NK3	2436NK4	2436NS	24x36	610x914	10.1	4.6
2442BR	2442NC	2442NK3	2442NK4	2442NS	24x42	610x1066	11.9	5.4
2448BR	2448NC	2448NK3	2448NK4	2448NS	24x48	610x1219	14.2	6.4
2454BR	2454NC	2454NK3	2454NK4	2454NS	24x54	610x1370	16.1	7.3
2460BR	2460NC	2460NK3	2460NK4	2460NS	24x60	610x1524	18.0	8.2
2472BR	2472NC	2472NK3	2472NK4	2472NS	24x72	610x1829	21.4	9.7

**Note:** The actual length of the shelves is 1/8" (3.2mm) shorter than the nominal dimension shown. The actual depth of the shelves is 1/8" (3.2mm) greater than the nominal dimension shown.

**Note:** The following restrictions apply to shelving units that utilize 14" (355mm) wide shelves:  
Free-standing units: Units taller than 63" (1600mm) must be properly fastened to the floor or wall using Metro foot plates or wall brackets.  
Mobile units: maximum allowable post height is 54" (1370mm).





# Super Erecta® Shelf Wire Shelving

## SiteSelect® Posts

**Stationary Posts** - Equipped with a leveling bolt to account for uneven floors.

- Height includes leveling bolt (completely tightened) and post cap. Leveling bolt can be adjusted 0.5" (13mm).
- Foot plates may be ordered separately and installed in place of leveling foot.
- Replacement leveling bolts: Zinc Cat. No. **RPF04-004**, Stainless Steel Cat. No. **RPF04-004C**
- Replacement post cap for standard posts: Black Cat. No. **RPC06-035**

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No.. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Actual Height		Approx Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
<b>7P</b>	<b>7PK3</b>	<b>7PK4</b>	-	7.375	187	0.5	0.3
<b>13P</b>	<b>13PK3</b>	<b>13PK4</b>	<b>13PS</b>	14.375	365	1	0.5
<b>27P</b>	<b>27PK3</b>	<b>27PK4</b>	<b>27PS</b>	28.375	720	1.75	0.75
<b>33P</b>	<b>33PK3</b>	<b>33PK4</b>	<b>33PS</b>	34.375	873	2	0.9
<b>54P</b>	<b>54PK3</b>	<b>54PK4</b>	<b>54PS</b>	54.4375	1382	3	1.4
<b>63P</b>	<b>63PK3</b>	<b>63PK4</b>	<b>63PS</b>	62.4375	1585	3.5	1.6
<b>74P</b>	<b>74PK3</b>	<b>74PK4</b>	<b>74PS</b>	74.5	1892	4	1.8
<b>86P</b>	<b>86PK3</b>	<b>86PK4</b>	<b>86PS</b>	86.5	2197	5	2.3
<b>*96P</b>	-	-	-	96.5	2450	5.5	2.5

\*96P should not be used on units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.

## Mobile Posts (For use with Stem Casters)

- Height includes post cap.

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
<b>13UP</b>	<b>13UPK3</b>	<b>13UPK4</b>	<b>13UPS</b>	13.75	349	1	0.5
<b>27UP</b>	<b>27UPK3</b>	<b>27UPK4</b>	<b>27UPS</b>	27.75	704	1.75	0.75
<b>33UP</b>	<b>33UPK3</b>	<b>33UPK4</b>	<b>33UPS</b>	33.75	857	2	0.9
<b>54UP</b>	<b>54UPK3</b>	<b>54UPK4</b>	<b>54UPS</b>	53.8125	1366	3	1.4
<b>63UP</b>	<b>63UPK3</b>	<b>63UPK4</b>	<b>63UPS</b>	61.8125	1570	3.5	1.6
-	<b>70UPK3</b>	<b>70UPK4</b>	-	69.75	1771	3.75	1.7
<b>74UP</b>	<b>74UPK3</b>	<b>74UPK4</b>	<b>74UPS</b>	73.875	1876	4	1.8
<b>86UP</b>	<b>86UPK3</b>	<b>86UPK4</b>	<b>86UPS</b>	85.875	2181	4.5	2.0

## Staked Posts (For use with Truck Dollies)

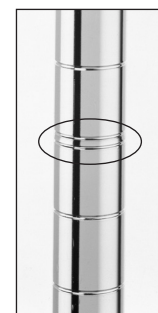
- Each post connects to the truck dolly through the stem receptacle. The stem receptacle is staked into the bottom of the post to ensure a durable connection in abusive mobile applications. Each includes a leveling/connecting bolt.

Cat. No. Chrome	Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
		(in.)	(mm)	(lbs.)	(kg)
<b>54P-STKD</b>	<b>54PS-STKD</b>	54.4375	1382	3	1.4
<b>63P-STKD</b>	<b>63PS-STKD</b>	62.4375	1585	3.5	1.6
<b>74P-STKD</b>	<b>74PS-STKD</b>	74.5	1892	4	1.8

## Swaged Posts (For use with Stem Casters in Cart Wash Applications)

- Each post has an aluminum cap swaged into the top of the post.

Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
	(in.)	(mm)	(lbs.)	(kg)
<b>33UPS-SW</b>	33.75	857	2	.9
<b>54UPS-SW</b>	53.8125	1366	3	1.4
<b>63UPS-SW</b>	61.8125	1570	3.5	1.6



SiteSelect Posts feature double grooves every 8" (203mm) to aid assembly.



Stationary Post



Post for Stem Caster

## Special Length Posts

Cut posts are available. Consult your Metro representative for more information.



Staked Post



Swaged Post

Job \_\_\_\_\_



We put space to work.

# Super Erecta Shelf®

## Wire Shelving

### Super Wide Shelving

- **High-density Storage:** Super Wide shelves have a greater storage area for holding large quantities of supplies, especially large, bulky objects, providing maximum storage in minimum space.

- **Load Capacity (evenly distributed) per shelf:**

Depths: 30" and 36" (760 and 914mm)

800 lbs. (363kg) for lengths 48" (1219mm) or shorter.

600 lbs. (272kg) for lengths 54" (1370mm) or longer.

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No.. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Nominal Width/Length		Approx. Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
3036NC	3036NK3	3036NK4	3036NS	30x36	760x914	14.2	6.4
3048NC	3048NK3	3048NK4	3048NS	30x48	760x1219	17.7	8.0
3060NC	3060NK3	3060NK4	3060NS	30x60	760x1524	20.2	9.2
3072NC	3072NK3	3072NK4	3072NS	30x72	760x1829	22.7	10.3
3636NC	3636NK3	-	3636NS	36x36	910x914	16.7	7.6
3648NC	3648NK3	-	3648NS	36x48	910x1219	21.6	9.8
3660NC	3660NK3	-	3660NS	36x60	910x1524	26.4	12.0
3672NC	3672NK3	-	3672NS	36x72	910x1829	31.6	14.3

**Note:** The actual length of the shelves is 1/8" (3.2mm) shorter than the nominal dimension shown. The actual depth of the shelves is 1/8" (3.2mm) greater than the nominal dimension shown.



### Foot Plates

- Use to bolt units to the floor, or when a broader, more stable foot is desired. Foot plates also help to protect floors by distributing the point load of the shelving unit across a larger contact point.
- Foot plates (completely tightened) add .125" (3mm) to the specified heights of each stationary post on the table.

Zinc Cat. No. **9993Z**

Stainless Steel Cat. No. **9993S**



### "S" Hook

- Used to add on shelving units with only two posts required. Order two per shelf level.

Cat. No. **9995Z**







Item # \_\_\_\_\_

We put space to work.

Job \_\_\_\_\_

## Super Erecta Pro®

### Durable and Cleanable. The original — reinnovated.

Corrosion resistant shelving constructed of removable polymer open grid shelf mats over a wire shelf frame. Shelf frames and posts have Metroseal epoxy coating over an electroplated substrate. Shelves with polymer mats offer a 15 year limited warranty against corrosion, while posts offer a 12 year warranty against corrosion. Microban® antimicrobial product protection is built into the frames, shelf mats, and posts. Shelf has a rigid four-sided frame with center truss(es). Robust corner provides complete 360° capture of the split sleeves and post for added stability. Stationary units have maximum capacity of 2,000 lbs. (907kg) evenly distributed. Mobile units (with stem casters) offer a maximum total unit load of 900 lbs. (408kg). Units assemble easily — shelves mount on split sleeves along grooved, numbered posts and adjust on 1" (25mm) increments.

- **Prolonged durability:** Polymer shelf mats are corrosion proof and impact resistant. They will not chip, rust, or corrode.
- **Easy to clean:** Removable polymer shelf mats can easily be lifted off the shelf frames for cleaning in sinks or wash/dish machines.

- **Strong and robust:** Steel corners, side and center supports assure a sturdy and stable weight bearing surface.

Weight capacities for evenly distributed loads:

800 lbs. (363kg) per shelf for lengths of 24" to 48" (610 to 1220mm)

600 lbs. (275kg) per shelf for lengths of 54" (1370mm) or longer

2,000 lbs. (907kg) maximum per stationary unit.

- **Interchangeable:** Super Erecta Pro shelves are compatible on the same shelving units with other Super Erecta shelving options: Super Erecta wire, Super Adjustable Super Erecta, Solid Super Erecta shelves, Dunnage shelves, Cantilever shelves. Super Erecta Pro shelves can be used with Post-Type Wall Mounts, Direct Wall Mounts, SmartWall Wall Mounts, Security Units, Top Track, and qwikTRAK systems.
- **Microban Product Protection:** Microban antimicrobial product protection is built into the shelf mats and the Metroseal 3 epoxy coating to protect the product from bacteria, mold, mildew, and fungus that cause odors and product degradation. Microban protection keeps the product "cleaner between cleanings".
- **Efficient use of storage space:** Shelves can be adjusted at 1" (25mm) increments along the post to maximize the use of available vertical storage space.
- **Open Grid Shelf Mats:** Open grid shelves promote air circulation and light penetration.
- **Fast, Easy Assembly:** Super Erecta Pro units assemble easily in minutes, without tools. SiteSelect posts have numbered grooves and feature unique double grooves every 8" (203mm) to help position the shelves.
- **Warranty against rust and corrosion:** Shelves with polymer shelf mats – 15 years. Posts – 12 years. Shelf mats are constructed of polypropylene and will never rust.

\*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



For stem casters,  
see catalog sheet #11.20



All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

Printed in U.S.A. L02-184  
Rev. 9/21

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2021 InterMetro Industries Corp.



**Super Erecta Pro® Shelves**

**10-80**

Job \_\_\_\_\_

10.80



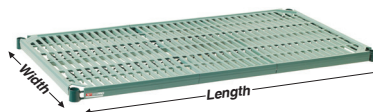
# Super Erecta Pro® Shelves

We put space to work.

## Standard Shelves

- Part number includes shelf with removable polymer shelf mats and one bag of split sleeves

Nominal Width/Length (in.)	Nominal Width/Length (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Model No. SE Pro Metroseal 3
14x24	355x610	4.5	2.0	PR1424NK3
14x30	355x760	6.3	2.9	PR1430NK3
14x36	355x914	8.0	3.6	PR1436NK3
14x42	355x1060	10.0	4.5	PR1442NK3
14x48	355x1219	11.9	5.4	PR1448NK3
14x60	355x1524	14.9	6.8	PR1460NK3
14x72	355x1829	18.3	8.3	PR1472NK3
18x24	457x610	6.0	2.7	PR1824NK3
18x30	457x760	7.8	3.5	PR1830NK3
18x36	457x914	9.5	4.2	PR1836NK3
18x42	457x1060	11.3	5.0	PR1842NK3
18x48	457x1219	13.0	5.8	PR1848NK3
18x54	457x1372	14.8	6.6	PR1854NK3
18x60	457x1524	16.5	7.4	PR1860NK3
18x72	457x1829	19.8	8.8	PR1872NK3
21x24	530x610	8.0	3.6	PR2124NK3
21x30	530x760	9.5	4.2	PR2130NK3
21x36	530x914	11.3	5.0	PR2136NK3
21x42	530x1060	12.5	5.6	PR2142NK3
21x48	530x1219	14.3	6.4	PR2148NK3
21x54	530x1372	16.5	7.4	PR2154NK3
21x60	530x1524	18.3	8.1	PR2160NK3
21x72	530x1829	21.5	9.6	PR2172NK3
24x24	610x610	9.5	4.2	PR2424NK3
24x30	610x760	11.3	5.0	PR2430NK3
24x36	610x914	13.0	5.8	PR2436NK3
24x42	610x1060	14.0	6.3	PR2442NK3
24x48	610x1219	15.5	6.9	PR2448NK3
24x54	610x1372	18.3	8.1	PR2454NK3
24x60	610x1524	20.0	8.9	PR2460NK3
24x72	610x1829	23.3	10.4	PR2472NK3



**Actual Dimensions:** Width: Add 1/4" (6mm) to nominal size. Length: Subtract 1/4" (6mm) from nominal size.

**Note:** Polymer Shelf mats are designed to fit Super Erecta Pro shelves and cannot be retrofitted to Super Erecta wire shelves.

**Replacement Split Sleeves**  
Model No. 9985 (Bag of four sets.)

## Specifications

- Shelf frames:** Carbon steel with Metroseal 3 epoxy coating.
  - Polymer Shelf mats:** polypropylene.
  - Microban antimicrobial product protection** is built into the polymer shelf mats and Metroseal 3 epoxy coating.
  - NSF listed for all environments.**
  - Continuous Temperature:** Super Erecta Pro Shelves can be used continuously within a range of -20/120° F (-29/49° C). For cleaning only, the unloaded product or shelf mats may be intermittently exposed to temperatures up to 200° F (93° C).
- NOTE:** Not suitable for cart wash applications.

## SHELVING HEIGHT GUIDELINES

Shelf Depth	14fl (356mm)	18fl (457mm)	21fl (533mm)	24fl (610mm)
Maximum Post Height Allowable	63fl (1600mm)	86fl (2184mm)	86fl (2184mm)	96fl (2438mm)
Stationary	63fl (1600mm)	86fl (2184mm)	86fl (2184mm)	96fl (2438mm)
Mobile	54fl (1372mm)	74fl (1880mm)	74fl (1880mm)	86fl (2184mm)

Note: 14" deep stationary shelving taller than 63" must be fastened to the floor or wall. For stationary units with foot plates or wall brackets properly attached to the floor or wall, the maximum allowable height is 96" (2438mm). See spec sheet 10.81 for options.

## SiteSelect Posts

Stationary post height includes leveling bolt.

## STATIONARY

Actual Height (in.)	Actual Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Model No. Metroseal 3	Model No. Stainless
14 1/2	370	1.0	0.5	13PK3	13PS
34 1/2	875	2.0	0.9	33PK3	33PS
54 9/16	1385	3.0	1.4	54PK3	54PS
62 9/16	1590	3.5	1.6	63PK3	63PS
—	—	—	—	—	—
74 5/8	1895	4.0	1.8	74PK3	74PS
86 5/8	2200	5.0	2.3	86PK3	86PS

## MOBILE (For use with stem casters)

Actual Height (in.)	Actual Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Model No. Metroseal 3	Model No. Stainless
13 3/4	349	1.0	0.5	13UPK3	13UPS
33 3/4	857	2.0	0.9	33UPK3	33UPS
53 13/16	1366	3.0	1.4	54UPK3	54UPS
61 13/16	1570	3.5	1.6	63UPK3	63UPS
69 3/4	1772	3.8	1.7	70UPK3	—
73 7/8	1876	4.0	1.8	74UPK3	74UPS
85 7/8	2181	5.0	2.3	86UPK3	86UPS

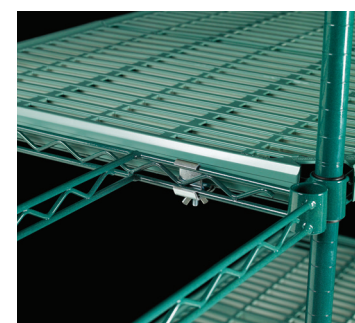
**NOTE:** Special length posts are available. Consult your Metro representative.

**"S" Hook:** Used to "add on" one or multiple Super Erecta Pro shelving units while eliminating the cost of two posts per unit. Can be used to join units end-to-end, back-to-back, at right angles, etc. Two "S" hooks are required for each shelf.

**Model No. Q9995Z**

## Notes about "add-on" units.

- Add-on (Adjacent) units must be configured entirely of one style of shelf. (Example: Adjacent unit may be configured entirely of Super Erecta Pro OR entirely of Super Erecta Wire/Super Adjustable shelves.)
- To connect an adjacent Super Erecta or Super Adjustable Super Erecta wire shelving unit to a Super Erecta Pro unit using S-hooks, the adjacent unit must use S-hook model number Q9995Z.
- A mixed shelving unit having a combination of Super Erecta Pro, Super Erecta wire, and Super Adjustable cannot be connected to another unit with "S" Hooks.



Super Erecta Pro® Shelves

an Ali Group Company



The Spirit of Excellence





We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

## Metro® Stem Casters - Super Erecta®

**Metro Stem-Type Casters** are designed to fit Super Erecta® Shelf posts to form shelf carts and other mobile units.

### Plated Casters with High Modulus treads

- Non marking high modulus donut tread and polyolefin hub. Plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Ball bearing swivel and axle. NSF listed. Bumpers included. Brake style: pedal brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage) (Fahrenheit) (Celsius)	Approx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
5 127	1-1/4 32	250 113	Stem/Swivel	High Modulus Donut	-40° - 180° -40° - 82°	2-1/2 1.1	<b>5MDA</b>
5 127	1-1/4 32	250 113	Stem/Brake	High Modulus Donut	-40° - 180° -40° - 82°	2-5/8 1.2	<b>5MDBA</b>
5 127	1-1/4 32	250 113	Stem/Rigid	High Modulus Donut	-40° - 180° -40° - 82°	2-3/8 1.1	<b>5MDRA</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



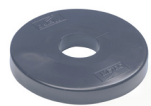
**5MDA**



**5MDBA**



**5MDRA**



**Bumper  
included with  
these models.**

Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

### Plated Casters with resilient rubber treads

- Solid resilient rubber material. Plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Ball bearing swivel. Select models are NSF listed. Bumpers included. Brake style: side brake.
- "LD" models have a plated hub cover.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage) (Fahrenheit) (Celsius)	Approx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
4 102	15/16 24	125 56	Stem/Swivel	Resilient Donut	-30° - 160° -34° - 71°	1-1/2 0.6	<b>4LD</b>
4 102	15/16 24	125 56	Stem/Brake	Resilient Donut	-30° - 160° -34° - 71°	2 0.9	<b>4LDB</b>
5 127	15/16 24	125 56	Stem/Swivel	Resilient Donut	-30° - 160° -34° - 71°	2 0.9	<b>5LD</b>
5 127	1-1/4 32	200 90	Stem/Swivel	Resilient, Flat	-30° - 160° -34° - 71°	2-1/2 1.1	<b>5M</b>
5 127	1-1/4 32	200 90	Stem/Brake	Resilient, Flat	-30° - 160° -34° - 71°	2-5/8 1.2	<b>5MB</b>
5 127	1-1/4 32	200 90	Stem/Rigid	Resilient, Flat	-30° - 160° -34° - 71°	3-1/2 1.5	<b>5MR</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



**4LD**



**5LD**



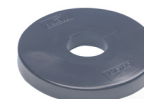
**5M**



**5MB**



**5MR**



**Bumper  
included with  
these models.**

All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

L02-041  
Printed in U.S.A. 8/19

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2019 InterMetro Industries Corp.



**Casters — Stem Type**



Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

## Plated Casters with Polyurethane Tread

- Chrome plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Non marking polyurethane flat tread and polyethylene hub. Ball bearing swivel and axle. NSF listed. Bumpers included. Brake style: side brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
					(Fahrenheit)	(Celsius)		
5 127	1-1/4 32	300 135	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/8 0.9	<b>5MP</b>
5 127	1-1/4 32	300 135	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>5MPB</b>
5 127	1-1/4 32	300 135	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2 0.9	<b>5MPR</b>
6 152	1-1/2 38	400 182	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1.1	<b>6MP</b>
6 152	1-1/2 38	400 182	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/2 0.9	<b>6MPB</b>
6 152	1-1/2 38	400 182	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>6MPR</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.

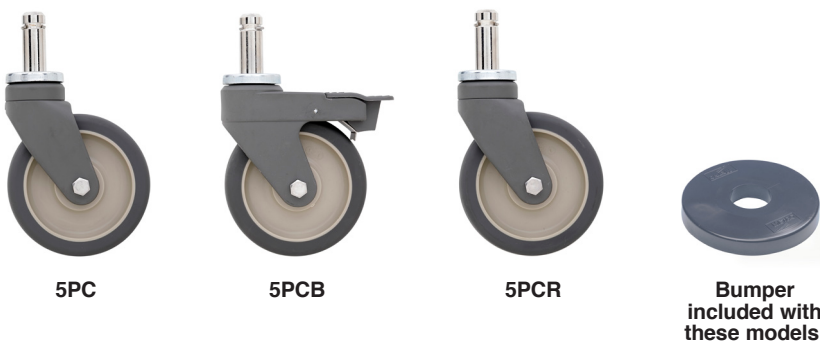


## Polymer Horn Casters with Polyurethane Tread

- Polymer horn and stainless axle and bolt provide corrosion resistance and enhanced durability. Premium Delron bearings are maintenance free. Non marking polyurethane flat tread and polyethylene hub. For medium-duty applications. Brake style: pedal brake. Bumpers included. NSF listed.
- 5PCM and 5PCBM have antimicrobial product protection built-into the wheel tread.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.	Antimicrobial Cat. No.
					(Fahrenheit)	(Celsius)			
5 127	1-1/4 32	300 135	Stem/Swivel	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PC</b>	<b>5PCM</b>
5 127	1-1/4 32	300 135	Stem/Brake	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PCB</b>	<b>5PCBM</b>
5 127	1-1/4 32	300 135	Stem/Rigid	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PCR</b>	-

Note: Rigid connecting channel (aluminum): Cat. No. P14RC, P18RC, P21RC, P24RC, P30RC, or P36RC.



Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.



Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

## Stainless Steel, Cart-Washable Casters

- Designed with sealed stainless steel bearings to withstand high-pressure washings and zerk fittings for easy routine maintenance. For medium duty applications. Bumpers included. NSF listed.
- Non marking tread
- Brake style: Pedal brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt.		Cat. No.
					(Fahrenheit)	(Celsius)	(lbs.)	(kg.)	
5 127	1-1/4 32	250 113	Stem/Swivel	High Modulus Donut	-40° - 180°	-40° - 82°	2-1/2	1.1	<b>5MDGSA</b>
5 127	1-1/4 32	250 113	Stem/Brake	High Modulus Donut	-40° - 180°	-40° - 82°	2-5/8	1.2	<b>5MDBGSA</b>
5 127	1-1/4 32	250 113	Stem/Rigid	High Modulus Donut	-40° - 180°	-40° - 82°	2-3/8	1.1	<b>5MDRGSA</b>
5 152	1-1/2 38	300 135	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/8	0.9	<b>5MPGSA</b>
5 152	1-1/2 38	300 135	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4	1	<b>5MPBGSA</b>
5 152	1-1/2 38	300 135	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2	0.9	<b>5MPRGSA</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



**5MDGSA**



**5MDBGSA**



**5MDRGSA**



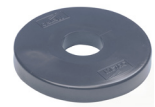
**5MPGSA**



**5MPBGSA**



**5MPRGSA**



**Bumper  
included with  
these models.**

Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

## Low Profile 3" Threaded Stem Casters

- Threaded stem installs into the base of a standard stationary post.
- Resilient rubber tread. Bumpers not included.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt.		Cat. No.
					(Fahrenheit)	(Celsius)	(lbs.)	(kg.)	
3 76	15/16 24	100 45	Stem/Swivel	Resilient Rubber	-30° - 130°	-34° - 71°	1.0	0.45	<b>3TM</b>
3 76	15/16 24	100 45	Stem/Brake	Resilient Rubber	-30° - 130°	-34° - 71°	1.1	0.50	<b>3TMB</b>



**3TM**



**3TMB**

Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

- **Swivel and Swivel/Brake casters** rotate a full 360 degrees for easy maneuvering.
- **Brakes:** Wheel brakes are foot operated.
- **Bumpers:** Non Phtalate vinyl material is strong yet flexible to protect walls from damage. Each caster, except where noted, includes a 3-1/2" (89mm) diameter bumper. Optional 5" (127mm) diameter bumpers are available.
- **Weight Load Capacity** of a cart (evenly distributed): Caster Load Rating x 3.
- **Stem casters** in spec sheet 11.20 are for use with 1" (25mm) diameter posts. Stem casters may be fit to larger 1-5/8" diameter posts used on Metro Work Tables and HD Super Shelving by using an adapter set.  
Cat. No. 9974HDP-4, bag of 4 adapters. Note: Adapters are not for use with threaded stem 3TM and 3TMB models.

## Caster Wheel Material Guide

Caster Tread	Grease/Oil Resistance	Floor Protection	Load Rating	Key Advantage
Resilient Rubber	Low	High	200 lbs. (90kg)	Basic mobility.
High Modulus Rubber	High	High	250 lbs. (113kg)	Quieter than resilient rubber and polyurethane.
Polyurethane	High	High	300 lbs. (135kg)	Easiest to move heavy loads.
Hi-Temp Phenolic	High	Medium	300 lbs. (135kg)	Suitable tread for Autoclave processes.
Hi-Temp Nylon	High	Medium	300 lbs. (135kg)	Suitable tread for Autoclave processes.

## Replacement Bumpers

Non Phtalate Vinyl

Diameter (in.) (mm)		Height (in.) (mm)		Cat. No.
3-1/2	89	3/4	19	9992DB
5-1/2	140	13/16	21	9992N



Donut Bumper

## Rigid Caster Channels

- Typically used opposite two swivel style casters to create carts that are easy to steer over long distances.

Note: A type 304 stainless rigid caster channel is included at no charge with each two rigid plated or SS casters. An aluminum rigid channel is included with each two polymer horn rigid casters (model 5PCR).

For shelf depth (in.) (mm)		Cat. No.	(For use with 5PCR) Cat. No.
14"	355	14RS	P14RC
18"	457	18RS	P18RC
21"	530	21RS	P21RC
24"	610	24RS	P24RC
30"	760	30RS	P30RC
36"	910	36RS	P36RC



Rigid Caster Channel

Swivel Casters



24RS



P24RC

All Metro Catalog Sheets are available on our website [www.metro.com](http://www.metro.com).

an Ali Group Company



The Spirit of Excellence



We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

## Metro® Stem Casters - Super Erecta®

**Metro Stem-Type Casters** are designed to fit Super Erecta® Shelf posts to form shelf carts and other mobile units.

### Plated Casters with High Modulus treads

- Non marking high modulus donut tread and polyolefin hub. Plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Ball bearing swivel and axle. NSF listed. Bumpers included. Brake style: pedal brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage) (Fahrenheit) (Celsius)	Approx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
5 127	1-1/4 32	250 113	Stem/Swivel	High Modulus Donut	-40° - 180° -40° - 82°	2-1/2 1.1	<b>5MDA</b>
5 127	1-1/4 32	250 113	Stem/Brake	High Modulus Donut	-40° - 180° -40° - 82°	2-5/8 1.2	<b>5MDBA</b>
5 127	1-1/4 32	250 113	Stem/Rigid	High Modulus Donut	-40° - 180° -40° - 82°	2-3/8 1.1	<b>5MDRA</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



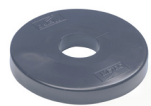
**5MDA**



**5MDBA**



**5MDRA**



**Bumper  
included with  
these models.**

Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

### Plated Casters with resilient rubber treads

- Solid resilient rubber material. Plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Ball bearing swivel. Select models are NSF listed. Bumpers included. Brake style: side brake.
- "LD" models have a plated hub cover.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage) (Fahrenheit) (Celsius)	Approx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
4 102	15/16 24	125 56	Stem/Swivel	Resilient Donut	-30° - 160° -34° - 71°	1-1/2 0.6	<b>4LD</b>
4 102	15/16 24	125 56	Stem/Brake	Resilient Donut	-30° - 160° -34° - 71°	2 0.9	<b>4LDB</b>
5 127	15/16 24	125 56	Stem/Swivel	Resilient Donut	-30° - 160° -34° - 71°	2 0.9	<b>5LD</b>
5 127	1-1/4 32	200 90	Stem/Swivel	Resilient, Flat	-30° - 160° -34° - 71°	2-1/2 1.1	<b>5M</b>
5 127	1-1/4 32	200 90	Stem/Brake	Resilient, Flat	-30° - 160° -34° - 71°	2-5/8 1.2	<b>5MB</b>
5 127	1-1/4 32	200 90	Stem/Rigid	Resilient, Flat	-30° - 160° -34° - 71°	3-1/2 1.5	<b>5MR</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



**4LD**



**5LD**



**5M**



**5MB**



**5MR**



**Bumper  
included with  
these models.**

All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

L02-041  
Printed in U.S.A. 8/19

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2019 InterMetro Industries Corp.



**Casters — Stem Type**

**11.20**

Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

## Plated Casters with Polyurethane Tread

- Chrome plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Non marking polyurethane flat tread and polyethylene hub. Ball bearing swivel and axle. NSF listed. Bumpers included. Brake style: side brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
					(Fahrenheit)	(Celsius)		
5 127	1-1/4 32	300 135	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/8 0.9	<b>5MP</b>
5 127	1-1/4 32	300 135	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>5MPB</b>
5 127	1-1/4 32	300 135	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2 0.9	<b>5MPR</b>
6 152	1-1/2 38	400 182	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1.1	<b>6MP</b>
6 152	1-1/2 38	400 182	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/2 0.9	<b>6MPB</b>
6 152	1-1/2 38	400 182	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>6MPR</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.

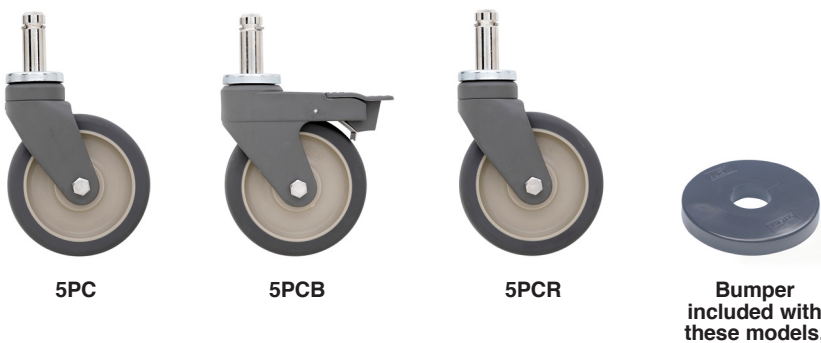


## Polymer Horn Casters with Polyurethane Tread

- Polymer horn and stainless axle and bolt provide corrosion resistance and enhanced durability. Premium Delron bearings are maintenance free. Non marking polyurethane flat tread and polyethylene hub. For medium-duty applications. Brake style: pedal brake. Bumpers included. NSF listed.
- 5PCM and 5PCBM have antimicrobial product protection built-into the wheel tread.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.	Antimicrobial Cat. No.
					(Fahrenheit)	(Celsius)			
5 127	1-1/4 32	300 135	Stem/Swivel	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PC</b>	<b>5PCM</b>
5 127	1-1/4 32	300 135	Stem/Brake	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PCB</b>	<b>5PCBM</b>
5 127	1-1/4 32	300 135	Stem/Rigid	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PCR</b>	-

Note: Rigid connecting channel (aluminum): Cat. No. P14RC, P18RC, P21RC, P24RC, P30RC, or P36RC.



Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.



Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

## Stainless Steel, Cart-Washable Casters

- Designed with sealed stainless steel bearings to withstand high-pressure washings and zerk fittings for easy routine maintenance. For medium duty applications. Bumpers included. NSF listed.
- Non marking tread
- Brake style: Pedal brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt.		Cat. No.
					(Fahrenheit)	(Celsius)	(lbs.)	(kg.)	
5 127	1-1/4 32	250 113	Stem/Swivel	High Modulus Donut	-40° - 180°	-40° - 82°	2-1/2	1.1	<b>5MDGSA</b>
5 127	1-1/4 32	250 113	Stem/Brake	High Modulus Donut	-40° - 180°	-40° - 82°	2-5/8	1.2	<b>5MDBGSA</b>
5 127	1-1/4 32	250 113	Stem/Rigid	High Modulus Donut	-40° - 180°	-40° - 82°	2-3/8	1.1	<b>5MDRGSA</b>
5 152	1-1/2 38	300 135	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/8	0.9	<b>5MPGSA</b>
5 152	1-1/2 38	300 135	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4	1	<b>5MPBGSA</b>
5 152	1-1/2 38	300 135	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2	0.9	<b>5MPRGSA</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



**5MDGSA**



**5MDBGSA**



**5MDRGSA**



**5MPGSA**



**5MPBGSA**



**5MPRGSA**



**Bumper  
included with  
these models.**

Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

## Low Profile 3" Threaded Stem Casters

- Threaded stem installs into the base of a standard stationary post.
- Resilient rubber tread. Bumpers not included.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt.		Cat. No.
					(Fahrenheit)	(Celsius)	(lbs.)	(kg.)	
3 76	15/16 24	100 45	Stem/Swivel	Resilient Rubber	-30° - 130°	-34° - 71°	1.0	0.45	<b>3TM</b>
3 76	15/16 24	100 45	Stem/Brake	Resilient Rubber	-30° - 130°	-34° - 71°	1.1	0.50	<b>3TMB</b>



**3TM**



**3TMB**

Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

- **Swivel and Swivel/Brake casters** rotate a full 360 degrees for easy maneuvering.
- **Brakes:** Wheel brakes are foot operated.
- **Bumpers:** Non Phtalate vinyl material is strong yet flexible to protect walls from damage. Each caster, except where noted, includes a 3-1/2" (89mm) diameter bumper. Optional 5" (127mm) diameter bumpers are available.
- **Weight Load Capacity** of a cart (evenly distributed): Caster Load Rating x 3.
- **Stem casters** in spec sheet 11.20 are for use with 1" (25mm) diameter posts. Stem casters may be fit to larger 1-5/8" diameter posts used on Metro Work Tables and HD Super Shelving by using an adapter set.  
Cat. No. 9974HDP-4, bag of 4 adapters. Note: Adapters are not for use with threaded stem 3TM and 3TMB models.

## Caster Wheel Material Guide

Caster Tread	Grease/Oil Resistance	Floor Protection	Load Rating	Key Advantage
Resilient Rubber	Low	High	200 lbs. (90kg)	Basic mobility.
High Modulus Rubber	High	High	250 lbs. (113kg)	Quieter than resilient rubber and polyurethane.
Polyurethane	High	High	300 lbs. (135kg)	Easiest to move heavy loads.
Hi-Temp Phenolic	High	Medium	300 lbs. (135kg)	Suitable tread for Autoclave processes.
Hi-Temp Nylon	High	Medium	300 lbs. (135kg)	Suitable tread for Autoclave processes.

## Replacement Bumpers

Non Phtalate Vinyl

Diameter (in.)	(mm)	Height (in.)	(mm)	Cat. No.
3-1/2	89	3/4	19	9992DB
5-1/2	140	13/16	21	9992N



Donut Bumper

## Rigid Caster Channels

- Typically used opposite two swivel style casters to create carts that are easy to steer over long distances.

Note: A type 304 stainless rigid caster channel is included at no charge with each two rigid plated or SS casters. An aluminum rigid channel is included with each two polymer horn rigid casters (model 5PCR).

For shelf depth (in.)	(mm)	Cat. No.	(For use with 5PCR) Cat. No.
14"	355	14RS	P14RC
18"	457	18RS	P18RC
21"	530	21RS	P21RC
24"	610	24RS	P24RC
30"	760	30RS	P30RC
36"	910	36RS	P36RC



Rigid Caster Channel

Swivel Casters



24RS



P24RC

All Metro Catalog Sheets are available on our website [www.metro.com](http://www.metro.com).

an Ali Group Company



The Spirit of Excellence



## Submittal Sheet

04/21/2023

### ITEM# 29 - WIRE SHELVING (4 EA REQ'D)

Metro 1836NK3

Super Erecta® Shelf, wire, 36"W x 18"D, Metroseal™ Green epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, plastic split sleeves are included in each carton, NSF

#### ACCESSORIES

Mfr	Qty	Model	Spec
Metro	4	74UPK3	Super Erecta® SiteSelect™ Post, 73-7/8"H, for use with stem casters, Metroseal 3 Green epoxy coated corrosion-resistant finish with Microban® antimicrobial protection
Metro	8	5PC	Super Erecta® Stem Caster, swivel, 5" dia., 1-1/4" face, 300 lb. capacity, corrosion resistant, polyurethane flat wheel tread, polymer horn, includes bumper
Metro	4	5PCB	Super Erecta® Stem Caster, swivel (with foot operated brake), 5" dia., 1-1/4" face, 300 lb. capacity, corrosion resistant, polyurethane flat wheel tread, polymer horn, includes bumper



We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

# Super Erecta® Shelf Wire Shelving



- **Unique Design:** The open wire design of these shelves minimizes dust accumulation and allows free circulation of air, greater visibility of stored items and greater light penetration.
- **Durable Construction:** Super Erecta shelves and posts are constructed of heavy-gauge carbon steel or Type 304 stainless steel.
- **Choice of Finishes:** Super Erecta Brite™ and chrome-plated for dry storage; Metroseal™ Epoxy (green or gray), and Type 304 stainless steel for corrosive environments; and attractive epoxy color options for merchandising applications.
- **Metroseal:** Proprietary rust-resistant finish is a durable epoxy coating over a protective zinc substrate. Metroseal contains Microban® antimicrobial product protection which continuously fights the growth of bacteria, mold, and mildew that cause stains and odors. 12-year limited warranty against rust and corrosion.
- **Versatile:** Super Erecta® Shelf wire shelving can adapt to your changing needs. By using various accessories, hundreds of shelving configurations become possible.
- **Fast, Secure Assembly:** SiteSelect® Posts have a double groove visual guide feature every 8" (203mm), circular grooves at 1" (25mm) increments, and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
- **Adjustability:** Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
- **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
- **Shelf Accessibility:** Shelves can be loaded/unloaded easily from all sides. This open construction allows maximum use of storage cube.
- **Adjustable Feet:** Bolt levelers compensate for surface irregularities.

**Note:** Stainless stationary posts are equipped with stainless steel leveling feet.



Super Erecta Chrome Wire



PROTECTION THAT LIVES ON  
**MICROBAN**

Super Erecta with Metroseal



Gray Metroseal Epoxy  
Finish with Microban



Green Metroseal Epoxy  
Finish with Microban



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

L02-006e  
Printed in U.S.A. 6/20

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2020 InterMetro Industries Corp.



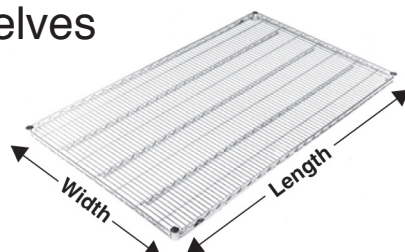
**Super Erecta® Shelf Wire Shelving**

**10.01**



# Super Erecta® Shelf Wire Shelving

## Wire Shelves



Aluminum Split Sleeve

- See spec sheet 10.14 for epoxy color options.
- Plastic split sleeves are included with each shelf  
Replacements are available: Cat. No. **9985** (bag of 4)
- Aluminum split sleeves are recommended for abusive mobile applications. Sleeves with stainless C-rings must be used for cart wash applications (exceeding 200°F/93°C) and for all autoclave applications.  
Cat. No. **9986Z** (bag of 4 with zinc C-rings)  
Cat. No. **9986S** (bag of 4 with stainless steel C-rings)
- Weight capacity (evenly distributed) per shelf  
800 lbs. (363kg) for lengths of 18" to 48" (457 to 1219mm)  
600 lbs. (272kg) for lengths of 54" (1370mm) or longer
- Weight capacity (evenly distributed) per unit.  
Stationary shelving units have a maximum load capacity (evenly distributed) of 2,000 lbs. (907kg). Mobile units have a maximum capacity of three times the caster load rating up to but not exceeding 1,000 lbs. (453kg) total. Consult the Metro catalog for caster load ratings.

Cat. No. Super Erecta Brite	Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No. Metroseal Gray (K4) with Microban	Cat. No. Stainless	Nominal Width/Length		Approx. Pkd. Wt.	
					(in.)	(mm)	(lbs.)	(kg)
1424BR	1424NC	1424NK3	1424NK4	1424NS	14x24	355x610	5.3	2.4
1430BR	1430NC	1430NK3	1430NK4	1430NS	14x30	355x760	6.3	2.8
1436BR	1436NC	1436NK3	1436NK4	1436NS	14x36	355x914	7.5	3.4
1442BR	1442NC	1442NK3	1442NK4	1442NS	14x42	355x1066	8.3	3.8
1448BR	1448NC	1448NK3	1448NK4	1448NS	14x48	355x1219	9.4	4.3
1460BR	1460NC	1460NK3	1460NK4	1460NS	14x60	355x1524	11.8	5.4
1472BR	1472NC	1472NK3	1472NK4	1472NS	14x72	355x1829	14.4	6.5
-	1818NC	1818NK3	1818NK4	-	18x18	457x457	5.3	2.4
1824BR	1824NC	1824NK3	1824NK4	1824NS	18x24	457x610	6.1	2.7
1830BR	1830NC	1830NK3	1830NK4	1830NS	18x30	457x760	7.1	3.2
1836BR	1836NC	1836NK3	1836NK4	1836NS	18x36	457x914	8.2	3.7
1842BR	1842NC	1842NK3	1842NK4	1842NS	18x42	457x1066	9.3	4.2
1848BR	1848NC	1848NK3	1848NK4	1848NS	18x48	457x1219	10.7	4.9
1854BR	1854NC	1854NK3	1854NK4	1854NS	18x54	457x1370	11.9	5.4
1860BR	1860NC	1860NK3	1860NK4	1860NS	18x60	457x1524	13.4	6.1
1872BR	1872NC	1872NK3	1872NK4	1872NS	18x72	457x1829	14.6	6.6
2124BR	2124NC	2124NK3	2124NK4	2124NS	21x24	530x610	10.1	4.6
2130BR	2130NC	2130NK3	2130NK4	2130NS	21x30	530x760	10.5	4.8
2136BR	2136NC	2136NK3	2136NK4	2136NS	21x36	530x914	10.7	4.9
2142BR	2142NC	2142NK3	2142NK4	2142NS	21x42	530x1066	11.5	5.2
2148BR	2148NC	2148NK3	2148NK4	2148NS	21x48	530x1219	11.9	5.4
2154BR	2154NC	2154NK3	2154NK4	2154NS	21x54	530x1370	12.9	5.8
2160BR	2160NC	2160NK3	2160NK4	2160NS	21x60	530x1524	13.4	6.1
2172BR	2172NC	2172NK3	2172NK4	2172NS	21x72	530x1829	14.4	6.5
2424BR	2424NC	2424NK3	2424NK4	2424NS	24x24	610x610	6.5	3.0
2430BR	2430NC	2430NK3	2430NK4	2430NS	24x30	610x760	8.3	3.8
2436BR	2436NC	2436NK3	2436NK4	2436NS	24x36	610x914	10.1	4.6
2442BR	2442NC	2442NK3	2442NK4	2442NS	24x42	610x1066	11.9	5.4
2448BR	2448NC	2448NK3	2448NK4	2448NS	24x48	610x1219	14.2	6.4
2454BR	2454NC	2454NK3	2454NK4	2454NS	24x54	610x1370	16.1	7.3
2460BR	2460NC	2460NK3	2460NK4	2460NS	24x60	610x1524	18.0	8.2
2472BR	2472NC	2472NK3	2472NK4	2472NS	24x72	610x1829	21.4	9.7

**Note:** The actual length of the shelves is 1/8" (3.2mm) shorter than the nominal dimension shown. The actual depth of the shelves is 1/8" (3.2mm) greater than the nominal dimension shown.

**Note:** The following restrictions apply to shelving units that utilize 14" (355mm) wide shelves:  
Free-standing units: Units taller than 63" (1600mm) must be properly fastened to the floor or wall using Metro foot plates or wall brackets.  
Mobile units: maximum allowable post height is 54" (1370mm).



# Super Erecta® Shelf Wire Shelving

## SiteSelect® Posts

**Stationary Posts** - Equipped with a leveling bolt to account for uneven floors.

- Height includes leveling bolt (completely tightened) and post cap. Leveling bolt can be adjusted 0.5" (13mm).
- Foot plates may be ordered separately and installed in place of leveling foot.
- Replacement leveling bolts: Zinc Cat. No. **RPF04-004**, Stainless Steel Cat. No. **RPF04-004C**
- Replacement post cap for standard posts: Black Cat. No. **RPC06-035**

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No.. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Actual Height		Approx Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
<b>7P</b>	<b>7PK3</b>	<b>7PK4</b>	-	7.375	187	0.5	0.3
<b>13P</b>	<b>13PK3</b>	<b>13PK4</b>	<b>13PS</b>	14.375	365	1	0.5
<b>27P</b>	<b>27PK3</b>	<b>27PK4</b>	<b>27PS</b>	28.375	720	1.75	0.75
<b>33P</b>	<b>33PK3</b>	<b>33PK4</b>	<b>33PS</b>	34.375	873	2	0.9
<b>54P</b>	<b>54PK3</b>	<b>54PK4</b>	<b>54PS</b>	54.4375	1382	3	1.4
<b>63P</b>	<b>63PK3</b>	<b>63PK4</b>	<b>63PS</b>	62.4375	1585	3.5	1.6
<b>74P</b>	<b>74PK3</b>	<b>74PK4</b>	<b>74PS</b>	74.5	1892	4	1.8
<b>86P</b>	<b>86PK3</b>	<b>86PK4</b>	<b>86PS</b>	86.5	2197	5	2.3
<b>*96P</b>	-	-	-	96.5	2450	5.5	2.5

\*96P should not be used on units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.

## Mobile Posts (For use with Stem Casters)

- Height includes post cap.

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
<b>13UP</b>	<b>13UPK3</b>	<b>13UPK4</b>	<b>13UPS</b>	13.75	349	1	0.5
<b>27UP</b>	<b>27UPK3</b>	<b>27UPK4</b>	<b>27UPS</b>	27.75	704	1.75	0.75
<b>33UP</b>	<b>33UPK3</b>	<b>33UPK4</b>	<b>33UPS</b>	33.75	857	2	0.9
<b>54UP</b>	<b>54UPK3</b>	<b>54UPK4</b>	<b>54UPS</b>	53.8125	1366	3	1.4
<b>63UP</b>	<b>63UPK3</b>	<b>63UPK4</b>	<b>63UPS</b>	61.8125	1570	3.5	1.6
-	<b>70UPK3</b>	<b>70UPK4</b>	-	69.75	1771	3.75	1.7
<b>74UP</b>	<b>74UPK3</b>	<b>74UPK4</b>	<b>74UPS</b>	73.875	1876	4	1.8
<b>86UP</b>	<b>86UPK3</b>	<b>86UPK4</b>	<b>86UPS</b>	85.875	2181	4.5	2.0

## Staked Posts (For use with Truck Dollies)

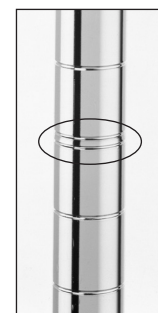
- Each post connects to the truck dolly through the stem receptacle. The stem receptacle is staked into the bottom of the post to ensure a durable connection in abusive mobile applications. Each includes a leveling/connecting bolt.

Cat. No. Chrome	Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
		(in.)	(mm)	(lbs.)	(kg)
<b>54P-STKD</b>	<b>54PS-STKD</b>	54.4375	1382	3	1.4
<b>63P-STKD</b>	<b>63PS-STKD</b>	62.4375	1585	3.5	1.6
<b>74P-STKD</b>	<b>74PS-STKD</b>	74.5	1892	4	1.8

## Swaged Posts (For use with Stem Casters in Cart Wash Applications)

- Each post has an aluminum cap swaged into the top of the post.

Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
	(in.)	(mm)	(lbs.)	(kg)
<b>33UPS-SW</b>	33.75	857	2	.9
<b>54UPS-SW</b>	53.8125	1366	3	1.4
<b>63UPS-SW</b>	61.8125	1570	3.5	1.6



SiteSelect Posts feature double grooves every 8" (203mm) to aid assembly.



Stationary Post



Post for Stem Caster

## Special Length Posts

Cut posts are available. Consult your Metro representative for more information.



Staked Post



Swaged Post



Job \_\_\_\_\_



We put space to work.

# Super Erecta Shelf®

## Wire Shelving

### Super Wide Shelving

- **High-density Storage:** Super Wide shelves have a greater storage area for holding large quantities of supplies, especially large, bulky objects, providing maximum storage in minimum space.

- **Load Capacity (evenly distributed) per shelf:**

Depths: 30" and 36" (760 and 914mm)

800 lbs. (363kg) for lengths 48" (1219mm) or shorter.

600 lbs. (272kg) for lengths 54" (1370mm) or longer.

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No.. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Nominal Width/Length		Approx. Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
3036NC	3036NK3	3036NK4	3036NS	30x36	760x914	14.2	6.4
3048NC	3048NK3	3048NK4	3048NS	30x48	760x1219	17.7	8.0
3060NC	3060NK3	3060NK4	3060NS	30x60	760x1524	20.2	9.2
3072NC	3072NK3	3072NK4	3072NS	30x72	760x1829	22.7	10.3
3636NC	3636NK3	-	3636NS	36x36	910x914	16.7	7.6
3648NC	3648NK3	-	3648NS	36x48	910x1219	21.6	9.8
3660NC	3660NK3	-	3660NS	36x60	910x1524	26.4	12.0
3672NC	3672NK3	-	3672NS	36x72	910x1829	31.6	14.3

**Note:** The actual length of the shelves is 1/8" (3.2mm) shorter than the nominal dimension shown. The actual depth of the shelves is 1/8" (3.2mm) greater than the nominal dimension shown.



### Foot Plates

- Use to bolt units to the floor, or when a broader, more stable foot is desired. Foot plates also help to protect floors by distributing the point load of the shelving unit across a larger contact point.
- Foot plates (completely tightened) add .125" (3mm) to the specified heights of each stationary post on the table.

Zinc Cat. No. **9993Z**

Stainless Steel Cat. No. **9993S**



### "S" Hook

- Used to add on shelving units with only two posts required. Order two per shelf level.

Cat. No. **9995Z**



an Ali Group Company



The Spirit of Excellence



Item # \_\_\_\_\_

We put space to work.

Job \_\_\_\_\_

## Super Erecta Pro®

### Durable and Cleanable. The original — reinnovated.

Corrosion resistant shelving constructed of removable polymer open grid shelf mats over a wire shelf frame. Shelf frames and posts have Metroseal epoxy coating over an electroplated substrate. Shelves with polymer mats offer a 15 year limited warranty against corrosion, while posts offer a 12 year warranty against corrosion. Microban® antimicrobial product protection is built into the frames, shelf mats, and posts. Shelf has a rigid four-sided frame with center truss(es). Robust corner provides complete 360° capture of the split sleeves and post for added stability. Stationary units have maximum capacity of 2,000 lbs. (907kg) evenly distributed. Mobile units (with stem casters) offer a maximum total unit load of 900 lbs. (408kg). Units assemble easily — shelves mount on split sleeves along grooved, numbered posts and adjust on 1" (25mm) increments.

- **Prolonged durability:** Polymer shelf mats are corrosion proof and impact resistant. They will not chip, rust, or corrode.
- **Easy to clean:** Removable polymer shelf mats can easily be lifted off the shelf frames for cleaning in sinks or wash/dish machines.

- **Strong and robust:** Steel corners, side and center supports assure a sturdy and stable weight bearing surface.

Weight capacities for evenly distributed loads:

800 lbs. (363kg) per shelf for lengths of 24" to 48" (610 to 1220mm)

600 lbs. (275kg) per shelf for lengths of 54" (1370mm) or longer

2,000 lbs. (907kg) maximum per stationary unit.

- **Interchangeable:** Super Erecta Pro shelves are compatible on the same shelving units with other Super Erecta shelving options: Super Erecta wire, Super Adjustable Super Erecta, Solid Super Erecta shelves, Dunnage shelves, Cantilever shelves. Super Erecta Pro shelves can be used with Post-Type Wall Mounts, Direct Wall Mounts, SmartWall Wall Mounts, Security Units, Top Track, and qwikTRAK systems.
- **Microban Product Protection:** Microban antimicrobial product protection is built into the shelf mats and the Metroseal 3 epoxy coating to protect the product from bacteria, mold, mildew, and fungus that cause odors and product degradation. Microban protection keeps the product "cleaner between cleanings".
- **Efficient use of storage space:** Shelves can be adjusted at 1" (25mm) increments along the post to maximize the use of available vertical storage space.
- **Open Grid Shelf Mats:** Open grid shelves promote air circulation and light penetration.
- **Fast, Easy Assembly:** Super Erecta Pro units assemble easily in minutes, without tools. SiteSelect posts have numbered grooves and feature unique double grooves every 8" (203mm) to help position the shelves.
- **Warranty against rust and corrosion:** Shelves with polymer shelf mats – 15 years. Posts – 12 years. Shelf mats are constructed of polypropylene and will never rust.

\*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



For stem casters,  
see catalog sheet #11.20



All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

Printed in U.S.A. L02-184  
Rev. 9/21

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2021 InterMetro Industries Corp.



**Super Erecta Pro® Shelves**

**10-80**



Job \_\_\_\_\_



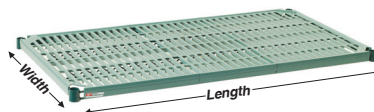
# Super Erecta Pro® Shelves

We put space to work.

## Standard Shelves

- Part number includes shelf with removable polymer shelf mats and one bag of split sleeves

Nominal Width/Length (in.)	Nominal Width/Length (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Model No. SE Pro Metroseal 3
14x24	355x610	4.5	2.0	PR1424NK3
14x30	355x760	6.3	2.9	PR1430NK3
14x36	355x914	8.0	3.6	PR1436NK3
14x42	355x1060	10.0	4.5	PR1442NK3
14x48	355x1219	11.9	5.4	PR1448NK3
14x60	355x1524	14.9	6.8	PR1460NK3
14x72	355x1829	18.3	8.3	PR1472NK3
18x24	457x610	6.0	2.7	PR1824NK3
18x30	457x760	7.8	3.5	PR1830NK3
18x36	457x914	9.5	4.2	PR1836NK3
18x42	457x1060	11.3	5.0	PR1842NK3
18x48	457x1219	13.0	5.8	PR1848NK3
18x54	457x1372	14.8	6.6	PR1854NK3
18x60	457x1524	16.5	7.4	PR1860NK3
18x72	457x1829	19.8	8.8	PR1872NK3
21x24	530x610	8.0	3.6	PR2124NK3
21x30	530x760	9.5	4.2	PR2130NK3
21x36	530x914	11.3	5.0	PR2136NK3
21x42	530x1060	12.5	5.6	PR2142NK3
21x48	530x1219	14.3	6.4	PR2148NK3
21x54	530x1372	16.5	7.4	PR2154NK3
21x60	530x1524	18.3	8.1	PR2160NK3
21x72	530x1829	21.5	9.6	PR2172NK3
24x24	610x610	9.5	4.2	PR2424NK3
24x30	610x760	11.3	5.0	PR2430NK3
24x36	610x914	13.0	5.8	PR2436NK3
24x42	610x1060	14.0	6.3	PR2442NK3
24x48	610x1219	15.5	6.9	PR2448NK3
24x54	610x1372	18.3	8.1	PR2454NK3
24x60	610x1524	20.0	8.9	PR2460NK3
24x72	610x1829	23.3	10.4	PR2472NK3



**Actual Dimensions:** Width: Add 1/4" (6mm) to nominal size. Length: Subtract 1/4" (6mm) from nominal size.

**Note:** Polymer Shelf mats are designed to fit Super Erecta Pro shelves and cannot be retrofitted to Super Erecta wire shelves.

**Replacement Split Sleeves**  
Model No. 9985 (Bag of four sets.)

## Specifications

- Shelf frames:** Carbon steel with Metroseal 3 epoxy coating.
  - Polymer Shelf mats:** polypropylene.
  - Microban antimicrobial product protection** is built into the polymer shelf mats and Metroseal 3 epoxy coating.
  - NSF listed for all environments.**
  - Continuous Temperature:** Super Erecta Pro Shelves can be used continuously within a range of -20/120° F (-29/49° C). For cleaning only, the unloaded product or shelf mats may be intermittently exposed to temperatures up to 200° F (93° C).
- NOTE:** Not suitable for cart wash applications.

## SHELVING HEIGHT GUIDELINES

Shelf Depth	14fl (356mm)	18fl (457mm)	21fl (533mm)	24fl (610mm)
Maximum Post Height Allowable	63fl (1600mm)	86fl (2184mm)	86fl (2184mm)	96fl (2438mm)
Stationary	63fl (1600mm)	86fl (2184mm)	86fl (2184mm)	96fl (2438mm)
Mobile	54fl (1372mm)	74fl (1880mm)	74fl (1880mm)	86fl (2184mm)

Note: 14" deep stationary shelving taller than 63" must be fastened to the floor or wall. For stationary units with foot plates or wall brackets properly attached to the floor or wall, the maximum allowable height is 96" (2438mm). See spec sheet 10.81 for options.

## SiteSelect Posts

Stationary post height includes leveling bolt.

## STATIONARY

Actual Height (in.)	Actual Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Model No. Metroseal 3	Model No. Stainless
14 1/2	370	1.0	0.5	13PK3	13PS
34 1/2	875	2.0	0.9	33PK3	33PS
54 9/16	1385	3.0	1.4	54PK3	54PS
62 9/16	1590	3.5	1.6	63PK3	63PS
—	—	—	—	—	—
74 5/8	1895	4.0	1.8	74PK3	74PS
86 5/8	2200	5.0	2.3	86PK3	86PS

## MOBILE (For use with stem casters)

Actual Height (in.)	Actual Height (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Model No. Metroseal 3	Model No. Stainless
13 3/4	349	1.0	0.5	13UPK3	13UPS
33 3/4	857	2.0	0.9	33UPK3	33UPS
53 13/16	1366	3.0	1.4	54UPK3	54UPS
61 13/16	1570	3.5	1.6	63UPK3	63UPS
69 3/4	1772	3.8	1.7	70UPK3	—
73 7/8	1876	4.0	1.8	74UPK3	74UPS
85 7/8	2181	5.0	2.3	86UPK3	86UPS

**NOTE:** Special length posts are available. Consult your Metro representative.

**"S" Hook:** Used to "add on" one or multiple Super Erecta Pro shelving units while eliminating the cost of two posts per unit. Can be used to join units end-to-end, back-to-back, at right angles, etc. Two "S" hooks are required for each shelf.

**Model No. Q9995Z**

## Notes about "add-on" units.

- Add-on (Adjacent) units must be configured entirely of one style of shelf. (Example: Adjacent unit may be configured entirely of Super Erecta Pro OR entirely of Super Erecta Wire/Super Adjustable shelves.)
- To connect an adjacent Super Erecta or Super Adjustable Super Erecta wire shelving unit to a Super Erecta Pro unit using S-hooks, the adjacent unit must use S-hook model number Q9995Z.
- A mixed shelving unit having a combination of Super Erecta Pro, Super Erecta wire, and Super Adjustable cannot be connected to another unit with "S" Hooks.



an Ali Group Company



The Spirit of Excellence



We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

## Metro® Stem Casters - Super Erecta®

**Metro Stem-Type Casters** are designed to fit Super Erecta® Shelf posts to form shelf carts and other mobile units.

### Plated Casters with High Modulus treads

- Non marking high modulus donut tread and polyolefin hub. Plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Ball bearing swivel and axle. NSF listed. Bumpers included. Brake style: pedal brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage) (Fahrenheit) (Celsius)	Approx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
5 127	1-1/4 32	250 113	Stem/Swivel	High Modulus Donut	-40° - 180° -40° - 82°	2-1/2 1.1	<b>5MDA</b>
5 127	1-1/4 32	250 113	Stem/Brake	High Modulus Donut	-40° - 180° -40° - 82°	2-5/8 1.2	<b>5MDBA</b>
5 127	1-1/4 32	250 113	Stem/Rigid	High Modulus Donut	-40° - 180° -40° - 82°	2-3/8 1.1	<b>5MDRA</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



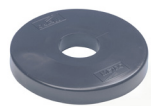
**5MDA**



**5MDBA**



**5MDRA**



**Bumper  
included with  
these models.**

Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

### Plated Casters with resilient rubber treads

- Solid resilient rubber material. Plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Ball bearing swivel. Select models are NSF listed. Bumpers included. Brake style: side brake.
- "LD" models have a plated hub cover.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage) (Fahrenheit) (Celsius)	Approx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
4 102	15/16 24	125 56	Stem/Swivel	Resilient Donut	-30° - 160° -34° - 71°	1-1/2 0.6	<b>4LD</b>
4 102	15/16 24	125 56	Stem/Brake	Resilient Donut	-30° - 160° -34° - 71°	2 0.9	<b>4LDB</b>
5 127	15/16 24	125 56	Stem/Swivel	Resilient Donut	-30° - 160° -34° - 71°	2 0.9	<b>5LD</b>
5 127	1-1/4 32	200 90	Stem/Swivel	Resilient, Flat	-30° - 160° -34° - 71°	2-1/2 1.1	<b>5M</b>
5 127	1-1/4 32	200 90	Stem/Brake	Resilient, Flat	-30° - 160° -34° - 71°	2-5/8 1.2	<b>5MB</b>
5 127	1-1/4 32	200 90	Stem/Rigid	Resilient, Flat	-30° - 160° -34° - 71°	3-1/2 1.5	<b>5MR</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



**4LD**



**5LD**



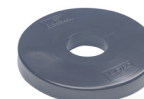
**5M**



**5MB**



**5MR**



**Bumper  
included with  
these models.**

All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

L02-041  
Printed in U.S.A. 8/19

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2019 InterMetro Industries Corp.



**Casters — Stem Type**

**11.20**

Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

## Plated Casters with Polyurethane Tread

- Chrome plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Non marking polyurethane flat tread and polyethylene hub. Ball bearing swivel and axle. NSF listed. Bumpers included. Brake style: side brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
					(Fahrenheit)	(Celsius)		
5 127	1-1/4 32	300 135	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/8 0.9	<b>5MP</b>
5 127	1-1/4 32	300 135	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>5MPB</b>
5 127	1-1/4 32	300 135	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2 0.9	<b>5MPR</b>
6 152	1-1/2 38	400 182	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1.1	<b>6MP</b>
6 152	1-1/2 38	400 182	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/2 0.9	<b>6MPB</b>
6 152	1-1/2 38	400 182	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>6MPR</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.

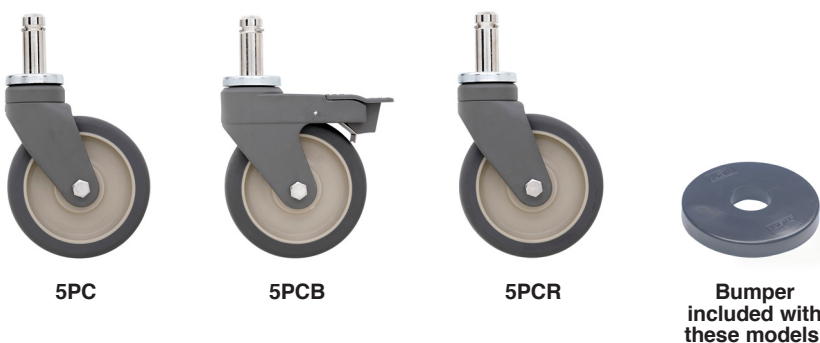


## Polymer Horn Casters with Polyurethane Tread

- Polymer horn and stainless axle and bolt provide corrosion resistance and enhanced durability. Premium Delron bearings are maintenance free. Non marking polyurethane flat tread and polyethylene hub. For medium-duty applications. Brake style: pedal brake. Bumpers included. NSF listed.
- 5PCM and 5PCBM have antimicrobial product protection built-into the wheel tread.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.	Antimicrobial Cat. No.
					(Fahrenheit)	(Celsius)			
5 127	1-1/4 32	300 135	Stem/Swivel	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PC</b>	<b>5PCM</b>
5 127	1-1/4 32	300 135	Stem/Brake	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PCB</b>	<b>5PCBM</b>
5 127	1-1/4 32	300 135	Stem/Rigid	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PCR</b>	-

Note: Rigid connecting channel (aluminum): Cat. No. P14RC, P18RC, P21RC, P24RC, P30RC, or P36RC.



Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

## Stainless Steel, Cart-Washable Casters

- Designed with sealed stainless steel bearings to withstand high-pressure washings and zerk fittings for easy routine maintenance. For medium duty applications. Bumpers included. NSF listed.
- Non marking tread
- Brake style: Pedal brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt.		Cat. No.
					(Fahrenheit)	(Celsius)	(lbs.)	(kg.)	
5 127	1-1/4 32	250 113	Stem/Swivel	High Modulus Donut	-40° - 180°	-40° - 82°	2-1/2	1.1	<b>5MDGSA</b>
5 127	1-1/4 32	250 113	Stem/Brake	High Modulus Donut	-40° - 180°	-40° - 82°	2-5/8	1.2	<b>5MDBGSA</b>
5 127	1-1/4 32	250 113	Stem/Rigid	High Modulus Donut	-40° - 180°	-40° - 82°	2-3/8	1.1	<b>5MDRGSA</b>
5 152	1-1/2 38	300 135	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/8	0.9	<b>5MPGSA</b>
5 152	1-1/2 38	300 135	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4	1	<b>5MPBGSA</b>
5 152	1-1/2 38	300 135	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2	0.9	<b>5MPRGSA</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



**5MDGSA**



**5MDBGSA**



**5MDRGSA**



**5MPGSA**



**5MPBGSA**



**5MPRGSA**



**Bumper  
included with  
these models.**

Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

## Low Profile 3" Threaded Stem Casters

- Threaded stem installs into the base of a standard stationary post.
- Resilient rubber tread. Bumpers not included.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt.		Cat. No.
					(Fahrenheit)	(Celsius)	(lbs.)	(kg.)	
3 76	15/16 24	100 45	Stem/Swivel	Resilient Rubber	-30° - 130°	-34° - 71°	1.0	0.45	<b>3TM</b>
3 76	15/16 24	100 45	Stem/Brake	Resilient Rubber	-30° - 130°	-34° - 71°	1.1	0.50	<b>3TMB</b>



**3TM**



**3TMB**

Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

- **Swivel and Swivel/Brake casters** rotate a full 360 degrees for easy maneuvering.
- **Brakes:** Wheel brakes are foot operated.
- **Bumpers:** Non Phtalate vinyl material is strong yet flexible to protect walls from damage. Each caster, except where noted, includes a 3-1/2" (89mm) diameter bumper. Optional 5" (127mm) diameter bumpers are available.
- **Weight Load Capacity** of a cart (evenly distributed): Caster Load Rating x 3.
- **Stem casters** in spec sheet 11.20 are for use with 1" (25mm) diameter posts. Stem casters may be fit to larger 1-5/8" diameter posts used on Metro Work Tables and HD Super Shelving by using an adapter set.  
Cat. No. 9974HDP-4, bag of 4 adapters. Note: Adapters are not for use with threaded stem 3TM and 3TMB models.

## Caster Wheel Material Guide

Caster Tread	Grease/Oil Resistance	Floor Protection	Load Rating	Key Advantage
Resilient Rubber	Low	High	200 lbs. (90kg)	Basic mobility.
High Modulus Rubber	High	High	250 lbs. (113kg)	Quieter than resilient rubber and polyurethane.
Polyurethane	High	High	300 lbs. (135kg)	Easiest to move heavy loads.
Hi-Temp Phenolic	High	Medium	300 lbs. (135kg)	Suitable tread for Autoclave processes.
Hi-Temp Nylon	High	Medium	300 lbs. (135kg)	Suitable tread for Autoclave processes.

## Replacement Bumpers

Non Phtalate Vinyl

Diameter (in.) (mm)		Height (in.) (mm)		Cat. No.
3-1/2	89	3/4	19	9992DB
5-1/2	140	13/16	21	9992N



Donut Bumper

## Rigid Caster Channels

- Typically used opposite two swivel style casters to create carts that are easy to steer over long distances.

Note: A type 304 stainless rigid caster channel is included at no charge with each two rigid plated or SS casters. An aluminum rigid channel is included with each two polymer horn rigid casters (model 5PCR).

For shelf depth (in.) (mm)		Cat. No.	(For use with 5PCR) Cat. No.
14"	355	14RS	P14RC
18"	457	18RS	P18RC
21"	530	21RS	P21RC
24"	610	24RS	P24RC
30"	760	30RS	P30RC
36"	910	36RS	P36RC



Rigid Caster Channel

Swivel Casters



24RS



P24RC

All Metro Catalog Sheets are available on our website [www.metro.com](http://www.metro.com).

an Ali Group Company



The Spirit of Excellence





We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

## Metro® Stem Casters - Super Erecta®

**Metro Stem-Type Casters** are designed to fit Super Erecta® Shelf posts to form shelf carts and other mobile units.

### Plated Casters with High Modulus treads

- Non marking high modulus donut tread and polyolefin hub. Plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Ball bearing swivel and axle. NSF listed. Bumpers included. Brake style: pedal brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage) (Fahrenheit) (Celsius)	Approx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
5 127	1-1/4 32	250 113	Stem/Swivel	High Modulus Donut	-40° - 180° -40° - 82°	2-1/2 1.1	<b>5MDA</b>
5 127	1-1/4 32	250 113	Stem/Brake	High Modulus Donut	-40° - 180° -40° - 82°	2-5/8 1.2	<b>5MDBA</b>
5 127	1-1/4 32	250 113	Stem/Rigid	High Modulus Donut	-40° - 180° -40° - 82°	2-3/8 1.1	<b>5MDRA</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



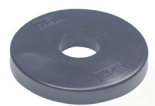
**5MDA**



**5MDBA**



**5MDRA**



**Bumper  
included with  
these models.**

Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

### Plated Casters with resilient rubber treads

- Solid resilient rubber material. Plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Ball bearing swivel. Select models are NSF listed. Bumpers included. Brake style: side brake.
- "LD" models have a plated hub cover.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage) (Fahrenheit) (Celsius)	Approx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
4 102	15/16 24	125 56	Stem/Swivel	Resilient Donut	-30° - 160° -34° - 71°	1-1/2 0.6	<b>4LD</b>
4 102	15/16 24	125 56	Stem/Brake	Resilient Donut	-30° - 160° -34° - 71°	2 0.9	<b>4LDB</b>
5 127	15/16 24	125 56	Stem/Swivel	Resilient Donut	-30° - 160° -34° - 71°	2 0.9	<b>5LD</b>
5 127	1-1/4 32	200 90	Stem/Swivel	Resilient, Flat	-30° - 160° -34° - 71°	2-1/2 1.1	<b>5M</b>
5 127	1-1/4 32	200 90	Stem/Brake	Resilient, Flat	-30° - 160° -34° - 71°	2-5/8 1.2	<b>5MB</b>
5 127	1-1/4 32	200 90	Stem/Rigid	Resilient, Flat	-30° - 160° -34° - 71°	3-1/2 1.5	<b>5MR</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



**4LD**



**5LD**



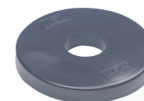
**5M**



**5MB**



**5MR**



**Bumper  
included with  
these models.**

All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

L02-041  
Printed in U.S.A. 8/19

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2019 InterMetro Industries Corp.



**Casters — Stem Type**

**11.20**

Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

## Plated Casters with Polyurethane Tread

- Chrome plated horns, stems, axles, and brakes (optional) are appropriate for dry environments and for medium duty applications. Non marking polyurethane flat tread and polyethylene hub. Ball bearing swivel and axle. NSF listed. Bumpers included. Brake style: side brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
					(Fahrenheit)	(Celsius)		
5 127	1-1/4 32	300 135	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/8 0.9	<b>5MP</b>
5 127	1-1/4 32	300 135	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>5MPB</b>
5 127	1-1/4 32	300 135	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2 0.9	<b>5MPR</b>
6 152	1-1/2 38	400 182	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1.1	<b>6MP</b>
6 152	1-1/2 38	400 182	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/2 0.9	<b>6MPB</b>
6 152	1-1/2 38	400 182	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>6MPR</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.

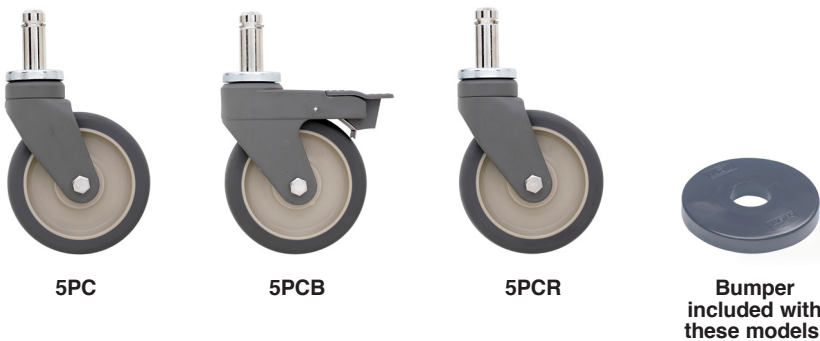


## Polymer Horn Casters with Polyurethane Tread

- Polymer horn and stainless axle and bolt provide corrosion resistance and enhanced durability. Premium Delron bearings are maintenance free. Non marking polyurethane flat tread and polyethylene hub. For medium-duty applications. Brake style: pedal brake. Bumpers included. NSF listed.
- 5PCM and 5PCBM have antimicrobial product protection built-into the wheel tread.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.	Antimicrobial Cat. No.
					(Fahrenheit)	(Celsius)			
5 127	1-1/4 32	300 135	Stem/Swivel	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PC</b>	<b>5PCM</b>
5 127	1-1/4 32	300 135	Stem/Brake	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PCB</b>	<b>5PCBM</b>
5 127	1-1/4 32	300 135	Stem/Rigid	Polyurethane, Flat	-20° - 120°	-49° - 49°	2 0.9	<b>5PCR</b>	-

Note: Rigid connecting channel (aluminum): Cat. No. P14RC, P18RC, P21RC, P24RC, P30RC, or P36RC.



Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

## Stainless Steel, Cart-Washable Casters

- Designed with sealed stainless steel bearings to withstand high-pressure washings and zerk fittings for easy routine maintenance. For medium duty applications. Bumpers included. NSF listed.
- Non marking tread
- Brake style: Pedal brake.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
					(Fahrenheit)	(Celsius)		
5 127	1-1/4 32	250 113	Stem/Swivel	High Modulus Donut	-40° - 180°	-40° - 82°	2-1/2 1.1	<b>5MDGSA</b>
5 127	1-1/4 32	250 113	Stem/Brake	High Modulus Donut	-40° - 180°	-40° - 82°	2-5/8 1.2	<b>5MDBGSA</b>
5 127	1-1/4 32	250 113	Stem/Rigid	High Modulus Donut	-40° - 180°	-40° - 82°	2-3/8 1.1	<b>5MDRGSA</b>
5 152	1-1/2 38	300 135	Stem/Swivel	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/8 0.9	<b>5MPGSA</b>
5 152	1-1/2 38	300 135	Stem/Brake	Polyurethane, Flat	-30° - 180°	-34° - 82°	2-1/4 1	<b>5MPBGSA</b>
5 152	1-1/2 38	300 135	Stem/Rigid	Polyurethane, Flat	-30° - 180°	-34° - 82°	2 0.9	<b>5MPRGSA</b>

Note: Rigid connecting channel (stainless steel): Cat. No. 14RS, 18RS, 21RS, 24RS, 30RS, or 36RS.



**5MDGSA**



**5MDBGSA**



**5MDRGSA**



**5MPGSA**



**5MPBGSA**



**5MPRGSA**



**Bumper  
included with  
these models.**

Rigid stem casters are often ordered two per unit for improved tracking and handling. Rigid caster channels are provided with each two rigid stem casters at no charge.

## Low Profile 3" Threaded Stem Casters

- Threaded stem installs into the base of a standard stationary post.
- Resilient rubber tread. Bumpers not included.

Wheel Diameter (in.) (mm)	Face (in.) (mm)	Load Rating (lbs.) (kg.)	Type	Wheel Tread	Temperature range (Continuous usage)		Apprx. Pkd. Wt. (lbs.) (kg.)	Cat. No.
					(Fahrenheit)	(Celsius)		
3 76	15/16 24	100 45	Stem/Swivel	Resilient Rubber	-30° - 130°	-34° - 71°	1.0 0.45	<b>3TM</b>
3 76	15/16 24	100 45	Stem/Brake	Resilient Rubber	-30° - 130°	-34° - 71°	1.1 0.50	<b>3TMB</b>



**3TM**



**3TMB**



Job \_\_\_\_\_



# Metro® Stem Casters

We put space to work.®

- **Swivel and Swivel/Brake casters** rotate a full 360 degrees for easy maneuvering.
- **Brakes:** Wheel brakes are foot operated.
- **Bumpers:** Non Phtalate vinyl material is strong yet flexible to protect walls from damage. Each caster, except where noted, includes a 3-1/2" (89mm) diameter bumper. Optional 5" (127mm) diameter bumpers are available.
- **Weight Load Capacity** of a cart (evenly distributed): Caster Load Rating x 3.
- **Stem casters** in spec sheet 11.20 are for use with 1" (25mm) diameter posts. Stem casters may be fit to larger 1-5/8" diameter posts used on Metro Work Tables and HD Super Shelving by using an adapter set.  
Cat. No. 9974HDP-4, bag of 4 adapters. Note: Adapters are not for use with threaded stem 3TM and 3TMB models.

## Caster Wheel Material Guide

Caster Tread	Grease/Oil Resistance	Floor Protection	Load Rating	Key Advantage
Resilient Rubber	Low	High	200 lbs. (90kg)	Basic mobility.
High Modulus Rubber	High	High	250 lbs. (113kg)	Quieter than resilient rubber and polyurethane.
Polyurethane	High	High	300 lbs. (135kg)	Easiest to move heavy loads.
Hi-Temp Phenolic	High	Medium	300 lbs. (135kg)	Suitable tread for Autoclave processes.
Hi-Temp Nylon	High	Medium	300 lbs. (135kg)	Suitable tread for Autoclave processes.

## Replacement Bumpers

Non Phtalate Vinyl

Diameter (in.) (mm)		Height (in.) (mm)		Cat. No.
3-1/2	89	3/4	19	9992DB
5-1/2	140	13/16	21	9992N



Donut Bumper

## Rigid Caster Channels

- Typically used opposite two swivel style casters to create carts that are easy to steer over long distances.

Note: A type 304 stainless rigid caster channel is included at no charge with each two rigid plated or SS casters. An aluminum rigid channel is included with each two polymer horn rigid casters (model 5PCR).

For shelf depth (in.) (mm)		Cat. No.	(For use with 5PCR) Cat. No.
14"	355	14RS	P14RC
18"	457	18RS	P18RC
21"	530	21RS	P21RC
24"	610	24RS	P24RC
30"	760	30RS	P30RC
36"	910	36RS	P36RC



Rigid Caster Channel

Swivel Casters



24RS



P24RC

All Metro Catalog Sheets are available on our website [www.metro.com](http://www.metro.com).

an Ali Group Company



The Spirit of Excellence

***Submittal Sheet***

04/21/2023

**ITEM# 30 - SPARE NO.**

&lt;Spare No.&gt;

***Submittal Sheet***

04/21/2023

**ITEM# 31 - SOILD DISH TABLE (1 EA REQ'D)**

Eagle Group CUSTOM

***Submittal Sheet***

04/21/2023

**ITEM# 32 - WIRE SHELVING (3 EA REQ'D)**

Metro 1448NK3

Super Erecta® Shelf, wire, 48"W x 14"D, Metroseal™ Green epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, plastic split sleeves are included in each carton, NSF



We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

# Super Erecta® Shelf Wire Shelving



- **Unique Design:** The open wire design of these shelves minimizes dust accumulation and allows free circulation of air, greater visibility of stored items and greater light penetration.
- **Durable Construction:** Super Erecta shelves and posts are constructed of heavy-gauge carbon steel or Type 304 stainless steel.
- **Choice of Finishes:** Super Erecta Brite™ and chrome-plated for dry storage; Metroseal™ Epoxy (green or gray), and Type 304 stainless steel for corrosive environments; and attractive epoxy color options for merchandising applications.
- **Metroseal:** Proprietary rust-resistant finish is a durable epoxy coating over a protective zinc substrate. Metroseal contains Microban® antimicrobial product protection which continuously fights the growth of bacteria, mold, and mildew that cause stains and odors. 12-year limited warranty against rust and corrosion.
- **Versatile:** Super Erecta® Shelf wire shelving can adapt to your changing needs. By using various accessories, hundreds of shelving configurations become possible.
- **Fast, Secure Assembly:** SiteSelect® Posts have a double groove visual guide feature every 8" (203mm), circular grooves at 1" (25mm) increments, and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
- **Adjustability:** Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
- **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
- **Shelf Accessibility:** Shelves can be loaded/unloaded easily from all sides. This open construction allows maximum use of storage cube.
- **Adjustable Feet:** Bolt levelers compensate for surface irregularities.

**Note:** Stainless stationary posts are equipped with stainless steel leveling feet.



Super Erecta Chrome Wire



Super Erecta with Metroseal



Gray Metroseal Epoxy Finish with Microban



Green Metroseal Epoxy Finish with Microban



**InterMetro Industries Corporation**  
 North Washington Street, Wilkes-Barre, PA 18705  
 Product Information. U.S. and Canada: 1.800.992.1776  
 Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

L02-006e  
 Printed in U.S.A. 6/20

Information and specifications are subject to change without notice. Please confirm at time of order.

Copyright © 2020 InterMetro Industries Corp.



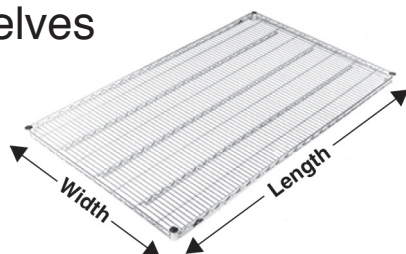
**Super Erecta® Shelf Wire Shelving**

**10.01**



# Super Erecta® Shelf Wire Shelving

## Wire Shelves



Aluminum Split Sleeve

- See spec sheet 10.14 for epoxy color options.
- Plastic split sleeves are included with each shelf  
Replacements are available: Cat. No. **9985** (bag of 4)
- Aluminum split sleeves are recommended for abusive mobile applications. Sleeves with stainless C-rings must be used for cart wash applications (exceeding 200°F/93°C) and for all autoclave applications.  
Cat. No. **9986Z** (bag of 4 with zinc C-rings)  
Cat. No. **9986S** (bag of 4 with stainless steel C-rings)
- Weight capacity (evenly distributed) per shelf  
800 lbs. (363kg) for lengths of 18" to 48" (457 to 1219mm)  
600 lbs. (272kg) for lengths of 54" (1370mm) or longer
- Weight capacity (evenly distributed) per unit.  
Stationary shelving units have a maximum load capacity (evenly distributed) of 2,000 lbs. (907kg). Mobile units have a maximum capacity of three times the caster load rating up to but not exceeding 1,000 lbs. (453kg) total. Consult the Metro catalog for caster load ratings.

Cat. No. Super Erecta Brite	Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No. Metroseal Gray (K4) with Microban	Cat. No. Stainless	Nominal Width/Length		Approx. Pkd. Wt.	
					(in.)	(mm)	(lbs.)	(kg)
1424BR	1424NC	1424NK3	1424NK4	1424NS	14x24	355x610	5.3	2.4
1430BR	1430NC	1430NK3	1430NK4	1430NS	14x30	355x760	6.3	2.8
1436BR	1436NC	1436NK3	1436NK4	1436NS	14x36	355x914	7.5	3.4
1442BR	1442NC	1442NK3	1442NK4	1442NS	14x42	355x1066	8.3	3.8
1448BR	1448NC	1448NK3	1448NK4	1448NS	14x48	355x1219	9.4	4.3
1460BR	1460NC	1460NK3	1460NK4	1460NS	14x60	355x1524	11.8	5.4
1472BR	1472NC	1472NK3	1472NK4	1472NS	14x72	355x1829	14.4	6.5
-	1818NC	1818NK3	1818NK4	-	18x18	457x457	5.3	2.4
1824BR	1824NC	1824NK3	1824NK4	1824NS	18x24	457x610	6.1	2.7
1830BR	1830NC	1830NK3	1830NK4	1830NS	18x30	457x760	7.1	3.2
1836BR	1836NC	1836NK3	1836NK4	1836NS	18x36	457x914	8.2	3.7
1842BR	1842NC	1842NK3	1842NK4	1842NS	18x42	457x1066	9.3	4.2
1848BR	1848NC	1848NK3	1848NK4	1848NS	18x48	457x1219	10.7	4.9
1854BR	1854NC	1854NK3	1854NK4	1854NS	18x54	457x1370	11.9	5.4
1860BR	1860NC	1860NK3	1860NK4	1860NS	18x60	457x1524	13.4	6.1
1872BR	1872NC	1872NK3	1872NK4	1872NS	18x72	457x1829	14.6	6.6
2124BR	2124NC	2124NK3	2124NK4	2124NS	21x24	530x610	10.1	4.6
2130BR	2130NC	2130NK3	2130NK4	2130NS	21x30	530x760	10.5	4.8
2136BR	2136NC	2136NK3	2136NK4	2136NS	21x36	530x914	10.7	4.9
2142BR	2142NC	2142NK3	2142NK4	2142NS	21x42	530x1066	11.5	5.2
2148BR	2148NC	2148NK3	2148NK4	2148NS	21x48	530x1219	11.9	5.4
2154BR	2154NC	2154NK3	2154NK4	2154NS	21x54	530x1370	12.9	5.8
2160BR	2160NC	2160NK3	2160NK4	2160NS	21x60	530x1524	13.4	6.1
2172BR	2172NC	2172NK3	2172NK4	2172NS	21x72	530x1829	14.4	6.5
2424BR	2424NC	2424NK3	2424NK4	2424NS	24x24	610x610	6.5	3.0
2430BR	2430NC	2430NK3	2430NK4	2430NS	24x30	610x760	8.3	3.8
2436BR	2436NC	2436NK3	2436NK4	2436NS	24x36	610x914	10.1	4.6
2442BR	2442NC	2442NK3	2442NK4	2442NS	24x42	610x1066	11.9	5.4
2448BR	2448NC	2448NK3	2448NK4	2448NS	24x48	610x1219	14.2	6.4
2454BR	2454NC	2454NK3	2454NK4	2454NS	24x54	610x1370	16.1	7.3
2460BR	2460NC	2460NK3	2460NK4	2460NS	24x60	610x1524	18.0	8.2
2472BR	2472NC	2472NK3	2472NK4	2472NS	24x72	610x1829	21.4	9.7

**Note:** The actual length of the shelves is 1/8" (3.2mm) shorter than the nominal dimension shown. The actual depth of the shelves is 1/8" (3.2mm) greater than the nominal dimension shown.

**Note:** The following restrictions apply to shelving units that utilize 14" (355mm) wide shelves:  
Free-standing units: Units taller than 63" (1600mm) must be properly fastened to the floor or wall using Metro foot plates or wall brackets.  
Mobile units: maximum allowable post height is 54" (1370mm).

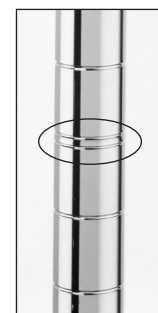


# Super Erecta® Shelf Wire Shelving

## SiteSelect® Posts

**Stationary Posts** - Equipped with a leveling bolt to account for uneven floors.

- Height includes leveling bolt (completely tightened) and post cap. Leveling bolt can be adjusted 0.5" (13mm).
- Foot plates may be ordered separately and installed in place of leveling foot.
- Replacement leveling bolts: Zinc Cat. No. **RPF04-004**, Stainless Steel Cat. No. **RPF04-004C**
- Replacement post cap for standard posts: Black Cat. No. **RPC06-035**



SiteSelect Posts feature double grooves every 8" (203mm) to aid assembly.



Stationary Post



Post for Stem Caster

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No.. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
<b>7P</b>	<b>7PK3</b>	<b>7PK4</b>	-	7.375	187	0.5	0.3
<b>13P</b>	<b>13PK3</b>	<b>13PK4</b>	<b>13PS</b>	14.375	365	1	0.5
<b>27P</b>	<b>27PK3</b>	<b>27PK4</b>	<b>27PS</b>	28.375	720	1.75	0.75
<b>33P</b>	<b>33PK3</b>	<b>33PK4</b>	<b>33PS</b>	34.375	873	2	0.9
<b>54P</b>	<b>54PK3</b>	<b>54PK4</b>	<b>54PS</b>	54.4375	1382	3	1.4
<b>63P</b>	<b>63PK3</b>	<b>63PK4</b>	<b>63PS</b>	62.4375	1585	3.5	1.6
<b>74P</b>	<b>74PK3</b>	<b>74PK4</b>	<b>74PS</b>	74.5	1892	4	1.8
<b>86P</b>	<b>86PK3</b>	<b>86PK4</b>	<b>86PS</b>	86.5	2197	5	2.3
<b>*96P</b>	-	-	-	96.5	2450	5.5	2.5

\*96P should not be used on units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.

## Mobile Posts (For use with Stem Casters)

- Height includes post cap.

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
<b>13UP</b>	<b>13UPK3</b>	<b>13UPK4</b>	<b>13UPS</b>	13.75	349	1	0.5
<b>27UP</b>	<b>27UPK3</b>	<b>27UPK4</b>	<b>27UPS</b>	27.75	704	1.75	0.75
<b>33UP</b>	<b>33UPK3</b>	<b>33UPK4</b>	<b>33UPS</b>	33.75	857	2	0.9
<b>54UP</b>	<b>54UPK3</b>	<b>54UPK4</b>	<b>54UPS</b>	53.8125	1366	3	1.4
<b>63UP</b>	<b>63UPK3</b>	<b>63UPK4</b>	<b>63UPS</b>	61.8125	1570	3.5	1.6
-	<b>70UPK3</b>	<b>70UPK4</b>	-	69.75	1771	3.75	1.7
<b>74UP</b>	<b>74UPK3</b>	<b>74UPK4</b>	<b>74UPS</b>	73.875	1876	4	1.8
<b>86UP</b>	<b>86UPK3</b>	<b>86UPK4</b>	<b>86UPS</b>	85.875	2181	4.5	2.0

## Special Length Posts

Cut posts are available. Consult your Metro representative for more information.

## Staked Posts (For use with Truck Dollies)

- Each post connects to the truck dolly through the stem receptacle. The stem receptacle is staked into the bottom of the post to ensure a durable connection in abusive mobile applications. Each includes a leveling/connecting bolt.

Cat. No. Chrome	Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
		(in.)	(mm)	(lbs.)	(kg)
<b>54P-STKD</b>	<b>54PS-STKD</b>	54.4375	1382	3	1.4
<b>63P-STKD</b>	<b>63PS-STKD</b>	62.4375	1585	3.5	1.6
<b>74P-STKD</b>	<b>74PS-STKD</b>	74.5	1892	4	1.8



Staked Post



Swaged Post

## Swaged Posts (For use with Stem Casters in Cart Wash Applications)

- Each post has an aluminum cap swaged into the top of the post.

Cat. No. Stainless Steel	Actual Height		Approx. Pkd. Wt.	
	(in.)	(mm)	(lbs.)	(kg)
<b>33UPS-SW</b>	33.75	857	2	.9
<b>54UPS-SW</b>	53.8125	1366	3	1.4
<b>63UPS-SW</b>	61.8125	1570	3.5	1.6



Job \_\_\_\_\_



We put space to work.

## Super Erecta Shelf®

### Wire Shelving

### Super Wide Shelving

- **High-density Storage:** Super Wide shelves have a greater storage area for holding large quantities of supplies, especially large, bulky objects, providing maximum storage in minimum space.

- **Load Capacity (evenly distributed) per shelf:**

Depths: 30" and 36" (760 and 914mm)

800 lbs. (363kg) for lengths 48" (1219mm) or shorter.

600 lbs. (272kg) for lengths 54" (1370mm) or longer.

Cat. No. Chrome	Cat. No. Metroseal Green (K3) with Microban	Cat. No.. Metroseal Gray (K4) with Microban	Cat. No. Stainless Steel	Nominal Width/Length		Approx. Pkd. Wt.	
				(in.)	(mm)	(lbs.)	(kg)
3036NC	3036NK3	3036NK4	3036NS	30x36	760x914	14.2	6.4
3048NC	3048NK3	3048NK4	3048NS	30x48	760x1219	17.7	8.0
3060NC	3060NK3	3060NK4	3060NS	30x60	760x1524	20.2	9.2
3072NC	3072NK3	3072NK4	3072NS	30x72	760x1829	22.7	10.3
3636NC	3636NK3	-	3636NS	36x36	910x914	16.7	7.6
3648NC	3648NK3	-	3648NS	36x48	910x1219	21.6	9.8
3660NC	3660NK3	-	3660NS	36x60	910x1524	26.4	12.0
3672NC	3672NK3	-	3672NS	36x72	910x1829	31.6	14.3

**Note:** The actual length of the shelves is 1/8" (3.2mm) shorter than the nominal dimension shown. The actual depth of the shelves is 1/8" (3.2mm) greater than the nominal dimension shown.



### Foot Plates

- Use to bolt units to the floor, or when a broader, more stable foot is desired. Foot plates also help to protect floors by distributing the point load of the shelving unit across a larger contact point.
- Foot plates (completely tightened) add .125" (3mm) to the specified heights of each stationary post on the table.

Zinc Cat. No. **9993Z**

Stainless Steel Cat. No. **9993S**



### "S" Hook

- Used to add on shelving units with only two posts required. Order two per shelf level.

Cat. No. **9995Z**



an Ali Group Company



The Spirit of Excellence



***Submittal Sheet***

04/21/2023

**ITEM# 33 - BUSSING UTILITY TRANSPORT CART, METAL (1 EA REQ'D)**

Eagle Group UC-311

Utility Cart, 3-tier, 16-3/4"W x 29-5/8"D x 32"H, 1" up-turn on sides & rear of top & center shelves, 12-1/2" shelf clearance, (1) push handle, angle legs include bumpers, 500 lbs. capacity, 430 stainless steel all welded construction, 4" swivel plate casters, NSF



Profit from the Eagle Advantage®

## Specification Sheet

### Short Form Specifications

Eagle Stainless Steel Utility Cart, model \_\_\_\_\_. Three stainless steel shelves welded to angle legs. Galvanized caster channel frame. Available with standard 1"-high upturn on ends and rear of top and center shelves, or 1"-high upturn on all sides of all shelves. Four 4"-diameter swivel plate casters. 1"-diameter handle on one end.



*"UC" cart with upturns on ends and rear of top and center shelves*

## Stainless Steel Utility Carts

### MODELS:

☐ UC-311  
☐ UC-322

☐ UUC-311  
☐ UUC-322

### Features on all carts...

- Three 20-gauge stainless steel shelves.
- Type 300 stainless steel shelves.
- 16-gauge stainless steel angle legs.
- Galvanized bottom frame consists of front-to-back caster channels and left-to-right support angles.
- 1" (25mm)-high upturns.
- Each shelf is hemmed for further strength and stability.
- 12½" (318mm) shelf clearance.
- Legs provided with bumpers.
- 4" (76mm)-diameter swivel plate casters.
- 1" (25mm)-diameter handle welded to angle legs.
- Corrosion- and stain-resistant.
- Polished stainless steel finish allows for ease of cleaning and sanitation.
- 500-lb. (226.8 kg) weight capacity.

### EAGLE GROUP

100 Industrial Boulevard  
Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • 800-441-8440

Fax: 302-653-2065

[www.eaglegrp.com](http://www.eaglegrp.com) • [www.eaglemhc.com](http://www.eaglemhc.com)

For custom configuration or fabrication needs, contact our **SpecFAB® Division**.

Phone: 302-653-3000 • Fax: 302-653-2065 • e-mail: [quotes@eaglegrp.com](mailto:quotes@eaglegrp.com)

### Certifications / Approvals



AutoQuotes



EG01.42 Rev. 03/22

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

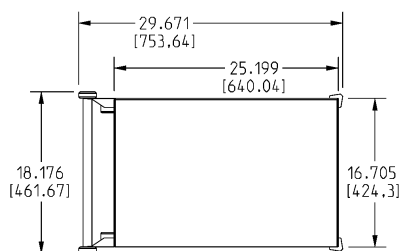
Eagle Foodservice Equipment, Eagle MHC, and SpecFAB® are divisions of Eagle Group. ©2022 by the Eagle Group



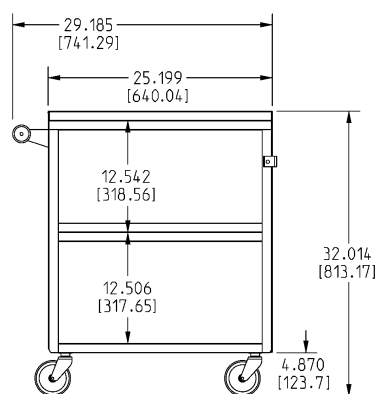
Profit from the Eagle Advantage®

Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

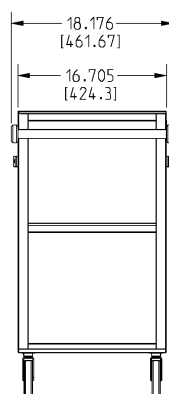
## Stainless Steel Utility Carts



TOP VIEW

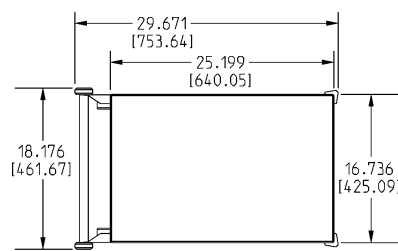


FRONT VIEW

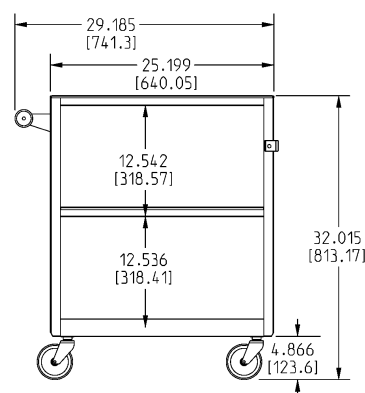


END VIEW

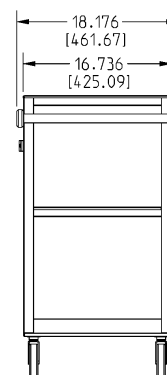
(CART WITH STANDARD UPTURNS SHOWN)



TOP VIEW



FRONT VIEW



END VIEW

(CART WITH UPTURNS ON ALL SIDES OF ALL SHELVES SHOWN)

## Standard Duty Carts

500-lb. weight capacity.

overall width x length x height		shelf width x length (inner dimensions)		shelf clearance		weight		with * Standard Upturns	with Upturn on all sides of all shelves
in.	mm	in.	mm	in.	mm	lbs.	kg	model #	model #
16 $\frac{3}{4}$ " x 29 $\frac{5}{8}$ " x 32"	426 x 753 x 813	16 $\frac{1}{2}$ " x 25 $\frac{5}{16}$ "	419 x 643	12 $\frac{1}{2}$ "	318	78	35.4	UC-311	UUC-311
19" x 33" x 32"	483 x 838 x 813	18 $\frac{3}{4}$ " x 28 $\frac{11}{16}$ "	476 x 729	12 $\frac{1}{2}$ "	318	78	35.4	UC-322	UUC-322

\* Upturn on sides and rear of top and center shelves.

## EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 or 800-441-8440 • Fax: 302-653-2065

www.eaglegrp.com • www.eaglemh.com

Printed in U.S.A.  
 ©2022 by Eagle Group

Rev. 03/22

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.



## Submittal Sheet

04/21/2023

### ITEM# 34 - DISHWASHER, DOOR TYPE (1 EA REQ'D)

Champion DH-6000T

Genesis Dishwasher, door type, extended hood (27" vertical clearance), high temperature sanitizing, (60) racks/hour capacity, auto start, auto-fill, detergent & chemical connections, interchangeable upper & lower spray arms, automatic drain valve, vent fan control, bottom mounted HMI controls, stainless steel construction, electric tank heat, peg rack, flat rack, 2 HP self draining pump, NSF, cULus, ENERGY STAR®

#### ACCESSORIES

Mfr	Qty	Model	Spec
Champion	1		Fuel Surcharge (NET/NET)
Champion	1		1 year parts & labor warranty, standard
Champion	1		Complimentary factory authorized performance test included, upon equipment start-up. Consult local Champion sales representative for coordination of the start-up. If customer is beyond 60 miles from Champion authorized service agent, consult factory.
Champion	1		Single-point electrical connection, standard
Champion	1		Booster Heater, built-in, configured to ensure 180°, with mounted PRV
Champion	1		Voltage to be specified
Champion	1		Straight-through design application

#### ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1									2		

#### WATER

	HOT SIZE	HOT AFF	HOT GPH	COLD SIZE	COLD AFF	FILTERED SIZE	FILTERED AFF	CONDENSER INLET SIZE	CONDENSER OUTLET SIZE
1	3/4"								

#### WASTE

	INDIRECT SIZE	DIRECT SIZE
1	1"	

# Champion®

The Dishwashing Machine Specialists

Project \_\_\_\_\_  
 Item No. \_\_\_\_\_  
 Quantity \_\_\_\_\_

## STANDARD FEATURES

- **Factory Authorized Startup**
- **HMI – Operator Touch Screen Interface**
- **On-Board Service Diagnostics**
- **Field Convertible – Single to three, or three to single phase**
- **Sleep Mode – All internal heaters shut off after 4 hours idle**
- Auto delime with delime notification
- Field convertible from straight to corner operation
- Dual NSF listed as both a dishwasher and potwasher
- Rinse Sentry – ensures 180°F final rinse, built-in booster required
- Cycle counter
- Auto start – starts unit when hood is closed
- Single or dual point electrical connection
- High efficiency 2 HP pump
- Self draining pump
- Automatic tank fill
- Automatic drain valve – drains wash tank when power is off
- PRV (Mounted Pressure Reducing Valve)
- 4 selectable cycles
- Vent fan control
- 27" [686mm] extended clearance

## DH-6000T

DH-6000T High Temperature  
Hood-type Dishwashing Machine



DH-6000T HOOD-TYPE

## OPTIONS & ACCESSORIES

- ☐ **NEW** Built in detergent and rinse aid pumps
- ☐ Drain Water Tempering Kit (unmounted)
- ☐ Door interlock – locks door closed during the vent fan cycle
- ☐ Single phase option
- ☐ Racks
  - ☐ Peg
  - ☐ Flat
  - ☐ Sheet Pan rack
- ☐ Corner operation splash baffle
- ☐ **NEW** Champion ION scale prevention system (unmounted)
- ☐ Built-in booster configured to ensure 180° rinse



*Photo is for general visual representation only. Please refer to specifications for the latest detailed product information.*

## SPECIFIER STATEMENT

Specified unit will be Champion model DH-6000T high temperature, high-hood type dishwashing machine.

Features, electronic controls, Rinse Sentry, Auto start, interchangeable stainless steel wash and rinse arms, up to 60 racks/hr, 0.73 US gals [2.76 liters, 0.61 imp. gals]/rack.

1 year parts and labor warranty.

Champion Industries, Inc.  
 3765 Champion Blvd., Winston-Salem, NC 27105  
 Tel: 336/661-1556 Fax: 336/661-1979

2674 N. Service Road  
 Jordan Station, Ontario, Canada L0R 1S0  
 Tel: 800/263-5798 Fax: 905/562-4618

[www.ChampionIndustries.com](http://www.ChampionIndustries.com)

# Champion®

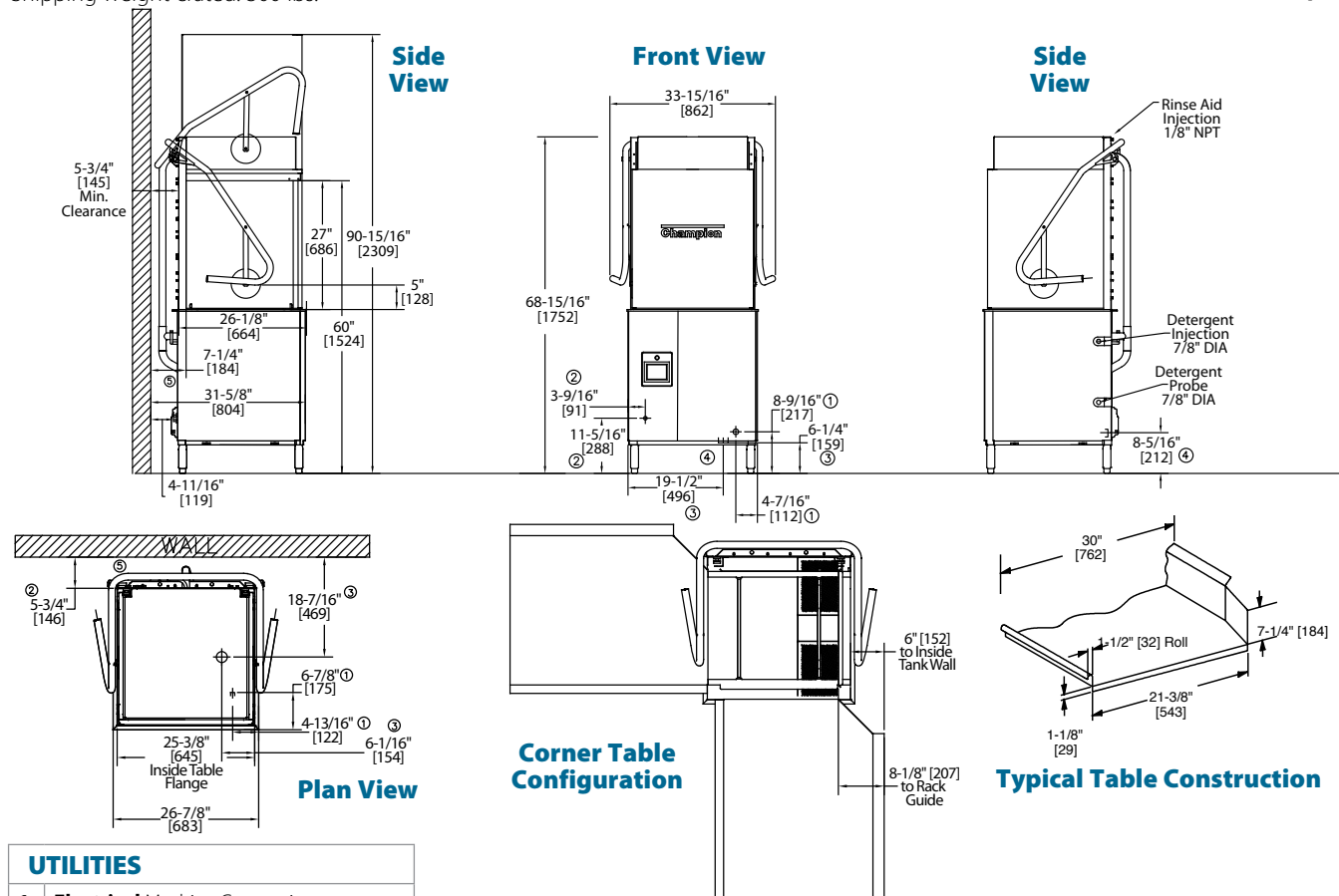
The Dishwashing Machine Specialists

## DH-6000T

DH-6000T High Temperature  
Hood-type Dishwashing Machine

Shipping weight crated: 300 lbs.

Dimensions shown in inches and [mm]



### UTILITIES

- Electrical** Machine Connection (See Electrical Box)
- Hot Water** 3/4" NPT Hot Water 110° - 140°F 45 PSI dynamic min. incoming Final rinse 18 PSI
- Drain** 1" NPT Connection Gravity flow, 15 GRM max flow
- Drain Water Tempering** 1/2" Cold water line with customer supplied cut-off valve (optional)
- Integrated Detergent System** Detergent bottle supply connections (optional)

**Warning:** Plumbing, electrical connections should be made by qualified personnel who will observe all the applicable plumbing, sanitary and safety codes and the National Electrical Code.

**Note:** Optional Drain Tempering: 1/2" NPT cold water connection required. 1/2" NPT drain connection from back flow preventer to house drain. (FIELD INSTALLED and PLUMBED).

Due to an ongoing value analysis program at Champion, specifications contained in this catalog are subject to change without notice.

Champion Industries, Inc.,  
3765 Champion Blvd., NC 27105  
336/661-1556 • Fax: 336/661-1979  
ChampionIndustries.com

### Machine & Built-in Booster (Standard)

Voltage	Rated Amps	Minimum Supply Circuit Ampacity	Maximum Overcurrent Protective Device
208-240/60/1	77-68	100	100
208-240/60/3	46-41	60	60
480/60/3	20	30	30

### Machine Only (two point electrical connection or no built-in booster)

Voltage	Rated Amps	Minimum Supply Circuit Ampacity	Maximum Overcurrent Protective Device
208-240/60/1	38-34	50	50
208-240/60/3	25-23	30	30
480/60/3	11	15	15

### Booster Only (two point electrical connection)

Voltage	Rated Amps	Minimum Supply Circuit Ampacity	Maximum Overcurrent Protective Device
208-240/60/1	39-34	50	50
208-240/60/3	21-18	25	25
480/60/3	9	15	15

**Note:** Water Hammer Arrestor (meeting ASSE-1010 standard or equivalent) to be supplied (by others) in common water supply line at service connection. Recommended water hardness to be 3 grains or less for optimal performance results.

### SPECIFICATIONS

#### Capacities

Racks per hr. (NSF rated)	60
Wash tank (gal.)	10

**Motor horsepower** 2 HP

#### Water consumption

Gal. per hr. (max. use)	39
Gal. per rack	0.73

#### Temperature °F

Wash	150
Rinse	180

#### Heating

Tank heat, electric	5.2 kW
Electric Booster	7.5 kW

	Dish-washer Mode	Pot & Pan Mode		
Selectable cycle times in minutes	1	2	4	6
<b>Time cycles in seconds</b>				
Wash	36	94	214	334
Rinse	8	10	10	10
Sanitary Dwell	16	16	16	16
Total	60	120	240	360

an Ali Group Company



The Spirit of Excellence

***Submittal Sheet***

04/21/2023

**ITEM# 35 - CLEAN DISHTABLE (1 EA REQ'D)**

Eagle Group CDTL-60-14/3

Spec-Master® Clean Dishtable, straight design, 60"W x 30"D x 43-1/2"H overall, right-to-left operation, 14/304 stainless steel top, 8"H backsplash, raised rolled edges on front & side, stainless steel legs & crossbracing, adjustable metal feet, NSF



Profit from the Eagle Advantage®

## Specification Sheet

### Short Form Specifications

Eagle Clean Dishtables, model \_\_\_\_\_. Top to be 16/430, 16/304, or 14/304 stainless steel, with all seams welded, ground smooth, and polished. Front and ends to have 3"-high upturn with 1½"-diameter rolled edge. Galvanized hat channels welded to underside. Backsplash is 8"-high. 20½" standard opening for dishwasher. Legs to be 1½" O.D. galvanized tubing, 1" diameter crossbracing and adjustable bullet feet (14/304 models come standard with stainless steel hat channels welded to underside of table, stainless steel crossbraced legs, and adjustable metal feet).



right-hand model shown with optional undershelf \*  
(dishwasher not included)

### Options / Accessories \*

- ☐ Undershelf
- ☐ Stainless steel legs
- ☐ Stainless steel gussets
- ☐ Stainless steel feet

\* See Spec Sheet #EG50.07 for full line of options and accessories.

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-2065 • e-mail: quotes@eaglegrp.com

Item No.: \_\_\_\_\_  
Project No.: \_\_\_\_\_  
S.I.S. No.: \_\_\_\_\_

## Clean Dishtables— Straight Design

### MODELS:

<input type="checkbox"/> CDTL-24-16/4	<input type="checkbox"/> CDTL-48-14/3	<input type="checkbox"/> CDTR-84-16/3
<input type="checkbox"/> CDTL-24-16/3	<input type="checkbox"/> CDTR-48-16/4	<input type="checkbox"/> CDTR-84-14/3
<input type="checkbox"/> CDTL-24-14/3	<input type="checkbox"/> CDTR-48-16/3	<input type="checkbox"/> CDTL-96-16/4
<input type="checkbox"/> CDTR-24-16/4	<input type="checkbox"/> CDTR-48-14/3	<input type="checkbox"/> CDTL-96-16/3
<input type="checkbox"/> CDTR-24-16/3	<input type="checkbox"/> CDTL-60-16/4	<input type="checkbox"/> CDTL-96-14/3
<input type="checkbox"/> CDTR-24-14/3	<input type="checkbox"/> CDTL-60-16/3	<input type="checkbox"/> CDTR-96-16/4
<input type="checkbox"/> CDTL-30-16/4	<input type="checkbox"/> CDTL-60-14/3	<input type="checkbox"/> CDTR-96-16/3
<input type="checkbox"/> CDTL-30-16/3	<input type="checkbox"/> CDTR-60-16/4	<input type="checkbox"/> CDTR-96-14/3
<input type="checkbox"/> CDTL-30-14/3	<input type="checkbox"/> CDTR-60-16/3	<input type="checkbox"/> CDTL-108-16/4
<input type="checkbox"/> CDTR-30-16/4	<input type="checkbox"/> CDTR-60-14/3	<input type="checkbox"/> CDTL-108-16/3
<input type="checkbox"/> CDTR-30-16/3	<input type="checkbox"/> CDTL-72-16/4	<input type="checkbox"/> CDTL-108-14/3
<input type="checkbox"/> CDTR-30-14/3	<input type="checkbox"/> CDTL-72-16/3	<input type="checkbox"/> CDTR-108-16/4
<input type="checkbox"/> CDTL-36-16/4	<input type="checkbox"/> CDTL-72-14/3	<input type="checkbox"/> CDTR-108-16/3
<input type="checkbox"/> CDTL-36-16/3	<input type="checkbox"/> CDTR-72-16/4	<input type="checkbox"/> CDTR-108-14/3
<input type="checkbox"/> CDTR-36-14/3	<input type="checkbox"/> CDTR-72-16/3	<input type="checkbox"/> CDTL-120-16/4
<input type="checkbox"/> CDTR-36-16/4	<input type="checkbox"/> CDTR-72-14/3	<input type="checkbox"/> CDTL-120-16/3
<input type="checkbox"/> CDTR-36-16/3	<input type="checkbox"/> CDTL-84-16/4	<input type="checkbox"/> CDTL-120-14/3
<input type="checkbox"/> CDTR-36-14/3	<input type="checkbox"/> CDTL-84-16/3	<input type="checkbox"/> CDTR-120-16/4
<input type="checkbox"/> CDTL-48-16/4	<input type="checkbox"/> CDTL-84-14/3	<input type="checkbox"/> CDTR-120-16/3
<input type="checkbox"/> CDTL-48-16/3	<input type="checkbox"/> CDTR-84-16/4	<input type="checkbox"/> CDTR-120-14/3

### Design and Construction Features

- 14 or 16 gauge stainless steel.
- 30" (762mm)-wide table furnished in lengths ranging from 24" to 120" (610 to 3048mm).
- 1½" (38mm) raised rolled rim on front and end.
- 1½" (41mm)-diameter galvanized legs with welded 1" (25mm)-diameter crossbracing.
- 8" (203mm)-high backsplash.
- Adjustable non-marking bullet feet with up to 1" (25mm) adjustment.
- All Spec-Master® 14 gauge type 304 dishtables come standard with stainless steel crossbraced legs and gussets, complete with metal feet.

### Certifications / Approvals



AutoQuotes



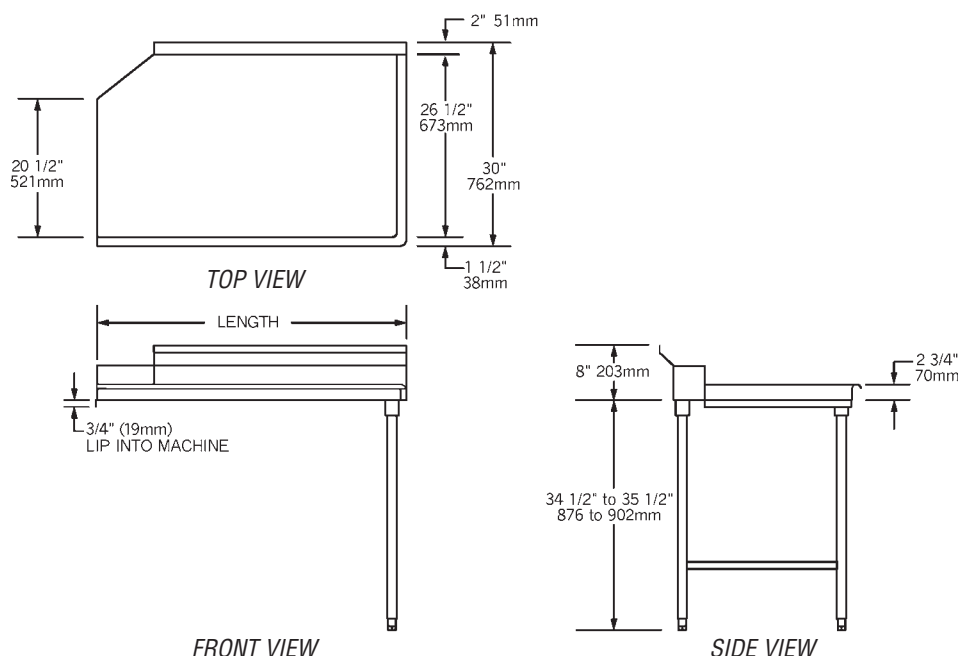




Profit from the Eagle Advantage®

Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

## Clean Dishtables—Straight Design



16 gauge type 430 model #	16 gauge type 304 model #	Spec-Master® 14 gauge type 304 model #	description	length		weight	
				in.	mm	lbs.	kg
CDTL-24-16/4	CDTL-24-14/3	CDTL-24-16/3	left-hand model	24"	610	36	16.3
CDTR-24-16/4	CDTR-24-16/3	CDTR-24-14/3	right-hand model	24"	610	36	16.3
CDTL-30-16/4	CDTL-30-16/3	CDTL-30-14/3	left-hand model	30"	762	42	19.1
CDTR-30-16/4	CDTR-30-16/3	CDTR-30-14/3	right-hand model	30"	762	42	19.1
CDTL-36-16/4	CDTL-36-16/3	CDTL-36-14/3	left-hand model	36"	914	49	22.2
CDTR-36-16/4	CDTR-36-16/3	CDTR-36-14/3	right-hand model	36"	914	49	22.2
CDTL-48-16/4	CDTL-48-16/3	CDTL-48-14/3	left-hand model	48"	1219	63	29.6
CDTR-48-16/4	CDTR-48-16/3	CDTR-48-14/3	right-hand model	48"	1219	63	29.6
CDTL-60-16/4	CDTL-60-16/3	CDTL-60-14/3	left-hand model	60"	1524	77	34.9
CDTR-60-16/4	CDTR-60-16/3	CDTR-60-14/3	right-hand model	60"	1524	77	34.9
CDTL-72-16/4	CDTL-72-16/3	CDTL-72-14/3	left-hand model	72"	1829	91	41.3
CDTR-72-16/4	CDTR-72-16/3	CDTR-72-14/3	right-hand model	72"	1829	91	41.3
CDTL-84-16/4	CDTL-84-16/3	CDTL-84-14/3	left-hand model	84"	2134	105	47.6
CDTR-84-16/4	CDTR-84-16/3	CDTR-84-14/3	right-hand model	84"	2134	105	47.6
CDTL-96-16/4	CDTL-96-16/3	CDTL-96-14/3	left-hand model	96"	2438	119	54.0
CDTR-96-16/4	CDTR-96-16/3	CDTR-96-14/3	right-hand model	96"	2438	119	54.0
CDTL-108-16/4	CDTL-108-16/3	CDTL-108-14/3	left-hand model	108"	2743	134	60.8
CDTR-108-16/4	CDTR-108-16/3	CDTR-108-14/3	right-hand model	108"	2754	134	60.8
CDTL-120-16/4	CDTL-120-16/3	CDTL-120-14/3	left-hand model	120"	3048	147	66.7
CDTR-120-16/4	CDTR-120-16/3	CDTR-120-14/3	right-hand model	120"	3048	147	66.7

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

Printed in U.S.A.  
 ©2017 by Eagle Group

Rev. 11/17

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.

***Submittal Sheet***

04/21/2023

**ITEM# 36 - WORK TABLE, STAINLESS STEEL TOP (1 EA REQ'D)**

Eagle Group T3030STE-BS

Spec-Master® Series Work Table, 30"W x 30"D, 4-1/2"H backsplash, 14/300 series stainless steel top, rolled front edge, Uni-Lok® gusset system, stainless steel crossrails on side & rear, (4) stainless steel legs & adjustable bullet feet, NSF



Profit from the Eagle Advantage®

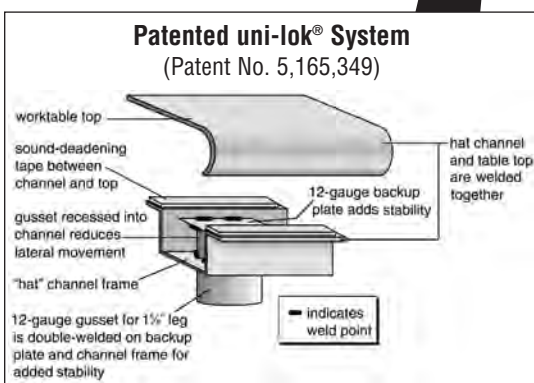
## Specification Sheet

### Short Form Specifications

Eagle worktables, Spec-Master® series, model \_\_\_\_\_, Top constructed of 14 gauge 300 series stainless steel with 1½" roll on front, 4½" backsplash, and sides turned down 90°. Open front with 1¼" O.D., stainless steel tubular cross bracing on sides and rear. Top reinforced with welded hat channels and sound deadened. Constructed with uni-lok® patented gusset system with the gussets recessed into the hat channels to reduce lateral movement. Legs are 1½" O.D., stainless steel tubing, with stainless steel gussets and 1" adjustable stainless steel bullet feet.



worktable with backsplash  
and tubular base  
—shown with optional drawer



### MODELS:

<input type="checkbox"/> T2424STE-BS	<input type="checkbox"/> T24108STE-BS	<input type="checkbox"/> T3072STE-BS	<input type="checkbox"/> T3660STE-BS
<input type="checkbox"/> T2430STE-BS	<input type="checkbox"/> T24120STE-BS	<input type="checkbox"/> T3084STE-BS	<input type="checkbox"/> T3672STE-BS
<input type="checkbox"/> T2436STE-BS	<input type="checkbox"/> T24132STE-BS	<input type="checkbox"/> T3096STE-BS	<input type="checkbox"/> T3684STE-BS
<input type="checkbox"/> T2448STE-BS	<input type="checkbox"/> T24144STE-BS	<input type="checkbox"/> T30108STE-BS	<input type="checkbox"/> T3696STE-BS
<input type="checkbox"/> T2460STE-BS	<input type="checkbox"/> T3030STE-BS	<input type="checkbox"/> T30120STE-BS	<input type="checkbox"/> T36108STE-BS
<input type="checkbox"/> T2472STE-BS	<input type="checkbox"/> T3036STE-BS	<input type="checkbox"/> T30132STE-BS	<input type="checkbox"/> T36120STE-BS
<input type="checkbox"/> T2484STE-BS	<input type="checkbox"/> T3048STE-BS	<input type="checkbox"/> T30144STE-BS	<input type="checkbox"/> T36132STE-BS
<input type="checkbox"/> T2496STE-BS	<input type="checkbox"/> T3060STE-BS	<input type="checkbox"/> T3648STE-BS	<input type="checkbox"/> T36144STE-BS

### Tabletop

- Patented uni-lok® gusset system (patent #5,165,349): gussets are recessed into hat channel, reducing lateral movement.
- Top reinforced with welded-on hat channel.
- Sound-deadened between top and channels.
- 4½" (114mm)-high 90° backsplash with 1" (25mm) turn at 90°.
- 1½" (38mm)-diameter 180° rolled edge on front. Ends are turned down 90°, providing for flush installations when required.
- 14 gauge 300 series polished stainless steel.

### Crossbracing—1¼" (38mm)-diameter

- Heavy gauge stainless steel.
- Aluminum castings join crossbraces, legs and rear brace.

### Legs—1½" (41mm)-diameter

- Tables 96" (2438mm) and longer come with six legs or more.
- Heavy gauge stainless steel.
- 1" (25mm) adjustable stainless steel feet.

### Options / Accessories

- |  |  |
|--|--|
| <input type="checkbox"/> Drawer                              | <input type="checkbox"/> Duplex receptacles                            |
| <input type="checkbox"/> Lock                                | <input type="checkbox"/> Pot rack                                      |
| <input type="checkbox"/> Casters                             | <input type="checkbox"/> Sink  |
| <input type="checkbox"/> Stainless steel bullet feet         | <input type="checkbox"/> Stabilizer Bar (for 30"- and 36"-wide tables) |
| <input type="checkbox"/> Overshelves                         |  |
| <input type="checkbox"/> Power strip (for material handling) |  |

### Certifications / Approvals



### AUTOQUOTES



### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-2065 • e-mail: quotes@eaglegrp.com

EG10.47C Rev. 10/15

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Eagle Foodservice Equipment, Eagle MHC, SpecFAB®, and Retail Display are divisions of Eagle Group. ©2015 by the Eagle Group



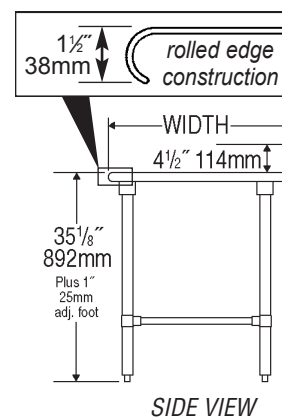
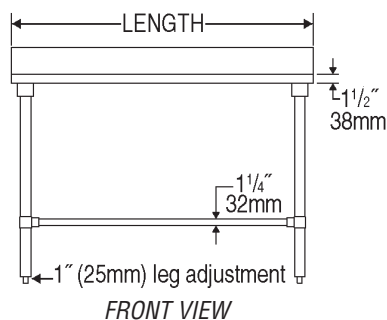
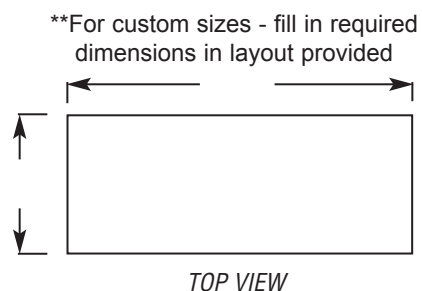
Profit from the Eagle Advantage®

Item No.: \_\_\_\_\_

Project No.: \_\_\_\_\_

S.I.S. No.: \_\_\_\_\_

## Worktables with Backsplash and Stainless Steel Tubular Base —Spec-Master® Series



model #	# of legs	width		length		weight	
		in.	mm	in.	mm	lbs.	kg
T2424STE-BS	4	24"	610	24"	610	45	20.4
T2430STE-BS	4	24"	610	30"	762	51	23.1
T2436STE-BS	4	24"	610	36"	914	56	25.4
T2448STE-BS	4	24"	610	48"	1219	67	30.4
T2460STE-BS	4	24"	610	60"	1524	78	35.4
T2472STE-BS	4	24"	610	72"	1829	89	40.4
T2484STE-BS	4	24"	610	84"	2134	100	45.4
T2496STE-BS	6	24"	610	96"	2438	111	50.3
T24108STE-BS	6	24"	610	108"	2743	122	55.8
T24120STE-BS	6	24"	610	120"	3048	133	60.3
T24132STE-BS	8	24"	610	132"	3353	144	65.3
T24144STE-BS	8	24"	610	144"	3658	155	70.3
T3030STE-BS	4	30"	762	30"	762	56	25.4
T3036STE-BS	4	30"	762	36"	914	62	28.1
T3048STE-BS	4	30"	762	48"	1219	73	33.1
T3060STE-BS	4	30"	762	60"	1524	84	38.1
T3072STE-BS	4	30"	762	72"	1829	95	43.1
T3084STE-BS	4	30"	762	84"	2134	106	48.1
T3096STE-BS	6	30"	762	96"	2438	117	53.1
T30108STE-BS	6	30"	762	108"	2743	128	58.1
T30120STE-BS	6	30"	762	120"	3048	139	63.1
T30132STE-BS	8	30"	762	132"	3353	150	68.0
T30144STE-BS	8	30"	762	144"	3658	161	73.0
T3648STE-BS	4	36"	914	48"	1219	78	35.4
T3660STE-BS	4	36"	914	60"	1524	89	40.4
T3672STE-BS	4	36"	914	72"	1829	100	45.4
T3684STE-BS	4	36"	914	84"	2134	111	50.3
T3696STE-BS	6	36"	914	96"	2438	122	55.3
T36108STE-BS	6	36"	914	108"	2743	133	60.3
T36120STE-BS	6	36"	914	120"	3048	144	65.3
T36132STE-BS	8	36"	914	132"	3353	155	70.3
T36144STE-BS	8	36"	914	144"	3658	166	75.3

**EAGLE GROUP**

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

Printed in U.S.A.

©2015 by Eagle Group

Rev. 10/15

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.



## Submittal Sheet

04/21/2023

### ITEM# 37 - REACH-IN FREEZER (1 EA REQ'D)

Turbo Air M3F19-1-N

M3 Freezer, reach-in, one-section, 18.7 cu. ft. capacity, 25-1/4"W x 33-1/2"D x 77-1/8"H, top mount self-contained refrigeration with self-cleaning condenser, (1) field reversible hinged solid door with lock & door alarm, exterior LED digital thermometer, self-diagnostic monitoring system, smart fuzzy defrost, automatic fan motor delays, LED interior lighting, (3) PE coated wire shelves, aluminum interior with stainless steel floor, stainless steel front & sides (galvanized steel top, bottom & back), R290 Hydrocarbon refrigerant, 3/8 HP, 115v/60/1-ph, 4.5 amps, cord with NEMA 5-15P, cETLus, ETL-Sanitation, ENERGY STAR®

#### ACCESSORIES

Mfr	Qty	Model	Spec
Turbo Air	1		Note: Contact factory representative for parts & accessories discounts
Turbo Air	1		3 year parts & labor warranty, standard
Turbo Air	1		Additional 2 year compressor warranty (5 year total), standard
Turbo Air	1		Self-cleaning condenser device equipped, standard
Turbo Air	1		Caster Set, swivel, locking front wheels, standard

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	4.5		3/8		

**REFRIGERATOR MANUFACTURER**  
**Turbo air**  
 more durable, efficient, beautiful

4184 E. Conant St.  
 Long Beach, CA 90808  
 Tel. 310-900-1000  
 Fax. 310-900-1077  
[www.turboairinc.com](http://www.turboairinc.com)

Project:	
Model #:	
Item #:	
Available W/H:	Qty:
Approval:	
ALA #:	SIS #:
CSI Section 11400	

## Solid Door Freezer

Reach-In Top Mount  
 M3 Series

**Model : M3F19-1-N**

### FEATURES & BENEFITS

#### ■ Self-Cleaning Condenser

The accumulation of dust in the condenser can cause the failure or breakdown of refrigerators. Refrigerators run normally until they reach a certain level of accumulation. At some point, when they are over the limit, their performance drops quickly resulting in damage to, or disposal of the stored products inside. The Self-Cleaning Condenser device keeps the condenser clean and prevents system failure by automatically brushing daily.

#### ■ Digital temperature control & monitor system

- Keep food products safe by maintaining constant temperatures.
- Alarms that sound when doors are not sealed shut; protect against food spoilage that originates from cold air leaks.
- Early warning alarm program detects issues before malfunction occurs.
- Digital display allows for easy monitoring.
- Programs interpret the condition of refrigeration systems by self-diagnosis.
- Rapid cool-down function (Turbo Freeze).
- Smart defrost system will defrost as needed.
- Automatic evaporator fan motor delays.

#### ■ Hydrocarbon refrigerants (R-290)

With innovative and eco-friendly technology, Turbo Air brings you hydrocarbon refrigerators designed to meet DOE's Energy Conservation Standards in 2017 and to use EPA's SNAP Program approved HC refrigerants. Hydrocarbon refrigerants do not deplete the ozone layer and have very low contribution to global warming (ODP-0, GWP-3).

#### ■ Stainless steel exterior

The Turbo Air M3 freezer model boasts a stainless steel exterior (galvanized steel top, bottom and back) and AL interior with stainless steel floor. It guarantees the utmost in cleanliness and long product life. Sharp corners and edges have been rounded to reduce the risk of injury. The M3 adds a touch of style to the most refined setting.

#### ■ Door pressure release device

Pressure relief doors are designed to eliminate vacuum pressure and allow easy, instant door opening.

#### ■ Field reversible door hinge

#### ■ LED interior lighting

#### ■ Adjustable, heavy duty, PE (polyethylene) coated wire shelves

#### ■ High-density polyurethane insulation

The entire cabinet structure and solid doors are foamed-in-place using high density, CFC free polyurethane insulation.

#### ■ Top mount compressor

#### ■ Freezer holds -10°F ~ 0°F for the best in frozen food preservation



#### Patented Self-Cleaning Condenser



This product is equipped with a fine mesh filter to the front of the condenser to catch dust, and a rotating brush that moves up and down daily to remove excess buildup outward and away.

**NATURAL**  
 Refrigerant




ENERGY STAR®  
 Qualified

Model	Swing Door	CU./FT.	#of Shelves	HP	AMPS	Crated Weight (lbs.)	L x D* x H† (inches)
M3F19-1-N	1	18.7	3	3/8	4.5	194	25 1/4 x 31 1/2 x 72 1/8

# Solid Door Freezer

Reach-In Top Mount  
M3 Series

## Model : M3F19-1-N

ELECTRICAL DATA	
Voltage	115/60/1
Plug Type	 NEMA 5-15P
Full Load Amperes	4.5
Compressor HP	3/8
Feed Wires with Ground	3
Cord Length (ft.)	9
Refrigerant	R-290
DIMENSIONAL DATA	
# of Doors	1
# of Racks Accepted	-
Net Capacity (cu. ft.)	18.7
Ext. Length Overall (in.)	25 1/4 (640mm)
Ext. Depth Overall (in.)*	31 1/2 (800mm)
Ext. Height Overall (in.)†	72 1/8 (1831mm)
Int. Length Overall (in.)	21 5/8 (550mm)
Int. Depth Overall (in.)	27 3/8 (694mm)
Int. Height Overall (in.)	58 1/4 (1478mm)
# of Shelves	3
Shelf Size (L x D) (in.)	20 1/2 x 23 3/4
Gross Weight (lbs.)	194

Design and specifications subject to change without notice.

Actual shipping weight may differ due to extra packing materials for product protection.

\* Depth does not include 2" for rear condensate enclosure.

† Height does not include 5" for caster height.

### ■ WARRANTY : 3 Year Parts and Labor Warranty Additional 2 Year Warranty on Compressor

### ■ STANDARD FEATURES

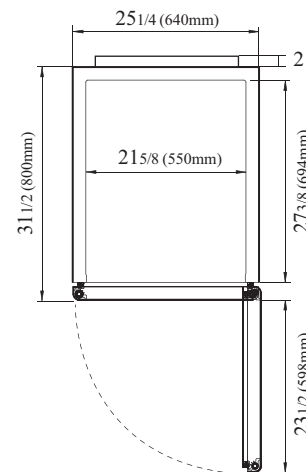
- Anti-corrosion coated evaporator
- Self-contained system
- Standard 4" dia. swivel casters with locks on the front set
- Door locks standard
- Magnetic door gaskets
- Solid and sturdy grille design

### ■ OPTIONAL ACCESSORIES

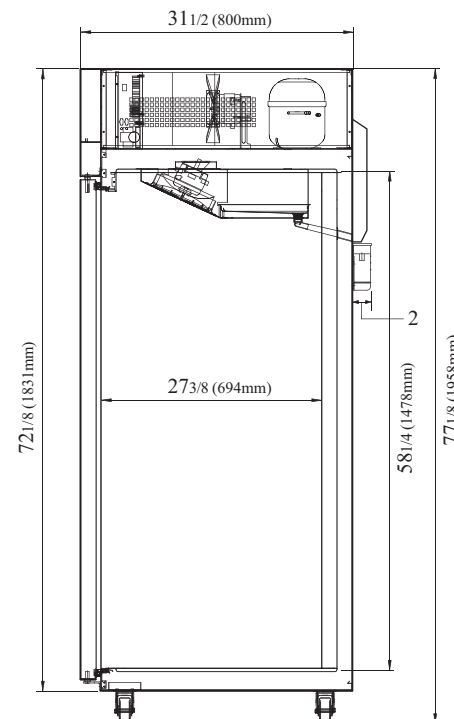
- 5" caster, 1/2" diameter & 13 TPI: M726500100 (non-brake), M726500200 (w/ brake)
- 6" stainless steel leg: 30221M0600
- Additional PE coated wire shelf: K1F9000103

## PLAN VIEW

(unit : inch)



TOP VIEW



SIDE VIEW

Ver.20210105



- Turbo Air : 800-627-0032 ■ GK : 800-500-3519
- Warranty : 800-381-7770 ■ AC : 888-900-1002



Continued product development may necessitate specification changes without notice.





## Submittal Sheet

04/21/2023

### ITEM# 38 - REACH-IN REFRIGERATOR (1 EA REQ'D)

Turbo Air M3R47-2-G-N

M3 Refrigerator, reach-in, two-section, 42.3 cu. ft. capacity, (2) locking hinged glass doors, self-cleaning condenser equipped, digital temperature control & monitor system, hot gas condensate system, LED interior lighting, (6) adjustable PE coated wire shelves, insulated, top mounted self-contained compressor, R290 Hydrocarbon refrigerant, stainless steel front & sides (galvanized steel top, bottom & back), aluminum interior with stainless steel floor, 1/3 HP, 115v/60/1-ph, 2.8 amps, NEMA 5-15P, cETLus, ETL-Sanitation, MADE IN USA, ENERGY STAR® (contact factory for lead time)

#### ACCESSORIES

Mfr	Qty	Model	Spec
Turbo Air	1		Note: Contact factory representative for parts & accessories discounts
Turbo Air	1		3 year parts & labor warranty, standard
Turbo Air	1		Additional 2 year compressor warranty (5 year total), standard
Turbo Air	1		Self-cleaning condenser device equipped, standard
Turbo Air	1		Caster Set, swivel, locking front wheels, standard

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	2.8		1/3		



<b>REFRIGERATOR MANUFACTURER</b> <b>Turbo air</b> more durable, efficient, beautiful	4184 E. Conant St. Long Beach, CA 90808 Tel. 310-900-1000 Fax. 310-900-1077 <a href="http://www.turboairinc.com">www.turboairinc.com</a>	
	Project:	
	Model #:	
	Item #:	
	Available W/H:	Qty:
	Approval:	
	ALA #:	SIS #:
	CSI Section 11400	

## Glass Door Refrigerator

Reach-In Top Mount  
M3 Series

### FEATURES & BENEFITS

**Model : M3R47-2-G-N**

#### Self-Cleaning Condenser

The accumulation of dust in the condenser can cause the failure or breakdown of refrigerators. Refrigerators run normally until they reach a certain level of accumulation. At some point, when they are over the limit, their performance drops quickly resulting in damage to, or disposal of the stored products inside. The Self-Cleaning Condenser device keeps the condenser clean and prevents system failure by automatically brushing daily.

#### Digital temperature control & monitor system

- Keep food products safe by maintaining constant temperatures.
- Alarms that sound when doors are not sealed shut; protect against food spoilage that originates from cold air leaks.
- Early warning alarm program detects issues before malfunction occurs.
- Digital display allows for easy monitoring.
- Programs interpret the condition of refrigeration systems by self-diagnosis.
- Rapid cool-down function (Turbo cooling).
- Automatic evaporator fan motor delays.

#### Hydrocarbon refrigerants (R-290)

With innovative and eco-friendly technology, Turbo Air brings you hydrocarbon refrigerators designed to meet DOE's Energy Conservation Standards in 2017 and to use EPA's SNAP Program approved HC refrigerants. Hydrocarbon refrigerants do not deplete the ozone layer and have very low contribution to global warming (ODP-0, GWP-3).

#### Hot gas condensate system

Through Turbo Air's creative innovation, the condensate system surfaces have been specially treated to resist corrosion. This not only increases efficiency without the risk of refrigerant leakage from corrosion, but also thoroughly prevents the overflow of condensate water.

#### High-density polyurethane insulation

The entire cabinet structure and solid doors are foamed-in-place using high density, CFC free polyurethane insulation.

#### Stainless steel exterior

The Turbo Air M3 refrigerator model boasts a stainless steel exterior (galvanized steel top, bottom and back) and AL interior with stainless steel floor. It guarantees the utmost in cleanliness and long product life. Sharp corners and edges have been rounded to reduce the risk of injury. The M3 adds a touch of style to the most refined setting.

#### Stainless steel door with glass window

#### LED interior lighting

#### Adjustable, heavy duty, PE (polyethylene) coated wire shelves

#### Top mount compressor

#### Refrigerator holds 33°F ~ 38°F for the best in food preservation



#### Patented Self-Cleaning Condenser



This product is equipped with a fine mesh filter to the front of the condenser to catch dust, and a rotating brush that moves up and down daily to remove excess buildup outward and away.




ENERGY STAR®  
Qualified

Model	Swing Door	CU./FT.	#of Shelves	HP	AMPS	Crated Weight (lbs.)	L x D x H † (inches)
M3R47-2-G-N	2	42.3	6	1/3	2.8	423	51 3/4 x 30 3/4 x 78

# Glass Door Refrigerator

Reach-In Top Mount  
M3 Series

## Model : M3R47-2-G-N

ELECTRICAL DATA	
Voltage	115/60/1
Plug Type	 NEMA 5-15P
Full Load Amperes	2.8
Compressor HP	1/3
Feed Wires with Ground	3
Cord Length (ft.)	9
Refrigerant	R-290
DIMENSIONAL DATA	
# of Doors	2
# of Racks Accepted	2
Net Capacity (cu. ft.)	42.3
Ext. Length Overall (in.)	51 3/4 (1314mm)
Ext. Depth Overall (in.) *	30 3/4 (780mm)
Ext. Height Overall (in.) †	78 (1981mm)
Int. Length Overall (in.)	47 (1194mm)
Int. Depth Overall (in.)	23 3/4 (604mm)
Int. Height Overall (in.)	53 3/4 (1365mm)
Gross Weight (lbs.)	423
# of Shelves	6
Shelf Size (L x D) (in.)	23 x 23 1/2

Design and specifications subject to change without notice.

Actual shipping weight may differ due to extra packing materials for product protection.

\* Depth does not include 4-3/8" for door handles & rear condensate enclosure.

† Height does not include 5" for caster height.

### ■ WARRANTY : 3 Year Parts and Labor Warranty Additional 2 Year Warranty on Compressor

### ■ STANDARD FEATURES

- Anti-corrosion coated evaporator
- Self-contained system
- Standard 4" dia. swivel casters with locks on the front set
- Door locks standard
- Magnetic door gaskets
- Solid and sturdy grille design

\*\* Lead time applies. Please contact your sales representative for more details to order.

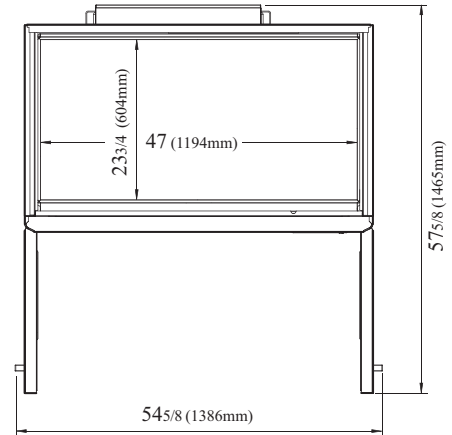
### ■ OPTIONAL ACCESSORIES

- 5" caster, 1/2" diameter & 13 TPI: M726500100 (non-brake), M726500200 (w/ brake)
- 6" stainless steel leg: 30221M0600
- Additional PE coated wire shelf: G8F1800101
- Half door bun tray rack: TSP-2224  
(each holds up to six 18"L x 26"D sheet pans)
- Full door bun tray rack: TSP-2250  
(each holds up to fifteen 18"L x 26"D sheet pans)

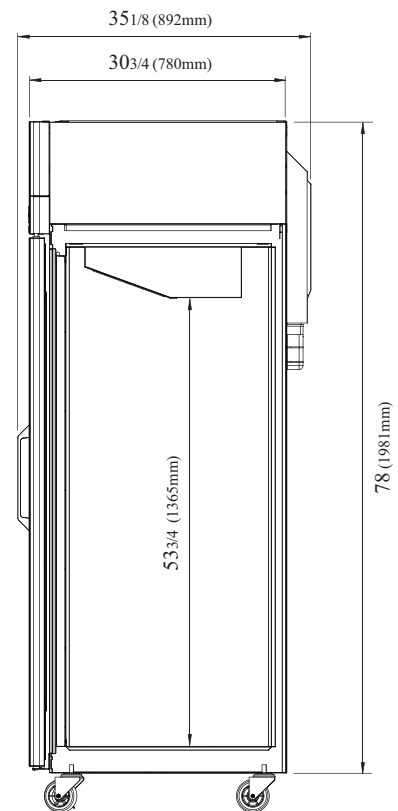
Ver.20210105

## PLAN VIEW

(unit : inch)



TOP VIEW



SIDE VIEW



- Turbo Air : 800-627-0032 ■ GK : 800-500-3519
- Warranty : 800-381-7770 ■ AC : 888-900-1002



Continued product development may necessitate specification changes without notice.



## Submittal Sheet

04/21/2023

### ITEM# 39 - ICE BIN FOR ICE MACHINES (1 EA REQ'D)

Hoshizaki B-300SF

Ice Bin, 22"W, top-hinged front-opening door, 300-lb ice storage capacity, for top-mounted ice maker, stainless steel exterior, 6" painted flange legs included, protected with H-GUARD Plus Antimicrobial Agent, ETL, ETL-Sanitation

#### ACCESSORIES

Mfr	Qty	Model	Spec
Hoshizaki	1		Warranty: 3-Year parts & labor for bin

#### WATER

	HOT SIZE	HOT AFF	HOT GPH	COLD SIZE	COLD AFF	FILTERED SIZE	FILTERED AFF	CONDENSER INLET SIZE	CONDENSER OUTLET SIZE
1									

#### WASTE

	INDIRECT SIZE	DIRECT SIZE
1	3/4"	



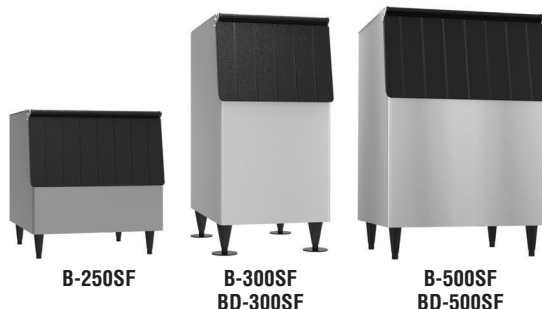
# SF Bins

## ICE STORAGE BIN SERIES




SF Bins  
03/19/21  
Item # 13163

### SF - Stainless Steel Finish



## Features

- ▶ Protected by H-GUARD Plus Antimicrobial Agent 
- ▶ Polyethylene bin liner for sanitary storage
- ▶ Sturdy construction for side-by-side or stacked ice machine installation

- Ice storage capacity from 250 lbs. up to 900 lbs.
- Both surfaces are designed for easy cleaning
- Long lasting attractive appearance
- Foamed-in-place polyurethane insulation, in all bin walls and bottom, provides dependable ice storage
- H-GUARD Plus Antimicrobial adds extra protection to the ice scoop (included)

### SF - Stainless Steel Finish

#### BD Bins

- Fit 24" - 24 1/2" deep ice machine without top kit extension

#### Warranty:

2 Year Parts & Labor (Production prior to January 2012)

3 Year Parts & Labor (Production January 2012 and after)

Valid in United States, Canada, Puerto Rico and U.S. Territories. Contact factory for warranty in other countries.

Model Number	Exterior Dimensions W x D x H*	Interior Dimensions W x D x H	Application Storage Capacity†	Cubic Volume	Shipping Dimensions L x W x H	Shipping Weight (lbs.)
B-250SF	30" x 32.3" x 33.4"	27" x 27.7" x 23.7"	250 lbs.	10.30 ft <sup>3</sup>	35" x 32" x 32"	—
B-300SF	22" x 32.3" x 46"	19" x 27.7" x 37.6"	300 lbs.	11.51 ft <sup>3</sup>	35" x 24" x 45"	125
BD-300SF	22" x 32.3" x 46"	19" x 27.7" x 37.6"	300 lbs.	11.51 ft <sup>3</sup>	35" x 24" x 45"	130
B-500SF	30" x 32.3" x 46"	27" x 27.7" x 37.6"	500 lbs.	16.33 ft <sup>3</sup>	35" x 32" x 45"	140
BD-500SF	30" x 32.3" x 46"	27" x 27.7" x 37.6"	500 lbs.	16.33 ft <sup>3</sup>	35" x 32" x 45"	140
B-700SF	44" x 32.3" x 46"	41" x 27.7" x 37.6"	700 lbs.	24.77 ft <sup>3</sup>	46" x 35" x 45"	175
B-800SF	48" x 32.3" x 46"	45" x 27.7" x 37.6"	800 lbs.	26.90 ft <sup>3</sup>	50.25" x 35" x 45"	185
B-900SF	52" x 32.3" x 46"	49" x 27.7" x 37.6"	900 lbs.	29.59 ft <sup>3</sup>	54.5" x 35" x 45"	195

\*Height includes 6" legs

† Capacity based on volume x 30 lb/ft<sup>3</sup> average density of ice.

Hoshizaki reserves the right to change specifications without notice.



# SF Bins

## ICE STORAGE BIN SERIES



SF Bins  
03/19/21  
Item # 13163

### Ice Machine Model Application

	22" Width	22" Width	30" Width	30" Width	44" Width	44" Width	48" Width
	KM-350M KM-520M KM-660M F-450M F-801M F-1002M	KMD-410M† KMS-822M FD-650M-C† FD-1002M-C	KM-901M KM-1340M KM-1601M KML Series F-1501M F-2001	KMD-460M‡ KMD-530M‡ KMD-860M‡ KMS-1402M* KMS-2000M*	2 KM-350M 2 KM-520M 2 KM-660M IM-500S 2 F-450M 2 F-801M 2 F-1002M	2 KMD-410M 2 FD-650M-C 2 FD-1002M-C	KM-1301S KM-1400S KM-1601S KM-1900S KM-2200S KM-2600S
<b>Bins</b> B-300SF DB-130H	— (DB-130H - KMD only)	NEED HS-5424 HS-2153 (KMD-410 on B-300 only)	N/A	N/A	N/A	N/A	N/A
<b>Bins</b> B-250SF B-500SF	NEED HS-2033	NEED HS-2033 & HS-2129	—	NEED HS-2129	N/A	N/A	N/A
<b>Bins</b> B-700SF	NEED HS-2035	NEED HS-2035 & HS-2130	NEED HS-2034	NEED HS-2130 & HS-2034	—	NEED HS-2130 (KMD-410 does not apply)	N/A
<b>Bins</b> B-800SF	NEED HS-2035 & HS-2032	NEED HS-2035, HS-2032 & HS-2131	NEED HS-2034 & HS-2032	NEED HS-2131, HS-2034 & 2032	NEED HS-2032	NEED HS-2032 & HS-2131	—
<b>Bins</b> B-900SF	NEED HS-2035 & HS-2033	NEED HS-2035, HS-2033 & HS-2132	NEED HS-2035	NEED HS-2132 & HS-2035	NEED HS-2033	NEED HS-2033 & HS-2132	NEED HS-2032
<b>Bins</b> DB-200H DM-200B	NEED HS-2036 (KM units only)	N/A	— (KML only)	N/A	N/A	N/A	N/A

— No top kit necessary | N/A Combination of ice maker and bin is not possible

**BD Bins fit 24"** - 24 1/2" deep ice machine without Top Kit extension.

† **BD-300SF:** KMD-410M, KMS-822M, FD-650M-C, FD-1002M-C

‡ **BD-500SF:** KMD-460M, KMD-530, KMD-860

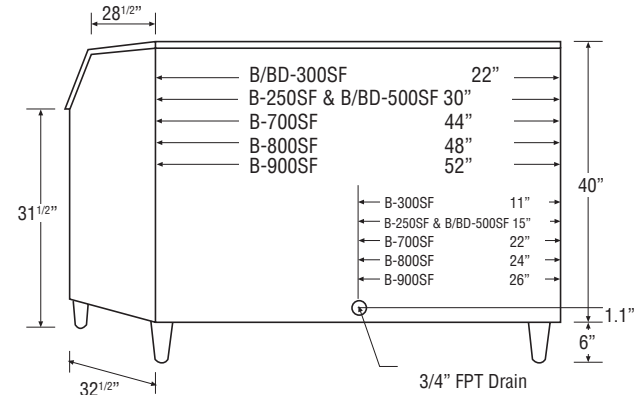
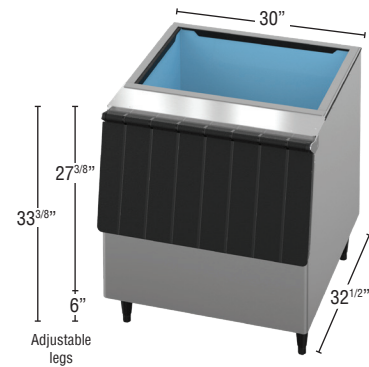
\* Any KMS or FD on bin need Top Kit Extension:

- HS-2129 - for use with B-500 bins
- HS-2130 - for use with B-700 bins
- HS-2131 - for use with B-800 bins
- HS-2132 - for use with B-900 bins

#### Top Kits:

- HS-2032 - 4" ABS Top Kit
- HS-2033 - 8" ABS Top Kit
- HS-2034 - 14" ABS Top Kit
- HS-2035 - 22" ABS Top Kit
- HS-2036 - (2) 4" ABS Top Kits
- HS-2066 - Seismic Kit for SD 500 Stands
- HS-2071 - Anchored Leg Kit SD 500 Stands
- HS-2111 - 11.3" x 26.2" Stainless Cover/Separator
- HS-2148 - 30" x 3.1" Stainless Cover
- HS-2153 - KMD-410 on B-300 bin
- HS-2160 - 2 KM-901M

**B-250SF**



### Ice Drop Area



**B Bins**



**BD Bins**



**Bin Flanged Legs:**  
B/BD-300SF



**Bin Legs:**  
B-250SF, B/BD-500SF  
B-700SF, B-800SF  
B-900SF



## Submittal Sheet

04/21/2023

### ITEM# 39.1 - ICE MAKER, CUBE-STYLE (1 EA REQ'D)

Hoshizaki KM-660MAJ

Ice Maker, Cube-Style, 22"W, air-cooled, self-contained condenser, production capacity up to 650 lb/24 hours at 70°/50° (560 lb AHRI certified at 90°/70°), stainless steel finish, crescent cube Style, R-404A refrigerant, 115v/60/1-ph, 15.2 amps, NSF, UL

#### ACCESSORIES

Mfr	Qty	Model	Spec
Hoshizaki	1		Warranty: 3-Year parts & labor on entire machine
Hoshizaki	1		Warranty: 5-Year parts & labor on evaporator
Hoshizaki	1		Warranty: 5-Year parts on compressor & air-cooled condenser

### ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Direct			15.2				

### WATER

	HOT SIZE	HOT AFF	HOT GPH	COLD SIZE	COLD AFF	FILTERED SIZE	FILTERED AFF	CONDENSER INLET SIZE	CONDENSER OUTLET SIZE
1				1/2"					
2									

### WASTE

	INDIRECT SIZE	DIRECT SIZE
1	3/4"	
2	3/8"	

#### PLUMBING 1 REMARKS

Ice Maker Drain

#### PLUMBING 2 REMARKS

Dew Drain





# KM-350/520/660M\_J(Z)

## SLIM-LINE MODULAR CRESCENT CUBER



KM-350/520/660M\_J(Z)

12/06/22

Item # 13260

**W x D x H**  
22" x 27<sup>3/8</sup>" x 28"

**KM|EDGE**  
ICE MACHINE SERIES

### Air-Cooled

KM-350MAJ ★

KM-520MAJ ★

KM-660MAJ

Air-cooled model  
shown on optional bin: B-300



### Water-Cooled

KM-350MWJ

KM-520MWJ

KM-660MWJ

### Remote Air-Cooled

KM-520MRJZ★

KM-660MRJZ★



Item #: \_\_\_\_\_  
Project: \_\_\_\_\_  
Qty: \_\_\_\_\_  
AIA#: \_\_\_\_\_

## Features

- ▶ Individual crescent cube
- ▶ Factory-installed ultrasonic bin control can be adjusted on site
- ▶ Simple, one-hour cleaning process



- Durable construction with fewer parts
- Self-diagnostic programming automatically adjusts to changing conditions
- Snap fit parts for easy cleaning
- Stainless steel double-sided evaporator
- CycleSaver™ design
- Protected by H-GUARD Plus Antimicrobial Agent
- EverCheck™ alert system
- Removable air filters (air-cooled model only)
- R-404A Refrigerant

### Available on Bins/Dispensers:

B-250SF B-500/SF B-800SF B-1150SS DB-130H  
B-300SF B-700SF B-900SF B-1300SS DB-200H  
DM-200B

Top kit may be required. See Bin Spec Sheets.

### Warranty:

3 Year Parts & Labor on entire machine 5 Year Parts & Labor on evaporator  
5 Year Parts on Compressor; air-cooled condenser coil  
Valid in United States, Canada, Puerto Rico and U.S. Territories. Contact factory for warranty in other countries.

Shipping: (LxWxH) 33.5" x 25.88" X 34.6" Volume: 17.36ft<sup>3</sup>

		ICE PRODUCTION		WATER USAGE		ELECTRICAL								
Condenser	Model	Air / Water Temp Lbs. per 24 hours 70°/ 50°F	90°/ 70°F	Potable Gal. per 100 lbs. 90°/ 70°F	Condenser Gal. per 100 lbs. 90°/ 70°F	kWh Used per 100 lbs. 90°/ 70°F	Min. Circuit Amp - Max. Fuse/Breaker	Amperage	Voltage	Circuit Wires (including ground)	Heat Rejection BTU/hr.	Refrigerant Charge Amount	Net / Ship Weight (lbs.)	
	Air	KM-350MAJ ★	489	393	14.5	N/A	5.42	15A	9.05A	115V/60/1	3	5,700	1 lb. 3.4 oz.	125 / 175
	Water	KM-350MWJ	414	383	15.5	109	4.90	15A	7.5A	115V/60/1	3	6,600	11.6 oz.	126 / 175
	Air	KM-520MAJ ★	556	480	14.7	N/A	4.68	20A	10.6A	115V/60/1	3	6,600	1 lb. 10.8 oz.	145 / 175
	Water	KM-520MWJ	474	444	14.8	75	4.65	20A	8.45A	115V/60/1	3	6,300	12.7 oz.	127 / 175
	Remote	KM-520MRJZ ★	547	495	13.6	N/A	4.80	20A	12.05A	115V/60/1	3	6,200	2 lb. 4.7 oz. 4 lb. 2.7 oz.†	145 / 175
	Air	KM-660MAJ	650	560	14.8	N/A	5.3	20A	15.2A	115V/60/1	3	8,000	1 lb. 9.8 oz.	150 / 180
	Water	KM-660MWJ	647	630	16.1	152	4.28	20A	12.35A	115V/60/1	3	8,900	15.2 oz.	130 / 180
	Remote	KM-660MRJZ ★	642	570	15.0	N/A	5.25	20A	16.1A	115V/60/1	3	8,100	2 lb. 4.7 oz. 4 lb. 2.7 oz.†	150 / 180

<sup>†</sup> (with condenser)

Power cord not included. Must be hard-wired at site.

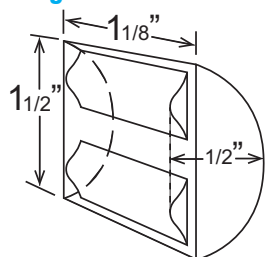
Hoshizaki reserves the right to change specifications without notice.



# KM-350/520/660M\_J(Z)

## SLIM-LINE MODULAR CRESCENT CUBER

### KM Edge Cube Dimensions†



† approximate size in inches, image not to scale

### Operating Limits

- Ambient Temp Range 45 - 100°F
- Water Temp Range 45 - 90°F
- Water Pressure 10 - 113 PSIG
- Voltage Range 104 - 127V

### Service

- Panels easily removed and all components accessible for service.
- Removable/cleanable air filters. (Air-cooled model only)
- Allow 6" (15 cm) clearance at rear, sides, and top for proper air circulation and ease of maintenance/service.

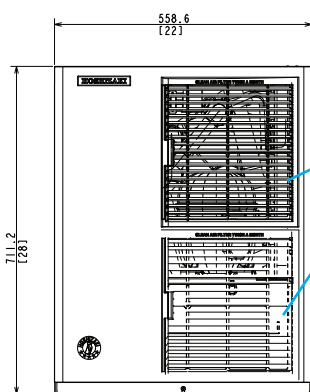
### Plumbing

- Icemaker water supply line: minimum 1/4" nominal ID copper water tubing or equivalent
- Icemaker drain line: minimum 3/4" nominal ID hard pipe or equivalent Water-Cooled Model (Lines Must Be Independent of Icemaker)
- Condenser water supply line: minimum 1/4" nominal ID copper water tubing or equivalent
- Condenser drain/return line: minimum 1/4" nominal ID hard pipe (open drain system) or copper water tubing (closed loop system) or equivalent

### Water Filter

Please refer to water filter specification sheet for recommendations.

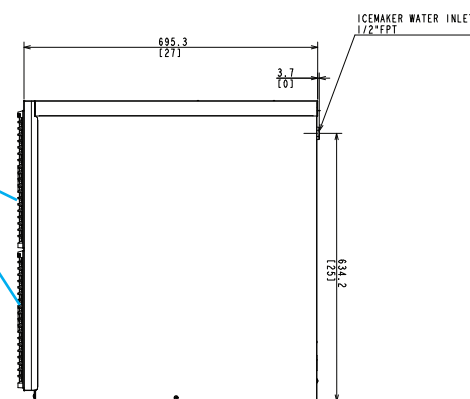
FRONT VIEW



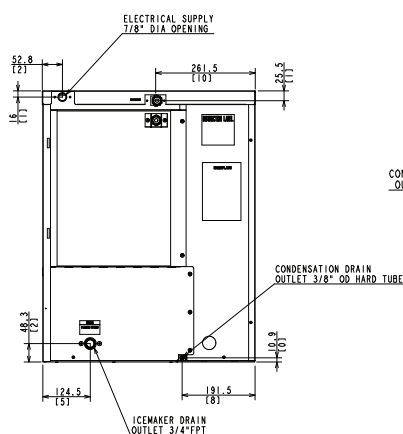
SIDE VIEW

Louvers on Air-Cooled models only

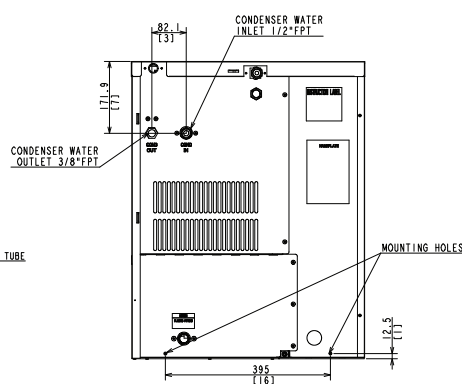
Front



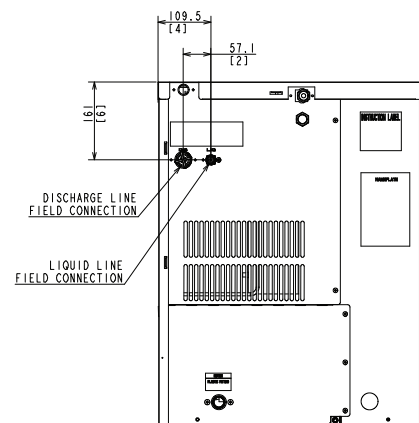
REAR VIEW



AIR-COOLED

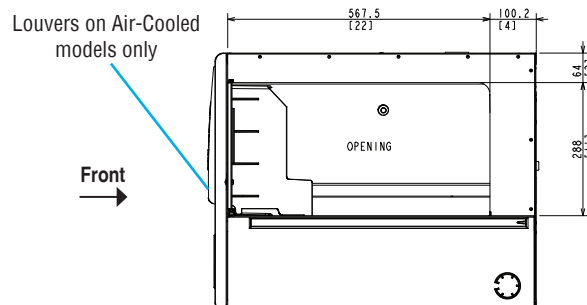


WATER-COOLED



REMOTE AIR-COOLED

BOTTOM VIEW



### URC-5FZ Remote Condenser (Sold Separately)

(W x D x H) 21<sup>13/16</sup> x 14<sup>1/16</sup> x 32<sup>13/16</sup>

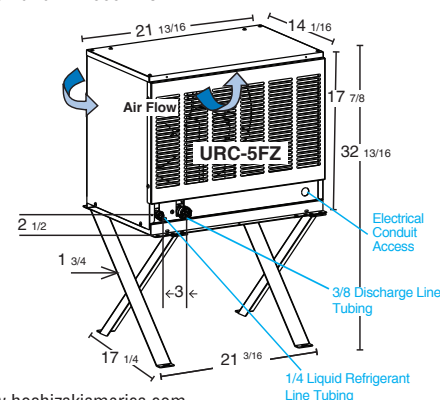
For Use with KM-520MRJZ and KM-660MRJZ

#### Brazed Line Sets

(Sold Separately)

25' HS-5587

35' HS-5588







***Submittal Sheet***

04/21/2023

**ITEM# 40 - SPARE NO.**

<Spare No.>



## Submittal Sheet

04/21/2023

### ITEM# 41 - HAND SINK (1 EA REQ'D)

Eagle Group HSAN-10-F-LRS

Hand Sink, wall mount, 9-3/4" x 13-1/2" x 6-3/4" deep bowl, 304 stainless steel construction, includes splash mounted faucet, left & right end splashes, basket drain, 1/2" NPS water inlet, deep-drawn seamless design-positive drain, inverted "V" edge, NSF

### WATER

	HOT SIZE	HOT AFF	HOT GPH	COLD SIZE	COLD AFF	FILTERED SIZE	FILTERED AFF	CONDENSER INLET SIZE	CONDENSER OUTLET SIZE
1	1/2"			1/2"					

### WASTE

	INDIRECT SIZE	DIRECT SIZE
1		1-1/2"



Profit from the Eagle Advantage®

## Specification Sheet

### Short Form Specifications

Eagle Space-Saver Hand Sink, model HSAN-10-F. Overall side-to-side dimension of 12". Constructed of type 304 stainless steel with deep-drawn positive drain narrow sink bowl, basket drain, inverted "V" edge to prevent spillage, and splash mounted gooseneck faucet.

Eagle Space-Saver Hand Sink, model HSAND-10-F. Overall side-to-side dimension of 12". Constructed of type 304 stainless steel with deep-drawn positive drain narrow sink bowl, basket drain, inverted "V" edge to prevent spillage, and deck mounted gooseneck faucet.

Eagle Space-Saver Hand Sink, model HSANT-FS. Overall side-to-side dimension of 12". Constructed of type 304 stainless steel with deep-drawn positive drain narrow sink bowl, basket drain, inverted "V" edge to prevent spillage, gooseneck faucet mounted to 19½"-high backsplash, and stainless steel skirt.



model# HSAN-10-F



model# HSAND-10-F



model# HSANT-FS

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

[www.eaglegrp.com](http://www.eaglegrp.com)

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our **SpecFAB®** Division.

Phone: 302-653-3000 • Fax: 302-653-2065 • e-mail: [quotes@eaglegrp.com](mailto:quotes@eaglegrp.com)

Item No.: \_\_\_\_\_  
Project No.: \_\_\_\_\_  
S.I.S. No.: \_\_\_\_\_

## Space-Saver Hand Sinks

### MODELS:

- ☐ **HSAN-10-F**
- ☐ **HSAND-10-F**
- ☐ **HSANT-FS**

### Design & Construction Features

- Only 12" (305mm) side-to-side for maximum space efficiency.
- Heavy gauge type 304 18-8 series stainless steel all-welded construction.
- Inverted "V" edge rim retards spillage.
- Unique deep-drawn positive-drain oval bowl assures complete drainage to meet the most stringent health code requirements.
- Three models to choose from: two with splash-mount faucet, and one with deck-mount faucet.

### Options / Accessories

- ☐ Wrist handle faucet
- ☐ P-trap
- ☐ Tail piece

### Certifications / Approvals



**AUTOQUOTES**



EG20.43 Rev. 10/14

**Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)**

Eagle Foodservice Equipment, Eagle MHC, SpecFAB®, and Retail Display are divisions of Eagle Group. ©2014 by the Eagle Group

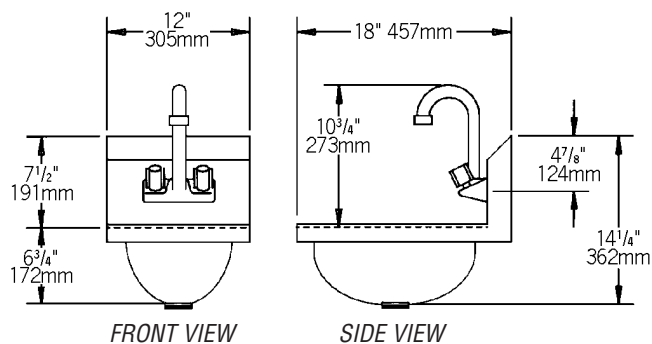


Profit from the Eagle Advantage®

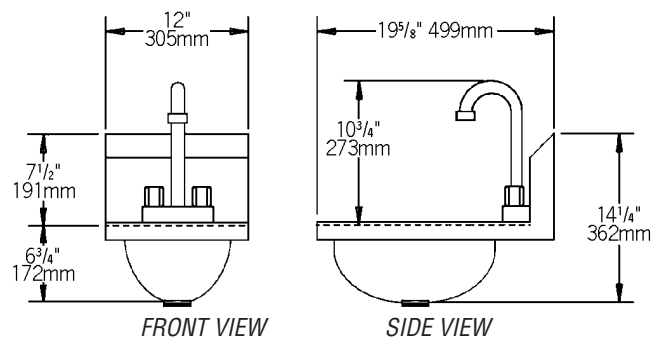
Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

## Space-Saver Hand Sinks

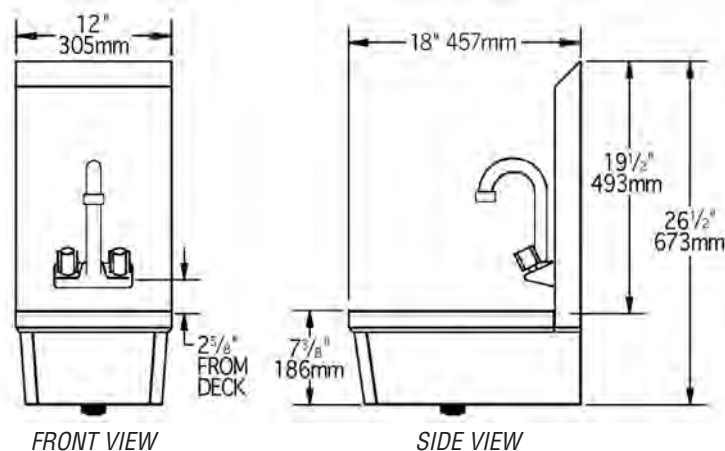
#HSAN-10-F



#HSAND-10-F



#HSANT-FS



model #	includes	bowl size		overall size		weight lbs. kg	
		width in.	length x depth mm	width x length in.	x height mm		
<b>HSAN-10-F</b>	splash mount faucet, basket drain	13 1/2"	9 3/4" x 6 3/4"	343 x 248 x 171	18" x 12" x 14 1/4"	457 x 305 x 362	12 5.2
<b>HSAND-10-F</b>	deck mount faucet, basket drain	13 1/2"	9 3/4" x 6 3/4"	343 x 248 x 171	19 5/8" x 12" x 14 1/4"	498 x 305 x 362	12 5.2
<b>HSANT-FS</b>	splash mount faucet, 19 1/2" (495mm)-high backsplash, skirt, basket drain	13 1/2"	9 3/4" x 6 3/4"	343 x 248 x 171	18" x 12" x 26 1/2"	457 x 305 x 673	26 11.8

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

Printed in U.S.A.  
©2014 by Eagle Group

Rev. 10/14

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.

***Submittal Sheet***

04/21/2023

**ITEM# 41.1 - HAND SOAP / SANITIZER DISPENSER (1 EA REQ'D)**

BOBRICK B-855



# Designer Series™ COUNTER-MOUNTED AUTOMATIC LIQUID SOAP DISPENSER

# B-858 SERIES

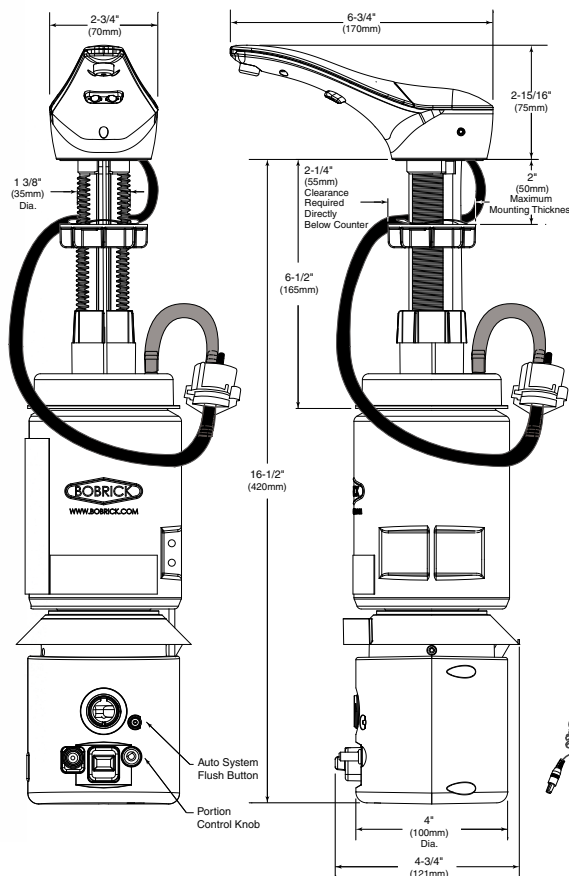
Specify Finish Required:

- ☐ B-850 Polished Brass\*  
☐ B-855 Brushed Nickel

- ☐ B-856 Polished Nickel  
☐ B-858 Polished Chrome



Patents Pending



## MATERIALS:

**Spout and Stem Assembly** — Above the counter - durable die cast zinc, available in four finishes:

Finish Type	Liquid
Polished Brass*	B-850
Brushed Nickel	B-855
Polished Nickel	B-856
Polished Chrome	B-858

Unit equipped with a spring loaded 180° rotatable lid with concealed locking mechanism for top filling. Rotatable lid mechanism consists of metal components. Integrated to Spout are a grey plastic Dispense Tip and Activation Lens Housing. Delrin Stem connects to Plastic Bottle.

*\*NOTE: Polished Chrome, Polished Nickel, and Brushed Nickel are available on a standard order basis. Polished Brass has a minimum quantity requirement and longer lead time. Please contact Customer Service for information.*

continued . . .

**Soap Bottle** — Translucent, shatter-resistant high-density polyethylene. Capacity: 34-fl oz (1.0-L).

**Pump and Soap Delivery System** — A plastic Gear Pump submerged in the bottom of the Bottle, pumps the liquid soap through a vinyl tube to spout.

**Bottom Housing** — Water-resistant, ABS plastic housing attached to the bottom of the Bottle houses the PC Board, motor that drives the Gear Pump, and the Gear Pump Housing. It includes a Portion Control Knob, Flush Button to allow for system cleaning and maintenance, a connector for the Fiber Optic cables, and Power Port.

**Electronic Activation/Indication System** — Pair of plastic Fiber Optic cables connects the plastic Activation Lenses to an IR Sensor located on a PC Board in the Bottom Housing. A third plastic Fiber Optic cable connects an LED located on the PC Board to an acrylic Lens at the tip of the Spout. All three cables are Integrated into one Fiber Optic Connector Tip for ease of installation.

**6V AC Adapter** — 6V AC Adapter with U.S. Plug comes standard.

#### OPERATION:

To fill dispenser, insert tip of standard BobKey provided into opening of the concealed locking mechanism in the Spout Assembly with spout body to disengage door for quick and easy top filling. Lid will rotate open for filling dispenser with bulk **liquid** hand soap only. Rotate door counter-clockwise to close and lock in place.

To activate dispenser, place hand under spout near the sensor for approximately 1 second. Spout dispenses adjustable amount (adjustment range approximately .4 to 3ml) of liquid hand soap of various viscosities ranging from 100 to 19,000 cP (centipoise).

LED Lights
Flash Green → Standby mode
No Light → During activation
Flash Red → Object remains in activation zone after single activation

*Designers Note:* Bobrick liquid soap dispensers are designed to dispense commercially marketed all purpose liquid hand soaps that are not alcohol or iodine based.

#### INSTALLATION:

Unit is designed for installation into counters up to 2" (50mm) maximum thickness with 1-3/8" (35mm) diameter mounting hole. Unit may be mounted through special hole requisitioned when lavatory is ordered from manufacturer (specify hole location). Recommended mounting location is between 6" to 8" (150 to 205mm) from back wall and 3" (75mm) from the sink rim to the center of the mounting hole. Minimum 18" (455mm) vertical and 5" (125mm) diameter clearance required for soap bottle and bottom housing below mounting hole. Plug AC Adapter into wall and end plug into power port on bottom housing.

*Designers Note:* For sinks with rim over the counter area, ensure that rim does not come in contact with activation area. Please refer to 858-91 Installation Instructions.

#### SPECIFICATIONS:

Designer Series Counter-Mounted Automatic Liquid Soap Dispenser shall dispense adjustable amount .4 to 3ml of commercially marketed all-purpose bulk liquid hand soaps, do not use iodine based or alcohol based soaps or sanitizers. Spout assembly shall be die cast zinc, with one of four finishes. Stem is integrated with spout and shall be Delrin plastic and accommodate up to 2" (50mm) thick counter tops. Unit shall be equipped with oversized funnel shape opening, covered by a 180° rotatable lid with concealed locking mechanism to allow for top filling. Unit shall have LED indicators to show unit is ready for activation. Unit shall have IR Sensor located on PC board housed in a water-resistant plastic housing. Activation Lens shall allow for defined activation range to eliminate chance of false activation during hand washing. Portion Control Knob shall allow field adjustment of desired volume of soap dispensed per hand wash. Unit shall be equipped with an Automatic System Flush Button to allow for cleaning and maintenance. Comes with 6V AC adapter.

**Designer Series Counter-Mounted Automatic Liquid Soap Dispenser shall be \_\_\_\_\_ (insert model number) of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.**

***Submittal Sheet***

04/21/2023

**ITEM# 41.2 - PAPER TOWEL DISPENSER (1 EA REQ'D)**

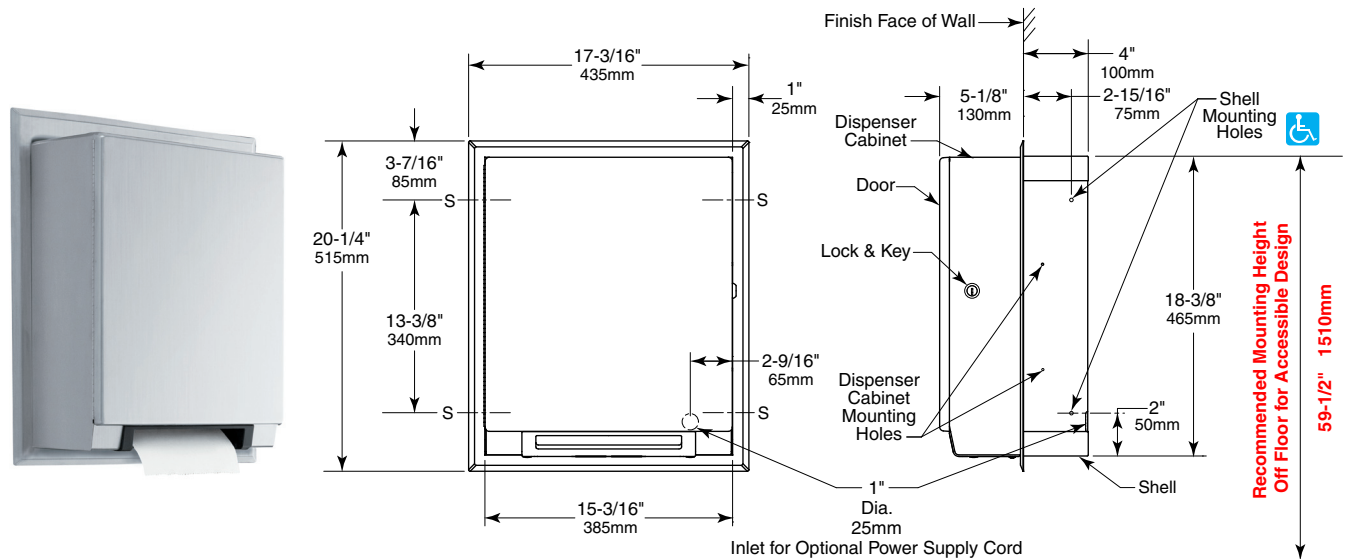
BOBRICK B-29744





# SEMI-RECESSED AUTOMATIC, UNIVERSAL ROLL PAPER TOWEL DISPENSER

# B-29744



**Rough Wall Opening**  
**16\" (405mm) wide**  
**18-7/8\" (480mm) high**  
**4\" (102mm) minimum**  
**recessed depth**

## MATERIALS:

**Cabinet** — 18-8, type-304, heavy-gauge stainless steel. All-welded construction. Exposed surfaces have satin finish. Equipped with a tumbler lock keyed like other Bobrick washroom accessories.

**Door** — 18-8, type-304, 20-gauge (0.9mm) stainless steel with satin finish. Drawn, one-piece, seamless construction. Secured to cabinet with a full-length stainless steel piano-hinge.

**Flange** — 18-8, type-304, 22-gauge (0.8mm) stainless steel with satin finish. Drawn, one-piece, seamless construction.

**Shell** — 18-8, type-304, 22-gauge (0.8mm) stainless steel. All welded construction. Exposed surfaces have satin-finish.

**Automatic Roll Towel Dispenser** — Durable, high-impact resin materials. Accepts universal standard-core, non-perforated rolls 8\" (205mm) wide, 8\" (205mm) diameter. 800 ft (244 m) long. Dispenses one towel per dispense and can be set to dispense paper towels at three different lengths. Accommodates up to 3-1/2\" (90mm) diameter stub roll with automatic transfer to full roll.

## OPERATION:

Electronic sensor automatically dispenses towel when hands are placed under the towel opening. Dispenses universal, 1-1/2\" to 2\" (38 to 51mm) diameter cores, up to 8\" (205mm) diameter, 8\" (205mm) wide, non-perforated, non-proprietary rolls. Towel length can be set to 9\" (230mm), 12\" (305mm), 15\" (380mm). Optional "Paper Saver" feature allows a shorter second sheet to dispense immediately after the first sheet. The "Paper Saver" feature has two second sheet length options: 25% shorter sheet length or 12.5% shorter sheet length. Dispense delay can be set to 1, 2 or 3 seconds. There is no delay when "Paper Saver" option is selected. LED light on dispenser blinks when battery needs to be changed. The battery pack power source, holds 4 "D" sized alkaline batteries (not furnished). Dispenser includes a 3-1/2\" (90mm) diameter stub roll feature. When the stub roll is depleted, main roll automatically starts dispensing without the need to open the dispenser.

continued . . .

**POWER REQUIREMENTS:**

Dispenser is powered by 4, "D" size alkaline batteries (not furnished) or a 6-volt DC power supply. Power supply is an optional accessory: order Bobrick Part No. 3974-57. (For non-U.S. compatible plugs, order Part No. 3974-55).

**INSTALLATION:**

Provide framed rough wall opening 16" wide x 18 7/8" high (405 x 480mm). Minimum recessed depth required to finish face of wall is 4" (102mm). Allow clearance for construction features that may protrude into rough wall opening from opposite wall. Coordinate with mechanical engineer to avoid pipes, vents and conduits. If unit projects above top of wainscot, provide channel or other filler to eliminate gap between flange and finish face of wall. Mount the Shell in wall opening with shims between framing and the shell at four points indicated by an S, then secure the Shell with four #8 x 1-1/4" (4.2 x 32mm) flat-head sheet-metal screws provided. Care should be taken to ensure that the heads of the mounting screws do not protrude. For plaster or dry wall construction, provide concealed backing to comply with local building codes, then secure the Shell with sheet-metal screws. For other wall surfaces, provide fiber plugs or expansion shields for use with flat-head sheet-metal screws, or provide 1/8" (3mm) toggle bolts or expansion bolts. Unlock and open the door of the dispenser cabinet. Carefully slide the dispenser cabinet into the shell while supporting it from underneath with one hand. Attach dispenser cabinet to shell using the pre-drilled pilot holes in the shell and four #8 x 1/2" (4.2 x 13mm) sheet metal screws (provided).

Open battery cover at the front of the dispenser and install 4, "D" size alkaline batteries. Select sheet length, delay and "Paper Saver" mode using the switches to the right of the batteries. Load paper towel using the instructions on the dispenser.

Electrical supply for use with 6-volt DC power supply must be installed per applicable building codes.

**SPECIFICATION:**

Semi-recessed mounted automatic universal roll paper towel dispenser shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Door shall be secured to cabinet with a full-length stainless steel piano-hinge and equipped with a concealed tumbler lock keyed like other Bobrick washroom accessories. No-touch dispenser, dispenses universal, 1-1/2" to 2" (38 to 51mm) diameter cores, up to 8" (205mm) diameter, 8" (205mm) wide, non-perforated, non-proprietary rolls. 800 ft (244 m) long. Dispenser automatically dispenses towel when hands are placed under the towel opening. Dispenser can be powered by 4 "D" size alkaline batteries or an optional 6-volt DC power supply. Equipped with switches that allow paper length to be set at 9" (230mm), 12" (305mm) or 15" (380mm), delay that can be set at 1, 2 or 3 seconds, and "Paper Saver" feature that provides a shorter second sheet with options of 25% shorter and 12.5% shorter. Blinking LED indicates if batteries need to be replaced. Automatic transfer shall dispense stub roll up to 3-1/2" (90mm) diameter before new roll is dispensed.

**Semi-Recessed Automatic Universal Roll Paper Towel Dispenser shall be Model B-29744 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.**

***Submittal Sheet***

04/21/2023

**ITEM# 42 - WORK TABLE, STAINLESS STEEL TOP (1 EA REQ'D)**

Eagle Group T2436STE-BS

Spec-Master® Series Work Table, 36"W x 24"D, 4-1/2"H backsplash, 14/300 series stainless steel top, rolled front edge, Uni-Lok® gusset system, stainless steel crossrails on side & rear, (4) stainless steel legs & adjustable bullet feet, NSF



Profit from the Eagle Advantage®

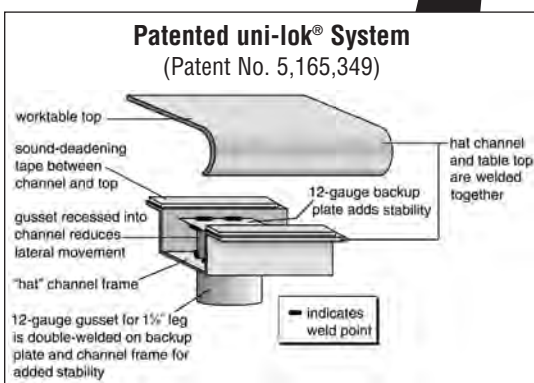
## Specification Sheet

### Short Form Specifications

Eagle worktables, Spec-Master® series, model \_\_\_\_\_, Top constructed of 14 gauge 300 series stainless steel with 1½" roll on front, 4½" backplash, and sides turned down 90°. Open front with 1¼" O.D., stainless steel tubular cross bracing on sides and rear. Top reinforced with welded hat channels and sound deadened. Constructed with uni-lok® patented gusset system with the gussets recessed into the hat channels to reduce lateral movement. Legs are 1½" O.D., stainless steel tubing, with stainless steel gussets and 1" adjustable stainless steel bullet feet.



worktable with backplash  
and tubular base  
—shown with optional drawer



## Worktables with Backsplash and Stainless Steel Tubular Base —Spec-Master® Series

### MODELS:

<input type="checkbox"/> T2424STE-BS	<input type="checkbox"/> T24108STE-BS	<input type="checkbox"/> T3072STE-BS	<input type="checkbox"/> T3660STE-BS
<input type="checkbox"/> T2430STE-BS	<input type="checkbox"/> T24120STE-BS	<input type="checkbox"/> T3084STE-BS	<input type="checkbox"/> T3672STE-BS
<input type="checkbox"/> T2436STE-BS	<input type="checkbox"/> T24132STE-BS	<input type="checkbox"/> T3096STE-BS	<input type="checkbox"/> T3684STE-BS
<input type="checkbox"/> T2448STE-BS	<input type="checkbox"/> T24144STE-BS	<input type="checkbox"/> T30108STE-BS	<input type="checkbox"/> T3696STE-BS
<input type="checkbox"/> T2460STE-BS	<input type="checkbox"/> T3030STE-BS	<input type="checkbox"/> T30120STE-BS	<input type="checkbox"/> T36108STE-BS
<input type="checkbox"/> T2472STE-BS	<input type="checkbox"/> T3036STE-BS	<input type="checkbox"/> T30132STE-BS	<input type="checkbox"/> T36120STE-BS
<input type="checkbox"/> T2484STE-BS	<input type="checkbox"/> T3048STE-BS	<input type="checkbox"/> T30144STE-BS	<input type="checkbox"/> T36132STE-BS
<input type="checkbox"/> T2496STE-BS	<input type="checkbox"/> T3060STE-BS	<input type="checkbox"/> T3648STE-BS	<input type="checkbox"/> T36144STE-BS

### Tabletop

- Patented uni-lok® gusset system (patent #5,165,349): gussets are recessed into hat channel, reducing lateral movement.
- Top reinforced with welded-on hat channel.
- Sound-deadened between top and channels.
- 4½" (114mm)-high 90° backplash with 1" (25mm) turn at 90°.
- 1½" (38mm)-diameter 180° rolled edge on front. Ends are turned down 90°, providing for flush installations when required.
- 14 gauge 300 series polished stainless steel.

### Crossbracing—1¼" (38mm)-diameter

- Heavy gauge stainless steel.
- Aluminum castings join crossbraces, legs and rear brace.

### Legs—1½" (41mm)-diameter

- Tables 96" (2438mm) and longer come with six legs or more.
- Heavy gauge stainless steel.
- 1" (25mm) adjustable stainless steel feet.

### Options / Accessories

- |  |  |
|--|--|
| <input type="checkbox"/> Drawer                              | <input type="checkbox"/> Duplex receptacles                            |
| <input type="checkbox"/> Lock                                | <input type="checkbox"/> Pot rack                                      |
| <input type="checkbox"/> Casters                             | <input type="checkbox"/> Sink  |
| <input type="checkbox"/> Stainless steel bullet feet         | <input type="checkbox"/> Stabilizer Bar (for 30"- and 36"-wide tables) |
| <input type="checkbox"/> Overshelves                         |  |
| <input type="checkbox"/> Power strip (for material handling) |  |

### Certifications / Approvals



### AUTOQUOTES



### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-2065 • e-mail: quotes@eaglegrp.com

EG10.47C Rev. 10/15

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Eagle Foodservice Equipment, Eagle MHC, SpecFAB®, and Retail Display are divisions of Eagle Group. ©2015 by the Eagle Group



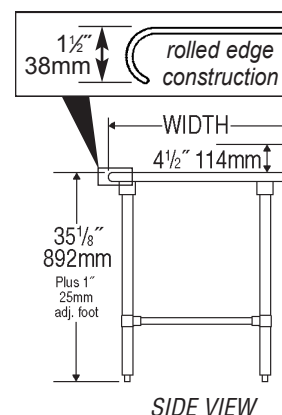
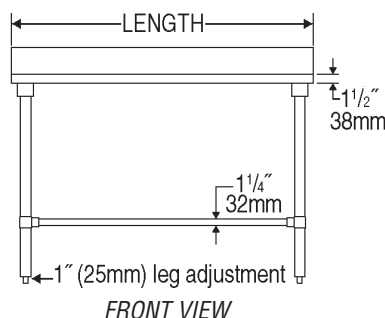
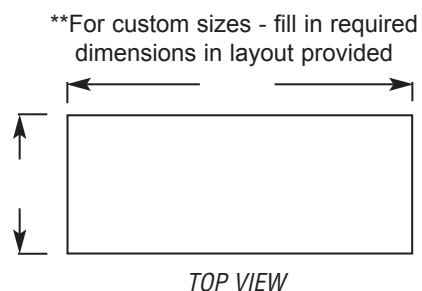
Profit from the Eagle Advantage®

Item No.: \_\_\_\_\_

Project No.: \_\_\_\_\_

S.I.S. No.: \_\_\_\_\_

## Worktables with Backsplash and Stainless Steel Tubular Base —Spec-Master® Series



model #	# of legs	width		length		weight	
		in.	mm	in.	mm	lbs.	kg
T2424STE-BS	4	24"	610	24"	610	45	20.4
T2430STE-BS	4	24"	610	30"	762	51	23.1
T2436STE-BS	4	24"	610	36"	914	56	25.4
T2448STE-BS	4	24"	610	48"	1219	67	30.4
T2460STE-BS	4	24"	610	60"	1524	78	35.4
T2472STE-BS	4	24"	610	72"	1829	89	40.4
T2484STE-BS	4	24"	610	84"	2134	100	45.4
T2496STE-BS	6	24"	610	96"	2438	111	50.3
T24108STE-BS	6	24"	610	108"	2743	122	55.8
T24120STE-BS	6	24"	610	120"	3048	133	60.3
T24132STE-BS	8	24"	610	132"	3353	144	65.3
T24144STE-BS	8	24"	610	144"	3658	155	70.3
T3030STE-BS	4	30"	762	30"	762	56	25.4
T3036STE-BS	4	30"	762	36"	914	62	28.1
T3048STE-BS	4	30"	762	48"	1219	73	33.1
T3060STE-BS	4	30"	762	60"	1524	84	38.1
T3072STE-BS	4	30"	762	72"	1829	95	43.1
T3084STE-BS	4	30"	762	84"	2134	106	48.1
T3096STE-BS	6	30"	762	96"	2438	117	53.1
T30108STE-BS	6	30"	762	108"	2743	128	58.1
T30120STE-BS	6	30"	762	120"	3048	139	63.1
T30132STE-BS	8	30"	762	132"	3353	150	68.0
T30144STE-BS	8	30"	762	144"	3658	161	73.0
T3648STE-BS	4	36"	914	48"	1219	78	35.4
T3660STE-BS	4	36"	914	60"	1524	89	40.4
T3672STE-BS	4	36"	914	72"	1829	100	45.4
T3684STE-BS	4	36"	914	84"	2134	111	50.3
T3696STE-BS	6	36"	914	96"	2438	122	55.3
T36108STE-BS	6	36"	914	108"	2743	133	60.3
T36120STE-BS	6	36"	914	120"	3048	144	65.3
T36132STE-BS	8	36"	914	132"	3353	155	70.3
T36144STE-BS	8	36"	914	144"	3658	166	75.3

**EAGLE GROUP**

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)

Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.

Printed in U.S.A.  
©2015 by Eagle Group

Rev. 10/15



## Submittal Sheet

04/21/2023

### ITEM# 43 - UNDERCOUNTER REFRIGERATOR (1 EA REQ'D)

Turbo Air PUR-28-G-N(-L)

PRO Series Undercounter Refrigerator, one-section, 6.8 cu. ft. .capacity, 27-1/2"W x 33"D x 35-3/8"H, self-contained refrigeration with self-cleaning condenser, (1) right-hinged swing glass door with lock, aluminum door liner, (1) shelf, digital temperature control & monitor system, stainless steel interior & exterior (galvanized bottom), LED interior lighting & fan control, 5-3/8"H casters, R290 Hydrocarbon refrigerant, 1/6 HP, 115v/60/1-ph, 6.6 amps, cord with NEMA 5-15P, cETLus, ETL-Sanitation, Made in USA

#### ACCESSORIES

Mfr	Qty	Model	Spec
Turbo Air	1		Note: Contact factory representative for parts & accessories discounts
Turbo Air	1		3 year parts & labor warranty, standard
Turbo Air	1		7 year compressor warranty (self-contained only), (updated warranty & spec sheets pending from Turbo Air)
Turbo Air	1		Must specify door hinging
Turbo Air	1		Caster Set, swivel, locking front wheels, standard

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	6.6		1/6		

**REFRIGERATOR MANUFACTURER**  
**Turbo air**  
 more durable, efficient, beautiful

4184 E. Conant St.  
 Long Beach, CA 90808  
 Tel. 310-900-1000  
 Fax. 310-900-1077  
[www.turboairinc.com](http://www.turboairinc.com)

Project:

Model #:

Item #:

Available W/H:

Qty:

Approval:

AIA #:

SIS #:

CSI Section 11400

## Glass door Undercounter Refrigerator

Undercounters  
**PRO Series**

### Patented Self-Cleaning Condenser



This product is equipped with a fine mesh filter to the front of the condenser to catch dust, and a rotating brush that moves up and down daily to remove excess buildup outward and away.



**Model : PUR-28-G-N**  
**PUR-28-G-N-L**

## FEATURES & BENEFITS

### Self-Cleaning Condenser

The accumulation of dust in the condenser can cause the failure or breakdown of refrigerators. Refrigerators run normally until they reach a certain level of accumulation. At some point, when they are over the limit, their performance drops quickly resulting in damage to, or disposal of the stored products inside. The Self-Cleaning Condenser device keeps the condenser clean and prevents system failure by automatically brushing daily.

### Digital temperature control & monitor system

Keep food products safe by maintaining constant temperatures. External digital display allows for easy monitoring.

### Hydrocarbon refrigerants (R-290)

With innovative and eco-friendly technology, Turbo Air brings you hydrocarbon refrigerators designed to meet DOE's Energy Conservation Standards in 2017 and to use EPA's SNAP Program approved HC refrigerants. Hydrocarbon refrigerants do not deplete the ozone layer and have very low contribution to global warming (ODP-0, GWP-3).

### Stainless steel cabinet construction

The PRO series model boasts a stainless steel interior (Aluminum door liner) and a **22 gauge** stainless steel exterior (galvanized steel bottom). It guarantees the utmost in cleanliness and long product life. The PRO series adds a touch of style to the most refined setting.

### Sturdy, clean stainless steel shelving

Shelves are the most important part of cleanliness as they come in direct contact with food. Only the PRO series uniquely provides stainless steel shelving.

### Spring assisted heavy duty gravity hinge

### LED interior lighting & fan control

Energy efficient LED lighting lights every corner, making items easy to find. Fan control function automatically shuts off the fan when the door is open, which prevents hot air from being drawn in, thus maintaining the cool inner temperature.

### Ergonomically designed doors

Customers' fatigue fades away with easy grip handles and doors that open effortlessly. These features along with self-closing doors make this the ultimate choice in customer convenience.

### High-density polyurethane insulation

The entire cabinet structure and solid doors are foamed-in-place using high density, CFC free polyurethane insulation.

### Magnetic door gaskets

Magnetic door gaskets are of one-piece construction, removable without tools for ease of cleaning and replacement.

### Refrigerator holds 33°F ~ 38°F for the best in food preservation

### Lifetime guaranteed heavy duty hinges and handles

### Built to maintain NSF standard temperatures in 86°F ambient

• **PUR-28-G-N: Right hinged door**

• **PUR-28-G-N-L: Left hinged door**

**NATURAL**  
 Refrigerant




Model	Swing Doors	CU./FT.	#of Shelves	HP	AMPS	Crated Weight (lbs.)	L x D* x H† (inches)
<b>PUR-28-G-N(-L)</b>	<b>1</b>	<b>6.8</b>	<b>1</b>	<b>1/6</b>	<b>6.6</b>	<b>171</b>	<b>27 1/2 x 30 x 30</b>



# Glass door Undercounter Refrigerator

Undercounters  
PRO Series

## Model : PUR-28-G-N(-L)

ELECTRICAL DATA	
Voltage	115/60/1
Plug Type	 NEMA 5-15P
Full Load Amperes	6.6
Compressor HP	1/6
Cord Length (ft.)	10
Refrigerant	R-290
DIMENSIONAL DATA	
Net Capacity (cu. ft.)	6.8
Ext. Length Overall (in.)	27 1/2 (699mm)
Ext. Depth Overall (in.)*	30 (762mm)
Ext. Height Overall (in.)†	30 (762mm)
# of Doors	1
# of Shelves	1
Shelf Size (L x D) (in.)	22 1/2 x 17
Net Weight (lbs.)	161
Gross Weight (lbs.)	171

Design and specifications subject to change without notice.

Actual shipping weight may differ due to extra packing materials for product protection.

\* Depth does not include 2" for door handle & rear spacers.

† Height does not include 5-3/8" for caster height.

- **WARRANTY :** 3 Year Parts and Labor Warranty  
Additional 4 Year Warranty on Compressor

### STANDARD FEATURES

- Anti-corrosion coated evaporator
- Self-contained system
- Standard 4" dia. swivel casters with locks on the front set
- Door locks standard

\*\* Lead time applies. Please contact your sales representative for more details to order.

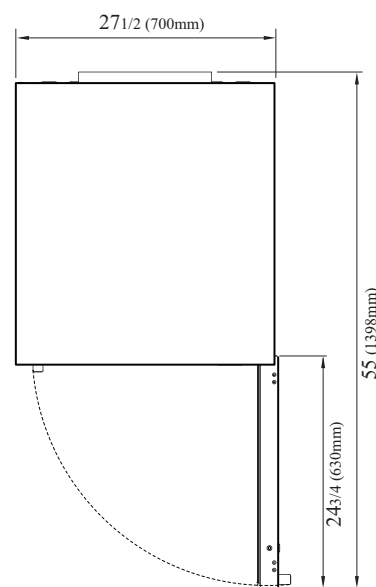
### OPTIONAL ACCESSORIES

- Low Profile casters kit
  - 1.5" caster, 1/2" diameter & 13 TPI: CAS1NBST00CC(non-brake), CAS1WBST00CC(w/ brake)
  - 1" drain pan: SDP1Q000
  - Brackets for drain pan: (Left) SDP1Q000-BL, (Right) SDP1Q000-BR
- 2.5" caster, 1/2" diameter & 13 TPI: 30265H0100 (non-brake), 30265H0200 (w/ brake)
- 5" caster, 1/2" diameter & 13 TPI: M726500100 (non-brake), M726500200 (w/ brake)
- Leveling leg, 1/2" - 13 TPI x 1.54": LFM1213566
- 6" ABS plastic leg: 30221M0200
- 6" stainless steel leg: 30221M0600
- Back splash guard: TU-28B
- Stacking kit: SKIT-28

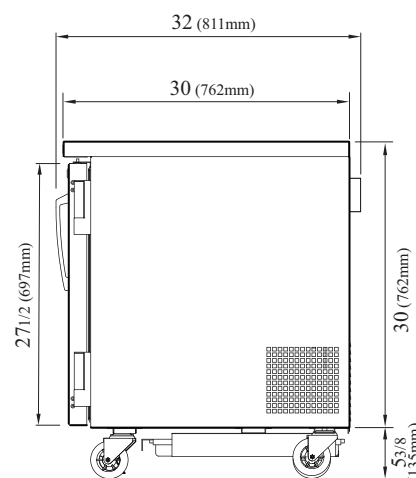
Ver.20201230

## PLAN VIEW

(unit : inch)



TOP VIEW



SIDE VIEW

NATURAL  
Refrigerant



- Turbo Air : 800-627-0032 ■ GK : 800-500-3519
- Warranty : 800-381-7770 ■ AC : 888-900-1002

TURBO AIR REFRIGERATION MANUFACTURER  
**Turbo air**

GERMAN  
**KNIFE**

**RADIANCE**

TURBO AIR REFRIGERATION SYSTEM  
**Turbo air**

**Texaking**

Continued product development may necessitate specification changes without notice.





## Submittal Sheet

04/21/2023

### ITEM# 44.1 - SNEEZE GUARD, STATIONARY (1 EA REQ'D)

Versa-Gard VG3.3

VG Series. Adjustable self service food protector with straight glass. Adjustable to 24 different self-service positions. 1" OD Solid Supports. End glass panels are 1/4" clear tempered. All glass meets ANSI Z97.1 specifications for safety performance and ASTM C1048-04 specifications for heat treated glass. All hardware supplied in a brushed aluminum finish. All glass with ground and polished edges. FL32- & FL33 mounting hardware. \*\* Provide with LED light fixture\*\*

#### ACCESSORIES

Mfr	Qty	Model	Spec
Hatco	1	GRN-30	Glo-Ray® Narrow Infrared Strip Heater, 30" L, tubular metal heater rod, single heater rod housing, steel housing in a variety of colors with angle mounting bracket, 450 watts, cULus, UL EPH Classified, Made in USA
Hatco	1		NOTE: Sale of this product must comply with Hatco's Minimum Resale Price Policy; consult order acknowledgement for details
Hatco	1		NOTE: Includes 24/7 parts & service assistance, call 414-671-6350
Hatco	1		One year on-site parts & labor warranty, plus one additional year parts only warranty on all Glo-Ray metal sheathed elements
Hatco	1		120v/60/1-ph
Hatco	1	RMB-3A	Remote Control Enclosure, (1) infinite switch, (for 120 volt only)
Hatco	1	STANDARD	Clear Anodized Aluminum housing, standard (available at time of purchase only)
Hatco	1	STANDARD	Black designer color, standard (available at time of purchase only)

HEAT LAMP IS ITEM 44.1A

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1								.45			
2	120	60	1								

# VG<sup>®</sup>

by VERSA-GARD<sup>®</sup>

# VG3.3

Protected by US Patent 7,040,723  
Other Patents Pending

## Adjustable Self-Service Protector

### FINISH:

- ☐ Brushed Stainless Steel  
☐ Clear Anodized Aluminum  
☐ Powder Coat:

☐ Black    ☐ Silver

RAL # \_\_\_\_\_

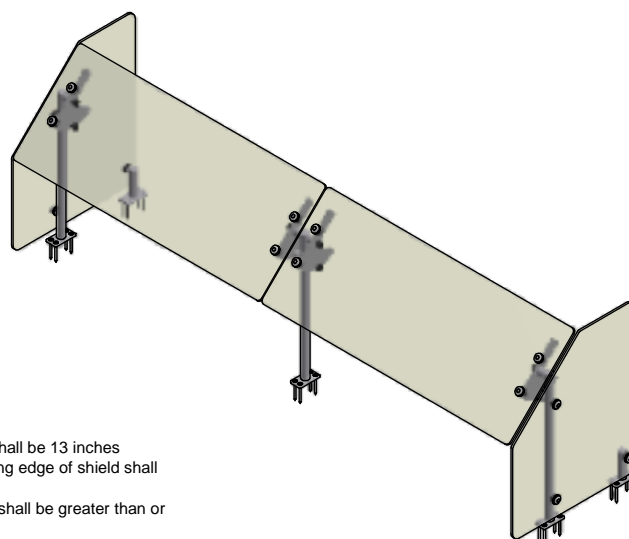
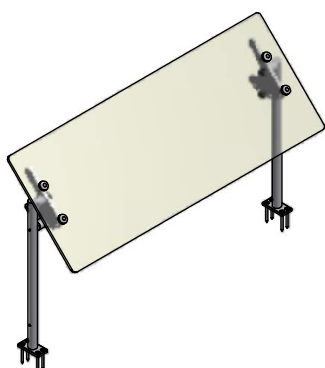
### GLASS:

- ☐ 1/4" Clr Temp - Std  
☐ 3/8" Clr Temp  
☐ 1/2" Clr Temp  
☐ Frosted

### OPTIONS(\*):

- ☐ End Panel - LT  
☐ End Panel - RT  
☐ Light Fixture  
☐ Warmer  
☐ Shelf Kit

(\*) Not all options available on all models  
 Contact factory for specific information  
 For Mounting Options see Mounting Hardware Guide



### NSF/ANSI 2 - 2010 Standards Requirements:

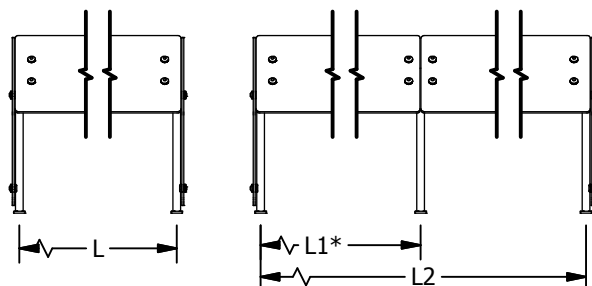
This language is copied with permission of NSF International

#### 5.35.7 Self service food shields

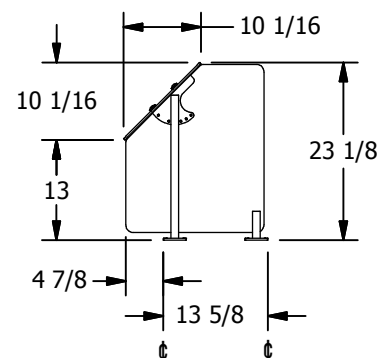
- 5.35.7.1** Maximum vertical distance between counter top and bottom leading edge of shield shall be 13 inches  
**5.35.7.2** Minimum horizontal distance between the front inside edge of food and bottom leading edge of shield shall be 3/4 of the Max. vertical distance of 5.35.7.1 (.75 x 13" = 9.75")  
**5.35.7.3** The sum of a shield's projected vertical plane (Y) and projected horizontal plane (X) shall be greater than or equal to 20 inches. Either (X) or (Y) may equal 0  
**5.35.7.5** Maximum horizontal distance between vertical, horizontal, and angled panels at post and framing member locations shall be 2 inches  
**5.35.7.10** Food shields for use on mobile buffet counters shall conform to 5.35.7
- 5.35.6** A vertical barrier (end shield) shall be provided at each end of a foodshield. The vertical barrier shall be a minimum of 18 inches deep (front to back) beginning at the bottom leading edge of the foodshield. The minimum height of the vertical barrier shall be equal to the overall height of the foodshield. The maximum distance from the bottom edge of the vertical barrier and counter top shall be 1.5 inches.
- 5.35.6.1** A foodshield intended to be installed a maximum of 3" (76mm) from a building wall perpendicular to the foodshield is exempt from the requirements of 5.35.6 provided that the height of the building wall is not lower than the overall height of the foodshield.

(2) End Panels per unit unless otherwise specified. End panels are 1/4" clear tempered glass unless otherwise specified.

-Centerline Dimensions -  
 L / L1 - 48" Max (1/4" Glass)  
 - 60" Max (3/8" Glass)  
 - 66" Max (1/2" Glass)



( \* - Middle support is centered unless L1 dimension is specified )



# VG<sup>®</sup>

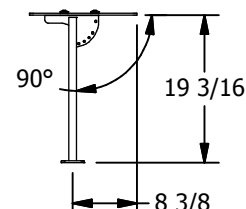
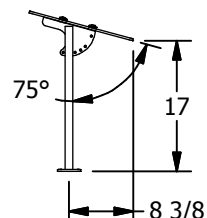
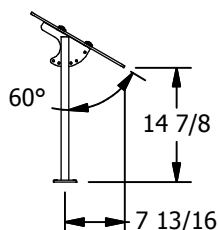
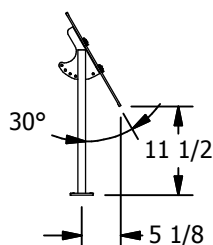
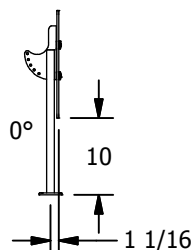
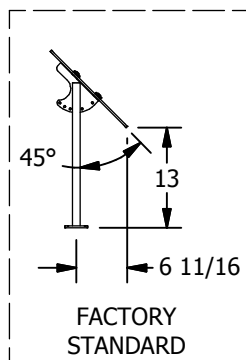
by VERSA-GARD<sup>®</sup>

# VG3.3

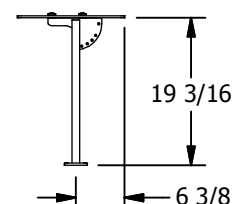
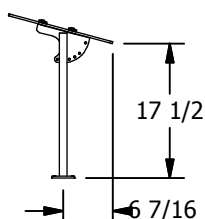
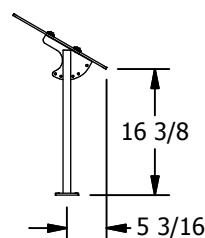
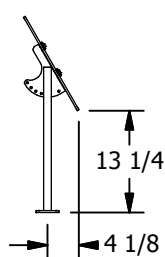
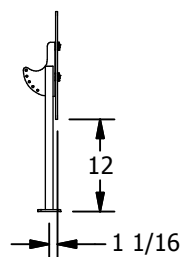
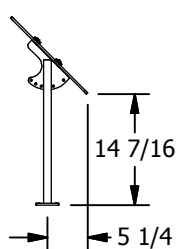
Protected by US Patent 7,040,723  
Other Patents Pending

Adjustable  
Self-Service Protector

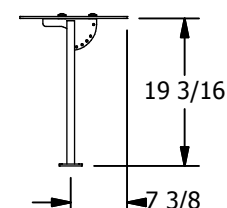
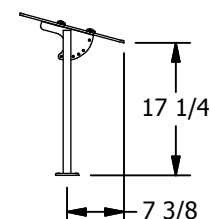
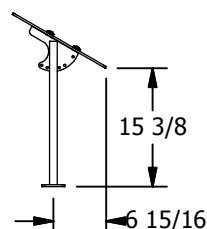
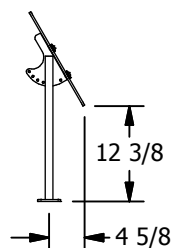
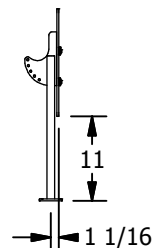
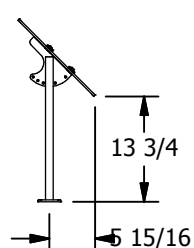
## GLASS SETTING - 1



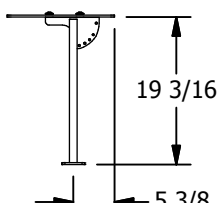
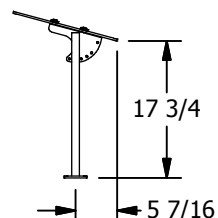
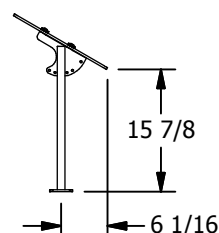
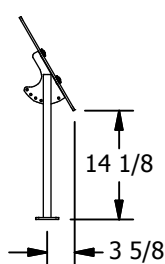
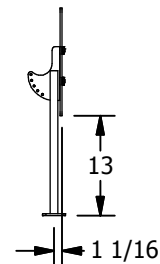
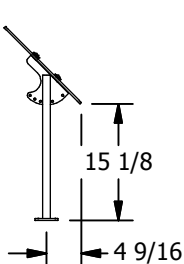
## GLASS SETTING - 2



## GLASS SETTING - 3



## GLASS SETTING - 4





## Glo-Ray® Narrow Infrared Strip Heaters

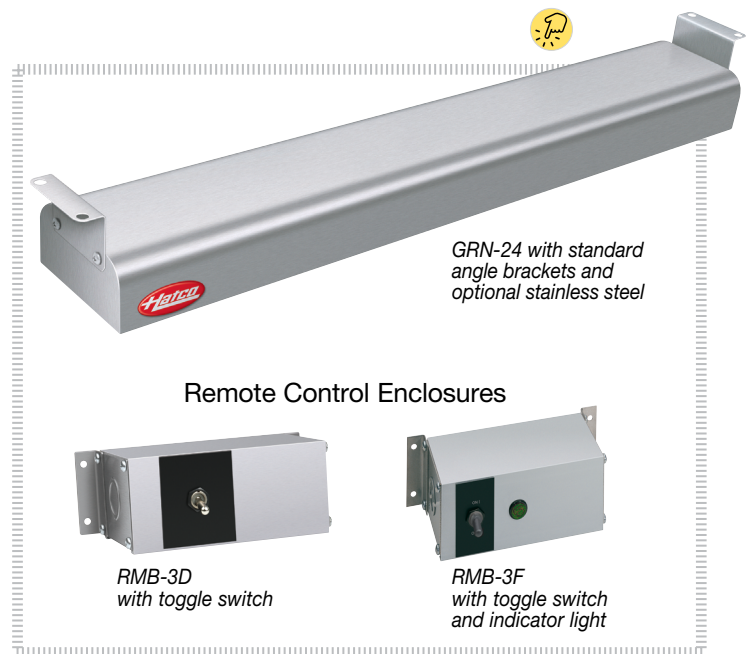
Models: GRN-18, -24, -30, -36, -42, -48, -54, -60, -66, -72  
 GRNH-18, -24, -30, -36, -42, -48, -54, -60, -66, -72  
 GRNM-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

Hatco Glo-Ray® Narrow Strip Heaters are great for use in tight spaces and keep the focus on food items being displayed. Ideal for minimal sight obstruction of food product in heated buffet areas. Even the most delicate dishes hold that "just-prepared" look.

### Standard features

- Sleek, slim design with just 2" (51 mm) height and 4" (102 mm) depth keeps the focus on the food in buffet lines
- Available in widths from 18" to 72" (457-1829 mm)
- Pre-focused heat maintains serving temperatures longer without continuing to cook the food
- Optional remote control enclosure in *Designer* colors†
- Sturdy continuous heavy duty Steel housings available in *Designer* colors: Warm Red, Black (standard), Gray Granite, White Granite, Navy Blue, Hunter Green, Antique Copper or Stainless Steel† (GRNM models available in Stainless Steel only)
- Accessorize units with non-adjustable tubular stands in *Designer* colors† (Available in Stainless Steel only for GRNM models)
- Models come with non-adjustable 1.5" (38 mm) angle brackets available in *Designer* colors† (Available in Stainless Steel only for GRNM models)
- Lower wattage elements also available, please consult factory for more information

Project \_\_\_\_\_  
 Item # \_\_\_\_\_  
 Quantity \_\_\_\_\_



### Options (available at time of purchase only)

- Housing in *Designer* Color – Black Standard† (not available for GRNM models)
  - ☐ Warm Red ☐ Gray Granite ☐ White Granite ☐ Navy Blue
  - ☐ Hunter Green ☐ Antique Copper ☐ Stainless Steel
- Power Leads – Standard 6" (152 mm) – must specify lead length
  - ☐ 1'-5' (305-1525 mm) ☐ 6'-10' (1829-3048 mm)
  - ☐ 11'-15' (3352-4572 mm) ☐ 16'-20' (4877-6096 mm)
- ☐ No Control included – requires selectoin of RMB2-xx control
- Remote Box(RMB) – in *Designer* Color – clear Anodized Standard† (GRNM requires RMB2-xx Remote Box)
  - ☐ Warm Red ☐ Black ☐ Gray Granite ☐ White Granite
  - ☐ Navy Blue ☐ Hunter Green ☐ Antique Copper
- ☐ Stainless Steel Hanger tabs in lieu of angle brackets (GRN, GRNH only)
- ☐ Attached 6' (1829 mm) Cord and Plug Set (120V GRN and GRNH only) on models up to 72" (1829 mm) wide with Standard Chain Mount Kit (two S hooks with two 6" (152 mm) lengths of chain) and hanger tabs (max.1800 watt)
- ☐ Two S Hooks with two 6" lengths of chain (GRN, GRNH only)
- ☐ Adjustable Tubular Stands 10"-14" (254-356 mm)
- Non-Adjustable Tubular Stands – choose clearance
  - ☐ 10" (254 mm) – not avallabe for GRNM models
  - ☐ 12" (305 mm) – not avallabe for GRNM models
  - ☐ 14" (356 mm) ☐ 16" (406 mm)
- Designer* Color for Tubular Stands (clear Anodized Standard)†
  - ☐ Warm Red ☐ Black ☐ Gray Granite ☐ White Granite
  - ☐ Navy Blue ☐ Hunter Green ☐ Antique Copper

†Non-standard colors are non-returnable



IFS anti-microbial coatings use naturally-occurring, environmentally sustainable, silver ions to help inhibit the growth of microbes on the powder coated surface. See [www.hatcocorp.com/antimicrobial-paint](http://www.hatcocorp.com/antimicrobial-paint) for more information.



For operation, location and safety information, please refer to the Installation and Operating Manual.



HATCO CORPORATION | P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. | (414) 671-6350



[www.hatcocorp.com](http://www.hatcocorp.com) | [support@hatcocorp.com](mailto:support@hatcocorp.com) | [Find a Hatco Rep](#) | [Image Library](#) | [Document Library](#) | [Patents](#) | [Chat](#)



# Glo-Ray® Narrow Infrared Strip Heaters

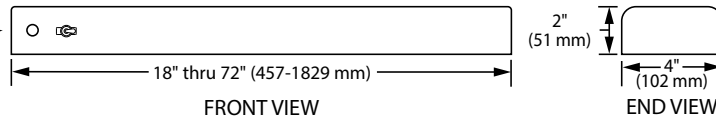
Models: GRN-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

GRNH-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

GRNM-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

## GRN, GRNH, GRNM

GRNM units use  
remote controls only  
(no built-ins)



## SPECIFICATIONS - Glo-Ray® Narrow Infrared Strip Heaters

Phase: Single

The shaded areas contain electrical  
information for International models

Standard Watt				High Watt				Max Watt				All Models		
Model	Volts	Watts	Amps	Model	Volts	Watts	Amps	Model <sup>○</sup>	Volts	Watts	Amps	Dimensions W x D x H	Optional Plug GRN, GRNH only	Ship Weight*
GRN-18	120	250	2.1	GRNH-18	120	350	2.9	GRNM-18	120	450	3.8	18" x 4" x 2" (457 x 102 x 51 mm)	NEMA 5-15P	GRN 5 lbs. (3 kg.) GRNH 7 lbs. (4 kg.) GRNM 7 lbs. (4 kg.)
	208		1.2		208		1.7		208		2.2		-	
	240		1.0		240		1.5		240		1.9		-	
	220	250	1.1		220	350	1.6		220	-	-		-	
	240		1.0		240		1.5		240		-		-	
	220-230 (CE)*		1.1-1.2		220-230 (CE)*		1.6-1.7		220-230		-		-	
	230-240 (CE)*	230-250	1.0-1.0		230-240 (CE)*	321-350	1.4-1.5		230-240	-	-		-	
GRN-24	120	350	2.9	GRNH-24	120	500	4.2	GRNM-24	120	650	5.4	24" x 4" x 2" (610 x 102 x 51 mm)	NEMA 5-15P	GRN 6 lbs. (3 kg.) GRNH 6 lbs. (3 kg.) GRNM 8 lbs. (4 kg.)
	208		1.7		208		2.4		208		3.1		-	
	240		1.5		240		2.1		240		2.7		-	
	220	350	1.6		220	500	2.3		220	-	-		-	
	240		1.5		240		2.1		240		-		-	
	220-230 (CE)*		1.6-1.7		220-230 (CE)*		2.3-2.4		220-230		-		-	
	230-240 (CE)*	321-350	1.4-1.5		230-240 (CE)*	459-500	2.0-2.1		230-240	-	-		-	
GRN-30	120	450	3.8	GRNH-30	120	660	5.5	GRNM-30	120	825	6.9	30" x 4" x 2" (762 x 102 x 51 mm)	NEMA 5-15P	GRN 9 lbs. (5 kg.) GRNH 7 lbs. (4 kg.) GRNM 9 lbs. (5 kg.)
	208		2.2		208		3.2		208		4.0		-	
	240		1.9		240		2.8		240		3.4		-	
	220	450	2.1		220	660	3.0		220	-	-		-	
	240		1.9		240		2.8		240		-		-	
	220-230 (CE)*		2.1-2.2		220-230 (CE)*		3.0-3.1		220-230		-		-	
	230-240 (CE)*	413-450	1.8-1.9		230-240 (CE)*	606-660	2.6-2.8		230-240	-	-		-	
GRN-36	120	575	4.8	GRNH-36	120	800	6.7	GRNM-36	120	1000	8.3	36" x 4" x 2" (914 x 102 x 51 mm)	NEMA 5-15P	GRN 9 lbs. (5 kg.) GRNH 8 lbs. (4 kg.) GRNM 10 lbs. (5 kg.)
	208		2.8		208		3.8		208		4.8		-	
	240		2.4		240		3.3		240		4.2		-	
	220	575	2.6		220	800	3.6		220	-	-		-	
	240		2.4		240		3.3		240		-		-	
	220-230 (CE)*		2.6-2.7		220-230 (CE)*		3.6-3.8		220-230		-		-	
	230-240 (CE)*	528-575	2.3-2.4		230-240 (CE)*	735-800	3.2-3.3		230-240	-	-		-	
GRN-42	120	675	5.6	GRNH-42	120	950	7.9	GRNM-42	120	1175	9.8	42" x 4" x 2" (1067 x 102 x 51 mm)	NEMA 5-15P	GRN 9 lbs. (5 kg.) GRNH 9 lbs. (5 kg.) GRNM 11 lbs. (5 kg.)
	208		3.2		208		4.7		208		5.6		-	
	240		2.8		240		4.0		240		4.9		-	
	220	675	3.1		220	950	4.3		220	-	-		-	
	240		2.8		240		4.0		240		-		-	
	220-230 (CE)*		3.1-3.2		220-230 (CE)*		4.3-4.5		220-230		-		-	
	230-240 (CE)*	620-675	2.7-2.8		230-240 (CE)*	873-950	3.8-4.0		230-240	-	-		-	
GRN-48	120	800	6.7	GRNH-48	120	1100	9.2	GRNM-48	120	1300	10.8	48" x 4" x 2" (1219 x 102 x 51 mm)	NEMA 5-15P	GRN 11 lbs. (5 kg.) GRNH 11 lbs. (5 kg.) GRNM 13 lbs. (6 kg.)
	208		3.8		208		5.3		208		6.3		-	
	240		3.3		240		4.6		240		5.4		-	
	220	800	3.6		220	1100	5.0		220	-	-		-	
	240		3.3		240		4.6		240		-		-	
	220-230 (CE)*		3.6-3.8		220-230 (CE)*		5.0-5.2		220-230		-		-	
	230-240 (CE)*	735-800	3.2-3.3		230-240 (CE)*	1010-1100	4.4-4.6		230-240	-	-		-	
GRN-54	120	925	7.7	GRNH-54	120	1250	10.4	GRNM-54	120 <sup>†</sup>	1500	12.5	54" x 4" x 2" (1372 x 102 x 51 mm)	NEMA 5-15P	GRN 12 lbs. (6 kg.) GRNH 12 lbs. (6 kg.) GRNM 13 lbs. (6 kg.)
	208		4.4		208		6.0		208		7.2		-	
	240		3.9		240		5.2		240		6.3		-	
	220	925	4.2		220	1250	5.7		220	-	-		-	
	240		3.9		240		5.2		240		-		-	
	220-230 (CE)*		4.2-4.4		220-230 (CE)*		5.7-5.9		220-230		-		-	
	230-240 (CE)*	850-925	3.7-3.9		230-240 (CE)*	1148-1250	5.0-5.2		230-240	-	-		-	
GRN-60	120	1050	8.8	GRNH-60	120	1400	11.7	GRNM-60	120 <sup>†</sup>	1700	14.2	60" x 4" x 2" (1524 x 102 x 51 mm)	NEMA 5-15P	GRN 13 lbs. (6 kg.) GRNH 13 lbs. (6 kg.) GRNM 13 lbs. (6 kg.)
	208		5.0		208		6.7		208		8.2		-	
	240		4.4		240		5.8		240		7.1		-	
	220	1050	4.8		220	1400	6.4		220	-	-		-	
	240		4.4		240		5.8		240		-		-	
	220-230 (CE)*		4.8-5.0		220-230 (CE)*		6.4-6.7		220-230		-		-	
	230-240 (CE)*	964-1050	4.2-4.4		230-240 (CE)*	1286-1400	5.6-5.8		230-240	-	-		-	

<sup>○</sup> All GRNM units must use Remote Controls (no Built-Ins), cord & plug not available.

\* Shipping weight includes packaging and does not include RMB.

<sup>†</sup> CE approved units for 220-230V utilize a 220V heating system; 230-240V CE units utilize a 240V heating system.

<sup>‡</sup> Units not available with Infinite Switch in 120V. RMB2-1R or RMB2-2R series remote control box required.

HATCO CORPORATION

P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. | (414) 671-6350



[www.hatcocorp.com](http://www.hatcocorp.com)

[support@hatcocorp.com](mailto:support@hatcocorp.com)

[Find a Hatco Rep](#)

[Image Library](#)

[Document Library](#)

[Patents](#)

[Chat](#)



# Glo-Ray® Narrow Infrared Strip Heaters

Models: GRN-18, -24, -30, -36, -42, -48, -54, -60, -66, -72  
 GRNH-18, -24, -30, -36, -42, -48, -54, -60, -66, -72  
 GRNM-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

## SPECIFICATIONS - Glo-Ray® Narrow Infrared Strip Heaters

Phase: Single

The shaded areas contain electrical information for international models

Standard Watt				High Watt				Max Watt				All Models		
Model	Volts	Watts	Amps	Model	Volts	Watts	Amps	Model <sup>○</sup>	Volts	Watts	Amps	Dimensions W x D x H	Optional Plug GRN, GRNH only	Ship Weight*
GRN-66	120	1160	9.7	GRNH-66	120 †	1560	13.0	GRNM-66	120	1875	15.6	66" x 4" x 2" (1676 x 102 x 51 mm)	NEMA 5-15P▶	GRN
	208		5.6		208		7.5		208		9.0		–	16 lbs. (8 kg.)
	240		4.8		240		6.5		240		7.8		GRNH	
	220	1160	5.3		220	1560	7.1		220	–	–		–	16 lbs. (8 kg.)
	240		4.8		240		6.5		240	–	–		GRNM	
	220-230 (CE)*		1160-1268		5.3-5.5		220-230 (CE)*		1560-1705	7.1-7.4	220-230		–	–
	230-240 (CE)*	1066-1160	4.6-4.8		230-240 (CE)*	1433-1560	6.2-6.5		230-240	–	–			
	GRN-72	120	1275		10.6	GRNH-72	120 †		1725	14.4	GRNM-72		120	2075
208		6.1		208	8.3		208	10.0		–		17 lbs. (8 kg.)		
240		5.3		240	7.2		240	8.6		GRNH				
220		1275	5.8	220	1725		7.8	220	–	–		–	17 lbs. (8 kg.)	
240			5.3	240			7.2	240	–	–		GRNM		
220-230 (CE)*			1275-1394	5.8-6.1			220-230 (CE)*	1725-1886	7.8-8.2	220-230		–	–	16 lbs. (8 kg.)
230-240 (CE)*		1171-1275	5.1-5.3	230-240 (CE)*	1584-1725		6.9-7.2	230-240	–	–				

○ All GRNM units must use Remote Controls (no Built-Ins), and not available with cord and plug.

\* Shipping weight includes packaging and does not include RMB.

♦ CE approved units for 220-230V utilize a 220V heating system; 230-240V CE units utilize a 240V heating system.

▶ GRNH-66 and GRNH-72 require NEMA 5-20P cord for Canada.

### TOGGLE SWITCH

Toggle Switch: Max. 15 amps

Location: Chef's left side standard, other options available

GRNM units use remote control enclosures only (no built-ins)

### INFINITE SWITCH

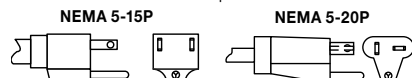
Max. 12.2 amps

### LEADS

6" (152 mm) leads (on server's right)

### PLUG CONFIGURATIONS

Please refer to electrical specifications shown in charts.



### REMOTE CONTROL ENCLOSURES

RMB series uses one Control Box per Strip Heater - If RMB2 series is used, multiple warmers can be controlled from one box (U.S., Canada only). CE models require any remote switches be contained in a Remote Control Enclosure.

[Click here to download the RMB Choose Remote Box Excel Spreadsheet](#)

or follow this file path: [www.hatcocorp.com](http://www.hatcocorp.com) > Resources > Choose Remote Box

Model	Volts	Width	Infinite/Toggle Switches
			U.S., Canada, Export U.S. Dollar
RMB-3A	120	5.5" (140 mm)	1 infinite
RMB-3B	208	5.5" (140 mm)	1 infinite
RMB-3C	240	5.5" (140 mm)	1 infinite
RMB-3D	120, 208, 240	5.5" (140 mm)	1 toggle
RMB-3F	120	5.5" (140 mm)	1 toggle, 1 indicator light
RMB-3G	208	5.5" (140 mm)	1 toggle, 1 indicator light
RMB-3H	240	5.5" (140 mm)	1 toggle, 1 indicator light
RMB-7F	120	9" (229 mm)	1 infinite, 1 indicator light
RMB-7G	208	9" (229 mm)	1 infinite, 1 indicator light
RMB-7H	240	9" (229 mm)	1 infinite, 1 indicator light
RMB2-1R	120, 208, 240	11" (280 mm)	1 toggle, 1 electronic infinite
RMB2-2R	120, 208, 240	14" (356 mm)	1 toggle, 1 electronic infinite

### PRODUCT SPECS - Infrared Strip Heaters

The Narrow Infrared Strip Heater shall be a Glo-Ray®, manufactured by the Hatco Corporation, Milwaukee, WI 53234 U.S.A.

The Foodwarmer shall be a Glo-Ray Model ... , rated at ... watts, ... volts, single phase and be ... inches (millimeters) in overall width.

The Glo-Ray shall consist of Stainless Steel or Designer painted housing and include as standard equipment non-adjustable 1.5" (38 mm) angle brackets.

### RECOMMENDED MOUNTING HEIGHTS



(For diagrams, refer to the Product Installation Manual on the Hatco website)

#### GRN, GRNH

Standard Watt: 8"-11" (203-279 mm) High Watt: 11"-14" (279-356 mm)

#### GRNM

Max Watt: 14"-18" (356-457 mm)

### MINIMUM CLEARANCES

#### GRN, GRNH

##### Combustibles

Unit to surface below: 11" (279 mm)

Unit to back wall: 2" (51 mm)

Below overshelf: 1" (25 mm) clearance

##### Non-Combustibles

Corded Units with Built-In Switches:

Must be installed in a pass through area, not allowed with back wall installation

Unit to surface below: 7" (178 mm)

Unit to back wall: 2" (51 mm)

Below overshelf: 3" (76 mm) clearance

##### Hardwired Units with Built-In Switches:

Must be installed in a pass through area, not allowed with back wall installation

With Infinite Control or Indicator Light

Unit to surface below: 10" (254 mm)

Below overshelf: 1" (25 mm) clearance

With On/Off Toggle Switch

Unit to surface below: 8" (203 mm)

Below overshelf: 1" (25 mm) clearance

##### Hardwired Units with Remote Switches:

Unit to surface below: 8" (203 mm)

Unit to wall: 0" (0 mm)

Below overshelf: 0" (0 mm) clearance

#### GRNM

##### Combustibles

Must be installed in non-combustible surroundings only

##### Non-Combustibles

Unit to surface below: 12" (305 mm)

Unit to wall: 3" (76 mm)

Below overshelf: 1" (24 mm) clearance

Set back 10" (254 mm) maximum from front of an overshelf

The infrared heating element shall be tubular metal sheathed. The foodwarmer shall be factory assembled ready for electrical installation.

Options shall include choice of Stainless Steel or Designer color anti-microbial paint, extended electrical leads, remote control box, and non-adjustable tubular stands, and NEMA-15 P plug (GRN, GRNH 120V models only)

Warranty consists of 24/7 parts and service assistance (U.S. and Canada only).

HATCO CORPORATION

P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. | (414) 671-6350



[www.hatcocorp.com](http://www.hatcocorp.com)

[support@hatcocorp.com](mailto:support@hatcocorp.com)

[Find a Hatco Rep](#)

[Image Library](#)

[Document Library](#)

[Patents](#)

[Chat](#)

***Submittal Sheet***

04/21/2023

**ITEM# 44.2 - SNEEZE GUARD, STATIONARY (1 EA REQ'D)**

Versa-Gard VP24.3

VG Series. Full service food protector with 24" tall vertical glass. 1" OD Solid Supports. End glass panels are 1/4" clear tempered. All glass meets ANSI Z97.1 specifications for safety performance and ASTM C1048-04 specifications for heat treated glass. All hardware supplied in a brushed aluminum finish. All glass with ground and polished edges. FL32- & FL33 mounting hardware.





# VP24.3

Protected by US Patent 7,040,723

Other Patents Pending

## Full Service Vertical Protector

- Cafeteria Counters
- Cooking Stations
- Carving Stations

### FINISH:

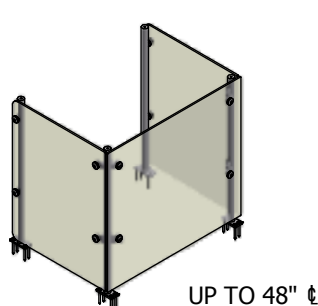
- ☐ Brushed Stainless Steel  
☐ Clear Anodized Aluminum  
☐ Powder Coat:  
☐ Black    ☐ Silver  
 RAL # \_\_\_\_\_

### GLASS:

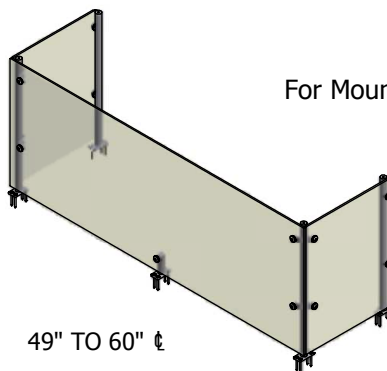
- ☐ 1/4" Clr Temp - Std  
☐ Frosted

### OPTIONS(\*):

- ☐ End Panel - LT  
☐ End Panel - RT  
☐ Light Fixture  
☐ Warmer  
☐ Shelf Kit

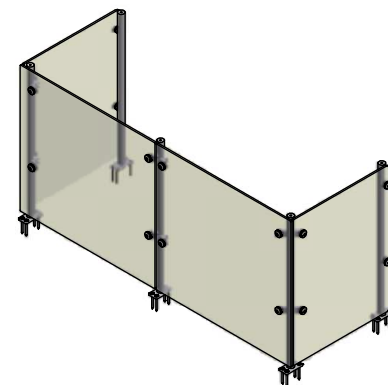


UP TO 48" t



49" TO 60" t

(\*) Not all options available on all models  
 Contact factory for specific information  
 For Mounting Options see Mounting Hardware Guide



OVER 60" t

### NSF/ANSI 2 - 2010 Standards Requirements:

This language is copied with permission of NSF International

#### 5.35.11 Food Shields for use on cooking and/or carving station operations

5.35.11.1 Shields for use on a cooking and/or carving station shall include a vertical barrier to a minimum height of 60 inches above the finished floor.

5.35.11.2 Maximum vertical distance from the bottom edge of the shield and counter top shall be 6 inches

5.35.11.3 Minimum horizontal distance between the front inside edge of displayed food and front (customer side) face of shield shall be 3/4 of the vertical distance (.75 x 6" = 4") of 5.35.11.2

#### 5.35.12 Food Shields for use on cafeteria counters

5.35.12.1 The sum of a shield's protected horizontal plane (X) and its protected vertical plane (Y) shall be greater than or equal to 32 inches. When (X) = 0, (Y) shall be a minimum of 60 inches from finished floor

5.35.12.2 Maximum distance from the bottom edge of the front vertical glass and counter top shall be 1.5 inches

5.35.12.3 Maximum distance between the vertical glass and horizontal glass is 3/4 inch

5.35.12.4 Minimum horizontal distance between the front inside edge of displayed food and the bottom leading edge of the shield s 1.5 inches

5.35.6 A vertical barrier (end shield) shall be provided at each end of a foodshield. The vertical barrier shall be a minimum of 18 inches deep (front to back) beginning at the bottom leading edge of the foodshield.

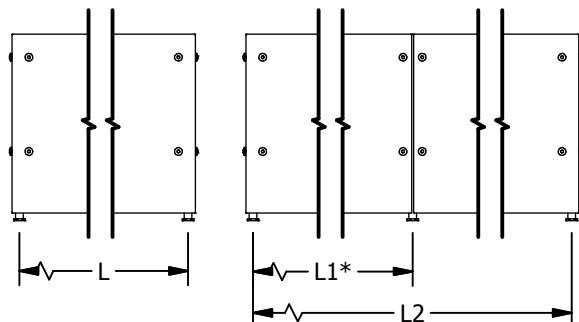
The minimum height of the vertical barrier shall be equal to the overall height of the foodshield.

The maximum distance from the bottom edge of the vertical barrier and counter top shall be 1.5 inches.

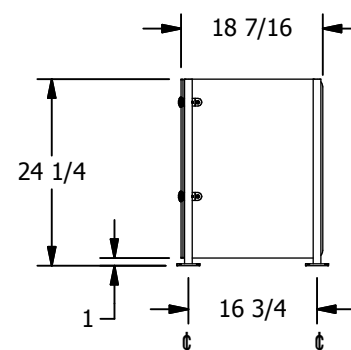
5.35.6.1 A foodshield intended to be installed a maximum of 3" (76mm) from a building wall perpendicular to the foodshield is exempt from the requirements of 5.35.6 provided that the height of the building wall is not lower than the overall height of the foodshield.

(2) End Panels per unit unless otherwise specified. End panels are 1/4" clear tempered glass unless otherwise specified.

-Centerline Dimensions -  
 L / L1 - 60" Max (1/4" Glass)



( \* - Middle support is centered unless L1 dimension is specified )





***Submittal Sheet***

04/21/2023

**ITEM# 44.3 - SNEEZE GUARD, STATIONARY (1 EA REQ'D)**

Versa-Gard VP24.3

VG Series. Full service food protector with 24" tall vertical glass. 1" OD Solid Supports. End glass panels are 1/4" clear tempered. All glass meets ANSI Z97.1 specifications for safety performance and ASTM C1048-04 specifications for heat treated glass. All hardware supplied in a brushed aluminum finish. All glass with ground and polished edges. FL32- & FL33 mounting hardware.



# VP24.3

Protected by US Patent 7,040,723

Other Patents Pending

## Full Service Vertical Protector

- Cafeteria Counters
- Cooking Stations
- Carving Stations

### FINISH:

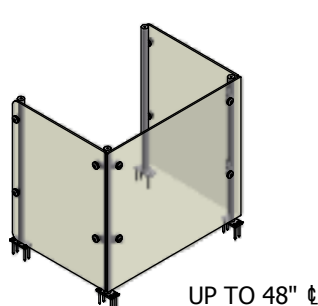
- ☐ Brushed Stainless Steel  
☐ Clear Anodized Aluminum  
☐ Powder Coat:  
☐ Black    ☐ Silver  
 RAL # \_\_\_\_\_

### GLASS:

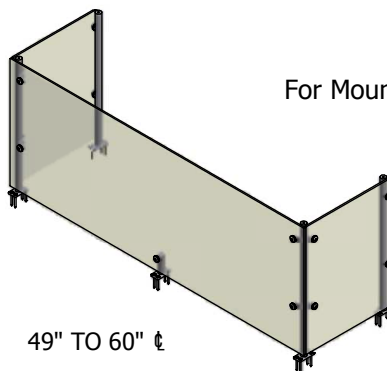
- ☐ 1/4" Clr Temp - Std  
☐ Frosted

### OPTIONS(\*):

- ☐ End Panel - LT  
☐ End Panel - RT  
☐ Light Fixture  
☐ Warmer  
☐ Shelf Kit

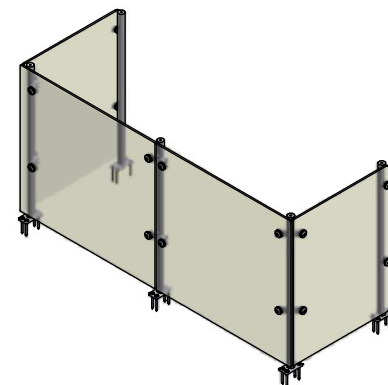


UP TO 48" t



49" TO 60" t

(\*) Not all options available on all models  
 Contact factory for specific information  
 For Mounting Options see Mounting Hardware Guide



OVER 60" t

### NSF/ANSI 2 - 2010 Standards Requirements:

This language is copied with permission of NSF International

#### 5.35.11 Food Shields for use on cooking and/or carving station operations

5.35.11.1 Shields for use on a cooking and/or carving station shall include a vertical barrier to a minimum height of 60 inches above the finished floor.

5.35.11.2 Maximum vertical distance from the bottom edge of the shield and counter top shall be 6 inches

5.35.11.3 Minimum horizontal distance between the front inside edge of displayed food and front (customer side) face of shield shall be 3/4 of the vertical distance (.75 x 6" = 4") of 5.35.11.2

#### 5.35.12 Food Shields for use on cafeteria counters

5.35.12.1 The sum of a shield's protected horizontal plane (X) and its protected vertical plane (Y) shall be greater than or equal to 32 inches. When (X) = 0, (Y) shall be a minimum of 60 inches from finished floor

5.35.12.2 Maximum distance from the bottom edge of the front vertical glass and counter top shall be 1.5 inches

5.35.12.3 Maximum distance between the vertical glass and horizontal glass is 3/4 inch

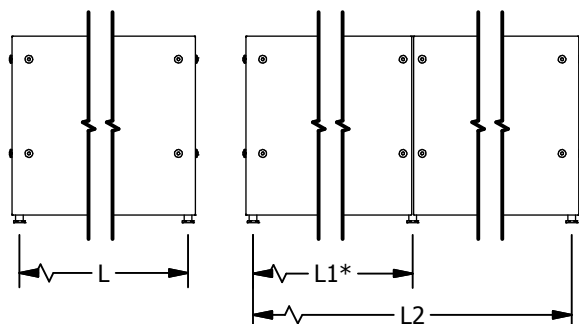
5.35.12.4 Minimum horizontal distance between the front inside edge of displayed food and the bottom leading edge of the shield s 1.5 inches

5.35.6 A vertical barrier (end shield) shall be provided at each end of a foodshield. The vertical barrier shall be a minimum of 18 inches deep (front to back) beginning at the bottom leading edge of the foodshield. The minimum height of the vertical barrier shall be equal to the overall height of the foodshield.

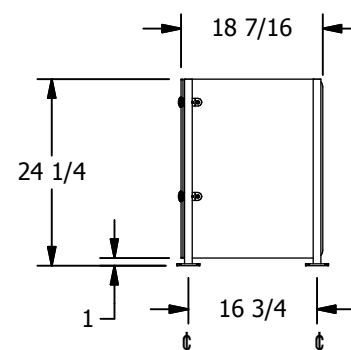
5.35.6.1 The maximum distance from the bottom edge of the vertical barrier and counter top shall be 1.5 inches. A foodshield intended to be installed a maximum of 3" (76mm) from a building wall perpendicular to the foodshield is exempt from the requirements of 5.35.6 provided that the height of the building wall is not lower than the overall height of the foodshield.

(2) End Panels per unit unless otherwise specified. End panels are 1/4" clear tempered glass unless otherwise specified.

-Centerline Dimensions -  
 L / L1 - 60" Max (1/4" Glass)



( \* - Middle support is centered unless L1 dimension is specified )



***Submittal Sheet***

04/21/2023

**ITEM# 44.4 - SNEEZE GUARD, STATIONARY (1 EA REQ'D)**

Versa-Gard VP24.3

VG Series. Full service food protector with 24" tall vertical glass. 1" OD Solid Supports. End glass panels are 1/4" clear tempered. All glass meets ANSI Z97.1 specifications for safety performance and ASTM C1048-04 specifications for heat treated glass. All hardware supplied in a brushed aluminum finish. All glass with ground and polished edges. FL32- & FL33 mounting hardware.



# VP24.3

Protected by US Patent 7,040,723

Other Patents Pending

## Full Service Vertical Protector

- Cafeteria Counters
- Cooking Stations
- Carving Stations

### FINISH:

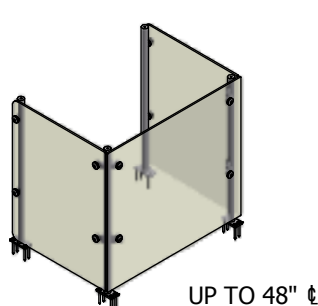
- ☐ Brushed Stainless Steel  
☐ Clear Anodized Aluminum  
☐ Powder Coat:  
☐ Black    ☐ Silver  
 RAL # \_\_\_\_\_

### GLASS:

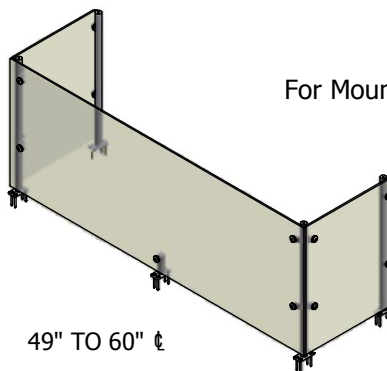
- ☐ 1/4" Clr Temp - Std  
☐ Frosted

### OPTIONS(\*):

- ☐ End Panel - LT  
☐ End Panel - RT  
☐ Light Fixture  
☐ Warmer  
☐ Shelf Kit

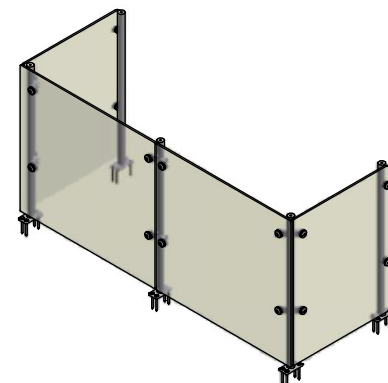


UP TO 48" t



49" TO 60" t

(\*) Not all options available on all models  
 Contact factory for specific information  
 For Mounting Options see Mounting Hardware Guide



OVER 60" t

### NSF/ANSI 2 - 2010 Standards Requirements:

This language is copied with permission of NSF International

#### 5.35.11 Food Shields for use on cooking and/or carving station operations

5.35.11.1 Shields for use on a cooking and/or carving station shall include a vertical barrier to a minimum height of 60 inches above the finished floor.

5.35.11.2 Maximum vertical distance from the bottom edge of the shield and counter top shall be 6 inches

5.35.11.3 Minimum horizontal distance between the front inside edge of displayed food and front (customer side) face of shield shall be 3/4 of the vertical distance (.75 x 6" = 4") of 5.35.11.2

#### 5.35.12 Food Shields for use on cafeteria counters

5.35.12.1 The sum of a shield's protected horizontal plane (X) and its protected vertical plane (Y) shall be greater than or equal to 32 inches. When (X) = 0, (Y) shall be a minimum of 60 inches from finished floor

5.35.12.2 Maximum distance from the bottom edge of the front vertical glass and counter top shall be 1.5 inches

5.35.12.3 Maximum distance between the vertical glass and horizontal glass is 3/4 inch

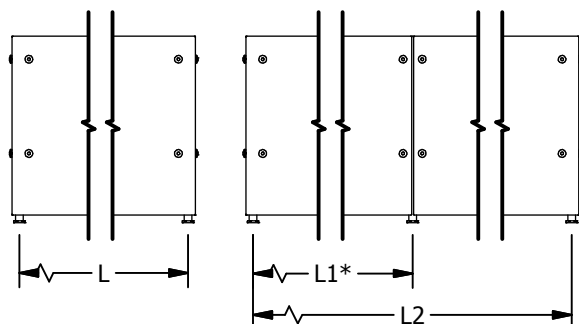
5.35.12.4 Minimum horizontal distance between the front inside edge of displayed food and the bottom leading edge of the shield s 1.5 inches

5.35.6 A vertical barrier (end shield) shall be provided at each end of a foodshield. The vertical barrier shall be a minimum of 18 inches deep (front to back) beginning at the bottom leading edge of the foodshield. The minimum height of the vertical barrier shall be equal to the overall height of the foodshield.

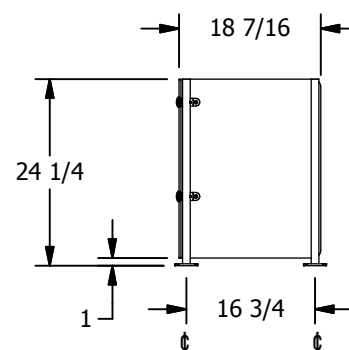
5.35.6.1 A foodshield intended to be installed a maximum of 3" (76mm) from a building wall perpendicular to the foodshield is exempt from the requirements of 5.35.6 provided that the height of the building wall is not lower than the overall height of the foodshield.

(2) End Panels per unit unless otherwise specified. End panels are 1/4" clear tempered glass unless otherwise specified.

-Centerline Dimensions -  
 L / L1 - 60" Max (1/4" Glass)



( \* - Middle support is centered unless L1 dimension is specified )



***Submittal Sheet***

04/21/2023

**ITEM# 44.5 - SNEEZE GUARD, STATIONARY (1 EA REQ'D)**

Versa-Gard VP24.3

VG Series. Full service food protector with 24" tall vertical glass. 1" OD Solid Supports. End glass panels are 1/4" clear tempered. All glass meets ANSI Z97.1 specifications for safety performance and ASTM C1048-04 specifications for heat treated glass. All hardware supplied in a brushed aluminum finish. All glass with ground and polished edges. FL32- & FL33 mounting hardware.



# VP24.3

Protected by US Patent 7,040,723

Other Patents Pending

## Full Service Vertical Protector

- Cafeteria Counters
- Cooking Stations
- Carving Stations

### FINISH:

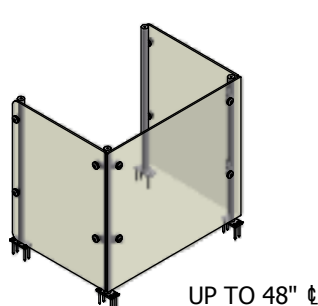
- ☐ Brushed Stainless Steel  
☐ Clear Anodized Aluminum  
☐ Powder Coat:  
☐ Black    ☐ Silver  
 RAL # \_\_\_\_\_

### GLASS:

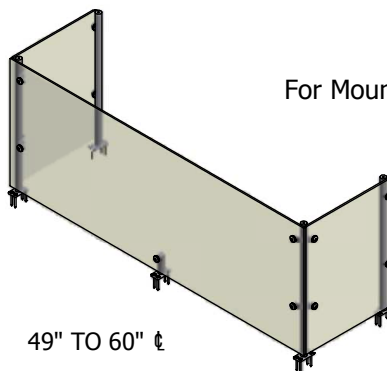
- ☐ 1/4" Clr Temp - Std  
☐ Frosted

### OPTIONS(\*):

- ☐ End Panel - LT  
☐ End Panel - RT  
☐ Light Fixture  
☐ Warmer  
☐ Shelf Kit

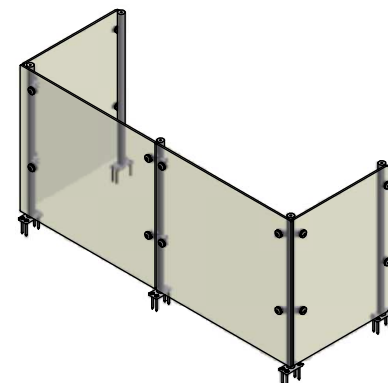


UP TO 48" t



49" TO 60" t

(\*) Not all options available on all models  
 Contact factory for specific information  
 For Mounting Options see Mounting Hardware Guide



OVER 60" t

### NSF/ANSI 2 - 2010 Standards Requirements:

This language is copied with permission of NSF International

#### 5.35.11 Food Shields for use on cooking and/or carving station operations

5.35.11.1 Shields for use on a cooking and/or carving station shall include a vertical barrier to a minimum height of 60 inches above the finished floor.

5.35.11.2 Maximum vertical distance from the bottom edge of the shield and counter top shall be 6 inches

5.35.11.3 Minimum horizontal distance between the front inside edge of displayed food and front (customer side) face of shield shall be 3/4 of the vertical distance (.75 x 6" = 4") of 5.35.11.2

#### 5.35.12 Food Shields for use on cafeteria counters

5.35.12.1 The sum of a shield's protected horizontal plane (X) and its protected vertical plane (Y) shall be greater than or equal to 32 inches. When (X) = 0, (Y) shall be a minimum of 60 inches from finished floor

5.35.12.2 Maximum distance from the bottom edge of the front vertical glass and counter top shall be 1.5 inches

5.35.12.3 Maximum distance between the vertical glass and horizontal glass is 3/4 inch

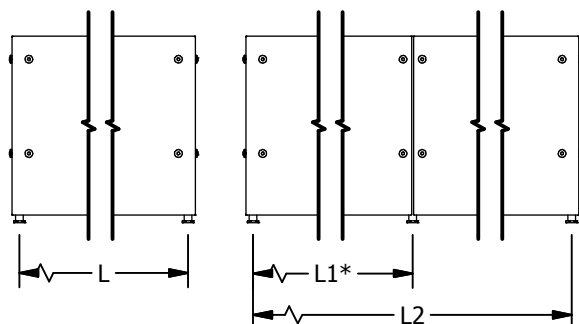
5.35.12.4 Minimum horizontal distance between the front inside edge of displayed food and the bottom leading edge of the shield s 1.5 inches

5.35.6 A vertical barrier (end shield) shall be provided at each end of a foodshield. The vertical barrier shall be a minimum of 18 inches deep (front to back) beginning at the bottom leading edge of the foodshield. The minimum height of the vertical barrier shall be equal to the overall height of the foodshield.

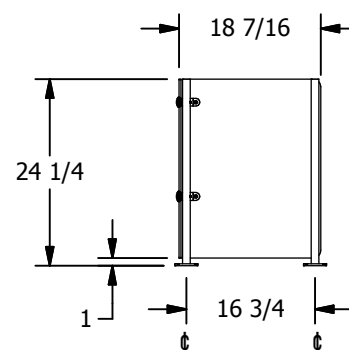
5.35.6.1 The maximum distance from the bottom edge of the vertical barrier and counter top shall be 1.5 inches. A foodshield intended to be installed a maximum of 3" (76mm) from a building wall perpendicular to the foodshield is exempt from the requirements of 5.35.6 provided that the height of the building wall is not lower than the overall height of the foodshield.

(2) End Panels per unit unless otherwise specified. End panels are 1/4" clear tempered glass unless otherwise specified.

-Centerline Dimensions -  
 L / L1 - 60" Max (1/4" Glass)



( \* - Middle support is centered unless L1 dimension is specified )





## Submittal Sheet

04/21/2023

### ITEM# 45 - HEATED SHELF FOOD WARMER (1 EA REQ'D)

Hatco GRS-30-J

Glo-Ray® Heated Shelf, Free-standing, 30" W, 21-1/2"D, with adjustable thermostat, aluminum base, stainless steel top, CE, cULus, UL EPH Classified, Made in USA

#### ACCESSORIES

Mfr	Qty	Model	Spec
Hatco	1		NOTE: Sale of this product must comply with Hatco's Minimum Resale Price Policy; consult order acknowledgement for details
Hatco	1		NOTE: Includes 24/7 parts & service assistance, call 414-671-6350
Hatco	1		1-Yr Warranty on Blanket Heating Elements against burnout, standard
Hatco	1		120v/60/1-ph, 450 watts, 3.8 amps, NEMA 5-15P (domestic voltage), standard
Hatco	1	STANDARD	Clear Anodized Aluminum housing, finish, standard (available at time of purchase only)

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	120	60	1	Cord & Plug		5-15P	3.8	.45			



There's only one #1™

## Glo-Ray® Heated Shelves

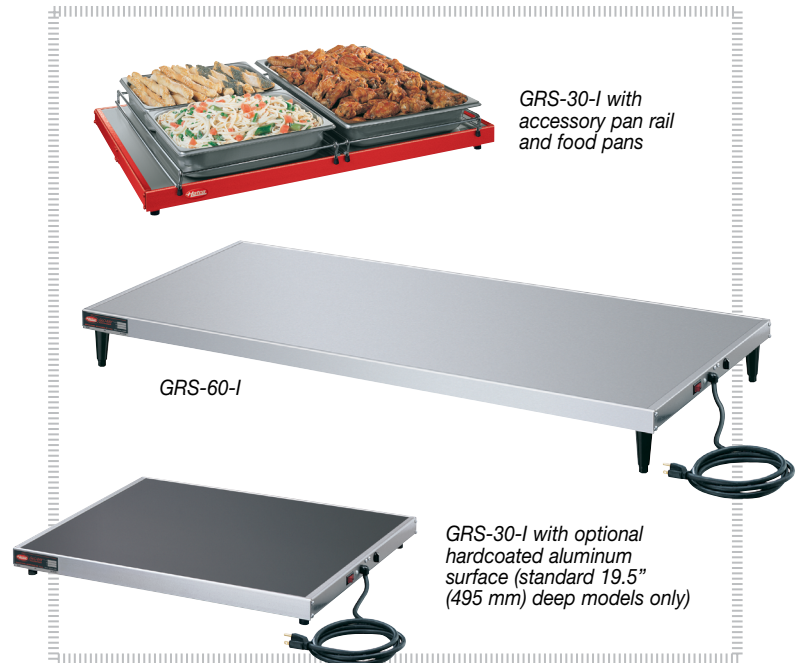
Models: GRS-18, -24, -30, -36, -42, -48, -54, -60, -66, -72

The Hatco Glo-Ray® Heated Shelf has an extruded aluminum base with non-slip rubber feet, stainless steel top and blanket-type element for uniform heat distribution. Fiberglass insulation keeps heat at the holding surface while a built-in adjustable thermostat controls surface temperature. Ideal for pass-through areas, buffet lines or as a heated work shelf.

### Standard features

- Uniform heat distribution with blanket-type element
- Built-in adjustable thermostat controls surface temperature
- Available in widths from 18" to 72" (457-1829 mm) and depths from 6" to 25.5" (152-648 mm)
- Extruded aluminum base with stainless steel top (optional hardcoated aluminum surface)
- Standard legs:  
Units 30" (762 mm) wide and under: 1" (25 mm) legs  
Units 36" (914 mm) or wider: 4" (102 mm) legs
- All models include a 72" (1829 mm) cord and plug attached

Project \_\_\_\_\_  
Item # \_\_\_\_\_  
Quantity \_\_\_\_\_



### Options (available at time of purchase only)

Designer Color (top surface not painted) – Clear Anodized Standard <sup>†</sup>

- ☐ Warm Red    ☐ Black    ☐ Gray Granite    ☐ White Granite  
☐ Navy Blue    ☐ Hunter Green    ☐ Antique Copper

Hardcoated Surface in lieu of Stainless Steel on Standard 19.5" (495 mm) deep "I" units - please consult factory for other depths

- ☐ GRS-18 through GRS-42    ☐ GRS-48 through GRS-72

☐ Thermostat Guard

### Accessories

- ☐ 4" (102 mm) adjustable Legs (Standard on GRS-36 units and larger)  
☐ Slant Leg Kit for models 12" (305 mm) deep or deeper

Pan Rail for 19.5" (495 mm) models only

- ☐ 2-Pan    ☐ 3-Pan    ☐ 4-Pan    ☐ 5-Pan

☐ ThruShelf Kit – Bolt and fender washer leg accessory kit for attaching one GRS unit to a wire rack shelf

<sup>†</sup>Non-standard colors are non-returnable



IFS anti-microbial coatings use naturally-occurring, environmentally sustainable, silver ions to help inhibit the growth of microbes on the powder coated surface. See [www.hatcocorp.com/antimicrobial-paint](http://www.hatcocorp.com/antimicrobial-paint) for more information.



For operation, location and safety information, please refer to the Installation and Operating Manual.



HATCO CORPORATION

P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. | (414) 671-6350



[www.hatcocorp.com](http://www.hatcocorp.com)

[support@hatcocorp.com](mailto:support@hatcocorp.com)

[Find a Hatco Rep](#)

[Image Library](#)

[Document Library](#)

[Patents](#)

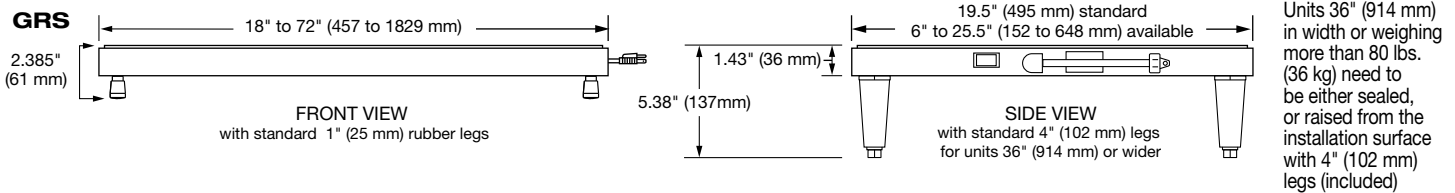
[Chat](#)





# Glo-Ray® Heated Shelves

Models: GRS-18, -24, -30, -36, -42, -48, -54, -60, -66, -72 (all depths)



## SPECIFICATIONS Glo-Ray® Heated Shelves

The shaded areas contain electrical information for international models

### 19.5" (495 mm) DEPTH (I)

Model	Dimensions W x H (height includes legs)	Voltages Single Phase	Watts	Amps	Plug	Ship Weight*
GRS-18-I	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	100	250	2.5	NEMA 5-15P	16 lbs (8 kg)
		120	250	2.1	NEMA 5-15P	
		220	229	1.0	CEE 7/7 Schuko	
		240	272	1.1	BS-1363	
		220-230 (CE)	229-250	1.0-1.1	CEE 7/7 Schuko	
		230-240 (CE)	250-272	1.1	BS-1363	
GRS-24-I	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	100	350	3.5	NEMA 5-15P	20 lbs (10 kg)
		120	350	2.9	NEMA 5-15P	
		220	320	1.5	CEE 7/7 Schuko	
		240	381	1.6	BS-1363	
		220-230 (CE)	320-350	1.5-1.6	CEE 7/7 Schuko	
		230-240 (CE)	350-381	1.5-1.6	BS-1363	
GRS-30-I	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	100	450	4.5	NEMA 5-15P	25 lbs (12 kg)
		120	450	3.8	NEMA 5-15P	
		220	412	1.9	CEE 7/7 Schuko	
		240	490	2.0	BS-1363	
		220-230 (CE)	412-450	1.9-2.0	CEE 7/7 Schuko	
		230-240 (CE)	450-490	2.0	BS-1363	
GRS-36-I*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	100	550	5.5	NEMA 5-15P	28 lbs (13 kg)
		120	550	4.6	NEMA 5-15P	
		220	503	2.3	CEE 7/7 Schuko	
		240	599	2.5	BS-1363	
		220-230 (CE)	503-550	2.3-2.4	CEE 7/7 Schuko	
		230-240 (CE)	550-599	2.4-2.5	BS-1363	
GRS-42-I*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	100	600	6.0	NEMA 5-15P	32 lbs (15 kg)
		120	600	5.0	NEMA 5-15P	
		220	549	2.5	CEE 7/7 Schuko	
		240	653	2.7	BS-1363	
		220-230 (CE)	549-600	2.5-2.6	CEE 7/7 Schuko	
		230-240 (CE)	600-653	2.6-2.7	BS-1363	

### 19.5" (495 mm) DEPTH (I)

Model	Dimensions W x H (height includes legs)	Voltages Single phase	Watts	Amps	Plug	Ship Weight*
GRS-48-I*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	100	700	7.0	NEMA 5-15P	36 lbs (17 kg)
		120	700	5.8	NEMA 5-15P	
		220	640	2.9	CEE 7/7 Schuko	
		240	762	3.2	BS-1363	
		220-230 (CE)	640-700	2.9-3.0	CEE 7/7 Schuko	
		230-240 (CE)	700-762	3.0-3.2	BS-1363	
GRS-54-I*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	100	800	8.0	NEMA 5-15P	42 lbs. (20 kg)
		120	800	6.7	NEMA 5-15P	
		220	732	3.3	CEE 7/7 Schuko	
		240	871	3.6	BS-1363	
		220-230 (CE)	732-800	3.3-3.5	CEE 7/7 Schuko	
		220-240 (CE)	800-871	3.5-3.6	BS-1363	
GRS-60-I*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	100	900	9.0	NEMA 5-15P	44 lbs. (20 kg)
		120	900	7.5	NEMA 5-15P	
		220	823	3.7	CEE 7/7 Schuko	
		240	980	4.1	BS-1363	
		220-230 (CE)	823-900	3.7-3.9	CEE 7/7 Schuko	
		220-240 (CE)	900-980	3.9-4.1	BS-1363	
GRS-66-I*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	100	1000	10.0	NEMA 5-15P	50 lbs (23 kg)
		120	1000	8.3	NEMA 5-15P	
		220	915	4.2	CEE 7/7 Schuko	
		240	1089	4.5	BS-1363	
		220-230 (CE)	915-1000	4.2-4.3	CEE 7/7 Schuko	
		230-240 (CE)	1000-1089	4.3-4.5	BS-1363	
GRS-72-I*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	100	1100	11.0	NEMA 5-15P	56 lbs (26 kg)
		120	1100	9.2	NEMA 5-15P	
		220	1006	4.6	CEE 7/7 Schuko	
		240	1198	5.0	BS-1363	
		220-230 (CE)	1006-1100	4.6-4.8	CEE 7/7 Schuko	
		230-240 (CE)	1100-1198	4.8-5.0	BS-1363	

\* NSF requires units 36" (914 mm) and over in width or weighing more than 80 lbs. (36 kg) to be either sealed, or raised on the installation surface with the 4" (102 mm) legs included.

\* Shipping weight includes packaging.

## Pan Capacity

Accommodates 12" x 20" (305 x 508 mm) steam table pans

Model	Capacity	Model	Capacity
GRS-18-I	1 pan	GRS-48-I	3 pans
GRS-24-I	1 pan	GRS-54-I	4 pans
GRS-30-I	2 pans	GRS-60-I	4 pans
GRS-36-I	2 pans	GRS-66-I	5 pans
GRS-42-I	3 pans	GRS-72-I	5 pans

HATCO CORPORATION | P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. | (414) 671-6350



[www.hatcocorp.com](http://www.hatcocorp.com)

[support@hatcocorp.com](mailto:support@hatcocorp.com)

[Find a Hatco Rep](#)

[Image Library](#)

[Document Library](#)

[Patents](#)

[Chat](#)



# Glo-Ray® Heated Shelves

Models: GRS-18, -24, -30, -36, -42, -48, -54, -60, -66, -72 (all depths)

## SPECIFICATIONS Glo-Ray® Heated Shelves

The shaded areas contain electrical information for International models

### 6" (152 mm) DEPTH (A)

Model	Dimensions W x H (height includes legs)	Voltages Single Phase	Watts	Amps	Plug	Ship Weight*
GRS-18-A	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	100	0.8	NEMA 5-15P	10 lbs (5 kg)
		220	91	0.4	CEE 7/7 Schuko	
		240	109	0.5	BS-1363	
		220-230 (CE)	91-100	0.4	CEE 7/7 Schuko	
		230-240 (CE)	100-109	0.4-0.5	BS-1363	
GRS-24-A	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	125	1.0	NEMA 5-15P	11 lbs (5 kg)
		220	114	0.5	CEE 7/7 Schuko	
		240	136	0.6	BS-1363	
		220-230 (CE)	114-125	0.5	CEE 7/7 Schuko	
		230-240 (CE)	125-136	0.5-0.6	BS-1363	
GRS-30-A	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	150	1.3	NEMA 5-15P	9 lbs (5 kg)
		220	137	0.6	CEE 7/7 Schuko	
		240	163	0.7	BS-1363	
		220-230 (CE)	137-150	0.6-0.7	CEE 7/7 Schuko	
		230-240 (CE)	150-163	0.7	BS-1363	
GRS-36-A*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	175	1.5	NEMA 5-15P	11 lbs (5 kg)
		220	160	0.7	CEE 7/7 Schuko	
		240	191	0.8	BS-1363	
		220-230 (CE)	160-175	0.7-0.8	CEE 7/7 Schuko	
		230-240 (CE)	175-191	0.8	BS-1363	
GRS-42-A*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	225	1.9	NEMA 5-15P	15 lbs (7 kg)
		220	205	0.9	CEE 7/7 Schuko	
		240	245	1.0	BS-1363	
		220-230 (CE)	205-225	0.9-1.0	CEE 7/7 Schuko	
		230-240 (CE)	225-245	1.0	BS-1363	
GRS-48-A*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	250	2.1	NEMA 5-15P	16 lbs (8 kg)
		220	228	1.0	CEE 7/7 Schuko	
		240	272	1.1	BS-1363	
		220-230 (CE)	228-250	1.0-1.1	CEE 7/7 Schuko	
		230-240 (CE)	250-272	1.1	BS-1363	
GRS-54-A*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	275	2.3	NEMA 5-15P	17 lbs (8 kg)
		220	251	1.1	CEE 7/7 Schuko	
		240	299	1.2	BS-1363	
		220-230 (CE)	251-275	1.1-1.2	CEE 7/7 Schuko	
		230-240 (CE)	275-299	1.2	BS-1363	
GRS-60-A*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	300	2.5	NEMA 5-15P	18 lbs (9 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-66-A*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	325	2.7	NEMA 5-15P	20 lbs (9 kg)
		220	297	1.4	CEE 7/7 Schuko	
		240	354	1.5	BS-1363	
		220-230 (CE)	297-325	1.4	CEE 7/7 Schuko	
		230-240 (CE)	325-354	1.4-1.5	BS-1363	
GRS-72-A*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	350	2.9	NEMA 5-15P	22 lbs (10 kg)
		220	320	1.5	CEE 7/7 Schuko	
		240	381	1.6	BS-1363	
		220-230 (CE)	320-350	1.5	CEE 7/7 Schuko	
		230-240 (CE)	350-381	1.5-1.6	BS-1363	

### 7.75" (197 mm) DEPTH (B)

Model	Dimensions W x H (height includes legs)	Voltages Single phase	Watts	Amps	Plug	Ship Weight*
GRS-18-B	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	100	0.8	NEMA 5-15P	10 lbs (5 kg)
		220	91	0.4	CEE 7/7 Schuko	
		240	109	0.5	BS-1363	
		220-230 (CE)	91-100	0.4	CEE 7/7 Schuko	
		230-240 (CE)	100-109	0.4-0.5	BS-1363	
GRS-24-B	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	125	1.0	NEMA 5-15P	10 lbs (5 kg)
		220	114	0.5	CEE 7/7 Schuko	
		240	136	0.6	BS-1363	
		220-230 (CE)	114-125	0.5	CEE 7/7 Schuko	
		230-240 (CE)	125-136	0.5-0.6	BS-1363	
GRS-30-B	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	150	1.3	NEMA 5-15P	12 lbs (6 kg)
		220	137	0.6	CEE 7/7 Schuko	
		240	163	0.7	BS-1363	
		220-230 (CE)	137-150	0.6-0.7	CEE 7/7 Schuko	
		230-240 (CE)	150-163	0.7	BS-1363	
GRS-36-B*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	175	1.5	NEMA 5-15P	14 lbs (7 kg)
		220	160	0.7	CEE 7/7 Schuko	
		240	191	0.8	BS-1363	
		220-230 (CE)	160-175	0.7-0.8	CEE 7/7 Schuko	
		230-240 (CE)	175-191	0.8	BS-1363	
GRS-42-B*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	225	1.9	NEMA 5-15P	17 lbs (8 kg)
		220	205	0.9	CEE 7/7 Schuko	
		240	245	1.0	BS-1363	
		220-230 (CE)	205-225	0.9-1.0	CEE 7/7 Schuko	
		230-240 (CE)	225-245	1.0	BS-1363	
GRS-48-B*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	250	2.1	NEMA 5-15P	19 lbs (9 kg)
		220	228	1.0	CEE 7/7 Schuko	
		240	272	1.1	BS-1363	
		220-230 (CE)	228-250	1.0-1.1	CEE 7/7 Schuko	
		230-240 (CE)	250-272	1.1	BS-1363	
GRS-54-B*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	275	2.3	NEMA 5-15P	20 lbs (10 kg)
		220	251	1.1	CEE 7/7 Schuko	
		240	299	1.2	BS-1363	
		220-230 (CE)	251-275	1.1-1.2	CEE 7/7 Schuko	
		230-240 (CE)	275-299	1.2	BS-1363	
GRS-60-B*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	300	2.5	NEMA 5-15P	21 lbs (10 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-66-B*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	325	2.7	NEMA 5-15P	23 lbs (11 kg)
		220	297	1.4	CEE 7/7 Schuko	
		240	354	1.5	BS-1363	
		220-230 (CE)	297-325	1.4	CEE 7/7 Schuko	
		230-240 (CE)	325-354	1.4-1.5	BS-1363	
GRS-72-B*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	350	2.9	NEMA 5-15P	25 lbs (12 kg)
		220	320	1.5	CEE 7/7 Schuko	
		240	381	1.6	BS-1363	
		220-230 (CE)	320-350	1.5	CEE 7/7 Schuko	
		230-240 (CE)	350-381	1.5-1.6	BS-1363	

\* NSF requires units 36" (914 mm) and over in width or weighing more than 80 lbs. (36 kg) to be either sealed, or raised on the installation surface with the 4" (102 mm) legs included.

\* Shipping weight includes packaging.





# Glo-Ray® Heated Shelves

Models: GRS-18, -24, -30, -36, -42, -48, -54, -60, -66, -72 (all depths)

## SPECIFICATIONS Glo-Ray® Heated Shelves

The shaded areas contain electrical information for International models

### 9.75" (248 mm) DEPTH (C)

Model	Dimensions W x H (height includes legs)	Voltages Single Phase	Watts	Amps	Plug	Ship Weight*
GRS-18-C	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	125	1.0	NEMA 5-15P	12 lbs (6 kg)
		220	114	0.5	CEE 7/7 Schuko	
		240	136	0.6	BS-1363	
		220-230 (CE)	114-125	0.5	CEE 7/7 Schuko	
		230-240 (CE)	125-136	0.5-0.6	BS-1363	
GRS-24-C	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	175	1.5	NEMA 5-15P	13 lbs (6 kg)
		220	160	0.7	CEE 7/7 Schuko	
		240	191	0.8	BS-1363	
		220-230 (CE)	160-175	0.7-0.8	CEE 7/7 Schuko	
		230-240 (CE)	175-191	0.8	BS-1363	
GRS-30-C	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	225	1.9	NEMA 5-15P	14 lbs (7 kg)
		220	206	0.9	CEE 7/7 Schuko	
		240	245	1.0	BS-1363	
		220-230 (CE)	206-225	0.9-1.0	CEE 7/7 Schuko	
		230-240 (CE)	225-245	1.0	BS-1363	
GRS-36-C*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	275	2.3	NEMA 5-15P	16 lbs (8 kg)
		220	252	1.1	CEE 7/7 Schuko	
		240	299	1.2	BS-1363	
		220-230 (CE)	252-275	1.1-1.2	CEE 7/7 Schuko	
		230-240 (CE)	275-299	1.2	BS-1363	
GRS-42-C*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	300	2.5	NEMA 5-15P	18 lbs (9 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-48-C*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	350	2.9	NEMA 5-15P	20 lbs (9 kg)
		220	320	1.5	CEE 7/7 Schuko	
		240	381	1.6	BS-1363	
		220-230 (CE)	320-350	1.5	CEE 7/7 Schuko	
		230-240 (CE)	350-381	1.5-1.6	BS-1363	
GRS-54-C*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	400	3.3	NEMA 5-15P	22 lbs (10 kg)
		220	366	1.7	CEE 7/7 Schuko	
		240	436	1.8	BS-1363	
		220-230 (CE)	366-400	1.7	CEE 7/7 Schuko	
		230-240 (CE)	400-436	1.7-1.8	BS-1363	
GRS-60-C*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	450	3.8	NEMA 5-15P	25 lbs (12 kg)
		220	412	1.9	CEE 7/7 Schuko	
		240	490	2.0	BS-1363	
		220-230 (CE)	412-450	1.9-2.0	CEE 7/7 Schuko	
		230-240 (CE)	450-490	2.0	BS-1363	
GRS-66-C*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	500	4.2	NEMA 5-15P	26 lbs (12 kg)
		220	458	2.1	CEE 7/7 Schuko	
		240	544	2.3	BS-1363	
		220-230 (CE)	458-500	2.1-2.2	CEE 7/7 Schuko	
		230-240 (CE)	500-544	2.2-2.3	BS-1363	
GRS-72-C*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	550	4.6	NEMA 5-15P	28 lbs (13 kg)
		220	504	2.3	CEE 7/7 Schuko	
		240	599	2.5	BS-1363	
		220-230 (CE)	504-550	2.3-2.4	CEE 7/7 Schuko	
		230-240 (CE)	550-599	2.4-2.5	BS-1363	

### 12" (305 mm) DEPTH (D)

Model	Dimensions W x H (height includes legs)	Voltages Single phase	Watts	Amps	Plug	Ship Weight*
GRS-18-D	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	200	1.7	NEMA 5-15P	12 lbs (6 kg)
		220	183	0.8	CEE 7/7 Schuko	
		240	218	0.9	BS-1363	
		220-230 (CE)	183-200	0.8-0.9	CEE 7/7 Schuko	
		230-240 (CE)	200-218	0.9	BS-1363	
GRS-24-D	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	250	2.1	NEMA 5-15P	15 lbs (7 kg)
		220	229	1.0	CEE 7/7 Schuko	
		240	272	1.1	BS-1363	
		220-230 (CE)	229-250	1.0-1.1	CEE 7/7 Schuko	
		230-240 (CE)	250-272	1.1	BS-1363	
GRS-30-D	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	300	2.5	NEMA 5-15P	17 lbs (8 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-36-D*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	350	2.9	NEMA 5-15P	20 lbs (9 kg)
		220	320	1.5	CEE 7/7 Schuko	
		240	381	1.6	BS-1363	
		220-230 (CE)	320-350	1.5	CEE 7/7 Schuko	
		230-240 (CE)	350-381	1.5-1.6	BS-1363	
GRS-42-D*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	450	3.8	NEMA 5-15P	23 lbs (11 kg)
		220	412	1.9	CEE 7/7 Schuko	
		240	490	2.0	BS-1363	
		220-230 (CE)	412-450	1.9-2.0	CEE 7/7 Schuko	
		230-240 (CE)	450-490	2.0	BS-1363	
GRS-48-D*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	500	4.2	NEMA 5-15P	26 lbs (12 kg)
		220	457	2.1	CEE 7/7 Schuko	
		240	544	2.3	BS-1363	
		220-230 (CE)	457-500	2.1-2.2	CEE 7/7 Schuko	
		230-240 (CE)	500-544	2.2-2.3	BS-1363	
GRS-54-D*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	550	4.6	NEMA 5-15P	30 lbs (14 kg)
		220	503	2.3	CEE 7/7 Schuko	
		240	599	2.5	BS-1363	
		220-230 (CE)	503-550	2.3-2.4	CEE 7/7 Schuko	
		230-240 (CE)	550-599	2.4-2.5	BS-1363	
GRS-60-D*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	600	5.0	NEMA 5-15P	34 lbs (16 kg)
		220	548	2.5	CEE 7/7 Schuko	
		240	653	2.7	BS-1363	
		220-230 (CE)	548-600	2.5-2.6	CEE 7/7 Schuko	
		230-240 (CE)	600-653	2.6-2.7	BS-1363	
GRS-66-D*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	650	5.4	NEMA 5-15P	36 lbs (17 kg)
		220	594	2.7	CEE 7/7 Schuko	
		240	708	3.0	BS-1363	
		220-230 (CE)	594-650	2.7-2.8	CEE 7/7 Schuko	
		230-240 (CE)	650-708	2.8-3.0	BS-1363	
GRS-72-D*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	700	5.8	NEMA 5-15P	37 lbs (17 kg)
		220	640	2.9	CEE 7/7 Schuko	
		240	762	3.2	BS-1363	
		220-230 (CE)	640-700	2.9-3.0	CEE 7/7 Schuko	
		230-240 (CE)	700-762	3.0-3.2	BS-1363	

\* NSF requires units 36" (914 mm) and over in width or weighing more than 80 lbs. (36 kg) to be either sealed, or raised on the installation surface with the 4" (102 mm) legs included.

\* Shipping weight includes packaging.





# Glo-Ray® Heated Shelves

Models: GRS-18, -24, -30, -36, -42, -48, -54, -60, -66, -72 (all depths)

## SPECIFICATIONS Glo-Ray® Heated Shelves

The shaded areas contain electrical information for International models

### 13.75" (349 mm) DEPTH (E)

Model	Dimensions W x H (height includes legs)	Voltages Single Phase	Watts	Amps	Plug	Ship Weight*
GRS-18-E	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	200	1.7	NEMA 5-15P	13 lbs (6 kg)
		220	183	0.8	CEE 7/7 Schuko	
		240	218	0.9	BS-1363	
		220-230 (CE)	183-200	0.8-0.9	CEE 7/7 Schuko	
		230-240 (CE)	200-218	0.9	BS-1363	
GRS-24-E	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	250	2.1	NEMA 5-15P	14 lbs (7 kg)
		220	229	1.0	CEE 7/7 Schuko	
		240	272	1.1	BS-1363	
		220-230 (CE)	229-250	1.0-1.1	CEE 7/7 Schuko	
		230-240 (CE)	250-272	1.1	BS-1363	
GRS-30-E	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	300	2.5	NEMA 5-15P	18 lbs (9 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-36-E*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	350	2.9	NEMA 5-15P	22 lbs (10 kg)
		220	320	1.5	CEE 7/7 Schuko	
		240	381	1.6	BS-1363	
		220-230 (CE)	320-350	1.5	CEE 7/7 Schuko	
		230-240 (CE)	350-381	1.5-1.6	BS-1363	
GRS-42-E*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	450	3.8	NEMA 5-15P	26 lbs (12 kg)
		220	412	1.9	CEE 7/7 Schuko	
		240	490	2.0	BS-1363	
		220-230 (CE)	412-450	1.9-2.0	CEE 7/7 Schuko	
		230-240 (CE)	450-490	2.0-2.1	BS-1363	
GRS-48-E*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	500	4.2	NEMA 5-15P	29 lbs (14 kg)
		220	457	2.1	CEE 7/7 Schuko	
		240	544	2.3	BS-1363	
		220-230 (CE)	457-500	2.1-2.2	CEE 7/7 Schuko	
		230-240 (CE)	500-544	2.2-2.3	BS-1363	
GRS-54-E*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	550	4.6	NEMA 5-15P	33 lbs (15 kg)
		220	503	2.3	CEE 7/7 Schuko	
		240	599	2.5	BS-1363	
		220-230 (CE)	503-550	2.3-2.4	CEE 7/7 Schuko	
		230-240 (CE)	550-599	2.4-2.5	BS-1363	
GRS-60-E*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	600	5.0	NEMA 5-15P	36 lbs (17 kg)
		220	548	2.5	CEE 7/7 Schuko	
		240	653	2.7	BS-1363	
		220-230 (CE)	548-600	2.5-2.6	CEE 7/7 Schuko	
		230-240 (CE)	600-653	2.6-2.7	BS-1363	
GRS-66-E*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	650	5.4	NEMA 5-15P	38 lbs (18 kg)
		220	594	2.7	CEE 7/7 Schuko	
		240	708	3.0	BS-1363	
		220-230 (CE)	594-650	2.7-2.8	CEE 7/7 Schuko	
		230-240 (CE)	650-708	2.8-3.0	BS-1363	
GRS-72-E*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	700	5.8	NEMA 5-15P	40 lbs (19 kg)
		220	640	2.9	CEE 7/7 Schuko	
		240	762	3.2	BS-1363	
		220-230 (CE)	640-700	2.9-3.0	CEE 7/7 Schuko	
		230-240 (CE)	700-762	3.0-3.2	BS-1363	

### 15.5" (394 mm) DEPTH (F)

Model	Dimensions W x H (height includes legs)	Voltages Single phase	Watts	Amps	Plug	Ship Weight*
GRS-18-F	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	200	1.7	NEMA 5-15P	16 lbs (7 kg)
		220	183	0.8	CEE 7/7 Schuko	
		240	218	0.9	BS-1363	
		220-230 (CE)	183-200	0.8-0.9	CEE 7/7 Schuko	
		230-240 (CE)	200-218	0.9	BS-1363	
GRS-24-F	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	250	2.1	NEMA 5-15P	17 lbs (8 kg)
		220	229	1.0	CEE 7/7 Schuko	
		240	272	1.1	BS-1363	
		220-230 (CE)	229-250	1.0-1.1	CEE 7/7 Schuko	
		230-240 (CE)	250-272	1.1	BS-1363	
GRS-30-F	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	300	2.5	NEMA 5-15P	22 lbs (10 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-36-F*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	350	2.9	NEMA 5-15P	25 lbs (12 kg)
		220	320	1.5	CEE 7/7 Schuko	
		240	381	1.6	BS-1363	
		220-230 (CE)	320-350	1.5	CEE 7/7 Schuko	
		230-240 (CE)	350-381	1.5-1.6	BS-1363	
GRS-42-F*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	450	3.8	NEMA 5-15P	26 lbs (12 kg)
		220	412	1.9	CEE 7/7 Schuko	
		240	490	2.0	BS-1363	
		220-230 (CE)	412-450	1.9-2.0	CEE 7/7 Schuko	
		230-240 (CE)	450-490	2.0	BS-1363	
GRS-48-F*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	500	4.2	NEMA 5-15P	32 lbs (15 kg)
		220	457	2.1	CEE 7/7 Schuko	
		240	544	2.3	BS-1363	
		220-230 (CE)	457-500	2.1-2.2	CEE 7/7 Schuko	
		230-240 (CE)	500-544	2.2-2.3	BS-1363	
GRS-54-F*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	550	4.6	NEMA 5-15P	38 lbs (18 kg)
		220	503	2.3	CEE 7/7 Schuko	
		240	599	2.5	BS-1363	
		220-230 (CE)	503-550	2.3-2.4	CEE 7/7 Schuko	
		230-240 (CE)	550-599	2.4-2.5	BS-1363	
GRS-60-F*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	600	5.0	NEMA 5-15P	39 lbs (18 kg)
		220	548	2.5	CEE 7/7 Schuko	
		240	653	2.7	BS-1363	
		220-230 (CE)	548-600	2.5-2.6	CEE 7/7 Schuko	
		230-240 (CE)	600-653	2.6-2.7	BS-1363	
GRS-66-F*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	650	5.4	NEMA 5-15P	42 lbs (19 kg)
		220	594	2.7	CEE 7/7 Schuko	
		240	708	3.0	BS-1363	
		220-230 (CE)	594-650	2.7-2.8	CEE 7/7 Schuko	
		230-240 (CE)	650-708	2.8-3.0	BS-1363	
GRS-72-F*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	700	5.8	NEMA 5-15P	46 lbs (21 kg)
		220	640	2.9	CEE 7/7 Schuko	
		240	762	3.2	BS-1363	
		220-230 (CE)	640-700	2.9-3.0	CEE 7/7 Schuko	
		230-240 (CE)	700-762	3.0-3.2	BS-1363	

\* NSF requires units 36" (914 mm) and over in width or weighing more than 80 lbs. (36 kg) to be either sealed, or raised on the installation surface with the 4" (102 mm) legs included.

\* Shipping weight includes packaging.







# Glo-Ray® Heated Shelves

Models: GRS-18, -24, -30, -36, -42, -48, -54, -60, -66, -72 (all depths)

## SPECIFICATIONS

### Glo-Ray® Heated Shelves

The shaded areas contain electrical information for international models

#### 15.75" (400 mm) DEPTH (G)

Model	Dimensions W x H (height includes legs)	Voltages Single Phase	Watts	Amps	Plug	Ship Weight*
GRS-18-G	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	225	1.9	NEMA 5-15P	16 lbs (7 kg)
		220	206	0.9	CEE 7/7 Schuko	
		240	245	1.0	BS-1363	
		220-230 (CE)	206-225	0.9-1.0	CEE 7/7 Schuko	
		230-240 (CE)	225-245	1.0	BS-1363	
GRS-24-G	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	300	2.5	NEMA 5-15P	18 lbs (9 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-30-G	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	375	3.1	NEMA 5-15P	21 lbs (10 kg)
		220	343	1.6	CEE 7/7 Schuko	
		240	408	1.7	BS-1363	
		220-230 (CE)	343-375	1.6	CEE 7/7 Schuko	
		230-240 (CE)	375-408	1.6-1.7	BS-1363	
GRS-36-G*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	450	3.8	NEMA 5-15P	27 lbs (13 kg)
		220	412	1.9	CEE 7/7 Schuko	
		240	490	2.0	BS-1363	
		220-230 (CE)	412-450	1.9-2.0	CEE 7/7 Schuko	
		230-240 (CE)	450-490	2.0	BS-1363	
GRS-42-G*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	525	4.4	NEMA 5-15P	29 lbs (14 kg)
		220	480	2.2	CEE 7/7 Schuko	
		240	572	2.4	BS-1363	
		220-230 (CE)	480-525	2.2-2.3	CEE 7/7 Schuko	
		230-240 (CE)	525-572	2.3-2.4	BS-1363	
GRS-48-G*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	600	5.0	NEMA 5-15P	33 lbs (15 kg)
		220	549	2.5	CEE 7/7 Schuko	
		240	653	2.7	BS-1363	
		220-230 (CE)	549-600	2.5-2.6	CEE 7/7 Schuko	
		230-240 (CE)	600-653	2.6-2.7	BS-1363	
GRS-54-G*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	675	5.6	NEMA 5-15P	38 lbs (18 kg)
		220	618	2.8	CEE 7/7 Schuko	
		240	735	3.1	BS-1363	
		220-230 (CE)	618-675	2.8-2.9	CEE 7/7 Schuko	
		230-240 (CE)	675-735	2.9-3.1	BS-1363	
GRS-60-G*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	750	6.3	NEMA 5-15P	42 lbs (19 kg)
		220	686	3.1	CEE 7/7 Schuko	
		240	817	3.4	BS-1363	
		220-230 (CE)	686-750	3.1-3.3	CEE 7/7 Schuko	
		230-240 (CE)	750-817	3.3-3.4	BS-1363	
GRS-66-G*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	825	6.9	NEMA 5-15P	45 lbs (21 kg)
		220	755	3.4	CEE 7/7 Schuko	
		240	898	3.7	BS-1363	
		220-230 (CE)	755-825	3.4-3.6	CEE 7/7 Schuko	
		230-240 (CE)	825-898	3.6-3.7	BS-1363	
GRS-72-G*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	900	7.5	NEMA 5-15P	46 lbs (21 kg)
		220	823	3.7	CEE 7/7 Schuko	
		240	980	4.1	BS-1363	
		220-230 (CE)	823-900	3.7-3.9	CEE 7/7 Schuko	
		230-240 (CE)	900-980	3.9-4.1	BS-1363	

#### 17.5" (445 mm) DEPTH (H)

Model	Dimensions W x H (height includes legs)	Voltages Single phase	Watts	Amps	Plug	Ship Weight*
GRS-18-H	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	225	1.9	NEMA 5-15P	16 lbs (8 kg)
		220	206	0.9	CEE 7/7 Schuko	
		240	245	1.0	BS-1363	
		220-230 (CE)	206-225	0.9-1.0	CEE 7/7 Schuko	
		230-240 (CE)	225-245	1.0	BS-1363	
GRS-24-H	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	300	2.5	NEMA 5-15P	18 lbs (9 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-30-H	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	375	3.1	NEMA 5-15P	21 lbs (10 kg)
		220	343	1.6	CEE 7/7 Schuko	
		240	408	1.7	BS-1363	
		220-230 (CE)	343-375	1.6	CEE 7/7 Schuko	
		230-240 (CE)	375-408	1.6-1.7	BS-1363	
GRS-36-H*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	450	3.8	NEMA 5-15P	27 lbs (13 kg)
		220	412	1.9	CEE 7/7 Schuko	
		240	490	2.0	BS-1363	
		220-230 (CE)	412-450	1.9-2.0	CEE 7/7 Schuko	
		230-240 (CE)	450-490	2.0	BS-1363	
GRS-42-H*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	525	4.4	NEMA 5-15P	32 lbs (15 kg)
		220	480	2.2	CEE 7/7 Schuko	
		240	572	2.4	BS-1363	
		220-230 (CE)	480-525	2.2-2.3	CEE 7/7 Schuko	
		230-240 (CE)	525-572	2.3-2.4	BS-1363	
GRS-48-H*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	600	5.0	NEMA 5-15P	35 lbs (16 kg)
		220	549	2.5	CEE 7/7 Schuko	
		240	653	2.7	BS-1363	
		220-230 (CE)	549-600	2.5-2.6	CEE 7/7 Schuko	
		230-240 (CE)	600-653	2.6-2.7	BS-1363	
GRS-54-H*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	675	5.6	NEMA 5-15P	40 lbs (19 kg)
		220	618	2.8	CEE 7/7 Schuko	
		240	735	3.1	BS-1363	
		220-230 (CE)	618-675	2.8-2.9	CEE 7/7 Schuko	
		230-240 (CE)	675-735	2.9-3.1	BS-1363	
GRS-60-H*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	750	6.3	NEMA 5-15P	44 lbs (20 kg)
		220	686	3.1	CEE 7/7 Schuko	
		240	817	3.4	BS-1363	
		220-230 (CE)	686-750	3.1-3.3	CEE 7/7 Schuko	
		230-240 (CE)	750-817	3.3-3.4	BS-1363	
GRS-66-H*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	825	6.9	NEMA 5-15P	49 lbs (23 kg)
		220	755	3.4	CEE 7/7 Schuko	
		240	898	3.7	BS-1363	
		220-230 (CE)	755-825	3.4-3.6	CEE 7/7 Schuko	
		230-240 (CE)	825-898	3.6-3.7	BS-1363	
GRS-72-H*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	900	7.5	NEMA 5-15P	50 lbs (23 kg)
		220	823	3.7	CEE 7/7 Schuko	
		240	980	4.1	BS-1363	
		220-230 (CE)	823-900	3.7-3.9	CEE 7/7 Schuko	
		230-240 (CE)	900-980	3.9-4.1	BS-1363	

\* NSF requires units 36" (914 mm) and over in width or weighing more than 80 lbs. (36 kg) to be either sealed, or raised on the installation surface with the 4" (102 mm) legs included.

\* Shipping weight includes packaging.





# Glo-Ray® Heated Shelves

Models: GRS-18, -24, -30, -36, -42, -48, -54, -60, -66, -72 (all depths)

## SPECIFICATIONS Glo-Ray® Heated Shelves

The shaded areas contain electrical information for International models

### 21.5" (546 mm) DEPTH (J)

Model	Dimensions W x H (height includes legs)	Voltages Single Phase	Watts	Amps	Plug	Ship Weight*
GRS-18-J	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	300	2.5	NEMA 5-15P	19 lbs (9 kg)
		220	274	1.2	CEE 7/7 Schuko	
		240	327	1.4	BS-1363	
		220-230 (CE)	274-300	1.2-1.3	CEE 7/7 Schuko	
		230-240 (CE)	300-327	1.3-1.4	BS-1363	
GRS-24-J	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	375	3.1	NEMA 5-15P	24 lbs (11 kg)
		220	343	1.6	CEE 7/7 Schuko	
		240	408	1.7	BS-1363	
		220-230 (CE)	343-375	1.6	CEE 7/7 Schuko	
		230-240 (CE)	375-408	1.6-1.7	BS-1363	
GRS-30-J	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	450	3.8	NEMA 5-15P	30 lbs (14 kg)
		220	412	1.9	CEE 7/7 Schuko	
		240	490	2.0	BS-1363	
		220-230 (CE)	412-450	1.9-2.0	CEE 7/7 Schuko	
		230-240 (CE)	450-490	2.0	BS-1363	
GRS-36-J*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	525	4.4	NEMA 5-15P	33 lbs (15 kg)
		220	480	2.2	CEE 7/7 Schuko	
		240	572	2.4	BS-1363	
		220-230 (CE)	480-525	2.2-2.3	CEE 7/7 Schuko	
		230-240 (CE)	525-572	2.3-2.4	BS-1363	
GRS-42-J*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	675	5.6	NEMA 5-15P	39 lbs (18 kg)
		220	618	2.8	CEE 7/7 Schuko	
		240	735	3.1	BS-1363	
		220-230 (CE)	618-675	2.8-2.9	CEE 7/7 Schuko	
		230-240 (CE)	675-735	2.9-3.1	BS-1363	
GRS-48-J*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	750	6.3	NEMA 5-15P	45 lbs (21 kg)
		220	686	3.1	CEE 7/7 Schuko	
		240	817	3.4	BS-1363	
		220-230 (CE)	686-750	3.1-3.3	CEE 7/7 Schuko	
		230-240 (CE)	750-817	3.3-3.4	BS-1363	
GRS-54-J*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	825	6.9	NEMA 5-15P	49 lbs (23 kg)
		220	755	3.4	CEE 7/7 Schuko	
		240	898	3.7	BS-1363	
		220-230 (CE)	755-825	3.4-3.6	CEE 7/7 Schuko	
		230-240 (CE)	825-898	3.6-3.7	BS-1363	
GRS-60-J*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	900	7.5	NEMA 5-15P	53 lbs (24 kg)
		220	823	3.7	CEE 7/7 Schuko	
		240	980	4.1	BS-1363	
		220-230 (CE)	823-900	3.7-3.9	CEE 7/7 Schuko	
		230-240 (CE)	900-980	3.9-4.1	BS-1363	
GRS-66-J*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	975	8.1	NEMA 5-15P	60 lbs (28 kg)
		220	892	4.1	CEE 7/7 Schuko	
		240	1062	4.4	BS-1363	
		220-230 (CE)	892-975	4.1-4.2	CEE 7/7 Schuko	
		230-240 (CE)	975-1062	4.2-4.4	BS-1363	
GRS-72-J*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	1050	8.8	NEMA 5-15P	64 lbs (30 kg)
		220	961	4.4	CEE 7/7 Schuko	
		240	1143	4.8	BS-1363	
		220-230 (CE)	961-1050	4.4-4.6	CEE 7/7 Schuko	
		230-240 (CE)	1050-1143	4.6-4.8	BS-1363	

### 23.5" (597 mm) DEPTH (K)

Model	Dimensions W x H (height includes legs)	Voltages Single phase	Watts	Amps	Plug	Ship Weight*
GRS-18-K	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	325	2.7	NEMA 5-15P	21 lbs (10 kg)
		220	297	1.4	CEE 7/7 Schuko	
		240	354	1.5	BS-1363	
		220-230 (CE)	297-325	1.4	CEE 7/7 Schuko	
		230-240 (CE)	325-354	1.4-1.5	BS-1363	
GRS-24-K	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	425	3.5	NEMA 5-15P	27 lbs (13 kg)
		220	389	1.8	CEE 7/7 Schuko	
		240	463	1.9	BS-1363	
		220-230 (CE)	389-425	1.8	CEE 7/7 Schuko	
		230-240 (CE)	425-463	1.8-1.9	BS-1363	
GRS-30-K	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	525	4.4	NEMA 5-15P	33 lbs (15 kg)
		220	480	2.2	CEE 7/7 Schuko	
		240	572	2.4	BS-1363	
		220-230 (CE)	480-525	2.2-2.3	CEE 7/7 Schuko	
		230-240 (CE)	525-572	2.3-2.4	BS-1363	
GRS-36-K*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	625	5.2	NEMA 5-15P	36 lbs (17 kg)
		220	572	2.6	CEE 7/7 Schuko	
		240	681	2.8	BS-1363	
		220-230 (CE)	572-625	2.6-2.7	CEE 7/7 Schuko	
		230-240 (CE)	625-681	2.7-2.8	BS-1363	
GRS-42-K*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	750	6.3	NEMA 5-15P	43 lbs (20 kg)
		220	686	3.1	CEE 7/7 Schuko	
		240	817	3.4	BS-1363	
		220-230 (CE)	686-750	3.1-3.3	CEE 7/7 Schuko	
		230-240 (CE)	750-817	3.3-3.4	BS-1363	
GRS-48-K*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	850	7.1	NEMA 5-15P	48 lbs (22 kg)
		220	778	3.5	CEE 7/7 Schuko	
		240	925	3.9	BS-1363	
		220-230 (CE)	778-850	3.5-3.7	CEE 7/7 Schuko	
		230-240 (CE)	850-925	3.7-3.9	BS-1363	
GRS-54-K*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	950	7.9	NEMA 5-15P	52 lbs (24 kg)
		220	869	4.0	CEE 7/7 Schuko	
		240	1034	4.3	BS-1363	
		220-230 (CE)	869-950	4.0-4.1	CEE 7/7 Schuko	
		230-240 (CE)	950-1034	4.1-4.3	BS-1363	
GRS-60-K*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	1050	8.8	NEMA 5-15P	56 lbs (26 kg)
		220	961	4.4	CEE 7/7 Schuko	
		240	1143	4.8	BS-1363	
		220-230 (CE)	961-1050	4.4-4.6	CEE 7/7 Schuko	
		230-240 (CE)	1050-1143	4.6-4.8	BS-1363	
GRS-66-K*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	1150	9.6	NEMA 5-15P	68 lbs (31 kg)
		220	1052	4.8	CEE 7/7 Schuko	
		240	1252	5.2	BS-1363	
		220-230 (CE)	1052-1150	4.8-5.0	CEE 7/7 Schuko	
		230-240 (CE)	1150-1252	5.0-5.2	BS-1363	
GRS-72-K*	72" x 5.38" (1829 x 133 mm)	120	1250	10.4	NEMA 5-15P	69 lbs (32 kg)
		220	1144	5.2	CEE 7/7 Schuko	
		240	1361	5.7	BS-1363	
		220-230 (CE)	1144-1250	5.2-5.4	CEE 7/7 Schuko	
		230-240 (CE)	1250-1361	5.4-5.7	BS-1363	

\* NSF requires units 36" (914 mm) and over in width or weighing more than 80 lbs. (36 kg) to be either sealed, or raised on the installation surface with the 4" (102 mm) legs included.

\* Shipping weight includes packaging.





# Glo-Ray® Heated Shelves

Models: GRS-18, -24, -30, -36, -42, -48, -54, -60, -66, -72 (all depths)

## SPECIFICATIONS Glo-Ray® Heated Shelves

The shaded areas contain electrical information for International models

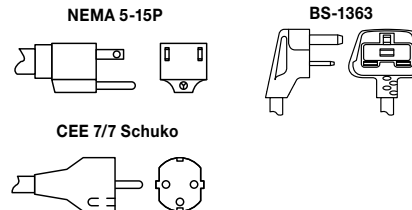
### 25.5" (648 mm) DEPTH (L)

Model	Dimensions W x H (height includes legs)	Voltages Single Phase	Watts	Amps	Plug	Ship Weight*
GRS-18-L	18" x 2.385" (457 x 61 mm) Legs: 1" (25 mm)	120	350	2.9	NEMA 5-15P	22 lbs (10 kg)
		220	320	1.5	CEE 7/7 Schuko	
		240	381	1.6	BS-1363	
		220-230 (CE)	320-350	1.5	CEE 7/7 Schuko	
		230-240 (CE)	350-381	1.5-1.6	BS-1363	
GRS-24-L	24" x 2.385" (610 x 61 mm) Legs: 1" (25 mm)	120	475	4.0	NEMA 5-15P	26 lbs (12 kg)
		220	435	2.0	CEE 7/7 Schuko	
		240	517	2.2	BS-1363	
		220-230 (CE)	435-475	2.0-2.1	CEE 7/7 Schuko	
		230-240 (CE)	475-517	2.1-2.2	BS-1363	
GRS-30-L	30" x 2.385" (762 x 61 mm) Legs: 1" (25 mm)	120	600	5.0	NEMA 5-15P	33 lbs (15 kg)
		220	549	2.5	CEE 7/7 Schuko	
		240	653	2.7	BS-1363	
		220-230 (CE)	549-600	2.5-2.6	CEE 7/7 Schuko	
		230-240 (CE)	600-653	2.6-2.7	BS-1363	
GRS-36-L*	36" x 5.38" (914 x 137 mm) Legs: 4" (102 mm)	120	725	6.0	NEMA 5-15P	37 lbs (17 kg)
		220	663	3.0	CEE 7/7 Schuko	
		240	789	3.3	BS-1363	
		220-230 (CE)	663-725	3.0-3.2	CEE 7/7 Schuko	
		230-240 (CE)	725-789	3.2-3.3	BS-1363	
GRS-42-L*	42" x 5.38" (1067 x 137 mm) Legs: 4" (102 mm)	120	825	6.9	NEMA 5-15P	43 lbs (20 kg)
		220	755	3.4	CEE 7/7 Schuko	
		240	898	3.7	BS-1363	
		220-230 (CE)	755-825	3.4-3.6	CEE 7/7 Schuko	
		230-240 (CE)	825-898	3.6-3.7	BS-1363	
GRS-48-L*	48" x 5.38" (1219 x 137 mm) Legs: 4" (102 mm)	120	950	7.9	NEMA 5-15P	50 lbs (23 kg)
		220	869	4.0	CEE 7/7 Schuko	
		240	1034	4.3	BS-1363	
		220-230 (CE)	869-950	4.0-4.1	CEE 7/7 Schuko	
		230-240 (CE)	950-1034	4.1-4.3	BS-1363	
GRS-54-L*	54" x 5.38" (1372 x 137 mm) Legs: 4" (102 mm)	120	1075	9.0	NEMA 5-15P	58 lbs (27 kg)
		220	984	4.5	CEE 7/7 Schuko	
		240	1171	4.9	BS-1363	
		220-230 (CE)	984-1075	4.5-4.7	CEE 7/7 Schuko	
		230-240 (CE)	1075-1171	4.7-4.9	BS-1363	
GRS-60-L*	60" x 5.38" (1524 x 137 mm) Legs: 4" (102 mm)	120	1200	10.0	NEMA 5-15P	60 lbs (28 kg)
		220	1098	5.0	CEE 7/7 Schuko	
		240	1307	5.4	BS-1363	
		220-230 (CE)	1098-1200	5.0-5.2	CEE 7/7 Schuko	
		230-240 (CE)	1200-1307	5.2-5.4	BS-1363	
GRS-66-L*	66" x 5.38" (1676 x 137 mm) Legs: 4" (102 mm)	120	1325	11.0	NEMA 5-15P	65 lbs (30 kg)
		220	1212	5.5	CEE 7/7 Schuko	
		240	1443	6.0	BS-1363	
		220-230 (CE)	1212-1325	5.5-5.8	CEE 7/7 Schuko	
		230-240 (CE)	1325-1443	5.8-6.0	BS-1363	
GRS-72-L*	72" x 5.38" (1829 x 137 mm) Legs: 4" (102 mm)	120	1450	12.0	NEMA 5-15P	69 lbs (32 kg)
		220	1327	6.0	CEE 7/7 Schuko	
		240	1579	6.6	BS-1363	
		220-230 (CE)	1327-1450	6.0-6.3	CEE 7/7 Schuko	
		230-240 (CE)	1450-1579	6.3-6.6	BS-1363	

## CORD LOCATION

Center of side with controls.

## PLUG CONFIGURATIONS



\* NSF requires units 36" (914 mm) and over in width or weighing more than 80 lbs. (36 kg) to be either sealed, or raised on the installation surface with the 4" (102 mm) legs included.

† Shipping weight includes packaging.

## PRODUCT SPECS Glo-Ray® Heated Shelves

The Heated Shelf shall be a Glo-Ray®... as manufactured by the Hatco Corporation, Milwaukee, WI 53234 U.S.A. The Shelf shall be rated at ... watts, ... volts, and be ... inches (millimeters) in overall width. It shall consist of a thermostatically-controlled heated base and a cord with plug attached.

Options shall include anti-microbial *Designer Color* frame, Hardcoat surface and Thermostat Guard. Accessories shall include 4" (102 mm) adjustable legs, slant leg kit, pan rail and ThruShelf kit.

Warranty consists of 24/7 parts and service assistance (U.S. and Canada only).

HATCO CORPORATION

P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. | (414) 671-6350



[www.hatcocorp.com](http://www.hatcocorp.com)

[support@hatcocorp.com](mailto:support@hatcocorp.com)

[Find a Hatco Rep](#)

[Image Library](#)

[Document Library](#)

[Patents](#)

[Chat](#)



## Submittal Sheet

04/21/2023

### ITEM# 46 - ICE & WATER DISPENSER (1 EA REQ'D)

Hoshizaki DCM-271BAH

Ice Maker/Water Dispenser, Cubelet-Style, air-cooled, self-contained condenser, production capacity up to 257 lb/24 hours at 70°/50° (196 lb AHRI certified at 90°/70°), 10 lb built-in storage capacity, counter model, (2) sets of LED touch buttons (upper and lower), 10-1/4" cup clearance, protected with H-GUARD Plus Antimicrobial Agent, R-404A refrigerant, 4" legs, 115v/60/1-ph, 8.5 amps, cord & NEMA 5-15P, NSF, UL, ADA Compliant

#### ACCESSORIES

Mfr	Qty	Model	Spec
Hoshizaki	1		Warranty: 3-Year parts & labor on entire machine
Hoshizaki	1		Warranty: 5-Year parts on compressor, air-cooled condenser
Hoshizaki	1	H9320-51	Water Filtration System, single configuration, 18.4" H (manifold & cartridge)
Hoshizaki	1		Warranty: 1-Year on entire water filtration system & replaceable elements, standard

## ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	115	60	1	Cord & Plug		5-15P	8.5				





# DCM-271BAH

## CUBELET ICE MACHINE AND WATER DISPENSER



DCM-271BAH  
12/01/20  
Item # 13549

**W x D x H**  
**16<sup>5</sup>/<sub>8</sub>" x 24<sup>1</sup>/<sub>4</sub>" x 31<sup>3</sup>/<sub>4</sub>" \***  
\*including 4" legs






Lower buttons for easy  
wheelchair access



Item #: \_\_\_\_\_  
Project: \_\_\_\_\_  
Qty: \_\_\_\_\_  
AIA#: \_\_\_\_\_

## Features

- ▶ LED touch buttons, upper and lower
- ▶ 10<sup>1</sup>/<sub>4</sub>" cup clearance
- ▶ Quieter operation
- ▶ ADA Compliant 

- Attractive modern design
- Easy to chew, Cubelet ice
- Up to 257 lbs. of ice production per 24 hours
- Built-in storage capacity of 0.3ft<sup>3</sup>/10 lbs. \*
- Durable stainless steel drain pan grate
- Easy-cleaning removable spout
- 2-second flush cycle every hour
- Advanced CleanCycle24™ design 
- Protected by H-GUARD Plus Antimicrobial Agent 
- 6 ft. cord with a NEMA 5-15 plug
- R-404A Refrigerant

## Warranty:

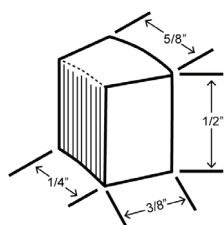
3 Year Parts & Labor on entire machine.  
5 Year Parts on Compressor; air-cooled condenser coil.  
Valid in United States, Canada, Puerto Rico and U.S. Territories. Contact factory for warranty in other countries.

\*Rated in accordance with AHRI Standard 820(I-P). Capacity based on 100% of total volume x 30 lb/ft<sup>3</sup> average density of ice.

Shipping: (LxWxH) 20.88" x 30.63" X 36.25" Volume: 13.42ft<sup>3</sup>

Condenser	Model	ICE PRODUCTION		WATER USAGE		ELECTRICAL				Heat Rejection BTU/hr.	Refrigerant Charge Amount	Net / Ship Weight (lbs.)
		Air / Water Temp Lbs. per 24 hours 70°/ 50°F	90°/ 70°F	Potable Gal. per 100 lbs. 90°/ 70°F	Condenser Gal. per 100 lbs. 90°/ 70°F	kWh Used per 100 lbs. 90°/ 70°F	Max. Fuse Size or HACR Circuit Breaker	Amperage	Voltage			
Air-Cooled	DCM-271BAH	257	196	12.0	N/A	6.9	15A	8.5A	115V/60/1	3,300	14.8 oz	136 / 154

## Cubelet Dimensions\*



\* approximate size in inches, image not to scale

## Operating Limits

- Ambient Temp Range 45 - 100°F
- Water Temp Range 45 - 90°F
- Water Pressure 10 - 113 PSIG
- Voltage Range 104 - 127V

## Service

- Allow 6" (15cm) clearance at rear and sides for proper air circulation and ease of maintenance and/or service should they be required. Allow 24" (61 cm) clearance at top to allow for removal of auger.

Not intended for outdoor use - avoid placement in direct sunlight.

## Plumbing

- Ice maker Water Supply Line: Minimum 1/4" Nominal ID Copper Water Tubing or Equivalent
- Ice maker Drain Line: Minimum 3/4" Nominal ID Hard Pipe or Equivalent
- 3/4" MPT drain

## Water Filter

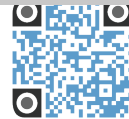
Please refer to water filter specification sheet for recommendations.

Hoshizaki reserves the right to change specifications without notice.



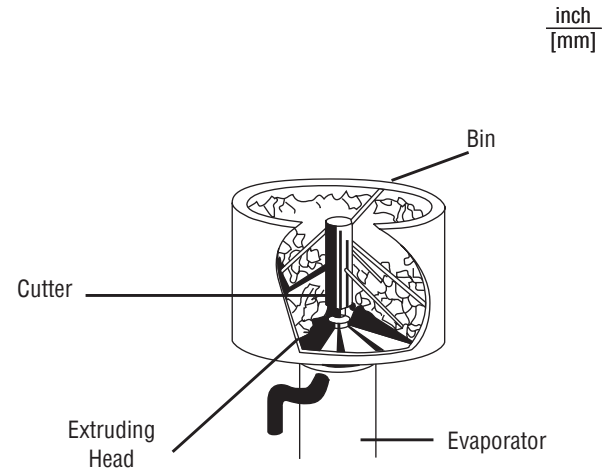
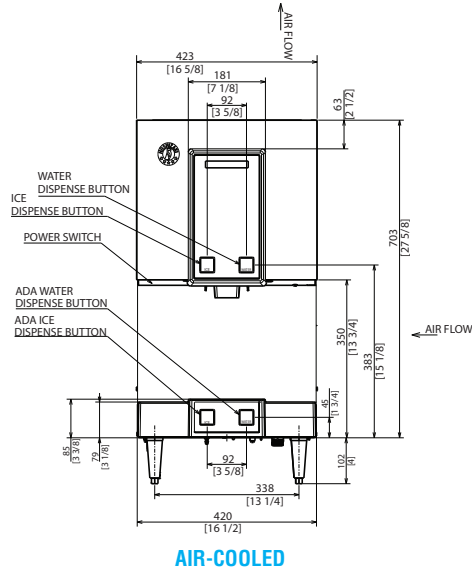
# DCM-271BAH

## CUBELET ICE MACHINE AND WATER DISPENSER

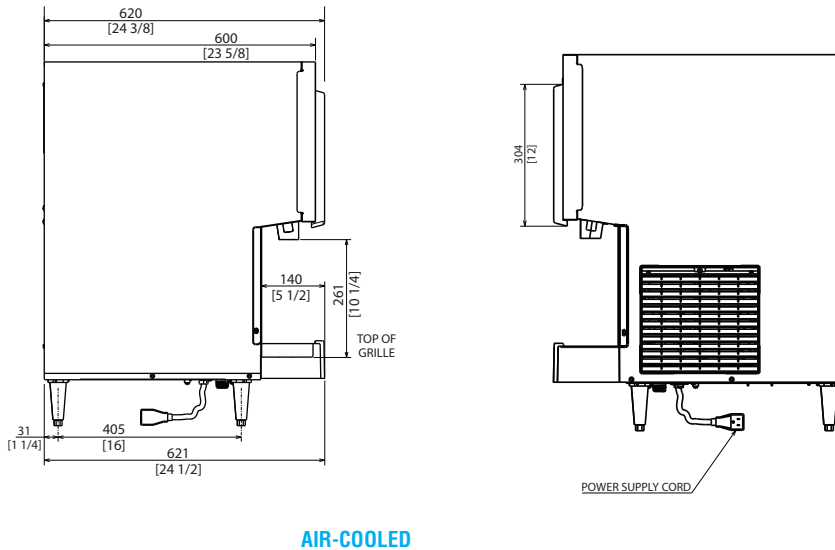


DCM-271BAH  
12/01/20  
Item # 13549

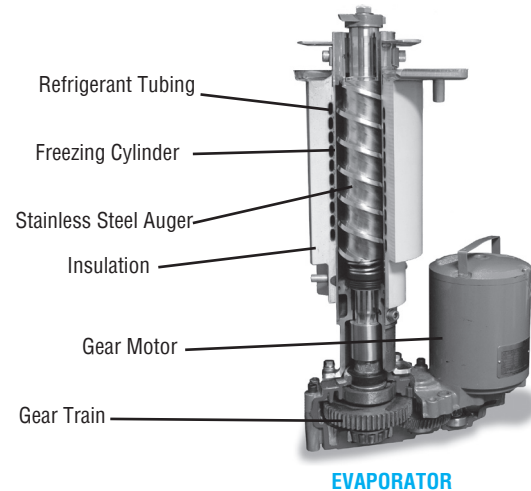
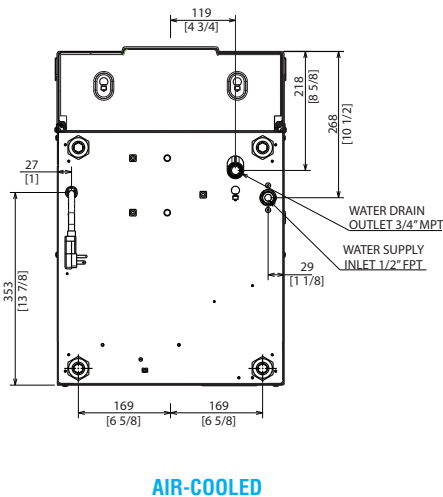
FRONT VIEW



SIDE VIEW



BOTTOM VIEW





# WATER FILTERS

## FILTRATION SYSTEMS



WATER FILTERS  
06/26/20  
Item # 13076

Item #: \_\_\_\_\_  
Project: \_\_\_\_\_  
Qty: \_\_\_\_\_  
AIA#: \_\_\_\_\_

### H9320 FILTER

Single, Double, Triple



**H9320-51**

**Single Configuration**  
18.4" H\*



**H9320-52**

**Double Configuration**  
19.11" H\*



**H9320-53**

**Triple Configuration**  
19.15" H\*

\*height includes manifold and cartridge

### HOSHIZAKI H9320 FILTER

Available in single, double and triple configurations. Rated NSF Class 1, STD 42, for taste, odor and chlorine reduction and for mechanical filtration (95.6% removal of particles one (1) micron and larger in size.)

- Keep ice makers functioning at full capacity
- 93.7% average reduction of chlorine from incoming water supply, eliminating tastes and odors of the ice
- Filters are rated as one (1) micron nominal producing crystal clear ice
- Decrease machine maintenance by reducing lime scale build-up

Model	Filter	Max Flow Rate	Working Pressure	Temperature	Capacity
H9320-51	4HC-H	2 gpm	10-125 psi	35-100°F	21,000 gal
H9320-52	4HC-H	4 gpm	10-125 psi	35-100°F	42,000 gal
H9320-53	4HC-H	6 gpm	10-125 psi	35-100°F	63,000 gal

### Plumbing

Inlet/Outlet Connections: Single: (2) 3/8" FNPT

Double & Triple: (1) 3/4" MNPT / (1) 3/4" FNPT

The H9320 Filters and their respective cartridges have been tested and listed by NSF only for the functions listed above. Check for compliance with state and local laws and regulations. Do not use where the water is microbiologically unsafe, or with waters of unknown quality without adequate disinfection before or after the unit. The H9320 filter can be used with water that may contain filterable cysts.



The H9320 System is tested and certified by NSF International against NSF/ANSI Standard 42 for the reduction of:

#### Std. No. 42 - Aesthetic effects

Aesthetic Effects	Mechanical Filtration
Bacteriostatic Effects	Nominal Particulate Class 1
Chemical Reduction	Taste & Odor
Chlorine	

### E-10 PREFILTER (9795-80)

### E-20 PREFILTER (9795-90)



**E-10  
PREFILTER**  
(9795-80)

Recommended for  
single configuraton

**E-20  
PREFILTER**  
(9795-90)

Recommended for  
twin and triple  
configuration

E-10 and E-20 Prefilters can be used for ice. Everpure prefilters are designed to increase the life of Hoshizaki 4HC-H water filters in areas with an unusual amount of dirt in the water. With a 10 micron (nominal) rating, the economical Everpure prefilter traps much of the dirt which contributes to scale buildup in ice makers, and clogs the delicate orifices of other water-using equipment.

When you install an Everpure prefilter, the Hoshizaki 4HC-H water filters can concentrate on what they do best: remove particles one (1) micron nominal and larger in size.

#### Replacement Cartridges:

E-10 Prefilters: 12 pack (9534-12)  
40 pack (9534-40)

E-20 Prefilters: 6 pack (9534-26)  
20 pack (9534-20)



#### Warranty:

One Year replaceable elements\*  
One Year the entire system

\* Warranty applies to material defects in materials & workmanship only.

Hoshizaki reserves the right to change specifications without notice.



# WATER FILTERS

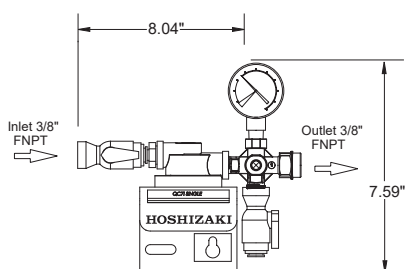
## FILTRATION SYSTEMS



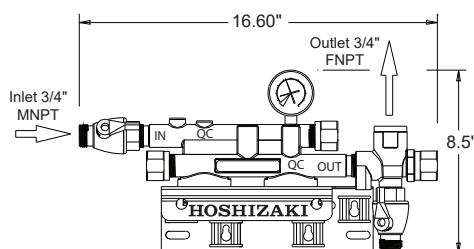
WATER FILTERS  
06/26/20  
Item # 13076

Model Number	Description Flow Rate (Gal. per min.)	Undercounter KMs	KM Cubers	IM Cubers	Cubelets & Flakers	DCM/DBs
H9320-51	Single (2 GPM)	AM-50 KM-81 KM-116 KM-161 KM-231 KM-301	KM-350, 520, 660 KML-325, 500, 700 KMD-410, 460, 530 KMS-830 DKM-500	IM-200, 500	All Models	All Models
H9320-52	Twin 2 x (2 GPM)	N/A	KM-901, 1100 KMD-860 KMS-822, 1122, 1402	IM-50BAA-Q	N/A	N/A
H9320-53	Triple 3 x (2 GPM)	N/A	KM-1301, 1340, 1601, 1900, 2200, 2600 KMH-2100 KMS-2000	N/A	N/A	N/A
H9655-11	Replacement Cartridge (1) One each	Recommended water filter configurations based on average ice machine usage and regular filter replacement. If your operation has challenging water conditions or higher usage, then it may be necessary to use an additional filter or prefilter.				

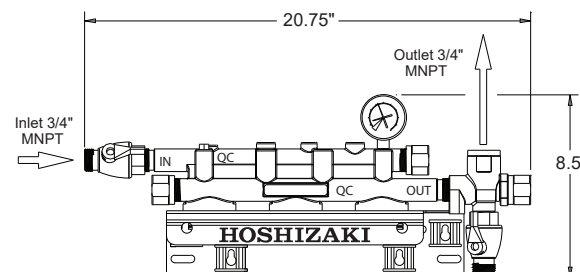
### Single



### Twin



### Triple



**SECTION 122113  
HORIZONTAL LOUVER BLINDS**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Horizontal louver blinds with polymer.

**1.2 SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details for horizontal louver blinds.
- C. Samples: For each exposed product and for each color and texture specified, 12 inches long.
- D. Samples for Verification: For each type and color of horizontal louver blind indicated.
  - 1. Slat: Not less than 12 inches long.
  - 2. Tapes: Full width, not less than 6 inches long.
  - 3. Horizontal Louver Blind: Full-size unit, not less than 16 inches wide by 24 inches long.
  - 4. Valance: Full-size unit, not less than 12 inches wide.
- E. Window Treatment Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

**1.3 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing content.
  - 1. Horizontal Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and gloss indicated, but no fewer than two units.

**1.4 QUALITY ASSURANCE**

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers:
  - 1. SWF Contract
- B. Requests for substitutions will be considered in accordance with provisions of Section 016000.

### 2.2 HORIZONTAL LOUVER BLINDS, POLYMER BLINDS

- A. Flame-resistance rating: comply with NFPA 701; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Slats: Polymers that are lead free, UV stabilized, integrally colored, opaque, and Will not crack or yellow; antistatic, dust repellent treated.
  - 1. Width: 2 inch.
  - 2. Thickness: manufacturer's standard.
  - 3. Spacing: manufacturer's standard.
  - 4. Profile: manufacturer's standard.
  - 5. Features:
    - a. Lift-cord rout holes: minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gap between slats.
- C. Headrail: formed steel or extruded aluminum; long edges returned or rolled. Headrail fully encloses operating mechanisms on three sides and ends.
  - 1. Capacity: one blind per headrail unless otherwise indicated.
  - 2. Manual lift mechanism:
    - a. Lift-cord lock: variable; stops lift cord at user-selected position within full operating range.

3. Manual tilt mechanism: enclosed work-gear mechanism and linkage rod that adjusts ladders.
    - a. Tilt: full
    - b. Tilt: two direction, positive stop or lockout limited at an angle of 80 degrees from horizontal both directions.
    - c. Operator: clear plastic wand.
    - d. Over-rotation protection: manufacturer's detachable operator of slip clutch
    - e. to prevent over rotation of gear.
    - f. Location: all windows, typical and accessible.
  4. Manual lift-operator cord: custom length, shortened cord to comply with accessible reach range height minimum.
  5. Manual lift-operator and tilt operator locations: Manufacturer's standard unless otherwise indicated.
- D. Bottom Rail: secures and protects ends of ladders and lift cords.
  1. Type: manufacturer's standard.
- E. Lift cord: manufacturer's standard braided cord.
- F. Ladders: evenly spaced across headrail at spacing that prevents long term slat sag.
  1. Type: braided cord.
- G. Valance: manufacturer's standard.
- H. Mounting brackets: with spacers and shims required for blind placement and alignment indicated.
  1. Type wall or overhead.
  2. Intermediate support: Provide intermediate support brackets to produce support spacing recommended by blind manufacture for weight and size of blind.
- I. Hold down brackets and hooks or pins: manufacturer's standard.
- J. Colors, textures, patterns and gloss:
  1. Slats: See interior design finish schedule.
  2. Components: provide rails, cords, ladders and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and

aligned with adjacent units according to manufacturer's written instructions.

1. Locate so exterior slat edges are not closer than 1 inch from interior faces of glass and not closer than 1/2 inch from interior faces of glazing frames through full operating ranges of blinds.
2. Install mounting and intermediate brackets to prevent deflection of headrails.
3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

### 3.3 ADJUSTING

- A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

### 3.4 CLEANING AND PROTECTION

- A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer and that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

**END OF SECTION**



**SECTION 122413  
ROLLER WINDOW SHADES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Shade Type 1: Manual operated solar roller shades with single rollers.
- B. Related Requirements:
  - 1. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
  - 2. Division 09 Section "Gypsum Board Assemblies" and/or "Acoustical Ceilings" Coordination with gypsum board assemblies and/or acoustical ceiling systems for installation of shade pockets, closures, and related accessories.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
  - 2. Storage and handling requirements and recommendations.
  - 3. Mounting details and installation methods.
  - 4. Flame spread data for each product type.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
- C. Samples for Initial Selection: For each type and color of shadeband material.
  - 1. Include samples of accessories involving color selection.
- D. Samples for Verification: For each type of roller shade.
  - 1. Shadeband Material: Not less than 10 inches square. Mark inside face of material if applicable.
  - 2. Roller Shade: Full-size operating unit, not less than 12 inches wide by 12 inches long for each type of roller shade indicated.
  - 3. Installation Accessories: Full-size unit, not less than 10 inches (250 mm) long.
- E. Roller-Shade Schedule: Use same designations indicated on Drawings.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.

- B. Product Certificates: For each type of shadeband material, signed by product manufacturer.
- C. Product Test Reports:
  - A. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
  - B. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roller shades to include in maintenance manuals.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Roller Shades:
    - a. Fabric equal to 5 percent of quantity installed for each color, and shadeband material indicated.
    - b. Brackets equal to 5 percent of quantity installed for each type on project.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Installer trained and certified by the manufacturer having at least ten years experience installing products comparable to those specified in this section.

#### 1.8 WARRANTY

- A. Manual Roller Shade Hardware and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.
- B. Roller Shade Installation: One year from date of substantial completion, not including scaffolding, lifts, and other means of access.

#### 1.9 MOCKUPS

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
  - 3. Mock ups to remain in place through completion of work or to be archived by General Contractor to serve as an objective standard of work.
  - 4. Mock ups requested by architect shall be paid for by owner.

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

#### 1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- 1. See Interior Design finish schedule.
- B. Source Limitations: Obtain roller shades from single source from single manufacturer.

#### 2.2 MANUALLY OPERATED SOLAR SHADES WITH SINGLE ROLLERS

- A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated
  - 1. Bead Chains: Stainless steel
    - a. Loop Length: Full length of roller shade.
    - b. Limit Stops: Provide upper and lower ball stops.
    - c. Chain-Retainer Type: Standard Clip.
  - 2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.
    - a. Provide for shadebands that weigh more than 12 lb or for shades as recommended by manufacturer, whichever criteria are more stringent.
- B. Rollers: Corrosion-resistant extruded-aluminum tubes of diameters and wall thicknesses required for accommodating operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
  - 1. Roller Drive-End Location: As indicated on Drawings.
  - 2. Direction of Shadeband Roll: Regular, from back of roller.
  - 3. Shadeband-to-Roller Attachment: Removable spline fitting integral channel in tube
- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
  - 1. Brackets: Constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade
  - 2. Plastics: Provide self-lubricating plastic for all plastic components of shade hardware.

## 2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
  - 1. Basis of Design: MechoSystems EuroTwill 6450 Series.
  - 2. Type: Extruded vinyl yarn comprising of 21 percent polyester and 79 percent reinforced vinyl.
  - 3. Roll Width: 126 inches.
  - 4. Weave: Basketweave.
  - 5. Orientation of Shadeband: As indicated on Drawings.
  - 6. Openness Factor: See Interior Design finish schedule.
  - 7. Color: As selected by Architect from manufacturer's full range.
- C. Shadeband Bottom Hembar: Extruded Aluminum.
  - 1. Type: Enclosed in sealed pocket of shadeband material with welded seams including welded ends.
  - 2. Hemweights: Hemweights must be of appropriate size and weight for shade.

## 2.4 INSTALLATION ACCESSORIES

- A. Roller Shade Pocket:
  - 1. Gypsum Board pocket with continuous overhead blocking provided by others.
  - 2. No cost pocket with continuous overhead blocking provided by others.
- B. Closure and Closure Mount: Provided by shade contractor.
  - 1. Provide exposed extruded aluminum closure mount and removable closure panel to provide access to shades in pocket conditions.
- C. Front Fascia: SnapLoc aluminum extrusion that conceals front and underside of roller and operation mechanism and attaches to roller endcaps without exposed fasteners. Provide for all exposed shades.
  - 1. Shape: L-shaped.
  - 2. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open.
  - 3. Endcap Covers: To cover exposed endcaps.
  - 4. Color and Finish: As selected from manufacturer's full range.

## 2.5 ROLLER-SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
  - 1. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:

1. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, [accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 ROLLER-SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
  1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.
- B. Electrical Connections: Connect motor-operated roller shades to building electrical system.
- C. Turn-Key Single-Source Responsibility for Motorized Interior Roller Shades: To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:
  1. Main Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the mechanical and electrical drawings
  2. Main Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
  3. Roller shade installer/dealer shall run line voltage (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
  4. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/ control locations designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction
  5. Main Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

**END OF SECTION**

**SECTION 123530  
RESIDENTIAL CASEWORK**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Kitchen and vanity cabinets.
- B. Related requirements:
  - 1. Section 123661.13 – Cultured Marble Countertops
  - 2. Section 123661.16 – Solid Surface Countertops

**1.2 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Cabinets.
  - 2. Cabinet hardware.
- C. Shop Drawings: Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, and hardware.
- D. Samples: For cabinet finishes.
- E. Samples for Verification: 8-by-10 inch Samples for each type of finish.
  - 1. Exposed hardware, for each type of item.
  - 2. One full-size door.

**1.3 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet work is complete and dry, and temporary HVAC system is operating and maintaining temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Provide fillers and scribes to allow for trimming and fitting.
- C. Field Measurements: Where casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For manufacturer.
- B. Product Certificates: for casework.

## 1.5 MAINTENANCE SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 5 hinges, 5 glides, and 5 pulls.

## 1.6 COORDINATION

- A. Coordinate layout and installation of blocking and reinforcement in partitions for support of casework.

## PART 2 - PRODUCTS

### 2.1 CABINETS

- A. Manufacturer:
1. See interior design finish schedule.
  2. Substitutions: comply with section 012500.
    - a. Any substitutions shall provide the standard 4-inch/4 1/2-inch toe kick for accessible units to match typical units. If it does not, all cabinetry at accessible units will be custom.
- B. Quality Standard: Provide cabinets that comply with KCMA A161.1.
- C. KCMA Certification: Provide cabinets with KCMA's "Certified Cabinet" seal affixed in a semi exposed location of each unit and showing compliance with the above standard.
- D. Exposed Wood Species: Maple
- E. Face Style: See Interior Design Finish Schedule.
- F. Cabinet Style: Face frame, 3/4", solid wood with wood veneer face frames, drawers and doors.
- G. Door and Drawer Fronts: Solid-wood stiles and rails, 3/4-inch-thick, with 1/4-inch thick, veneer-faced plywood center panels.
- H. Exposed Cabinet End Finish: Wood veneer.
- I. Cabinet End Construction: 1/2-inch thick plywood.
- J. Cabinet Tops: 1/2-inch-thick plywood.
- K. Cabinet Bottoms: 1/2-inch-thick plywood.
- L. Back, Top and Bottom Rails: 3/4 inch-by-2-
- M. 1/2-inch solid wood, interlocking with end panels and rabbeted to receive top and bottom panels. Back rails secured under pressure with glue and with mechanical fasteners.
- N. Wall-Hung-Unit Back Panels: 1/2-inch-thick plywood fastened to rear edge of end panels



and to top and bottom rails.

- O. Base-Unit Back Panels: 1/2-inch-thick plywood fastened to rear edge of end panels and to top and bottom rails.
- P. Front Frame Drawer Rails: 3/4-by-1 – 3/4-inch solid wood mortised and fastened into face frame.
- Q. Toe kick: 3/4" thick pressure treated with wood veneer face. Standard 4-inch/4 1/2-inch toe kick at typical and accessible units.
- R. Drawers: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
  - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
  - 2. Subfronts, Backs, and Sides: 3/4-inch thick plywood.
  - 3. Bottoms: 3/16-inch thick plywood.
  - 4. Guides: 75 lb. rated epoxy coated side mount, self-closing.
- S. Interiors: stained/sealed veneers and solids.
- T. Shelves: 3/4-inch-thick plywood, at wall cabinets adjustable up to 24" wide; at base cabinets 11" deep 1/2 shelf.
- U. Joinery: Rabbet backs flush into end panels and secure with concealed mechanical fasteners. Connect tops and bottoms of wall cabinets and bottoms and stretchers of base cabinets to ends and dividers with mechanical fasteners. Rabbet tops, bottoms, and backs into end panels.
- V. Factory Finishing: Finish cabinets at factory. Defer only final touch-up until after installation.

## 2.2 CABINET MATERIALS

- A. General:
  - 1. Adhesives and Composite Wood and Agrifiber Products: Do not use products that contain added urea formaldehyde product shall be urea formaldehyde-free.
  - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  - 3. VOC content for adhesives shall have levels, in grams per liter, less than or equal to the thresholds established by the South Coast Air Quality Management District (SCAQMD) Rule 1168.
  - 4. Composite Wood and Agrifiber Products: Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  - 5. Hardwood Lumber: Kiln dried to 7 percent moisture content.
  - 6. Softwood Lumber: Kiln dried to 10 percent moisture content.
  - 7. Hardwood Plywood: HPVA HP-1; made with adhesive containing no added urea formaldehyde.
  - 8. Particleboard: ANSI A208.1, Grade M-; made with binder containing no added urea formaldehyde.

9. Particleboard: Straw-based particleboard complying with requirements in ANSI A208.1, Grade M-2, except for density.
  10. MDF: ANSI A208.2, Grade MD; made with binder containing no urea formaldehyde.
  11. Hardboard: ANSI A135.4, Class 1 Tempered
- B. Exposed Materials:
1. Exposed Wood Species: Maple.
    - a. Select materials for compatible color and grain. Do not use two adjacent exposed surfaces that are noticeably dissimilar in color, grain, figure, or natural character markings.
    - b. Staining and Finish: See Interior Design Finish Schedule.
  2. Solid Wood: Clear hardwood lumber of species indicated, free of defects.
  3. Plywood: Hardwood plywood with face veneer of species indicated, with Grade A faces and Grade C backs of same species as faces.
    - a. Edge band exposed edges with a minimum of 1/8-inch veneer edging of same species as face veneer.
- C. Semi-exposed Materials: Unless otherwise indicated, provide the following:

## 2.3 CABINET HARDWARE

- A. General: Manufacturer's standard units complying with BHMA A156.9, of type, size, style, material, and finish as selected by Architect from manufacturer's full range.
- B. Pulls: Wire pulls. See Interior Design Finish Schedule.
- C. Hinges: Concealed European-style, self-closing hinges.
- D. Drawer Guides: Epoxy-coated-metal, self-closing drawer guides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; and complying with BHMA A156.9, Type B05011 or Type B05091.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install cabinets with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.

- B. Install cabinets without distortion so doors and drawers fit the openings, are aligned, and are uniformly spaced. Complete installation of hardware and accessories as indicated.
- C. Install cabinets level and plumb to a tolerance of 1/8 inch in 8 feet.
- D. Fasten cabinets to adjacent units and to backing.
  - 1. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.

### 3.3 ADJUSTING AND CLEANING

- A. Adjust cabinets and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- B. Clean casework on exposed and semi exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

**END OF SECTION**

**SECTION 123661.13**  
**CULTURED MARBLE VANITY TOPS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Cultured Marble Vanity Tops.
- B. Accessories.

**1.2 RELATED REQUIREMENTS**

- A. Section 123530 – Residential Casework.

**1.3 REFERENCE STANDARDS**

- A. ANSI A208.1 – Particleboard; 2009.
- B. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2009.
- C. ANSI/NEMA LD-3 – high-Pressure Decorative Laminates (HPDL); 2005.
- D. ANSI Z124.6 – Plastic Sinks; 2007.
  - 1. Section 5.2: Stain Resistance.
  - 2. Section 5.3: Wear and Cleanability.
  - 3. Section 5.4: Cigarette Test.
  - 4. Section 5.5: Chemical Resistance.
- E. ASTM C 97 – Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone; 2009.
- F. ASTM C 501 – Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser; 2009.
- G. ASTM C 650 - Standard Test Method for Resistance of Ceramic Tile to Chemical Substances; 2009.
- H. ASTM C 880 – Standard Test Method for Flexural Strength of Dimension Stone; 2009.
- I. ASTM C 1026 - Standard Test Method for Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling
- J. ASTM C 1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method; 2007, Edition 1.
- K. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010
- L. ASTM E 228 – Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push-Rod Dilatometer; 2006.
- M. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2009.
- N. AWI (QCP) – Architectural Woodwork Standards (Quality Certification Program), [www.awiqcp.org](http://www.awiqcp.org); current edition at [www.awiqcp.org](http://www.awiqcp.org).
- O. AWMAC (GIS) – Architectural Woodwork Manufacturers Association of Canada (Guarantee and Inspection Services Program); current edition at [www.awmac.com/gis.php](http://www.awmac.com/gis.php).
- P. AWS (AWI/AWMAC/WI) - Architectural Woodwork Standards (Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute) ([www.awinet.org](http://www.awinet.org) - [www.awmac.com](http://www.awmac.com) - [www.woodworkinstitute.com](http://www.woodworkinstitute.com)); Edition 1, 2009.
- Q. ISSFA-2-01 – Classification and Standards for Solid Surfacing Materials; 2007.

- R. MIA-DSDM – Marble Institute of America, Dimension Stone Design Manual; 2005.
- S. PS 1 – Structural Plywood; 2007.

#### 1.4 SUBMITTALS

- A. Comply with Section 013300 – Submittal Procedures, for administrative and procedural requirements for processing of submittals during the construction phase.
- B. Product Data: Provide data on material characteristics, performance criteria and limitations, installation instructions, and cleaning and maintenance instructions.
- C. Shop Drawings: Provide complete detailed and dimensioned drawings combined with shop drawings of cabinets and casework specified in other sections showing fabrication details, edging, sink installation, coving, seams, fastener types and locations, use and type of sealant, and fabrication details for support brackets.
- D. Samples: Provide samples of colors as indicated on Drawings; submit 4-inch by 4-inch samples showing each color and finish.
  - 1. When colors are not indicated on Drawings, submit manufacturer's standard color book showing colors of actual material in greater than 1 1/2 inch size.
  - 2. Upon selection of colors, submit samples as indicated above.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Certificates: Certify that products meet or exceed specified requirements.
  - 1. Low emitting VOC.
  - 2. Does not support growth of mold, mildew and bacteria on surface.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Approved by the cabinet manufacturer.
- B. Installer Qualifications: Fabricator.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling: Store materials in clean, dry, interior area in accordance with manufacturer's instructions. Protect materials from damage during handling and installation.

#### 1.7 AMBIENT CONDITIONS

- A. Maintain ambient temperature of 50 to 95 degrees F (10 to 35 degrees C) for 48 hours before, during and for minimum 7 days after installation.

## 1.8 WARRANTY

- A. Manufacturer Warranty: Submit manufacturer's standard One Year Limited Warranty from the date of purchase against avoidable and unnatural defects in material and workmanship.
  - 1. Warranty does not cover the following;
    - a. Installation of products or any product used or installed in connection with this work.
    - b. Defects from miss-use, abuse, accident, alteration, improper care or failure to perform reasonable and necessary maintenance after installation.
  - 2. Warranty Performance:
    - a. Any products covered by this warranty that under normal use and within period of time indicated, prove to be defective, these products will be repaired or replaced by manufacturer without charge.
    - b. Manufacturer will not provide, or pay expenses for removal of defective products, installation of repaired or replaced products, or transportation of either repaired, replaced, or defective products.
    - c. Others shall provide payment for removal, installation or transportation.

## PART 2 PRODUCTS

### 2.1 MANUFACTURER

- 1. See Interior Design finish schedule.

### 2.2 VANITY TOPS

- A. Cultured Marble Vanity Tops: Sheet or slab of polyester resin composite over vanity base.
  - 1. Sheet Thickness: 3/4 inch.
  - 2. Natural Marble, Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISSFA-2 and NEMA LD 3; polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
  - 3. Surface Burning Characteristics: Flame spread 25, maximum; smoke developed 450, maximum; when tested in accordance with ASTM E 84.
  - 4. Sinks: Integral castings, with at least 3/4 inch wall thickness; comply with ANSI Z124.3.
  - 5. Finish on Exposed Surfaces: Polished.
  - 6. Color and Pattern: See interior design finish schedule.
  - 7. Exposed Edge Treatment: As selected by Architect.
  - 8. Back and End Splashes: Integral with vanity top.
    - a. Height: 4 inch.
  - 9. Color: See Interior Design finish schedule.

### 2.3 FABRICATION

- A. Fabricate components to greatest extent practical in sizes and shapes as indicated and in accordance with MIA- DSDM.
  - 1. Inspect surfacing prior to fabrication.
- B. Fabricate joints between components using manufacturer's recommended, color matched, joint adhesive, reinforce as required.
- C. Fabricate factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
- D. Fabricate and finish routed edges of component with clean, sharp returns.
- E. Fabricate cutouts, radii and contours using template to ensure clean, sharp edges.
- F. Fabricate backsplash height and profile as indicated on Drawings.
- G. Fabricate vanity top components with finish as indicated.

### 2.4 FABRICATION TOLERANCE

- A. Panel Thickness Tolerance:
  - 1. Thickness of 3/8 to 1/2 inch (9.5 mm to 12.7 mm): Plus or minus 1/32 inch (0.8 mm).
  - 2. Thickness of 3/4 to 1 5/8 inch (19 mm to 41.3 mm): Plus or minus 1/8 inch (3.2 mm).
  - 3. Thickness Greater Than 1 5/8 inch (41.3 mm): Plus or minus 1/4 inch (6.4 mm).
- B. Panel Face Dimension: Plus or minus 1/16 inch (1.6 mm).
- C. Rectangular Face Variation (Maximum out of Square): Plus or minus 1/16 inch (1.6 mm).
- D. Edges: Plus or minus 1/16 inch (1.6 mm).

## 2.5 ACCESSORIES

- A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.
- B. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf minimum density; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.
- C. Medium Density Fiberboard for Supporting Substrate: ANSI A208.2.
- D. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- E. Backsplashes: Provide integral.
- F. Endsplashes: Provide end mounted, loose.

## PART 3 EXECUTION

### 3.1 VERIFICATION OF CONDITIONS

- A. Verify that field conditions are acceptable and are ready to receive this work.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for installation of this work.

### 3.2 INSTALLATION

- A. Install vanity top materials in accordance with manufacturer's instructions.
- B. Install components plumb and level and in accordance with approved shop drawings and installation details.
- C. Install backsplashes and endsplashes as indicated on Drawings.
  - 1. Adhere to countertops using appropriate adhesive and color matched silicone sealant.
- D. Interface with Other Work: Provide proper installation of other materials and work as necessary for a complete and properly functioning system.

### 3.3 CLEANING

- A. Remove adhesives, sealants and other stains from surfaces in accordance with manufacturer's instructions.
- B. Clean countertops prior to date of Substantial Completion.

### 3.4 PROTECTION

- A. Protect surfaces from damage during construction until date of Substantial Completion, replace damaged work.

## END OF SECTION

**SECTION 123661.16**  
**SOLID SURFACE COUNTERTOPS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Solid surface countertops.
- B. Related Sections:
  - 1. Section "Plumbing Fixtures" for sinks and plumbing fittings.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification: For the following products:
  - 1. Countertop material, 6 inches square.
  - 2. One 8 by 10-inch solid surface countertop, with front edge, of construction and in configuration specified.

**1.4 PROJECT CONDITIONS**

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

**1.5 COORDINATION**

- A. Coordinate locations of utilities that will penetrate countertops.



## **PART 2 - PRODUCTS**

### **2.1 SOLID SURFACE COUNTERTOPS**

- A. Manufacturers:
  - 1. Refer to Interior Design finish schedule.
- B. Configuration: Provide countertops with the following front and backsplash style.
  - 1. Front: Straight, slightly eased at top.
  - 2. Splashes: No splashes at wall tile.
- C. Countertops: 3/4-inch-thick, solid surface material with front edge built up with same material.
- D. Fabrication: Fabricate tops in one piece with shop-applied edges and backsplashes as appropriate unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

### **2.2 COUNTERTOP MATERIALS**

- A. Certified Wood Materials: Fabricate countertops with wood and wood-based products produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. Composite Wood and Agrifiber Products: Provide products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Particleboard: ANSI A208.1, Grade M-2.
- D. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
- E. Adhesives: Adhesives shall not contain urea formaldehyde.
- F. Adhesives: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- G. Solid surface material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet.

- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
1. Seal edges of cutouts in particleboard sub-tops by saturating with varnish.
  2. Install backsplashes and end splashes to comply with manufacturer's written instruction for adhesives, sealers, fabrication and finishing.

**END OF SECTION**

**SECTION 123661.19**  
**QUARTZ SURFACING**

**Part1-General**

**1.1 SECTION INCLUDES**

- A. Section includes quartz surfacing for (includes, but not limited to):
1. Quartz Countertops.
  2. Setting materials and accessories.

**1.2 RELATED SECTIONS**

Related Sections include the following:

- A. Administrative, procedural and temporary work requirements.
- B. Section 064113 – Wood Veneer Custom Cabinets
- C. Section 064116 – Plastic Laminate Clad Architectural Cabinets.

**1.3 REFERENCES**

A. ASTM International:

1. C-97 Absorption and Bulk Specific Gravity of Dimension Stone.
2. C-99 Modulus of Rupture of Dimension Stone.
3. C-170 Compressive Strength of Dimension Stone.
4. C-370 Moisture Expansion.
5. C-501 Relative Resistance to Wear of Unglazed Tile to Taber Abrader.
6. C-482 Bond Strength of Ceramic Tile to Portland Cement.
7. C-484 Thermal Shock Resistance of Glazed Ceramic Tile.
8. C-531 Linear Shrinkage and Coefficient of Thermal Expansion of Chemical - Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concrete.
9. C-648 Breaking Strength of Ceramic Tile.
10. C-1026 Resistance of Ceramic Tile to Freeze Thaw Cycling.
11. E-84 Surface Burning Characteristics of Building Materials.
12. E-662 Smoke Density.

B. American National Standards Institute (ANSI)

1. ANSI Z124.6 Stain Resistance.
2. A137.1 Dynamic Coefficient of Friction.

**1.4 SUBMITTALS**

A. Product Data:

1. Product Specification Sheet.
2. Care and Maintenance Information.
3. Submit Full Lifetime Warranty.
4. NSF Approved.

B. Samples:

1. Submit two 4" x 4" inch samples.

C. Adhesive:

1. Submit two samples of adhesive joint for each Design selected.

D. Shop Drawings:

1. Drawings to include countertop layout, dimensions, seaming locations, required locations of support and blocking member, edge profiles, cutouts and attachments.

E. Fabricator Qualifications:

1. Work of this section shall be performed by a fabricator/installer approved by.

15 QUALITY ASSURANCE

A. Delivery, Storage and Handling:

1. Packaging, Shipping, Handling and Unloading; Observe manufacturer's recommendations and handle in a manner to prevent breakage. Brace parts if necessary. Transport in the near vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping and handling.

B. Storage and Protection:

1. Store in racks in near vertical position. Prevent warpage and breakage. Store inside away from direct exposure to sunlight.

16 WARRANTY

1. Full Lifetime Warranty.

**Part 2-Products**

21 MANUFACTURERS

A. Acceptable Manufacturer:

1. See Interior Design finish schedule.

22 MATERIALS

A. Material:

1. See Interior Design finish schedule.

B. Thickness:

1. 2 cm.
2. 3 cm.

C. Finish:

1. See Interior Design finish schedule.

D. Exposed Edges and Corners:

1. Countertops profile: eased edge.
2. Backsplash profile: square.

- a. No backsplash at wall tile locations.

G. Performance:

1. Moisture Absorption: typical results negligible; ASTM C97
2. Modulus of Rupture: typical results 6,800 psi; ASTM C99
3. Compressive Strength: typical results 24,750 psi; ASTM C170
4. Abrasion Resistance: typical results 223; ASTM C501
5. Bond Strength: typical results 205; ASTM C482
6. Thermal Shock: Passes 5 cycles; ASTM C484
7. Coefficient of Thermal Expansion: typical results  $1.2 \times 10^{-5}$  inch/°F; ASTM C531
8. Breaking Strength of Tile: typical results 3,661 lbf; ASTM C648
9. Resistance to Freeze Thaw Cycling: Unaffected 15 cycles; ASTM C1026
10. Dynamic Coefficient of Friction: 0.72 dry / 0.34 wet; ANSI A137.1
11. Surface Burning Characteristics: typical results 17 (Class A/1 Rating); ASTM E84
12. Smoke Density: Flaming 196, Non-flaming 69; ASTM E662
13. Stain Resistance: Unaffected; ANSI Z124.6

23 ACCESSORIES

A. Mounting Adhesive:

1. Provide structural grade 50-year 100% silicone or epoxy adhesive.

B. Quartz Surface Adhesive:

1. Provide epoxy or polyester adhesive of a type recommended by manufacturer for application and conditions of use.
2. Adhesive which will be visible in finished work shall be tinted to match quartz surface.

C. Joint Sealant:

1. Clear sealant of type recommended by manufacturer for application and use.
2. Provide anti-bacterial type in toilet, bath and food preparation.
3. Acceptable manufacturers:
  - a. Dow Corning.
  - b. GE Sealants.

D. Solvent: Denatured alcohol for cleaning surfacing to assure adhesion of adhesives and sealants.

E. Cleaning Agents: Mild soap and water.

24 FABRICATION

A. Layout:

1. Layout surface to minimize joints and avoid L-shaped pieces of quartz surfacing. Layout and fabricate with 'hairline' joints.
2. Work with a certified fabricator who utilizes digital images for seam coordination and product flow (i.e. Slabsmith<sup>TM</sup>).

B. Inspection of Materials:

1. Inspect materials for defects prior to fabrication.
- C. Tools: Cut and polish with water cooled powered tools.
- D. Cutouts:
  1. Cutouts shall have a minimum of ¼" inch (6.35mm) radius.
  2. Where edges of cutouts will be exposed in finished work; polish edges.
- E. Laminations: Laminate layers of surfacing as required to create built up edges following procedures recommended by the manufacturer.

### **PART 3 -EXECUTION**

#### **31 INSTALLER**

- A. Installation shall be by an approved Installer, certified in writing by manufacturer.

#### **32 PRE-INSTALLATION EXAMINATION. Contact Commercial Representative.**

- A. Site Verification:
  1. Verify dimensions by field measurements prior to installation.
  2. Verify that substrates supporting surfaces are plumb, level and flat to within 1/8 inch in 10 feet and that all necessary supports and blocking are in place.
  3. Base Cabinets shall be secured to adjoining units and back wall.
- B. Inspection of Surfaces:
  1. Inspect materials for imperfections prior to installation.

#### **33 PREPARATION**

- A. Prepare Surface:
  1. Clean surfaces prior to installation.
- B. Protection of Surfaces:
  1. Protect finished surfaces from scratches. Apply masking where necessary. Take necessary precautions to prevent dirt, grit, dust and debris from other trades from contacting the surface by covering the top and exposed edge profiles after installation is completed.

#### **34 INSTALLATION**

- A. Install materials in accordance with manufacturer's instructions and approved shop drawings.
- B. Preliminary Installation:
  1. Position materials to verify the correct size.
  2. If size adjustments, or additional fabrication is necessary, use water cooled tools. Protect jobsite and surface from dust and water. Perform work away from installation site if possible.
  3. Allow gaps for expansion of not less than 1/8 inch (1.5mm) per 10 feet when installed between walls or other fixed structure.
- C. Permanent Installation:
  1. After verification of fit and finish, clean substrate; remove loose and foreign matter

which may interfere with adhesion.

Clean quartz surface backside & joints with denatured alcohol.

2. Horizontal surface: Apply continuous bead of 100% silicone at the intersection point of the countertop and the substrate or cabinet. This bead will be continuous throughout the entire perimeter.
3. Vertical surface: Apply continuous bead of mounting adhesive around perimeter. In addition, apply ¼ inch mounting adhesive bead every 8 inches on vertical center.
4. Install quartz surfacing plumb, level, square and all on the same plane.
5. Align adjacent pieces in same plane.

D. Joints:

1. Joints Between Adjacent Pieces of Surfaces:

- a. Joints shall be flush, tight fitting, level and neat.
- b. Securely join adjacent pieces with Adhesive.
- c. Fill joints level to polished surface.
- d. Secure adjacent quartz surfaces with vacuum clamps until adhesive hardens.

2. Joints between Surface and back splash or wall;

- a. Seal joints with 50-year 100% mildew resistant silicone sealant.

35 REPAIR

- A. Perform finish work or replace damaged material in a satisfactory manner.

36 CLEANING

- A. Remove masking, excessive adhesive and sealants. Clean exposed surfaces with denatured alcohol.

37 PROTECTION

- A. Protect installed fabrications with non-staining sheet coverings.

**END OF SECTION**

**SECTION 124813  
ENTRANCE FLOOR MATS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Resilient entrance mats.

**1.2 ACTION SUBMITTALS**

**A. Product Data:** For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for floor mats and frames.
2. Flame spread data for each type of product.

**B. Samples:** For the following products, in manufacturer's standard sizes:

1. Floor Mat: Assembled sections of resilient entrance mat.

**1.3 CLOSEOUT SUBMITTALS**

**A. Maintenance Data:** For floor mats to include in maintenance manuals.

**1.4 MAINTENANCE MATERIAL SUBMITTALS**

**A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.**

1. Carpet: Full-size units equal to 5 percent of amount installed, but not less than 5 sq. yd.

**PART 2 - PRODUCTS**

**2.1 RESILIENT ENTRANCE MATS**

**A. Manufacturers:**

1. See Interior Design finish schedule.

**B. Carpet-Type Mats:** Polypropylene carpet bonded to 1/8- to 1/4-inch-thick, flexible rubber backing to form mats 3/8 inch thick with non-raveling edges.

1. Colors, Textures, and Patterns: See Interior Design Finish Schedule.
2. Mat Size: As indicated.



- C. Adhesives: Water resistant type recommended by floor mat manufacturer to suit tile and and substrate conditions indicated.
  - 1. Adhesives should be floor mat manufacturer's adhesive spec for highest moisture limit.

## 2.2 FABRICATION

- A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and floor conditions for compliance with requirements for location, sizes and other conditions affecting installation of floor mats and frames.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install surface-type units to comply with manufacturer's written instructions at locations indicated, coordinate with entrance locations and traffic patterns. Retain paragraph below for surface-type units.

**END OF SECTION**