

In the Eye of the Beholder: Electrical Codes from the View of the AHJ and the Designer

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Agenda

1. Procedure Room Electrical Outlets
 2. Arc Flash
 3. Nurse Call
 4. Owner Furnished Equipment
 5. Generator Quick Connect – GBC 449.4.2.9.7
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Procedure Room Electrical Outlets

2010 FGI Table 2.1-3 – Identifies quantity of outlets per area designation.

Location convenient to head of bed (or table)

2.1 COMMON ELEMENTS FOR HOSPITALS

Table 2.1-3

Electrical Convenience Receptacle Requirements for Clinical Areas

Area Designation	Number	Locations
PATIENT BED LOCATIONS		
Medical, surgical, pediatric, postpartum, physical rehabilitation units	12	Convenient to head of bed with one on each wall
Critical care unit, neonatal ICU, pediatric ICU (and associated exam/treatment)	16	Convenient to head of bed with one on each wall
Psychiatric, substance abuse units	No minimum	
LDR/LDRP rooms	16	8 convenient to head of mother's bed and 4 convenient to each bassinet with one on each wall
Newborn nursery	4	Convenient to each bassinet
Continuing care nursery	5	Convenient to head of each bed, crib, or bassinet (At least 50% of these outlets shall be connected to emergency system power and be so labeled.)
Special care nursery	8	Convenient to each bassinet
DIAGNOSTIC AND TREATMENT LOCATIONS		
General examination/treatment rooms	8	4 convenient to head of stretcher or bed
Emergency care—general	12	Convenient to head of stretcher or bed
Triage rooms or areas in the emergency department	6	Convenient to head of stretcher or bed (At least 50 percent of these outlets shall be connected to emergency system power and be so labeled.)
Trauma/resuscitation emergency room	16	Convenient to head of stretcher or bed
Minor (no general anesthesia) surgical room	16	Convenient to head of stretcher or bed
Operating rooms, cesarean delivery rooms	24	16 convenient to table placement with two on each wall
Cardiac catheterization, interventional radiology, angiography rooms	12	8 convenient to table placement with one on each wall
Endoscopy, bronchoscopy, non-surgical cystoscopy, lithotripsy, urology procedure rooms	8	
POST-ANESTHESIA CARE		
PACU	8	Convenient to head of stretcher or bed
Phase II recovery	4	Convenient to stretcher or chair

Notes

1. Single or duplex receptacles or a combination of both shall be permitted.
2. Consideration shall be given to providing some outlets on emergency power and some on normal power at the head of patient beds and in operating rooms, cesarean delivery rooms, and trauma/resuscitation emergency rooms in case of transfer switch failure.
3. Each patient bed location or procedure room shall be supplied by at least two branch circuits, one from the emergency system and one or more from the normal system. Critical care locations served from two separate transfer switches on the emergency system shall not be required to have separate circuits from the normal system.
4. Branch circuits serving only special purpose receptacles or equipment in critical care areas shall be permitted to be served by other panel boards.
5. An additional outlet shall be provided for a television if one is furnished in the room.
6. A minimum of one dedicated circuit shall be provided to each critical care patient location.
7. Open heart post-anesthesia recovery spaces require outlets beyond those specified in Table 2.1-3 based on the functional program.

Procedure Room Electrical Outlets

Table 2-1.3 of FGI Guidelines: “Convenient to head of stretcher or bed.”

NEC Definitions 517.2: Patient Care Vicinity. “...6-feet beyond the perimeter of the bed ...and not less than 6-7.5 feet above the floor.”

Options for outlets to be convenient to head of bed



Boom



Pedestal



Ceiling Mounted

Arc Flash

- ❑ What is Arc Flash?

 - Electrical current flashing over from its intended path

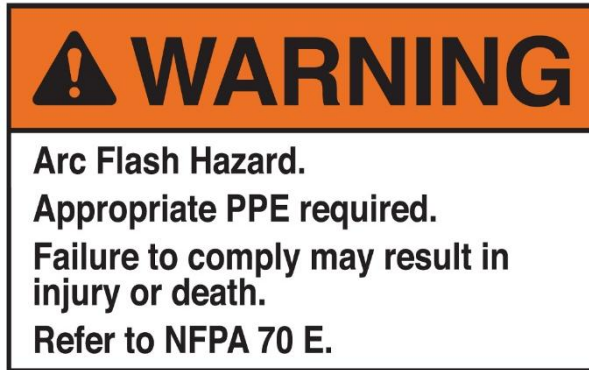
- ❑ Causes – Accidental Touching, Faulty Installation, Corrosion, etc.

- ❑ Results – Burns, Fire, Flying Objects, Sound Blast, etc.

- ❑ Most effective way to eliminate arc flash is to de-energize the equipment

Arc Flash

NEC 110.16:” ...shall be field marked to warn qualified persons of potential electric arc flash hazard.”



BRADY #94913 Y4103153

Exhibit 110.17 (Basic Label)

Informational Note No.1: NFPA 70E...provides assistance in determining severity of potential exposure, planning safe work practices and selecting personal protective equipment.

 WARNING	
Arc Flash and Shock Risk	
Appropriate PPE Required	
4 in	Flash Hazard Boundary
0.11 cal/cm²	Flash Hazard at 18 in
Level 0	Nonmelting or Untreated Fiber with Weight >= 4.5 oz/sq yd
208 VAC	Shock Hazard when cover is removed
00	Glove Class
42 in	Limited Approach
Avoid Contact	Restricted Approach Prohibited Approach
Equipment Name: 2CLN	
Job#: 817031	Prepared on: 10/09/17 By: TLC ENG.
Warning: Changes in equipment or system configuration will invalidate the calculated values & PPE requirements.	
TLC Arc Flash Label	

Arc Flash

PPE (Personal Protective Equipment) – NFPA 70E Categories

Personal Protective Equipment (PPE)

Categories of PPE as described in NFPA 70E are:

Category	Cal/cm ²	Clothing
0	1.2	Untreated Cotton
1	5	Flame retardant (FR) shirt and FR pants
2	8	Cotton underwear FR shirt and FR pants
3	25	Cotton underwear FR shirt, FR pants and FR coveralls
4	40	Cotton underwear FR shirt, FR pants and double layer switching coat and pants



Category 4 PPE

Nurse Call

NFPA 99 Rule 7.3.3.1.7.1: An emergency assistance system for staff to summon additional assistance shall be provided in each operating, delivery, recovery, emergency, examination, treatment, and intermediate care area, and in critical care units, nurseries, special procedure rooms, cardiac catheterization rooms, stress test areas, triage, outpatient surgery, **admission and discharge areas**, and areas for psychiatric patients, including seclusion and security rooms, anterooms and toilet rooms that serve them, communal toilet and bathing facility rooms, and dining, activity, therapy, exam, and treatment rooms.

Owner-Furnished Equipment

Data systems, OR exam lights, OR boom and gas columns, Patient or Resident Headwalls, & OR Tables
Responsibility of the EOR or the facility

FBC Rules 449.3.11.1: All material, including equipment, conductors, controls, and signaling devices, shall be installed to provide a **complete electrical system** with the necessary characteristics and capacity to supply the electrical facility requirements as shown in the specifications and as indicated on the plans.

449.3.11.2: All materials and equipment shall be factory listed as complying with applicable standards of Underwriter's Laboratories, Inc., or other similarly established standards of a nationally recognized testing laboratory (NRTL) that has been certified by the Occupational Safety and Health Administration (OSHA) for that referenced standard.

450.3.14.1: All material, including equipment, conductors, controls, and signaling devices, shall be installed to provide a **complete electrical system** with the necessary characteristics and capacity to supply the electrical facility requirements as shown in the specifications and as indicated on the plans. All materials and equipment **shall be listed** as complying with applicable standards of Underwriter's Laboratories, Inc., or other nationally recognized testing facilities. Field labeling of equipment and materials will be permitted only when provided by a nationally recognized testing laboratory (NRTL) that has been certified by the Occupational Safety and Health Administration (OSHA) for that referenced standard.

NFPA 99 10.2.1 Permanently Connected — Fixed Equipment.

Patient-connected electric appliances shall be grounded to the equipment grounding bus in the distribution panel by an insulated grounding conductor run with the power conductors.

Generator Quick Connect

Permanently installed switchgear that will allow quick connection from a portable generator.



Generator Quick Connect

❑ Florida Building Code (FBC) – Section 449 (Hospitals) – Paragraph 449.4.2.9.6

“If the facility does not have a permanent onsite optional stand-by generator to operate the normal branch electrical system, there shall be a permanently installed predesigned electrical service entry for the normal branch electrical system that will allow a quick connection to a temporary electrical generator.

❑ Section 450 (Nursing Home) – Paragraph 450.4.2.9.6

“...to operate the entire normal branch...”

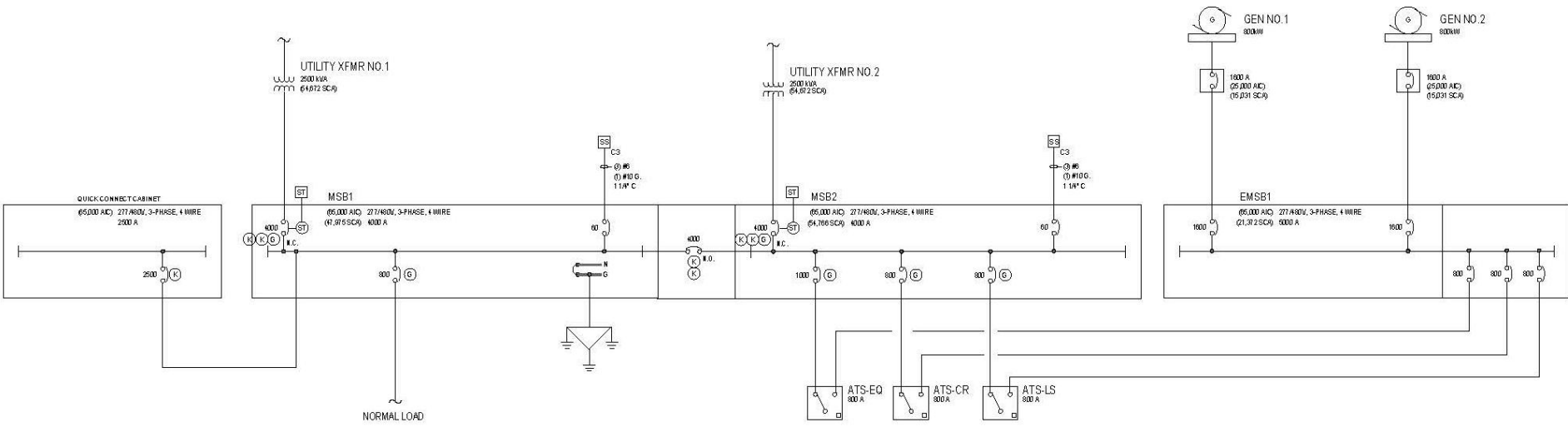
“...electrical service entry for the entire normal branch...”

❑ Florida Building Code (FBC)

New language in 2017 that will allow a quick connection to a temporary electrical generator to operate at least the non-essential loads of the electrical system or the entire normal branch of the electrical system.

Generator Quick Connect

FBC requires Quick Connect for entire normal branch on Nursing Homes, but not Hospitals.



Thank you for your attention!
