September 2012, rev. 00

26 2416 – Panelboards

PART 1. GENERAL

1.01 Summary

A. Section includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Load centers.

1.02 Definitions

A. SVR: Suppressed voltage rating.

1.03 Submittals

A. Product Data: For each type of panelboard, switching and overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of Nationally Recognized Testing Laboratories (NRTL) listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.

C. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

D. Typewritten Panelboard Schedules: For installation in panelboards. Submit final versions with close-out documents after load balancing.

E. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.04 Quality Assurance

A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

1. Square-D (Schnieder Electric) is the preferred manufacturer

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

E. Comply with UL 50, UL 67 , UL746C, NEMA PB, and Federal Specification W-P-115C Type 1 Class 1.

1.05 Delivery, Storage and Handling

A. Remove loose packing and flammable materials from inside panelboards; store in heated space to prevent condensation.

B. Handle and prepare panelboards for installation according to NECA 407.

1.06 Project Conditions

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry work above panelboards is complete.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a). Ambient Temperature: Not exceeding minus 23 deg F (minus 5 deg C) to plus 104 deg F (plus 40 deg C).
b). Altitude: Not exceeding 6600 feet (2000 m).

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

1.07 Coordination

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.08 Extra Materials

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Two spares for each type of panelboard cabinet lock.

2. Spare Breakers: Provide three spare 20-amp 1-pole 120-v AFCI breakers, three spare 20-amp 1-pole, 120-v GFCI, and three spare 20-amp, 1-pole, 120-v SWD rated circuit breakers, all bolt-on type, all listed for use in the lighting and appliance panelboards, and stored in the spare fuse cabinet specified elsewhere.

PART 2. PRODUCTS

2.01 General Requirements for Panelboards

A. Square-D (Schnieder Electric) is the preferred manufacturer.

B. Enclosures: Flush- and surface-mounted cabinets.

1. Rated for environmental conditions at installed location. Indoor Dry and Clean Locations: NEMA 250, Type 1.
2. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

a). Doors: Secured with vault-type latch with tumbler lock; keyed alike.
b). For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.

3. Standard Finishes:

a). Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
b). Back Boxes: Galvanized steel.

4. Directory Card: Inside panelboard door, detailed typewritten circuit assignments with room numbers and areas identified, mounted in metal directory frame.

C. Incoming Mains Location: Top and bottom (contractor to coordinate with feeder installation).

D. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Neutral: Bus: 100% rated.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box (or insulated where indicated).

E. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Main and Neutral Lugs: Mechanical type.
2. Ground Lugs and Bus-Configured Terminators: Mechanical type.
3. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices scheduled as "Space" or "3-Pole Space." Spaces shall be sized to accommodate the largest frame overcurrent device available for the application.

G. Panelboard Short-Circuit Current Rating: Series rating shall be permissible where integral or remote upstream overcurrent protective devices have been coordinated by the manufacturer, and the panel is thus labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL. Do not use series ratings where drawing notes indicate specific coordination requirements.

2.02 Lighting and Appliance Branch-Circuit Panelboards

A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

B. Mains: Circuit breaker or lugs only as scheduled; feed-thru lugs as scheduled.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

1. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
2. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.

E. Standard Finishes:

1. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
2. Back Boxes: Galvanized steel.

F. Directory Card: Inside panelboard door, typewritten circuit assignments, mounted in metal directory frame.

2.03 Accessory Components and Features

A. Accessory Set: Include any tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation (such as for locking-type circuit breakers).

PART 3. EXECUTION

3.01 Examination

A. Receive, inspect, handle, and store panelboards according to NECA 407.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Installation

A. Install panelboards and accessories according to NECA 407.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

C. Mount top of trim 72 inches above finished floor unless size of unit dictates otherwise.

D. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box. Adjust interiors to minimize voids between interior cover and wall finish.

E. Install overcurrent protective devices and controllers not already factory installed.

F. Install filler plates in unused spaces.

G. Stub two 1-inch (27-GRC) empty conduits from any flush panelboard into the nearest accessible ceiling space or custodial closet, whichever is closer.

H. Arrange conductors in gutters into groups and loosely (to prevent conductor overheating) bundle and wrap with wire ties after completing load balancing.

I. Comply with NECA 1.

3.03 Identification

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create the directory; handwritten directories are not acceptable. For load centers, if any, provide a clear plastic pouch inside the door to hold the directory in the correct orientation.

C. Panelboard Nameplates: Label each panelboard and load center with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.04 Field Quality Control

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections. Replace defective units and retest.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken and observations after remedial action.

3.05 Adjusting

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

B. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.06 Touch-Up and Cleaning

A. Prior to building occupancy, clean all enclosures of accumulated dust and debris.

B. Clean or restore all finished surfaces to factory finish. Provide surface preparation and touch-up painting per painting sections.

End of Division 26 2416

This section of the NIU Design and Construction Standards establishes minimum requirements only. It should not be used as a complete specification.