

**SECTION 262416 – PANELBOARDS**

- 1.0 The panelboards shall meet the applicable requirements of NEMA PB1, UL 50, UL 67 and NFPA 70/NEC. The installation shall be in accordance with NFPA 70. All panelboards shall be circuit breaker type, unless permitted otherwise by the University Engineering Department.
- 2.0 Shop drawing submittals are required for all new panelboards, and shall define the integrated short circuit rating, bus ampere rating, all breaker types, sizes, locations and trip units, future space, accessories, etc, for each panelboard.
- 3.0 The installation design shall include all calculations to determine available fault current at each panelboard location. Each panelboard shall have minimum integrated equipment short circuit ratings that is equal to or exceeds the calculated fault currents. Series rated panelboards shall not be used. The panelboard shall be sized for calculated load plus thirty (30) percent spare capacity. In addition to this spare capacity, future additions/renovations shall be considered in sizing the panels.
- 4.0 The following equipment is not permitted:
  - Residential type panelboards (load centers)
  - Single-phase panelboards
  - Tandem circuit breakers
  - Plug-in circuit breakers
- 5.0 All bus bars and terminations shall be copper. Main bus bars shall extend the full breaker mounting height of the panelboard. Separate copper neutral (mounted on insulated standoffs) and copper ground bus bars shall be provided
- 6.0 Panelboard enclosure shall be dead front and suitable for the environment. Panelboards installed in indoor locations shall utilize NEMA 1 enclosures. For outdoor locations, NEMA 4X enclosures shall be used. Enclosure shall include a hinged door-in-door cover with lock keyed to University Standard. Panelboard enclosures shall provide sufficient gutter width in accordance with NEC requirements for wire bending space.
- 7.0 All main and branch circuit breakers shall be of the bolt-on type.
- 8.0 Branch circuit panelboards shall include 10 percent spare breakers and 20 percent future spaces. Distribution panelboards shall provide a minimum of 30 percent future spaces.
- 9.0 Panelboards shall be located in accordance with code. In General, all panelboards shall be located in locked electrical rooms, so that access to the panelboards is restricted to qualified personnel. Branch circuit panelboards for labs or similar type spaces shall be located within the lab/space being served.
- 10.0 Panelboard loads shall be separated based on load type. For example, motor loads and sensitive electronic loads shall not be served from the same panelboard. Design Professional shall review the loads/load types and verify that such load conflicts are avoided.
- 11.0 Designed phase loads of each panelboard shall be balanced within 10 percent. After circuits have been energized, phases shall be rebalanced to 10 percent and a final typed circuit directory and as-built panelboard schedule drawings shall be provided by the Contractor.
- 12.0 Panelboards with 200 percent rated neutrals shall be used on the secondary of all K-rated transformers.
- 13.0 Circuit breakers shall comply with UL489.

- 14.0 All panelboards shall have a typed circuit directory, mounted in metal frame with transparent protective cover. Handwritten directories are not permitted.