SECTION 26 24 16
PANELBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation, and connection of panelboards.

1.2 RELATED WORK

A. Section 09 91 00, PAINTING: Painting of panelboards.

B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Requirements that apply to all sections of Division 26.

C. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES: Low-voltage conductors.

D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

E. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits.

1.3 QUALITY ASSURANCE

A. Refer to Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES), in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:
   a. Submit sufficient information to demonstrate compliance with drawings and specifications.
   b. Include electrical ratings, dimensions, mounting details, materials, required clearances, terminations, weight, circuit breakers, wiring and connection diagrams, accessories, and nameplate data.
2. Manuals:
   a. Submit, simultaneously with the shop drawings, complete maintenance and operating manuals including technical data sheets, wiring diagrams, and information for ordering circuit breakers and replacement parts.
      1) Include schematic diagrams, with all terminals identified, matching terminal identification in the panelboards.

2) Include information for testing, repair, troubleshooting, assembly, and disassembly.

b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.

3. Certifications: Two weeks prior to final inspection, submit the following.

a. Certification by the manufacturer that the panelboards conform to the requirements of the drawings and specifications.

b. Certification by the Contractor that the panelboards have been properly installed, adjusted, and tested.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. International Code Council (ICC):
IBC-12.....International Building Code

C. National Electrical Manufacturers Association (NEMA):
PB 1-11.....Panelboards
250-08.....Enclosures for Electrical Equipment (1,000V Maximum)

D. National Fire Protection Association (NFPA):
70-11.....National Electrical Code (NEC)
70E-12.....Standard for Electrical Safety in the Workplace

E. Underwriters Laboratories, Inc. (UL):
50-95.....Enclosures for Electrical Equipment
67-09.....Panelboards
489-09.....Molded Case Circuit Breakers and Circuit Breaker Enclosures

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Panelboards shall be in accordance with NEC, NEMA, UL, as specified, and as shown on the drawings.

B. Panelboards shall have main breaker or main lugs, bus size, voltage, phases, number of circuit breaker mounting spaces, top or bottom feed,

flush or surface mounting, branch circuit breakers, and accessories as shown on the drawings.

C. Panelboards shall be completely factory-assembled with molded case circuit breakers and integral accessories as shown on the drawings or specified herein.

D. Non-reduced size copper bus bars, rigidly supported on molded insulators, and fabricated for bolt-on type circuit breakers.

E. Bus bar connections to the branch circuit breakers shall be the “distributed phase” or “phase sequence” type.

F. Mechanical lugs furnished with panelboards shall be cast, stamped, or machined metal alloys listed for use with the conductors to which they will be connected.

G. Neutral bus shall be 100% rated, mounted on insulated supports.

H. Grounding bus bar shall be equipped with screws or lugs for the connection of equipment grounding conductors.

I. Bus bars shall be braced for the available short-circuit current as shown on the drawings, but not be less than 22,000 A symmetrical for 120/208 V and 120/240 V panelboards

K. Series-rated panelboards are not permitted.

2.2 ENCLOSURES AND TRIMS

A. Enclosures:

1. Provide galvanized steel enclosures, with NEMA rating as shown on the drawings or as required for the environmental conditions in which installed.
2. Enclosures shall not have ventilating openings.
3. Enclosures may be of one-piece formed steel or of formed sheet steel with end and side panels welded, riveted, or bolted as required.
4. Provide manufacturer’s standard option for prepunched knockouts on top and bottom endwalls.
5. Include removable inner dead front cover, independent of the panelboard cover.

B. Trims:

1. Hinged “door-in-door” type.
2. Interior hinged door with hand-operated latch or latches, as required to provide access only to circuit breaker operating handles, not to energized parts.

3. Outer hinged door shall be securely mounted to the panelboard enclosure with factory bolts, screws, clips, or other fasteners, requiring a key or tool for entry. Hand-operated latches are not acceptable.
4. Inner and outer doors shall open left to right.
5. Trims shall be flush or surface type as shown on the drawings.

2.3 MOLDED CASE CIRCUIT BREAKERS

A. Circuit breakers shall be per UL, NEC, as shown on the drawings, and as specified.
B. Circuit breakers shall be bolt-on type.
C. Circuit breakers shall have minimum interrupting rating as required to withstand the available fault current, but not less than:
   1. 120/208 V Panelboard: 22,000 A symmetrical.
D. Circuit breaker features shall be as follows:
   1. A rugged, integral housing of molded insulating material.
   2. Silver alloy contacts.
   3. Arc quenchers and phase barriers for each pole.
   4. Quick-make, quick-break, operating mechanisms.
   5. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
   6. Electrically and mechanically trip free.
   7. An operating handle which indicates closed, tripped, and open positions.
   8. An overload on one pole of a multi-pole breaker shall automatically cause all the poles of the breaker to open.
   9. For circuit breakers being added to existing panelboards, coordinate the breaker type with existing panelboards. Modify the panel directory accordingly.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the manufacturer’s instructions, the NEC, as shown on the drawings, and as specified.
B. Locate panelboards so that the present and future conduits can be conveniently connected.
C. Install a printed schedule of circuits in each panelboard after approval by the COR. Schedules shall reflect final load descriptions,

room numbers, and room names connected to each circuit breaker. Schedules shall be printed on the panelboard directory cards and be installed in the appropriate panelboards

D. Mount panelboards such that the maximum height of the top circuit breaker above the finished floor shall not exceed 78 inches.

E. Provide blank cover for each unused circuit breaker mounting space.

3.2 ACCEPTANCE CHECKS AND TESTS

A. Perform in accordance with the manufacturer's recommendations. In addition, include the following:

1. Visual Inspection and Tests:

a. Compare equipment nameplate data with specifications and approved shop drawings.

b. Inspect physical, electrical, and mechanical condition.

c. Verify appropriate anchorage and required area clearances.

d. Verify that circuit breaker sizes and types correspond to approved shop drawings.

e. To verify tightness of accessible bolted electrical connections, use the calibrated torque-wrench method or perform thermographic survey after energization.

f. Vacuum-clean enclosure interior. Clean enclosure exterior.

3.3 FOLLOW-UP VERIFICATION

A. Upon completion of acceptance checks, settings, and tests, the Contractor shall demonstrate that the panelboards are in good operating condition and properly performing the intended function.

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