each system shall be supplied by an individual circuit serving no other load.

Δ **(3) Mechanical Protection of the Essential Electrical System.** The wiring of the life safety and critical branches shall be mechanically protected by raceways. Where installed as branch circuits in patient care spaces, the installation shall comply with the requirements of 517.13(A) and (B) and 250.118. Only the following wiring methods shall be permitted:

To increase reliability of power delivery to life safety and patient care equipment, the feeder and branch-circuit wiring of the life safety and critical branch requires additional protection against mechanical damage that is not normally mandated for other occupancies. Although 517.31(C)(3) permits nonmetallic wiring methods, they are permitted only for branch circuits that do not supply patient care spaces and for feeders. The wiring methods for branch circuits in patient care spaces must comply with this section and in addition are required to comply with 517.13(A) and (B). This means metal-jacketed or metal-sheathed cables that do comply with 517.13(A) and (B) can be used for branch circuits supplied from the normal power system, but only metal raceways can be used for the branch circuits supplied by the critical and life safety branches of the essential electrical system. Section 517.31(C)(3)(3) does provide for limited use of metal-jacketed or metal-sheathed cables supplied from the life safety or critical branches.

(1) Nonflexible metal raceways, Type MI cable, RTRC marked with the suffix –XW, or Schedule 80 PVC conduit. Nonmetallic raceways shall not be used for branch circuits that supply patient care spaces.
(2) Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 PVC conduit, flexible nonmetallic or jacketed metallic raceways, or jacketed metallic cable assemblies listed for installation in concrete. Nonmetallic raceways shall not be used for branch circuits that supply patient care spaces.
(3) Listed flexible metal raceways and listed metal sheathed cable assemblies, as follows:
   a. Where used in listed prefabricated medical headwalls
   b. In listed office furnishings
   c. Where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage
   d. Where necessary for flexible connection to equipment
   e. For equipment that requires a flexible connection due to movement, vibration, or operation
   f. Luminaires installed in ceiling structures
(4) Flexible power cords of appliances or other utilization equipment connected to the essential electrical system.
(5) Cables for Class 2 or Class 3 systems permitted in Part VI of this article, with or without raceways.

Informational Note: See 517.13 for additional grounding requirements in patient care areas.

Section 517.31(C)(3)(3)(c) permits fishing flexible metal raceways and metal-sheathed cables in existing installations. This facilitates installations in renovated areas where the existing walls or ceilings remain intact. The secondary conductors of limited energy systems, such as nurse call, telephone, and alarm circuits, are exempt from being run in raceways, provided they comply with their applicable articles. Although this requirement allows substantial latitude in the wiring method, the restrictions of 300.22 (ducts, plenums, and other air-handling spaces) apply, unless cables specifically listed for use in those environments are used.

Δ **(D) Capacity of Systems.** The essential electrical system shall have the capacity and rating to meet the maximum actual demand likely to be produced by the connected load.

Feeders shall be sized in accordance with 215.2 and Part III of Article 220. The alternate power source(s) required in 517.30 shall have the capacity and rating to meet the demand produced by the load at any given time.

Demand calculations for sizing of the alternate power source(s) shall be based on any of the following:

(1) Prudent demand factors and historical data
(2) Connected load
(3) Feeder calculations
(4) Any combination of the above

The sizing requirements in 700.4 and 701.4 shall not apply to alternate sources.

(E) Receptacle Identification. The electrical receptacles or the cover plates for the electrical receptacles supplied from the life safety and critical branches shall have a distinctive color or marking so as to be readily identifiable. [**99:**6.7.2.2.5(B)]

(F) Feeders from Alternate Power Source. A single feeder supplied by a local or remote alternate power source shall be permitted to supply the essential electrical system to the point at which the life safety, critical, and equipment branches are separated. Installation of the transfer equipment shall be permitted at other than the location of the alternate power source.

Δ **(G) Coordination.** Overcurrent protective devices serving the essential electrical system shall be coordinated for the period of time that a fault's duration extends beyond 0.1 second.

Exception No. 1: Coordination shall not be required between transformer primary and secondary overcurrent protective devices where only one overcurrent protective device or set of overcurrent protective devices exists on the transformer secondary.

Exception No. 2: Coordination shall not be required between overcurrent protective devices of the same size (ampere rating) in series.

Informational Note No. 1: The terms *coordination* and *coordinated* as used in this section do not cover the full range of overcurrent conditions.