SECTION 16470

PANELBOARDS

PART 1 - GENERAL

1.1 GENERAL

A. Drawings and general provisions of the Contract, Section 16010, General Requirements for Electrical Work apply to the Work of this Section.

B. This Section includes lighting, appliance branch-circuit and distribution panelboards and associated auxiliary equipment rated 600 V or less.

C. Furnish all labor, materials, equipment and supplies and perform all work necessary for complete installation of panelboards in accordance with drawings and specifications.

1.2 CODES AND STANDARDS

A. Products shall comply with the following codes and standards listed below and shall be UL-listed and labeled for intended use:

NEMA AB-1	Molded Case Circuit Breakers
NEMA PB-1	Panelboards
UL 50	Enclosures for Electrical Equipment
UL 67	Panelboards
UL 489	Molded Case Circuit Breakers and Circuit Breaker Enclosures
UL 943	Ground Fault Circuit Interrupters

1.3 SUBMITTALS

A. Manufacturer's product data sheets for each type of panelboard, overcurrent device, digital metering equipment, accessories and other auxiliary components indicated on panel schedules, drawings and in specifications.

B. Panelboard Schedules indicating layout of all breakers (breaker layout shall be consistent with layout shown on panel schedules).

C. Dimensioned plans, elevations, sections and details. Include enclosure types, bus configuration, current and voltage ratings, short circuit current ratings, features, characteristics, factory settings of individual overcurrent protective devices and wiring diagrams.

1.4 MANUFACTURERS

A. Subject to compliance with the Specification requirements:

General Electric

Square D Co.
Cutler Hammer

PART 2 - PRODUCTS

2.1 GENERAL

A. All components of panelboards shall be manufactured by a single manufacturer. All similar panelboards shall be by the same manufacturer.

B. Panelboards shall be dead-front type assembled into a single interior unit mounted in a sheet-steel enclosure, consisting of a box and front, and designed to be mounted in or against wall.

C. Panelboards, including lighting and appliance branch circuit panelboards and distribution panelboards, shall have main breaker, main lugs, bus size, voltage, phase and recessed flush or surface mounting as indicated on the Drawings.

D. Panelboards shall be provided complete with all overcurrent devices, accessories and trim.

E. All panelboards shall be provided with safety barriers for dead front construction.

F. The required short circuit ratings of assembled panelboards are shown on the Drawings. The short circuit rating of every overcurrent device in the panel shall meet or exceed the panel rating. Series rated combinations will not be permitted.

G. Provide feed through or sub-feed lugs as indicated on panel schedules. Feed through lugs to be located at opposite end of bus from incoming lugs or main device.

H. Interior to be designed such that individual overcurrent protective devices may be removed without moving adjacent devices, main bus connectors and without drilling or tapping of bus.

2.2 CABINETS

A. Boxes shall be code gauge galvanized sheet steel flush or surface mounted as indicated on drawings. Back and sides shall be of one-piece formed steel. NEMA Type 1 enclosure unless otherwise noted on drawings. Surface mounted panelboards shall be provided without pre-punched knockouts. Cabinets shall not have openings for ventilation.

B. Trim shall be code gauge steel, ANSI-61 gray finish with stainless steel flush type lock/latch handle. Trims for recessed panelboards shall overlap box by at least ¾" all around and surface mounted panelboards shall have trim the same width and height of box. All locks shall be keyed alike.

C. Entire front trim to be hinged to box so that panelboard gutter space can be accessed without removing trim.

D. Directory frames shall be metal frame with plastic covers.

2.3 BUS

A. All bus work shall be 1000 amp/sq.in. hard drawn copper with 98% conductivity bus bars and connection straps bolted together and rigidly supported on molded insulators. Buses to be braced for the short circuit current indicated on drawings.

B. Neutral busses shall be 100% rated with adequate connections for all outgoing neutral conductors. Neutral bus to be mounted on insulated supports.

C. Panelboards shall be provided with copper equipment ground bus bonded to box and sized adequate for branch circuit equipment ground conductors.

D. Panelboards indicated as having Isolated Ground Bus shall have a copper bus insulated from box and having adequate capacity for branch circuit equipment ground conductors.

E. Bus shall be designed for sequence phase connection to allow the installation of one, two or three pole branch circuit breakers in any position.

F. Where designated as “SPACE”, provide mounting brackets, full bussing, hardware and necessary appurtenances required for future installation of circuit breakers. Provide blank cover for each space.

2.4 OVERCURRENT DEVICES

A. Overcurrent devices shall be fully rated, trip-free molded case, bolt-on, thermal magnetic circuit breakers. Breakers to have silver alloy contacts and have quick-make, quick-break operating mechanisms.

B. Main circuit breakers shall be individually mounted and bolted to bus assembly. Back-fed branch mounted circuit breakers are prohibited.

C. Front faces of all circuit breakers shall be flush. Trip indication shall be clearly shown by the handle position between the ON and OFF positions.

D. Ground fault circuit breakers shall require no more panel space than standard breakers. Where indicated ground fault interrupting circuit breakers shall have a 3 mA sensitivity.

E. Where circuit breakers are used for switching of lighting, circuits type "SWD" circuit breakers shall be provided.

F. All connections shall be rated for 75 degree C copper conductors.

G. An overload of one pole of a multi-pole breaker shall automatically cause all of the poles of the breaker to open.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The Contractor shall mount equipment at locations shown on the drawings, install all interiors, branch circuit protective devices, complete all external connections and install exterior trim.

B. The panelboard circuit directory card shall be completed in accordance with Section 16010.

C. Mount panelboards so that top of trim is at 6'-2" above finished floor. If panelboard is taller than the highest circuit breaker shall not exceed 6'-6" above finished floor.

D. Mount panelboards plumb and rigid without distortion of box. Mount recessed panels uniformly flush with wall finish. Install panels securely mounted to building structure or to steel channel framing fastened to building structure.

E. For all recessed panelboards stub four spare 1" conduits from panelboard to an accessible ceiling space for future access to panelboards.

F. Wiring in panel gutters to be trained neatly into groups, bundled and wrapped with wire ties.

G. Install electrical equipment to resist seismic forces determined in accordance with the latest edition of BOCA Building Code and based on applicable seismic zone for project geographical location.

H. Panelboards to be installed in accordance with NEMA publication NEMA PB 1.1.

3.2 IDENTIFICATION

A. All panelboards labels shall be engraved type indicating panelboard ID, Voltage and Amperage of panelboard.

B. Cardholders for panelboards shall be filled out with typewritten identification of each circuit, except that the word "spare" shall be written in soft pencil to identify all circuit breakers installed that are not used.

3.3 FIELD QUALITY INSPECTION

A. Make visual inspection for defects and physical damage, labeling and nameplate compliance with record drawings. Check panelboard mounting, area clearances, alignment and fit of components.

B. Exercise and perform operational tests of all mechanical components and other operable devices in accordance with manufacturer's instruction manual. Check tightness of all bolted electrical connections with calibrated torque wrench. Refer to manufacturer's instructions for proper torque values.

3.4 TESTING

A. Test insulation resistance for each panelboard bus, component, connecting supply, feeder and control circuit.

B. Test continuity of each circuit.

3.5 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt metal shavings and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 16470