

**PART 1 GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Supplementary Conditions and the following specification sections apply to all Work herein:
1. Section 26 00 10 - General Requirements
  2. Section 26 00 20 - Scope of Work
  3. Section 26 05 19 - Electrical Conductors - 600 Volts
  4. Section 26 05 26 - Grounding and Bonding
  5. Section 26 05 73 - Electrical Power System Study
  6. Section 26 08 13 - Testing
  7. Section 26 28 13 - Fuses
  8. Section 26 43 13 - Surge Protective Devices for Low-Voltage Electrical Power Circuits

**1.2 SUMMARY**

- A. Furnish and install all panelboards as specified herein and as required for proper control and distribution for power, lighting and receptacle loads throughout the Project as indicated on the Drawings.

**1.3 REFERENCE STANDARDS**

- A. Each panelboard and all components shall be designed, manufactured and tested in accordance with the latest applicable industry standards including the following:
1. Federal Specification W-C-375B - Molded Case Circuit Breakers
  2. Federal Specification W-P-115a
  3. NEMA AB1 - Molded Case Circuit Breakers
  4. NEMA PB1 - Panelboards
  5. NFPA 70 - National Electrical Code (NEC)
  6. UL Standard 489 - Molded Case Circuit Breakers
  7. UL Standard 67 - Panelboards
- B. All equipment and material to be furnished and installed on this Project shall be UL or ETL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

**1.4 SUBMITTALS**

- A. The following submittal data shall be furnished according to the General Conditions and Section 26 00 10 and shall include, but not be limited to:
1. Panelboards\* complete with physical dimensions, materials, bus capacity data, circuit schedule, connector details, nameplate data, voltage, current, and short circuit ratings, series device combination test data, factory test reports, installation details, etc.
- B. All items or equipment listed above with asterisks (\*) shall be certified by the manufacturer using Manufacturer Certification "MCA" as set forth in Section 26 00 10. See Section 26 00 10 for certification requirements.

**1.5 WARRANTY**

- A. Comply with the requirements of the General Conditions and Section 26 00 10.

**PART 2 PRODUCTS****2.1 ACCEPTABLE MANUFACTURERS**

- A. If it complies with these Specifications, panelboards manufactured by one of the following manufacturers will be acceptable:
1. Eaton/Cutler Hammer
  2. General Electric
  3. Siemens
  4. Square D

**2.2 RATINGS**

- A. Panelboards shall be of indoor construction, arranged for the voltage and current capacity ratings indicated on the Drawings and assembled complete with spare spaces and circuit protective devices as indicated on the Drawings. Panelboards shall have a short circuit interrupting rating, which exceeds the available rms symmetrical fault current values indicated on the Drawings.

**2.3 GENERAL**

- A. Enclosure Construction:
1. Panelboard cabinets shall be formed from Code gauge galvanized bonderized after fabrication with master keyed flush door locks. Cabinet fronts shall be finished with two coats of ANSI 61 gray enamel over a rust inhibiting primer coat or protected by an electro deposition or powder coat paint process.
  2. All unused spaces shall be provided with blank off plates.
  3. The indoor enclosure shall meet the applicable requirements of UL for NEMA 1 type construction.
  4. Panelboards shall be identified by laminated plastic nameplates indicating panelboard designation and voltage. See Section 26 00 10 for identification requirements.
  5. Cardholders and directory cards shall be provided for circuit identification in panelboards. Cardholder shall be located and permanently attached on the inside of panel door and shall be plastic frame with clear plastic front. Directory cards shall be typewritten. Circuit descriptions shall include specific floor and unit designations as indicated on floor plans and schedules for all equipment served. Circuit arrangement shall correspond to the arrangement indicated on the Panel Schedules on the Drawings.
- B. Bus Construction:
1. Panel bus shall be arranged to accommodate copper bodied, compression connectors at the main lug and feed through lug connections for #6 AWG or larger copper conductors and all aluminum conductors. See Section 26 05 19 titled "Electrical Conductors - 600 Volts" for conductor and connector specifications. Attach these lugs to the panel bus with two (2) bolts per lug or one (1) bolt with antiturn device. Use of rough edged washers will not be acceptable as an antiturn device. Bolts shall be captive or shall be studs to facilitate reinstallation of the lugs with the wire attached.
  2. Busbars shall be designed, supported and braced for a minimum short circuit equal to the short circuit interrupting rating of the panelboard as described hereinbefore.
  3. Busbars shall be sized to limit the temperature rise within the panelboard to 50°C over a 40°C ambient temperature. Busbars shall be 98% conductivity round edge copper with bolted joint connections. Bolted joint connections shall be readily accessible for inspection and proper maintenance.
  4. Neutral bars shall be full size unless otherwise indicated on the Drawings or specified hereinafter.
  5. Bolted joint connection surfaces shall be silver or tin plated. The joint laps shall lap sufficiently to limit the maximum ampere density to 200 amperes per square inch. Torque settings shall be provided on submittal data for use during installation.
  6. All two section panelboards shall be connected with conductors of a capacity equal to or greater than the panelboard main bus amperage capacity. Conductor connections shall be as specified hereinbefore.

**2.4 DISTRIBUTION PANELBOARDS**

- A. Distribution panelboards shall be arranged for one of the following voltages:
1. 480Y/277 Volts, three (3) phase, four (4) conductor
  2. 480 Volts, three (3) phase, three (3) conductor
  3. 208Y/120 Volts, three (3) phase, four (4) conductor

4. 208 Volts, three (3) phase, three (3) conductor
  5. as indicated on the Drawings. Distribution panelboards shall be similar and approved equal to General Electric Spectra Power Panelboards where circuit breakers are indicated or Spectra ADS where fused switches are indicated. Panelboards shall conform to standards and bear the label of the Underwriters Laboratories, Inc. and shall be of dead front construction. Cabinets and fronts shall be constructed as specified hereinbefore and shall be provided with a four-piece front cover.
- B. Circuit breaker type panelboards shall be assembled complete with molded case bolted-in circuit breakers and spare spaces as indicated on the Drawings. Panelboards shall be bussed for all breakers (including bus straps) for all spare breakers and spare spaces sized as indicated on the Drawings
- C. Fused switch type panelboards shall have safety cover interlocks and be assembled complete with quick make, quick break fusible switches. Panelboards shall be bussed for all switches (including bus straps) for all spare switches and spare spaces sized as indicated on the Drawings. Switches shall be equipped with rejection type fuse clips and have provisions for padlocking the handles in the "ON" or "OFF" position.
- D. All devices shall be rated for 277 Volts single phase, 480 Volts three (3) phase, 120 Volts single phase, or 208 Volts three (3) phase service as appropriate.
- E. All breakers shall be equipped with both thermal and magnetic trip elements. All two (2) and three (3) pole breakers shall have common trip action and shall be interchangeable with single pole breakers.
- F. All fusible switch units shall be equipped with Bussmann Type LPS "Low Peak" dual element Class J fuses or Gould-Shawmut Ampttrap 2000 Class J for devices rated 600 amperes or less and Bussmann Type KRP-C "Low Peak" dual element Class L fuses or Gould-Shawmut Ampttrap 2000 Class for devices rated over 600 amperes.
- G. All panelboards shall be fully rated for the available fault current as indicated on the Drawings and as specified hereinbefore. UL listed series rated devices shall be acceptable where the available fault current at the panelboard exceeds 100,000 A RMS symmetrical and the specific series rating device combinations are indicated on the distribution panelboard.
- H. All distribution panelboards shall be provided with a copper equipment ground bar bonded to the cabinet sized for the appropriate ground connections.

## 2.5 LIGHTING AND BRANCH CIRCUIT PANELBOARDS

- A. Lighting and branch circuit panelboards shall be arranged for 208Y/120 Volts, three (3) phase, four (4) conductor service (similar and approved equal to GE Type AQ) or 480Y/277 Volts, three (3) phase, four (4) conductors service (similar and approved equal to GE Type AE). All panelboards shall conform with the standards and bear the label of the Underwriters Laboratories.
- B. The lighting and branch circuit panelboards shall be assembled complete with molded case bolted-in circuit breakers and spare spaces as indicated on the Drawings. Panelboards shall be bussed for all breakers (including bus straps) for all spare breakers and spare spaces sized as indicated on the Drawings.
- C. All breakers shall be quick make, quick break type with thermal and magnetic trips as required. All two (2) and three (3) pole breakers shall have common trip action and shall be interchangeable with single pole breakers.
- D. All devices shall be rated for the available fault current as indicated on the Drawings and as specified hereinbefore. UL listed series rated devices shall be acceptable where the specific series rating device combinations are indicated on the panelboard.
- E. Lighting and branch circuit panelboards shall be provided with a copper equipment ground bar(s) bonded to the cabinet with a minimum of forty-two (42) terminal points. Provide additional copper ground bars as required where additional equipment and/or isolated ground conductors are shown on the Drawings.

- F. All lighting and branch circuit panelboards served by harmonic mitigating or K rated and harmonic mitigating transformers shall be provided with a 200% neutral bar.
- G. All lighting and branch circuit panelboards shall be provided with panel trim that is front hinged to box (hinged front cover) construction. The front cover shall be fastened to the panel enclosure with bolts or screws along the perimeter of the front. The trim shall contain an inner door to allow access to the circuit protection handles while maintaining deadfront construction when the door is open. Door shall have lockable latch. Provide additional hinges to allow the entire trim and inner circuit protection access door to be hinged open upon removal of screws along one side of the trim to provide access for removal of deadfront cover and breaker and/or conductor installation, removal, maintenance and inspections.

**PART 3 EXECUTION**

**3.1 INSTALLATION**

- A. Panelboards shall be installed per the manufacturer's recommendations and as indicated on the Drawings.
- B. Where panelboards are mounted on gypsum board partitions, the mounting screws shall pass through the gypsum board and be securely attached to the partition studs or framework. At the Subcontractor's option, the mounting screws may pass through the gypsum board and be securely attached to 6" square, 18 gauge galvanized metal backplates, which are attached to the gypsum board with an approved nonflammable adhesive. Toggle bolts installed in gypsum board partitions will not be acceptable.
- C. Three spare fuses of each type and size used in conjunction with circuit protective devices for the distribution panelboards shall be furnished and delivered to the Owner at Substantial Completion. Refer to Section 26 28 13 titled "Fuses" for fuse cabinet requirements.
- D. Reset surge counter on SPD device prior to energization.

**3.2 FACTORY TESTING**

- A. All standard factory tests shall be performed in accordance with the latest version of NEMA and UL Standards.

**3.3 FIELD TESTING**

- A. Refer to Section 26 08 13 for additional testing requirements for panelboards.

**END OF SECTION**