SECTION 262413 - SERVICE ENTRANCE SWITCHBOARD

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Main Switchboard - Furnish and install the Service Entrance switchboard as herein specified and shown on the associated electrical drawings.

1.02 REFERENCES

A. The switchboard and overcurrent protection devices referenced herein are designed and manufactured according to the following appropriate specifications:

1. ANSI/NFPA 70 - National Electric al Code (NEC).

2. ANSI/IEEE C12.16 - Solid State Electricity Metering.

3. ANSI C57.13 - Instrument Transformers.

4. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.

5. NEMA PB 2 - Deadfront Distribution Switchboards, File E8681

6. NEMA PB 2.1 - Proper Handling, Installation, Operation and Maintenance of Deadfront Switchboards Rated 600 Volts or Less.

7. NEMA PB 2.2 - Application Guide for Ground Fault Protective Devices for Equipment.

8. UL 50 - Cabinets and Boxes.

9. UL 98 - Enclosed and Dead Front Switches.

10. UL 489 - Molded Case Circuit Breakers.

11. UL 891 - Dead-Front Switchboards.

12. UL 943 - Ground Fault Circuit Interrupters.

13. Federal Specification W-C-375B/Gen - Circuit Breakers, Molded Case, Branch Circuit and Service.

1.03 SUBMITTALS

A. Shop Drawings shall indicate front and side enclosure elevations with overall dimensions shown; conduit entrance locations and requirements; nameplate legends; one-line diagrams; equipment schedule; and switchboard instrument details.

1.04 QUALIFICATIONS

A. To be considered for approval, a manufacturer shall have specialized in the manufacturing and assembly of switchboards for at least 50 years.

B. Furnish products listed by Underwriters Laboratories Incorporated and in accordance with standards listed in Article 1.03 - References.

C. The manufacturing facility shall be registered by Underwriters Laboratories Inc. to the International Organization for Standardization ISO 9002 Series Standards for quality.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products in conformance with manufacturer's recommended practices as outlined in applicable Installation and Maintenance Manuals.

B. Each switchboard section shall be delivered in individual shipping splits for ease of handling. They shall be individually wrapped for protection and mounted on shipping skids.

C. Inspect and report concealed damage to carrier within their required time period.

D. Store in a clean, dry space. Maintain factory protection and/or provide an additional heavy canvas or heavy plastic cover to protect structure from dirt, water, construction debris, and traffic. Where applicable, provide adequate heating within enclosures to prevent condensation.

E. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only by lifting means provided for this express purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Conform to NEMA PB 2 service conditions during and after installation of switchboards.

1.07 MAINTENANCE MATERIALS

A. Provide one set of installation and maintenance instructions with each switchboard. Instructions are to be easily identified and affixed within the incoming or main section of the line-up.

1.08 WARRANTY

A. Manufacturer shall warrant equipment to be free from defects in materials and workmanship for the lesser of one year from date of installation or eighteen months from date of purchase.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Shall be Square D Company.

B. Substitutions must be submitted in writing three weeks prior to original bid date with supporting documentation demonstrating that the alternate manufacturer conforms to all aspects of the specifications herein.

2.02 SWITCHBOARD - GENERAL

A. Short Circuit Current Rating: Switchboards shall be rated with a minimum short circuit current rating of 35,000 rms symmetrical amperes at 480 VAC maximum.

B. Fire pump: A fire pump tap and dedicated fire pump tap section shall be provided ahead of the main circuit breaker. This section shall be bussed with flexible connectors to the 1000kVA transformer.

C. Enclosure: Type 1 - General Purpose.

1. Sections shall be aligned front and rear.

2. Accessibility shall be from the front only.

3. Removable steel base channels (1.5 inch floor sills) shall be bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.

4. The switchboard enclosure shall be painted on all exterior surfaces. The paint finish shall be a medium gray, ANSI #49, applied by the electro-deposition process over an iron phosphate pre-treatment.

5. All front covers shall be screw removable with a single tool and all doors shall be hinged with removable hinge pins.

6. Top and bottom conduit areas shall be clearly indicated on shop drawings.

D. Nameplates: Provide 1 inch high x 3 inches engraved laminated (Gravoply) nameplates for each device. Furnish black letters on a white background for all voltages.

E. Bus Composition: Shall be plated copper. Plating shall be applied continuously to all bus work. The switchboard bussing shall be of sufficient cross-sectional area to meet UL Standard 891 temperature rise requirements. The phase and neutral through-bus shall have an ampacity as shown in the plans. For 4-wire systems, the neutral shall be of equivalent ampacity as the phase bus bar.

F. Ground Bus: Sized per NFPA70 and UL 891 Tables 25.1 and 25.2 and shall extend the entire length of the switchboard. Provisions for the addition of future sections shall be provided.

2.03 SWITCHBOARD - INCOMING MAIN SECTION DEVICES

A. Main Circuit Breaker:

1. Electronic trip stored energy insulated case fixed mounted 100% rated circuit breaker, as shown on the drawings.

a. Electronic main circuit breaker shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, Short Time Pickup, Short Time Delay, Instantaneous settings, and Ground-Fault Pickup and Delay settings. Each adjustment shall have discrete settings (fully adjustable) and shall be independent of all other adjustments.

b. Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the thirteenth harmonic. Sensor ampere ratings shall be as indicated on the associated drawing.

c. Local visual trip indication for overload, short circuit and ground fault trip occurrences.

d. Long Time Pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.

e. Communications capabilities for remote monitoring of circuit breaker trip system, to include phase and ground fault currents, pre-trip alarm indication, switch settings, and trip history information shall be provided.

2.04 METERING (CUSTOMER)

A. Manufacturers:

1. Square D.

2. Substitutions: substitutions shall be made only after proper verification

B. The switchboard main bus shall be metered using:

1. Square D digital power meter PM820 with utility revenue accuracy and the following features:

a. A, V, kW, kVAR, kVA, PF, F, kWh, kVARh, kVAh, KYZ, RS-485 communications, THD, Demand, kWd, kVARd, kVAd, date/time stamping.

2.05 METERING TRANSFORMERS

A. Manufacturer: Shall be Square D Company.

B. Current Transformers: ANSI C57.13; 5 ampere secondary.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine area to receive switchboard to provide adequate clearance for switchboard installation.

B. Check that concrete pads are level and free of irregularities.

C. Start work only after unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Install switchboard in accordance with manufacturer's written guidelines, the NEC, and local codes.

3.03 FIELD QUALITY CONTROL

A. Inspect completed installation for physical damage, proper alignment, anchorage, and grounding.

B. Measure, using a Megger, the insulation resistance of each bus section phase-to-phase and phase-to-ground for one minute each, at minimum test voltage of 1000 VDC; minimum acceptable value for insulation resistance is 1 megohms. NOTE: Refer to manufacturer's literature for specific testing procedures.

C. Check tightness of accessible bolted bus joints using calibrated torque wrench per manufacturer's recommended torque values.

D. Physically test key interlock systems to check for proper functionality.

E. Test ground fault systems by operating push-to-test button.

3.04 ADJUSTING

A. Adjust all operating mechanisms for free mechanical movement per manufacturers specifications.

B. Tighten bolted bus connections in accordance with manufacturer's instructions.

C. Adjust circuit breaker trip and time delay settings to values as instructed by the Architect/Engineer.

3.05 CLEANING

A. Touch up scratched or marred surfaces to match original finish.

END OF SECTION 262413