SECTION 16470
PANELBOARDS

PART 1  GENERAL

1.01  SUMMARY

A. Section Includes:

  1. Lighting and appliance branch circuit panelboards.

B. Related Sections:

  1. Section 16195 - Identification
  2. Section 16010 - Load Shedding requirements

1.02  REFERENCES

A. Specify Underwriters Laboratories (UL) listed equipment, assemblies and materials.

B. Where appropriate, refer to current ANSI and NEMA Standards for material ratings.

  1. NEMA AB 1 - Molded case circuit breakers.
  2. NEMA PB 1 - Panelboards
  3. NEMA PB 1.1 - Installation for safe installation operation and maintenance of panelboards.


1.03  SUBMITTALS

A. Require submittals under the provisions of Section 16010 - Basic Electrical Requirements and 01300 - Submittals.

B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes.

PART 2  PRODUCTS

2.01  MANUFACTURERS

A. Panelboards:

  1. General Electric
  2. Westinghouse/Cutler Hammer
  3. ITE - Siemens
  4. Square - D
2.02 MATERIALS

A. Panelboards:

1. Panelboard Assembly:

   a. Bolt on, circuit breaker type, cabinet front with concealed trim clamps door in
doors and flush lock, finished in manufacturer’s standard enamel. Provide with copper bus rated at 120/208V or 277/480V, 1Ø or 3Ø. Also provide ground bus and full size neutral bus. Current rating 100, 225, 400 or 600 amperes with minimum integrated short circuit rating: 10,000 amperes rms. symmetrical, 120/208V and 14,000 amperes rms. symmetrical 277/480V.

   b. Panelboard types shall be as indicated below for the type of purposes indicated. Type codes noted for illustration are by General Electric.

   (1) General purpose lighting, 277/480V - NHB
   (2) General purpose lighting and receptacles, 120/208V - NLAB
   (3) Power distribution, 277/480V - CCB

   c. Provide flush or surface cabinet front as required with concealed trim clamps,
hinged trim door-in-door construction with interior door containing a flush lock all
keyed alike. Finish in manufacturer’s standard gray enamel. Door-in-door hinged
trim enclosure shall contain two quarter turn latches. (See detail at the end of this
section.) University shall install the lock on the door-in-door exterior door.

   d. Two section panelboards shall be constructed in the same manner as stand alone
panelboards. The hinged covers shall not cover the adjacent panelboard.

   e. Non-linear load panelboards shall be provided in areas with heavy computer loads.
These panelboards shall be provided with double neutrals, isolated grounds and be
fed from K rated transformers.

   f. Panelboards shall be fully rated. The use of series rated panelboards is prohibited.

2. Molded Case Circuit Breakers:

   a. Provide full size bolt-on circuit breakers with integral thermal and instantaneous
magnetic trip in each pole. Provide circuit breakers listed as type SWD for
applications where load will be switched at panelboard. Do not allow piggyback
breakers. Breakers shall meet FSW-C-375.

3. Load Centers:

   a. Load centers are prohibited.

B. Panelboard layout

1. Lighting and receptacle branch circuit breakers shall be minimum 20 ampere.
2. **Provide minimum 25%** future circuit spaces for total connected circuit breakers in panelboard.

3. Specify maximum of 42 poles per panelboard. If more are required, specify two-section panelboards. Where two section panelboards are required, use full capacity sub-feed lugs. Sub-feed breakers are prohibited except in remodel projects. Both sections shall be the same size (ampacity and number of breakers.) All panelboards shall be full of breakers.

4. The Drawings shall contain a schedule of panelboards which clearly indicates the following information:

   a. Panelboard type  
   b. Number of poles  
   c. Main bus ampacity  
   d. Main circuit breaker or main lug ampacity  
   e. Quantities of each size of circuit breaker  
   f. Flush or surface mounting  
   g. Total connected load and demand load  
   h. Design load  
   i. Panelboard short circuit rating  
   j. Calculated available short circuit at panelboard  
   k. Each circuit shall have its load in watts shown and description of what/where the circuit feeds.  
   l. On remodel projects provide a full panelboard schedule with all existing devices and loads shown, and note the vacated/reused circuits. A load study is still required on remodel projects and depending upon the project size, a load change calculation (total existing load - removed load plus new load) may be acceptable.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

A. Require the following:

1. Install panelboards plumb (and flush in finished areas).
2. Maximum height to top of panelboard shall be 6’- 6”.
3. Provide directory cards, typed, showing each branch circuit load with spares and space written neatly in erasable pencil.
4. For every three (3) unused spaces and/or three (3) spare breakers, stub one (1) 3/4” empty conduit out of flush mounted panelboards into accessible areas.
5. Where main breakers are required, they shall be bolted to the ends of the main busses. Back connected breakers and branch mounted breakers are prohibited.
6. Provide identification of panelboards per Section 16195 - Identification.
7. Panelboards which are installed in electrical equipment rooms shall not share the space with other systems such as piping, ductwork, telephone equipment, etc.
8. Require phase balancing and show phase balancing on the drawings of completed panelboard installation to within 20%.
9. All 120/208 volt panelboards shall be provided with a main breaker.

END OF SECTION