Basis of Design

This section applies to the design and installation of panelboards.

Design Criteria

- UW Class N3 services building panelboards shall be front accessible and utilize group mounted thermal-magnetic molded case circuit breakers. Load Centers are not acceptable.
- For UW Class N1, N2S, and N2P services building panelboards, provide electronic trip units with long time, short time and ground fault (LSG) protection for molded case circuit breakers. Instantaneous protection shall not be provided since it limits coordination with downstream molded case circuit breakers. Two and preferably three levels of ground fault protection are desired. Selectivity is critical to the University in order to limit the extent of power outages.
- Provide multiple lugs or feed-through type panels when required.
- Laboratory panels shall have double lugs.
- Provide all 208Y/120V panels with a dedicated, isolated, full size ground bus to serve future computer equipment, and separate equipment grounding conductor bus. Provide terminals for a minimum of 50% of panel circuits on each bus.
- Provide isolation panels for Medical Center and other special applications when required.
- Provide “service entrance” listed service entrance applications.
- Series rated panelboards are not acceptable.
- Panelboards shall be 200% neutral rated when serving high non-linear type loads.
- Locate panels in electrical rooms, electrical closets, or utility hallways on each floor. Special rooms and laboratories with highly concentrated loads should have separate panels. Do not locate panels in janitor closets or toilet room entries. Locate panels near columns, on permanent corridor walls or other permanent features to prevent future relocations.
- Surface mounted panels are preferred to flush panels. Surface mount panels in utility spaces. In finished areas provide flush mount with full height access to ceiling for future raceways. Provide a minimum of three ¾-inch spare conduits stubbed into ceiling space.

Design Evaluation

The following information is required to evaluate the design:

- **Schematic Design Phase**: Description of overall design concept for power distribution.
- **Design Development Phase**: Load calculations to determine quantity of panelboards. Preliminary one-line and riser diagrams showing quantity and location of panelboards. Preliminary plans showing panel locations and compliance to clearance requirements. Draft specifications.
- **Construction Document Phase**: Final load calculations to determine quantity of panelboards. Final one-line and riser diagrams showing quantity and location of panelboards. Final plans showing panel locations and compliance to clearance requirements. Completed panel schedules showing circuit numbers and load information. Final specifications.
Submittals

- Shop drawings for review prior to manufacture
- Panel schedules

Products, Materials and Equipment

Approved Manufacturers

- Cutler Hammer
- GE
- Siemens

Cabinets and Fronts

- Dead front type
- Tight closing doors without play, when latched. Where remote controlled switch or contactor is mounted in panelboard, mount on same frame as panelboard interior with dedicated access door and key lock.
- Provide door-in-door construction with lockable latch fasteners on all doors. All latch components shall be metal. When more than one fastener is required on a door, provide single operator handle with multi-point fasteners. Locks shall be keyed alike and match the existing standard keying system (Corbin Cabinet Lock TEU-1 or GE – 75.) Opening outer door should expose terminals and circuit breakers in a single operation.

Circuit Breakers and Fused Switches

- UL interrupting rating labeled
- Coordinate interrupting ratings with the Protective System Device Studies. Minimum ratings shall be as follows:

<table>
<thead>
<tr>
<th>Panelboards</th>
<th>AIC Symmetrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>208Y/120V</td>
<td>10,000</td>
</tr>
<tr>
<td>480Y/277V</td>
<td>14,000</td>
</tr>
<tr>
<td>Fusible Panelboards</td>
<td>100,000</td>
</tr>
</tbody>
</table>

- Circuit breakers shall be “bolt-in” breaker units with common trip on multiple pole breakers.
- Provide minimum of 20% spare breakers for lighting panels and 25% spare breakers for receptacle and equipment branch panels.
- Spaces shall be provided with bussing, device mounting hardware and steel knockouts in dead front.
Installation, Fabrication and Construction

- Firmly anchor cabinets directly or with concealed bracing to building structure.
- Mount 6’ 6” above finished floor unless otherwise required. When not located directly on wall, provide support frame of formed steel channel anchored to floor and ceiling structure.
- Panelboards rated for 400 and 600 amps shall accept 225 amp frame circuit breakers.
- Verify space available with equipment sizes and code required working clearances prior to submitting shop drawings.
- Furnish cabinets prime painted. Do not field paint factory-finished panelboard or equipment covers.
- Locate in dedicated spaces. Coordinate project construction so piping, ducts, etc. are routed around dedicated spaces above and in front of panelboards per code.
- Provide nameplates and directories.

END OF DESIGN GUIDE SECTION