

## FACILITIES BUILDING STANDARDS

### Section 26 0000 Electrical

Updated date: **06/13/2022**

#### General

1. Reference 07 0000 Standards for information regarding wall penetrations and firestopping requirements.
2. Install raceways, junction and pull boxes, and accessories to permit access to equipment for maintenance.
3. Install equipment with ample space for removal, repair or changes to equipment.
4. Do not support equipment or fixtures from metal roof decking; only from structure.
5. All generators and ATs shall have controls monitoring to EBOC/BAS.

#### Power

1. Provide steel electrical fittings only; no diecast.
2. Wire and cable boxes and reels shall bear the date of manufacture; this date shall not precede contract date by more than one year.
3. Use No. 12 wire for branch circuits of any kind.
4. Use No. 14 wire for signal systems, fire alarm system.
5. Use No. 10 wire for exit signage and emergency lighting circuits.
6. Limit homeruns to (3) current-carrying conductors per circuit (3/4" conduit). Exception: (6) #12 AWG current-carrying conductors comprising (3) circuits (each consisting of a phase conductor and a separate neutral) protected by 20-amp breakers may be run in a single circuit.
7. In I-2 facilities, armored cable permitted for use only on normal power branch circuits within individual rooms where concealed in partition walls and above ceilings. This is not permitted for homeruns.
8. Minimum conductor size shall be No. 12 for branch circuits.
9. Provide separate neutrals for branch circuits.
10. All single-phase 120V and 277V branch circuits shall be run with separate neutrals; each conductor shall have its own neutral. A common neutral shall not be shared with two or three conductors of other phases.
11. Modular/systems furniture must have a dedicated neutral per circuit.
12. Provide color coded wiring (includes hospital grade MC wire):
  - a. 208Y/120 volt, 3 phase, 4 wire: phase A – black; phase B – red; phase C – blue; neutral – white; ground conductor – green
  - b. 480Y/277 volt, 3 phase, 4 wire: phase A – brown; phase B – orange; phase C – yellow; neutral – white or gray; ground conductor – green
13. **MC Cable may only be used in the following application**
  - a. **Business Occupancy (B) (no direct patient care provided)**
    - i. **MC cable may be used for normal power within individual rooms where concealed in partition walls to interconnected receptables**
    - ii. **MC cable may be concealed in modular furniture for normal power only**
  - b. **Healthcare Occupancy (I) (patient care and direct related services)**
    - i. **MC cable may be used for undercounter lighting applications**
    - ii. **MC may be concealed in modular furniture for normal power only.**

14. No feed-through circuits permitted on GFCI receptacles.
15. Plastic snap-on splice insulators are not allowed.
16. No patient room shall share circuits with a corridor or any other space/room.
17. Components serving a patient room requiring frequent servicing/maintenance shall be located in an accessible location away from the patient bed. Locations shall be approved by the Owner's representative (exit signs, nurse call dome lights, etc).
18. Identification of fixtures/items:
  - a. All J-boxes, covers and conductors shall be clearly labeled with panel and circuit number.
  - b. Identify each conductor of all systems at each panel, pull box and outlet with permanently attached adhesive markers.
  - c. Identify j-boxes, pull boxes and conductors with panel/switchboard, circuit number, phase, control circuit number.
  - d. Conduit and boxes shall be spot painted. Conduit shall be identified every 10' and within 6" of box or enclosure; or continuously colored conduit may be used. The following colors shall be used:
    - Life Safety – yellow
    - Critical – orange
    - Equipment – green
    - Normal – black
    - Controls – blue
  - e. All panel schedules shall use hospital nomenclature; coordinate with SUF Health. Panel schedules must include all room numbers and equipment description of number for each circuit. Panel schedules must be typed.
19. Provide Leviton Lev-Lok receptacles and switches in all locations, except for OR booms/columns.
20. All thermoplastic nylon wall plates for receptacles and switches shall be provided. Nylon device plates shall be permanently engraved with panel and circuit number for all devices (do we also want on switch plates?)
21. Receptacles in all public waiting rooms, pediatric patient rooms, pediatric bathrooms, pediatric playroom/activity rooms (other than nurseries) shall be tamper-resistant or use a listed tamper-resistant cover. Receptacles in pediatric OR pre- and post-op patient bays shall be tamper-resistant.
22. No gang-able type boxes are permitted on new partitions/walls.
23. All branch circuits shall be 20amp. Equipment circuit amperage shall be determined based on equipment requirements.
24. Spring steel clips and clamps are not permitted on anything over ¾".
25. Powder-actuated anchors are not permitted.
26. Provide irreversible compression crimps on feeder splices or terminations.
27. Thermostat back boxes are required on all walls.
28. All low voltage cables in patient rooms, offices, conference rooms, etc., are approved to be run in wall mounted J-hooks, no further than 48" apart. J-hooks may be used from corridor wall to cable tray properly supported from structure above. J-hooks may not be supported by ceiling wire.
29. Conduit sleeves in corridor walls shall have acoustical sealant around perimeter of conduit and conduit ends.

30. Electrical gear, switchboard and panelboard requirements:
  - a. All electrical gear and panelboards shall be Square D. Any deviations must be reviewed with Shands.
  - b. Provide fully-bussed switchboards and panelboards.
  - c. No snap-in type breakers are permitted; only bolt-in breakers or I-line breakers are permitted.
  - d. All panel covers shall be hinged.
  - e. Each panel shall have its own identity. Coordinate with Shands for nomenclature requirements.
  - f. Provide engraved name plates for electrical panels and equipment. These shall be attached with screws or rivets; contact adhesive is not permitted. Normal power shall have a black name plate with white lettering; emergency power shall have a red name plate with white lettering. All spare breakers shall be labeled and a lock device installed.
  - g. A 1" spare conduit shall be stubbed into ceiling space for each (6) spare breakers in each recessed panel. These shall be located in an accessible space (adjacent access door, etc).
  - h. All unused/spare breakers shall be in the "off" position and secure using a Garvin #UBL1.
  - i. No. 10 insulated ground conductor to bond together the ground buses of the normal and essential system panelboards serving the same room or patient area. Provide No. 8 insulated ground conductor to bond together the grounding bushings of all metallic raceways serving the same patient care area.
  - j. All feeder conduits serving patient care areas shall have grounding bushings in all panels and pull boxes.
  - k. All electrical panels shall receive a thermographic scan during commissioning.
  - l. All boxes shall be bonded to ensure ground continuity with raceway, as a secondary means of fault protection.
31. Riser diagrams must be provided for any new distribution additions/renovations.
32. ASCO and Russel Electric are preferred manufacturers for automatic transfer switches. Any substitutions must be reviewed by Shands.
33. Testing requirements:
  - a. The design engineer shall specify electrical acceptance testing of all conductors and electrical equipment of 480V or more by a NETA certified third party acceptable to the Owner and hired by the contractor. Testing is to include all tests and inspections recommended or required by the NETA Acceptance Testing Specification (ATS). The design engineer will include a requirement for the contractor to submit NETA ATS inspection and test reports to the engineer for approval. The design engineer will review the inspection and test reports for completeness and to verify applicable standards have been met. The engineer will specify that approval of the NETA ATS documentation is required before conductors or equipment may be energized.

- b. Equipotential ground test is required in all patient care areas
  - c. Insulation-resistance test must be provided for each conductor, with respect to ground and adjacent conductors. Applied potential to be 1000 volts DC for one minute. Minimum insulation resistance values shall not be less than 50 megohms. Investigate and correct any deviations between adjacent phases and values below minimum.
  - d. Continuity test must be performed to ensure correct cable connection.
- 34. Power for IT racks shall be provided at +8" AFF.
  - 35. Power and data for Omnicell or Optiflex units shall be provided at per Owner's direction.
  - 36. Power and data for TVs, patient tracking monitors shall be located at +66 AFF.
  - 37. Electrical receptacles in waiting areas shall be dual w/ USB ports.
  - 38. At gang nurse stations or work areas (4+ persons), plugmold for power data shall be provided.
  - 39. Floor box specifications and floor box locations shall be approved by Owner during design.

### Lighting

- 1. Basis of design manufacturers shall be GE, Acuity, Lithonia, Cooper, Cree. Vendor reps shall be local to accommodate maintenance/replacement issues. Light fixtures shall be reviewed and confirmed with Owner during design phase.
- 2. Provide LED fixtures only; verify with Owner.
- 3. All exit and emergency lighting shall be LED.
- 4. All exit lights shall be connected to life safety branch; no battery-backup devices are permitted.
- 5. In the hospital or I-2 facility with life safety as part of the EPS, Lithonia LE S 1 R (single-face) and LE S 2 R (double face) exit lights shall be used.
- 6. Provide and install hurricane clips if not provided with fixtures.
- 7. Provide wall box dimmers for dimmable LED fixtures.
- 8. Provide digital Wattstopper time delay switches in mechanical rooms.
- 9. No compact fluorescent light fixtures are permitted.
- 10. No dimmable fluorescent lights shall be provided.
- 11. No U-bent 2x2 lamp fixtures are permitted.
- 12. Light fixtures shall not be supported by power pins in the bottom of beams.
- 13. All light fixtures and components (particularly drivers and ballasts) shall be accessible for maintenance and repair.
  - a. Programmable lighting must have ability to be field modified
  - b. Wattstopper controllers is the basis of design. Curbell may be specified as an alternate. Other controllers may be considered, but must have Director approval
  - c. Greengate shall not be allowed in specifications or as an alternate.
- 14. All non-standard fixture must be reviewed with Shands staff to ensure compliance and approved by Director/VP of Facilities.
- 15. Attic stock of 1-2 components per specialty fixture type shall be provided. Verify on a per-project basis.
- 16. Contractor or CM must provide a final list of installed fixtures to the owner, to include manufacturer, model number and location.
- 17. In outpatient/off-campus buildings without EPS, Lithonia EXR LED EL M6 shall be used (battery equipped).

## Lighting Design Goals:

### General Notes

1. LED lamp types are standard.
2. Ambient lighting especially at common lines of sight (i.e. wall sconces and lights at the ceiling/wall line) should limit glare to users.
3. Allow for ample natural light where feasible (also consider how to block the light when needed)
4. If access to daylighting is not possible, consider how the lighting in the room act as a natural light source.
5. Consider if the lighting should function and change with the body's Circadian system.

### Patient Rooms

1. Provide user-friendly, easily accessible and controlled light sources for families, patients, and caregivers.
2. Limit glare of wall-mount and cove fixtures.

### Patient Corridors and Charting Alcoves

1. Provide fixtures and lighting control options that limit the glare into patient rooms especially when viewing windows exist between rooms and corridors.
2. Provide options for corridor lighting that allow for more than one light level.

### Specialty Areas

1. Consider needs for specialty areas (i.e. dimming to zero for Radiology viewing, etc.)

### Branch Wiring

1. For all 120V branch circuits that are longer than 100' and less than 150', the minimum wire size shall be No. 10 AWG.
2. For all 120V branch circuits that are longer than 150' and less than 200', the minimum wire size shall be No. 8 WG
3. For all 120V branch circuits that are longer than 200', the minimum wire size shall be No. 6 AWG.
4. All conduits installed inside walls to serve boxes and enclosures shall be vertical conduit runs from above the ceiling. Horizontal conduit runs are not allowed between boxes inside walls. Horizontal bends in conduit around corners is not allowed.
  - a. Exception: horizontal conduit runs shall be permitted inside walls to serve boxes in exterior walls where vertical conduit runs are impossible (e.g. exterior glass curtain walls, certain load bearing walls, etc.)
  - b. Exception: pre-approved by Owner.