



**Informational Note Figure 700.10(B)(b) Single or Multiple Feeders with Overcurrent Protection.**

(C) **Wiring Design and Location.** Emergency wiring circuits shall be designed and located so as to minimize the hazards that might cause failure due to flooding, fire, icing, vandalism, and other adverse conditions.

**Δ (D) Fire Protection.**

**N (1) Occupancies.** Emergency systems shall meet the additional requirements in 700.10(D)(2) through (D)(4) in the following occupancies:

- (1) Assembly occupancies for not less than 1000 persons
- (2) Buildings above 23 m (75 ft) in height
- (3) Educational occupancies with more than 300 occupants

**Δ (2) Feeder-Circuit Wiring.** Feeder-circuit wiring shall meet one of the following conditions:

- (1) The cable or raceway is installed in spaces or areas that are fully protected by an approved automatic fire protection system.
- (2) The cable or raceway is protected by a listed electrical circuit protective system with a minimum 2-hour fire rating.

**Informational Note No. 1:** Electrical circuit protective systems could include but not be limited to thermal barriers or a protective shaft and are tested to UL 1724, *Fire Tests for Electrical Circuit Protection Systems*.

**Informational Note No. 2:** The listing organization provides information for electrical circuit protective systems on proper installation requirements to maintain the fire rating.

- (3) The cable or raceway is a listed fire-resistive cable system with a minimum 2-hour fire rating.

**Informational Note No. 1:** Fire-resistive cables are tested to ANSI/UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*.

**Informational Note No. 2:** The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

- (4) The cable or raceway is protected by a listed fire-rated assembly that has a minimum fire rating of 2 hours and contains only emergency circuits.

- (5) The cable or raceway is encased in a minimum of 50 mm (2 in.) of concrete.

(3) **Feeder-Circuit Equipment.** Equipment for feeder circuits (including transfer switches, transformers, and panelboards) shall be located either in spaces fully protected by an approved automatic fire protection system or in spaces with a 2-hour fire resistance rating.

(4) **Generator Control Wiring.** Control conductors installed between the transfer equipment and the emergency generator shall be kept entirely independent of all other wiring and shall meet the conditions of 700.10(D)(2). The integrity of the generator remote start circuit shall be monitored for broken, disconnected, or shorted wires. Loss of integrity shall start the generator(s).

**Part III. Sources of Power**

**Δ 700.12 General Requirements.** Current supply shall be such that, in the event of failure of the normal supply to, or within, the building or group of buildings concerned, emergency lighting, emergency power, or both shall be available within the time required for the application but not to exceed 10 seconds. The supply system for emergency purposes, in addition to the normal services to the building and meeting the general requirements of this section, shall be one or more of the types of systems described in 700.12(C) through (H). Unit equipment in accordance with 700.12(I) shall satisfy the applicable requirements of this article.

**N (A) Power Source Considerations.** In selecting an emergency source of power, consideration shall be given to the occupancy and the type of service to be rendered, whether of minimum duration, as for evacuation of a theater, or longer duration, as for supplying emergency power and lighting due to an indefinite period of current failure from trouble either inside or outside the building.

**N (B) Equipment Design and Location.** Equipment shall be designed and located so as to minimize the hazards that might cause complete failure due to flooding, fires, icing, and vandalism.

Equipment for sources of power as described in 700.12(C) through (H) shall be installed either in spaces fully protected by approved automatic fire protection systems or in spaces with a 2-hour fire rating where located within the following:

- (1) Assembly occupancies for more than 1000 persons
- (2) Buildings above 23 m (75 ft) in height with any of the following occupancy classes — assembly, educational, residential, detention and correctional, business, and mercantile
- (3) Educational occupancies with more than 300 occupants

**Informational Note No. 1:** For the definition of *Occupancy Classification*, see Section 6.1 of NFPA 101-2018, *Life Safety Code*.

**Informational Note No. 2:** For information regarding power system reliability, see IEEE 3006.5-2014, *Recommended Practice for the Use of Probability Methods for Conducting a Reliability Analysis of Industrial and Commercial Power Systems*.

(C) **Storage Battery.** Storage batteries shall be of suitable rating and capacity to supply and maintain the total load for a minimum period of 1½ hours, without the voltage applied to the load falling below 87½ percent of normal. Automotive-type batteries shall not be used.

An automatic battery charging means shall be provided.

**(D) Generator Set.**

**Δ (1) Prime Mover-Driven.** For a generator set driven by a prime mover approved by the authority having jurisdiction and sized in accordance with 700.4, means shall be provided for automatically starting the prime mover on failure of the normal service and for automatic transfer and operation of all required electrical circuits. A time-delay feature shall be provided to avoid retransfer in case of short-time reestablishment of the normal source.

**Δ (2) Internal Combustion Engines as Prime Movers.**

(a) **On-Site Fuel Supply.** Where internal combustion engines are used as the prime mover, an on-site fuel supply shall be provided with an on-premises fuel supply sufficient for not less than 2 hours' operation of the system.

(b) **Fuel Transfer Pumps.** Where power is needed for the operation of the fuel transfer pumps to deliver fuel to a generator set day tank, this pump shall be connected to the emergency power system.

(c) **Public Gas System, Municipal Water Supply.** Prime movers shall not be solely dependent on a public utility gas system for their fuel supply or municipal water supply for their cooling systems.

*Exception: Where approved by the authority having jurisdiction, the use of other than on-site fuels shall be permitted where there is a low probability of a simultaneous failure of both the off-site fuel delivery system and power from the outside electrical utility company.*

(d) **Automatic Fuel Transfer.** Where dual fuel supplies are used, means shall be provided for automatically transferring from one fuel supply to another.

(3) **Battery Power and Dampers.** Where a storage battery is used for control or signal power or as the means of starting the prime mover, it shall be suitable for the purpose and shall be equipped with an automatic charging means independent of the generator set. Where the battery charger is required for the operation of the generator set, it shall be connected to the emergency system. Where power is required for the operation of dampers used to ventilate the generator set, the dampers shall be connected to the emergency system.

(4) **Auxiliary Power Supply.** Generator sets that require more than 10 seconds to develop power shall be permitted if an auxiliary power supply energizes the emergency system until the generator can pick up the load.

(5) **Outdoor Generator Sets.** Where an outdoor-housed generator set is equipped with a readily accessible disconnecting means in accordance with 445.18, and the disconnecting means is located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure. Where the generator supply conductors terminate at a disconnecting means in or on a building or structure, the disconnecting means shall meet the requirements of 225.36.

*Exception: For installations under single management, where conditions of maintenance and supervision ensure that only qualified persons will monitor and service the installation and where documented safe switching procedures are established and maintained for disconnection, the generator set disconnecting means shall not be required to be located within sight of the building or structure served.*

(E) **Uninterruptible Power Supplies.** Uninterruptible power supplies used to provide power for emergency systems shall comply with the applicable provisions of 700.12(B) and (C).

(F) **Separate Service.** Where approved by the authority having jurisdiction as suitable for use as an emergency source of power, an additional service shall be permitted. This service shall be in accordance with the applicable provisions of Article 230 and the following additional requirements:

- (1) Separate overhead service conductors, service drops, underground service conductors, or service laterals shall be installed.
- (2) The service conductors for the separate service shall be installed sufficiently remote electrically and physically from any other service conductors to minimize the possibility of simultaneous interruption of supply.

(G) **Fuel Cell System.** Fuel cell systems used as a source of power for emergency systems shall be of suitable rating and capacity to supply and maintain the total load for not less than 2 hours of full-demand operation.

Installation of a fuel cell system shall meet the requirements of Parts II through VIII of Article 692.

Where a single fuel cell system serves as the normal supply for the building or group of buildings concerned, it shall not serve as the sole source of power for the emergency standby system.

**N (H) DC Microgrid Systems.** Sources connected to a dc microgrid system shall be permitted where the system is capable of being isolated from all non-emergency sources.

DC microgrid systems used as a source of power for emergency systems shall be of suitable rating and capacity to supply and maintain the total emergency load for not less than 2 hours of full-demand operation.

Where a dc microgrid system source serves as the normal supply for the building or group of buildings concerned, it shall not serve as the sole source of power for the emergency standby system.

**(I) Unit Equipment.**

(1) **Components of Unit Equipment.** Individual unit equipment for emergency illumination shall consist of the following:

- (1) A rechargeable battery
- (2) A battery charging means
- (3) Provisions for one or more lamps mounted on the equipment, or shall be permitted to have terminals for remote lamps, or both
- (4) A relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment

**Δ (2) Installation of Unit Equipment.** Unit equipment shall be installed in accordance with the following: