

## SECTION 26 24 16 – PANELBOARDS

### PART 1 - GENERAL

#### 1.01 SUMMARY:

- A. This Section includes furnishing and installing panelboards for low-voltage power and lighting systems applications. It does not include equipment operating at over 600V or over 1200A.
- B. 26 24 16 (DS) - PANELBOARDS DATA SHEET (PL#) is part of this specification. The Data Sheet defines the scope of work that is included in the request for a proposal.

#### 1.02 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.
- B. 26 24 16 (DS) - PANELBOARDS DATA SHEET.

#### 1.03 RELATED REQUIREMENTS:

- A. Section 13 34 23.23 - Fabricated Substation Control Enclosures
- B. Section 23 75 00 – Substation Enclosure HVAC Equipment
- C. Section 26 51 23 - Substation Interior Lighting and Receptacles
- D. Section 26 36 00 – Power Switching and Control Devices
- E. Section 33 72 33 36 – Cable Tray and Wireway for Utility Substations
- F. Section 33 72 33 33 – Raceway and Boxes for Utility Substations
- G. Section 33 72 33.16 - Relay Switchboards
- H. Section 33 72 43 11 - Substation Wire, Cable and Accessories

#### 1.04 REFERENCE STANDARDS:

- A. Applicable Standards (conform to all standards applicable to each item utilized) shall be the latest revisions, supplements, and amendments to the following:
  - 1. Federal Specifications:
    - a. W-C-375E - Circuit Breakers, Molded Case; Branch Circuit and Service.
    - b. W-P-115C - Panel, Power Distribution.
  - 2. National Electrical Manufacturers Association (NEMA):
    - a. PB 1 - Panelboards.
    - b. PB 1.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Panelboards Rated 600V or less.
    - c. PB 2 - Deadfront Distribution Switchboards.
    - d. 250 - Enclosures for Electrical Equipment (1,000V Maximum).
  - 3. National Fire Protection Association (NFPA):
    - a. 70 - National Electrical Code.
  - 4. Underwriters Laboratory (UL):
    - a. 50 -Enclosures for Electrical Equipment, Non-Environmental Considerations.
    - b. 67 – Standard for Panelboards.
    - c. 486A-486B – Wire connectors.
    - d. 489 Standard for Molded-Case Circuit Breakers, Molded Case Switches and Circuit Breaker Enclosures
    - e. 489-A Circuit Breaker for use in Communication equipment
    - f. 489-B Molded-Case Circuit Breakers, Molded Case Switches and Circuit Breaker Enclosures for use with Photovoltaic (PV) Systems
    - g. 489C Molded-Case Circuit Breakers and Molded Case Switches for use with Wind Turbine

SECTION 26 24 16 – PANELBOARDS: continued

- 5. IEEE
  - a. 3001.5-2013 IEEE Recommended Practice for the Application of Power Distribution Apparatus in Industrial and Commercial Power System.
- 1.05 SUBMITTALS:
  - A. Submit as specified in other Contract Documents as applicable. Generally, panelboards are standard off-the-shelf equipment. In the case of a customized panelboard, any deviations from the specifications shall be indicated with written justification.
  - B. Submit with the proposal
    - 1. General arrangement and outline information. For off-the-shelf equipment provide manufacturer's product catalog cutsheet with the following information as a minimum. For a customized panel board (including panel options and modifications), provide project-specific document(s), if the following information is not covered in the manufacturer's catalog.
      - a. Panelboard dimensions and weights.
      - b. Voltage and current ratings, UL short circuit ratings.
      - c. Minimum and maximum wire size(s) for main circuit breakers or main lugs.
      - d. Applicable standards
      - e. Gutter dimensions and wiring space
      - f. Specific catalog number offered
      - g. Suitability for service entrance
      - h. Safety label
      - i. Derating factors/details for operation at a higher temperature and elevation
  - C. Action submittals
    - 1. Schematic and wiring diagrams
  - D. Informational submittals
    - 1. Product documentation and manuals, as applicable.
- 1.06 QUALITY ASSURANCE:
  - A. The SUPPLIER or a representative should have technical support services available 24/7.
  - B. All work and materials shall be used in accordance with the National Electrical Code.
  - C. Panelboards shall be UL 67 listed.
- 1.07 DELIVERY, STORAGE, AND HANDLING:
  - A. Store panelboards according to the manufacturer's instructions and in a conditioned space to avoid condensation, dust, and other environmental contaminants.
  - B. Handle and prepare panelboards for installation according to NEMA PB 1.
  - C. Report any damage found to the ENGINEER as soon as possible.
- 1.08 WARRANTY:
  - A. All equipment furnished under this Section shall be warranted by the SUPPLIER and the equipment manufacturer(s) for at least one year after the installation date or 1 ½ years from the date of delivery, whichever is earlier.
  - B. The warranty shall include all parts, labor, and expenses to perform necessary repair work or replacement.

## SECTION 26 24 16 – PANELBOARDS: continued

### PART 2 - PRODUCTS

#### 2.01 PANELBOARDS:

##### A. General

1. Voltage and ampere ratings as indicated on the datasheet(s).
2. Enclosure type as indicated on the datasheet(s).
3. Copper main bus ampacity rating as specified on the datasheet(s).
4. Enclosures shall be constructed per UL 50 and be made of hot-dipped galvanized steel, finished with a rust-inhibiting coating, and Munsell ANSI 61 light gray paint.
5. The short-circuit current rating of the assembled panelboard shall be equal to or greater than the interrupting capacity of the highest-rated breaker.
6. Provide UL-rated terminals suitable for 75 °C rated AWG copper conductors to match with 100% rating of the devices.
7. Provide filler plates for all unused spaces.
8. All circuit breakers shall be UL-listed and factory-assembled.
9. All circuit breakers shall be constructed with a trip-free, toggle-type operating mechanism with quick make/quick-break action and positive handle trip indication.
10. Circuit breaker short circuit interrupting rating as indicated on the datasheet(s).

### PART 3 - EXECUTION

#### 3.01 GENERAL:

- A. Visually inspect the equipment for defects or damage prior to installation. Report any concerns to the ENGINEER before installation.
- B. Install at the locations indicated on the design documents, including all necessary mounting and supporting materials.
- C. If no documents are available for the installation, locate and arrange clearances for other equipment and materials to obtain accessibility for operation and maintenance, per the NEC.
- D. Space away from walls or columns at least 1/4 inch to prevent surface moisture from rusting the enclosure.
- E. Provide all necessary floor openings unless indicated as being provided by others.
- F. Clean all welds, scars, and abrasions. Remove metal splatter, rust, and foreign material. Apply an organic zinc-rich coating in accordance with UL 50.

#### 3.02 PANELBOARDS INSTALLATION:

- A. Flush mount in finished areas and surface mount on walls or columns in all other areas.
- B. Install with top of panelboard approximately 6 feet above the floor unless otherwise shown on design documents.
- C. Provide a typed circuit directory in each panelboard indicating branch circuit connected loads.
- D. Inspect installation for proper grounding, per the NEC and design documents.
- E. Check the tightness of bolted connections using a torque wrench using the manufacturer's written instructions. If manufacturer requirements are not indicated, comply with tightening torques as specified in UL 486A.
- F. Enclosures installed in a moderate or high seismic zone (per IEEE 693) must be secured to the wall/structure by utilizing all mounting holes provided in the box and secured with grade 2 steel bolts sized per the mounting holes.

SECTION 26 24 16 – PANELBOARDS: continued

END OF SECTION 26 24 16