

SECTION TABLE OF CONTENTS

DIVISION 16 - ELECTRICAL

SECTION 16446

PANELBOARDS

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 GENERAL REQUIREMENTS
- 1.3 SUBMITTALS

PART 2 PRODUCTS

- 2.1 PANELBOARDS
- 2.2 CIRCUIT BREAKERS
- 2.3 DIRECTORY CARD AND HOLDER
- 2.4 FACTORY TESTING
- 2.5 PRECAUTIONARY LABEL

PART 3 EXECUTION

- 3.1 INSTALLATION
- 3.2 SITE TESTING

-- End of Section Table of Contents --

SECTION 16446

PANELBOARDS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)

NEMA 250	(1997) Enclosures for Electric Equipment (1000 Volts Maximum)
NEMA AB 1	(1999) Molded Case Circuit Breakers and Molded Case Switches
NEMA PB 1	(2000) Panelboards

UNDERWRITERS LABORATORIES (UL)

UL 67	(2002) Panelboards
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1.2 GENERAL REQUIREMENTS

Section 16003, "General Electrical Provisions," applies to work specified in this section.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01330, "Technical Submittals," in sufficient detail to show full compliance with the specification:

SD-01 Data

Manufacturer's Catalog Data shall be submitted for the following items:

Panelboards  
Directory Card and Holder

SD-09 Reports

Test Reports shall be submitted for the following tests in

ADDITIONS AND MODIFICATIONS TO CHILD DEVELOPMENT CENTER

accordance with the paragraph entitled, "Site Testing," of this section. Panelboards shall not be energized until the recorded test data have been submitted to and approved by the Contracting Officer.

Continuity Tests  
Insulation Tests

PART 2 PRODUCTS

2.1 PANELBOARDS

Power-distribution panelboards shall be totally enclosed in a steel cabinet, dead-front circuit breaker type with copper buses, surface- or flush-mounted as indicated. Panelboards shall conform to NEMA PB 1 and NEMA AB 1. Branch circuit panels shall have buses fabricated for bolt-on type circuit breakers.

An outer door or cover, hinged on one side, shall be provided on surface-mounted and recessed panelboards to provide gutter space access. A center door, hinged on one side, shall be provided for circuit breaker/switch access only.

Voltage and current rating, number of phases, and number of wires shall be as indicated. Four-wire distribution panelboards and lighting and appliance branch-circuit panelboards shall be provided with an isolated full-capacity neutral bus. Panelboards shall be rated 120/208-volt, three-phase and 277/480-volt, three-phase, 60-hertz current.

Three-phase, 4-wire lighting and branch circuit panelboards shall be provided with an isolated full-capacity copper bus providing spaces for single-pole circuit breakers/switches and spaces indicated as spare.

Panelboards shall be provided with a separate copper grounding bus bonded to the enclosure. Grounding bus shall be a solid copper bus bar of rectangular cross section equipped with binding screws for the connection of equipment grounding conductors.

Panelboards, for use in the 120/208 volts power system, shall have a short-circuit current rating of not less than 22,000 amperes. The achievement of the 22,000 amperes short-circuit rating by the use of series ratings is not acceptable.

Panelboards, for use on the 277/480 volts power system, shall have a short-circuit current rating of not less than 25,000 amperes. The achievement of the 25,000 amperes short-circuit rating by the use of series ratings is not acceptable.

Panelboards and main lugs or main breaker shall have current ratings as shown on the panelboard schedule.

Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type. Three-phase, four-wire busing shall be such that when any three adjacent single-pole breakers are

## ADDITIONS AND MODIFICATIONS TO CHILD DEVELOPMENT CENTER

individually connected to each of the three different phases, two- or three-pole breakers can be installed at any location. Current-carrying parts of the bus assembly shall be copper. Mains ratings shall be as shown.

Mechanical lugs furnished with panelboards shall be cast copper or copper alloys of sizes suitable for the conductors indicated to be connected thereto.

Boxes shall have the manufacturer's standard knockouts and shall be galvanized code-gage sheet steel. Fronts shall be of code-gage sheet steel furnished with hinged doors with adjustable trim clamps for securing the fronts to the boxes.

Panelboard enclosures shall be NEMA 250, Type 1. Enclosures shall be provided with hinged fronts and corrosion-resistant steel pin-tumbler cylinder locks. Locks shall be keyed alike, and two keys shall be provided for each enclosure.

Panelboards shall be finished with baked or fast drying enamel. Finish color shall be manufacturer's standard.

### 2.2 CIRCUIT BREAKERS

Circuit breakers shall be molded case, type as specified in Section 16286, "Overcurrent Protection Devices". Frame and trip rating shall be as indicated.

Interrupting capacity of the panel and lighting branch circuit breakers shall be sufficient to successfully interrupt the maximum short-circuit current imposed on the circuit at the breaker terminals. Circuit breaker interrupting capacities shall be a minimum of 22,000 amperes for 120/208 volt panelboards, and 25,000 amperes for 277/480 volt panelboards.

Circuit breakers shall be bolt-on type. Plug-in type shall not be acceptable.

Connections to the bus shall be bolt-on type.

Circuit breaker spaces called out on the drawings shall be complete with mounting hardware to permit ready installation of the circuit breakers.

### 2.3 DIRECTORY CARD AND HOLDER

A directory card shall be mounted on the inside of hinged fronts and doors 0.030-inch thick minimum plastic in a metal frame, with spaces for circuit numbers, outlets controlled, and room numbers. Where hinged fronts or doors are not required, the directory card shall be provided 0.030-inch thick minimum plastic in a metal frame mounted on the left-hand side of the front trim. Directory card shall identify each branch circuit with its respective and numbered circuit breaker.

### 2.4 FACTORY TESTING

Complete panelboards shall be tested in accordance with UL 67.

2.5 PRECAUTIONARY LABEL

To ensure persons are aware of immediate or potential hazard in the application, installation, use, or maintenance of panelboards, each panelboard shall be conspicuously marked on the trim or dead front shield with the text (or equivalent) **DANGER** symbol. If the panel is supplied with a door, the label shall be visible when the door is in the open position.

PART 3 EXECUTION

3.1 INSTALLATION

Panelboards shall be installed as indicated and in accordance with the manufacturer's instructions. Panels shall be fully aligned and mounted in the existing panelboard locations.

Directory-card information shall be typewritten in capital letters to indicate outlets controlled and final room numbers served by each circuit and shall be mounted in holders behind protective covering.

3.2 SITE TESTING

Each panelboard enclosure key shall be shown to operate the enclosure locks in the presence of the Contracting Officer.

Panelboards shall be given continuity tests after the installation has been completed and before the panelboard is energized.

Test equipment, labor, and personnel shall be provided by the Contractor as required to perform the tests as specified.

Test data shall be recorded and shall include the location and identification of panelboards and megohm readings versus time.

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