

SECTION 230005 – COORDINATION DRAWING REQUIREMENTS FOR HVAC

PART 1 – GENERAL

1.1 COORDINATION DRAWINGS

- A. All mechanical, electrical, plumbing, fire protection, telecommunications, and ATC subcontractors will be required to use AutoCad (CAD) or 3D BIM format. Coordination drawings will be distributed via email and/or USB drive.
- B. For 3D BIM projects, the CM/GC shall hold BIM coordination meetings with all trades to resolve conflicts and to coordinate the installation layouts. The BIM coordination meetings shall be at a frequency necessary to complete the overall coordination tasks and efforts.
- C. The drawings and model developed for the project is based on specific equipment and materials, as the Basis Of Design. This equipment and materials have been developed, designed and graphically represented within the model, such that the quantity, size, shape, location and orientation can be determined and measured. Non-graphic information may also be attached to the model element. The model does not fully resolve all minor spatial conflicts. The Contractor may utilize the model in developing his/her construction level drawings as well as shop drawings and submittals. The contractor shall update the spatial requirements of the equipment and materials, based on his/her final approved vendor selections and interdisciplinary coordination.

1.2 ABOVE CEILING AND NO CEILING OVERHEAD INSTALLATION

- A. The Mechanical Contractor shall furnish minimum 1/4" scale electronic background drawings of the sheet-metal shop drawings, for incorporation of plumbing and mechanical piping services. All ductwork and piping systems shall be thoroughly dimensioned as to location and height above finished floor. Each different system will be drawn in a different color. Upon conclusion of the various systems coordination with the Sheet-Metal Contractor, the composite drawing shall be distributed by the Construction Manager for contractor coordination. All lighting fixture locations will be "ghosted in" by the Sheet-Metal Contractor for coordination of the same. The Sheet-Metal Contractor shall prepare a title box on each drawing which allows space for the signature of the authorized individual from the Sheet-Metal, HVAC Piping, Plumbing, Fire Protection, Electrical, Telecommunications and ATC firms, with the statement below:

"The undersigned individual certifies by their signature that they have coordinated their work with all other work noted on this drawing and the contract documents and shall be held responsible for any costs arising out of their respective inability to fully coordinate their work."

NOTE: The composite drawing is in addition to separate shop drawings to be submitted at the conclusion of the coordination process.

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- B. At the conclusion of each composite drawing coordination process, the Construction Manager shall be notified by the Mechanical Contractor Project Manager. The Mechanical Contractor Project Manager shall then schedule an on-site coordination meeting for the purpose of signing off on the respective drawing. The Mechanical Contractor shall not be authorized to release any material for fabrication or installation until the composite drawing signature process is executed or until Construction Manager authorizes, in writing, a portion of the work to proceed.
- C. The Mechanical Contractor shall print a weekly status log and maintain a file for the project on this process. Each subcontractor is responsible to submit and coordinate their work with the Construction Manager and Mechanical Contractor.
- D. The Fire Protection Contractor shall overlay their complete piping system on a composite background drawing furnished by the Mechanical Contractor. The Fire Protection Contractor shall utilize a different color from that previously used by the HVAC and Plumbing draftsmen. The Fire Protection Contractor shall cooperate in the coordination process by the relocation of their piping as required to facilitate coordination. When completed, Sprinkler Contractor's coordination drawing shall be delivered to the Construction Manager. At the conclusion of the entire coordination process, the Fire Protection Contractor shall be responsible for attending a coordination meeting at the jobsite for the purpose of their authorized personnel affixing their signatures to the statement below:

“The undersigned individual certifies by their signature that they have coordinated their work with all other work noted on this drawing and the contract documents and shall be held responsible for any costs arising out of their respective inability to fully coordinate their work.”

NOTE: The composite drawing is in addition to a separate sprinkler piping shop drawing to be submitted at the conclusion of the coordination process.

- E. The Electrical Contractor shall be responsible to overlay their major conduit racks and equipment, as well as verifying all lighting fixture locations and heights for coordination with the other trades on a composite drawing prepared by the Mechanical Contractor. All conduits larger than 2" shall be documented. When completed, Electrical Contractor's coordination drawing shall be delivered to the Construction Manager. At the conclusion of the coordination drawing process, the Electrical Contractor shall be responsible to attend a coordination meeting at the jobsite for the purpose of their authorized personnel affixing their signature to the statement below:

“The undersigned individual certifies by their signature that they have coordinated their work with all other work noted on this drawing and the contract documents and shall be held responsible for any costs arising out of their respective inability to fully coordinate their work.”

- F. The Plumbing Contractor will be responsible to overlay their major piping racks and equipment, as well as verifying all plumbing fixture locations and heights for coordination with the other trades on a composite drawing prepared by the Mechanical Contractor. When completed, Plumbing Contractor's coordination drawing shall be delivered to the Construction Manager. At the conclusion of the coordination drawing process, the Plumbing Contractor shall be responsible to attend a coordination meeting at the jobsite for the purpose of their authorized personnel affixing their signature to the statement below:

“The undersigned individual certifies by their signature that they have coordinated their work with all other work noted on this drawing and the contract documents and shall be held responsible for any costs arising out of their respective inability to fully coordinate their work.”

- G. The Telecommunication Contractor will be responsible to overlay their major communication racks and cable tray, as well as verifying locations and heights for coordination with the other trades on a composite drawing prepared by the Mechanical Contractor. When completed, Telecommunication Contractor’s coordination drawing shall be delivered to the Construction Manager. At the conclusion of the coordination drawing process, the Telecommunication Contractor shall be responsible to attend a coordination meeting at the jobsite for the purpose of their authorized personnel affixing their signature to the statement below:

“The undersigned individual certifies by their signature that they have coordinated their work with all other work noted on this drawing and the contract documents and shall be held responsible for any costs arising out of their respective inability to fully coordinate their work.”

- H. Provide survey and coordination of underground plumbing for verification of location.
- I. Drawings, if available, may be obtained electronically from the Architect through the Construction Manager.
- J. The Mechanical, Electrical, Plumbing, Fire Protection, Telecommunication and ATC Contractors shall receive hard copies of all drawings.
- K. The Mechanical, Electrical, Plumbing, Fire Protection, Telecommunication and ATC Contractors shall review all drawings and advise if any additional drawings are needed.
- L. The Mechanical Trade Contractor shall take the lead and develop a drawing list for submissions and a submission schedule coordinated with the construction activities. The drawings shall be developed in a sequential fashion so as to no delay installation of the work or the overall project schedule. The lead Mechanical trade contractor shall include a master key plan so that the area of each drawing can be readily identified as to the location within each building. The Plumbing trade contractor shall lead the underground coordination and the HVAC trade contractor shall lead the balance of the coordination work. The drawing list and schedule shall be forwarded to the Construction Manager for review.
- M. Pursuant to Construction Manager approval of the list and schedule, the Mechanical trade contractor shall provide to all participants the latest plans in a timely fashion in accordance with their schedule.
- N. Prior to the start of the work, each subcontractor shall forward an insulation schedule to the Construction Manager M.E.P. Coordinator. The schedule shall show the size and thickness of each type of insulation and its intended use.

1.3 ACCESS FLOOR INSTALLATION

- A. Coordination drawings for systems to be installed in the access floor shall be prepared in the same manner as described for the overhead installation.

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- 1.4 SHEET-METAL / PIPING / ATC / ELECTRICAL ACCESS / MAINTENANCE CLEARANCES
- A. As soon as practical, the Mechanical trade contractor shall prepare layout drawings (not less than 3/8" scale) of all ductwork and piping. These drawings shall show all WALL FIRE RATINGS, registers, grilles, diffusers, and similar features, as well as locations of all valves, dampers, damper operators and other items requiring access for maintenance. It shall also be the responsibility of the Mechanical trade contractor to show on these drawings; beams with bottom elevations, ceiling heights, wall-to-wall dimensions, partitions, columns, windows, doors, electric lighting layouts as shown on the reflected ceiling plans, acoustical ceiling grid, and other major architectural and structural features as shown on the General Construction Drawings. All dimensions should be from centerlines of columns. All required access to equipment for service and/or required for NEC code required clearances shall be shown in a dotted zone.
- B. The Mechanical trade contractor, upon completion of their work, shall email their data back to the Plumbing trade contractor and copy all participants. The Plumbing trade contractor shall download the mechanical data and incorporate, by separate layer, their own routing, as well as other areas requiring access for service and maintenance to determine their relationship and possible interferences with the mechanical, architectural, or structural features to be performed as part of the work.
- C. The Plumbing trade contractor shall then email their data to the Electrical trade contractor and copy all participants. The Electrical trade contractor shall download the drawing and incorporate, by separate layer, their own routings, as well as the depth of all light fixtures, access panels, etc., as required to determine the relationship and possible interferences with plumbing, mechanical, architectural, or structural items to be installed as part of the overall work. The Electrical trade contractor shall be responsible to verify that the electrical lighting layout shown on these drawings is correct and to make corrections and additions of all other light fixtures as required. In areas where no mechanical work occurs, but where other crowded electrical installations are evident, the Electrical trade contractor shall prepare similar drawings.
- D. The Electrical trade contractor shall then email the Fire Protection trade contractor and copy all participants. The Fire Protection trade contractor shall download the drawing and incorporate, by separate layer, their own routings, as well as other areas requiring access for service and maintenance, to determine their relationship and possible interferences with the mechanical, electrical, plumbing, and architectural or structural items to be installed as part of the overall work.
- E. The Mechanical trade contractor shall provide one composite set of reproducible drawings and forward them to the Construction Manager. This composite shall then be reviewed during meetings determined by the Construction Manager, at which all subcontractors including their subcontractors, as required by the Construction Manager, shall be represented to review and resolve any real or apparent interference or conflicts.
- F. In the preparation of all the final composite drawings, large scale details, as well as cross and longitudinal sections shall be made as required to fully delineate all conditions. Particular attention shall be given to the locations, size and clearance dimensions of equipment items, shafts and similar features. The final composite drawings shall include the locations of all controls, tie-ins, connections for other subcontractor's work, and pipe and duct insulation as required.

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- G. Final composite drawings shall then be signed off by each trade subcontractor indicating their acceptance and approval of the indicated routings and layouts and their relationship with the adjoining or contiguous work of all subcontracts. Thereafter, no unauthorized deviations shall be permitted. If deviations are made without the knowledge and agreement of Construction Manager and other affected trade contractors, the work in question shall be subject to removal and correction at no additional cost.
- H. In preparing the composite drawings, minor changes in duct, pipe or conduit routings that do not affect the intended function may be made as required to avoid space conflicts, when mutually agreed. Items may not be resized, exposed items relocated, or items run exposed when not intended, without approval. No changes shall be made in any structural members or architectural features which affect the function or aesthetics of the buildings. If conflicts or interferences cannot be satisfactorily resolved, the Engineer shall be notified, and their decision obtained.
- I. After final composite drawings have been accepted and approved, and signed by ALL subcontractors, the Mechanical trade contractor shall provide and distribute to each of the subcontractor and to Construction Manager. Subcontractors requiring further prints for their own distribution will accomplish same.
- J. The record copies of final composite drawings shall be retained by each subcontractor as a working reference. All shop drawings, prior to their submittal to Construction Manager, shall be compared with the composite drawings and developed accordingly by the subcontractor responsible. Any revisions to the composite drawings, which may become necessary during the process of the work, shall be noted by all subcontractors, and shall be neatly and accurately recorded on the record copies. Each trade contractor shall be responsible for the up-to-date maintenance of their own record copies of the composite drawings and to keep one copy available at the site. The composite drawings and any subsequent changes thereto, shall be utilized by each subcontractor in the development of their as-built drawings. NOTE: The coordination drawings may be used with appropriate changes as as-builts and changes to title block.
- K. Preparation of coordination drawings shall commence as soon as possible after award of the subcontract. The coordination drawings may lack complete data in certain instances pending receipt of equipment drawings, but sufficient space shall be allotted for the items affected. When final information is received, such data shall be promptly inserted on the composite by that trade contractor.
- L. Coordination is the responsibility of all trade contractors. Construction Manager will call meetings, weekly, or as required, which subcontractors must attend to avoid delay. Failure to attend shall require the trade contractor to field run the work not coordinated. No extra compensation will be paid to any trade contractor for relocating any duct, pipe, conduit or other material that has been installed without proper coordination. If the installation of any uncoordinated work or improper installation or coordinated work necessitates additional work by other subcontractors, at the cost of such additional work shall be assigned to the trade contractor responsible as determined by Construction Manager.
- M. All changes in the work of any subcontract shall be shown on the composite drawings.
- N. All work on the coordination composite drawings shall be performed by competent CAD/BIM operators, in a clear legible manner. Each trade contractor shall execute a typical drawing activity in no more than three working days. It shall be the responsibility of each subcontractor to supply

a sufficient number of CAD/BIM operators so as not to delay the coordination process. Construction Manager and Engineer shall be the judge of the acceptability of the drawings.

- O. The composite drawings shall not be used for as-built drawings. (See Paragraph above)
- P. It shall be further understood that each trade contractor's specified submittals shall be transmitted for approval during the coordination period in order that the project encounter no delays.
- Q. The Mechanical trade subcontractor shall pre-coordinate all control equipment locations with the designated ATC trade subcontractor and indicate it on the composite document.

1.5 REQUIREMENTS

- A. All Mechanical, Electrical, Plumbing, Fire Protection, Telecommunication and ATC trade contractors shall be required to use AutoCad (CAD) or 3D BIM format. Coordination drawings shall be distributed via email or USB drive. ALL EMAILS SHALL BE COPIED TO CONSTRUCTION MANAGER, ENGINEER, AND PROJECT MANAGER.
- B. The Sheet-Metal trade contractor shall prepare a title box on each drawing which allows space for the signature of the authorized individual from the sheet-metal, HVAC, piping, plumbing, sprinkler, electrical and ATC firms with the statement below:

“The undersigned individual certifies by their signature that they have coordinated their work with all other work noted on this drawing and the contract documents and shall be held responsible for any costs arising out of their respective inability to fully coordinate their work.”
- C. The Mechanical trade contractor shall not be authorized to release any material for fabrication or installation until the composite drawing signature process is executed or until Construction Manager authorizes, in writing, a portion of the work to proceed.
- D. The Mechanical Contractor shall print a weekly status of all emails sent and received and maintain a hard copy file for use at the coordination “sign-off” meetings. Each subcontractor is required to check emails daily.
- E. Submittals: Once the coordination process has been completed, the coordination drawings shall be submitted to the Engineer for review. A single-color plot, as well as three blueprint copies of the drawings shall be submitted for review. The color plot shall delineate between the various disciplines by utilizing different color pens for each system.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 230005