ARTICLE 700—EMERGENCY SYSTEMS

A. General

700-1. Scope. The provisions of this article apply to the electrical safety of the installation, operation, and maintenance of emergency systems consisting of circuits and equipment intended to supply, distribute, and control electricity for illumination or power, or both, to required facilities when the normal electrical supply or system is interrupted.

Emergency systems are those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction. These systems are intended to automatically supply illumination or power, or both, to designated areas and equipment in the event of failure of the normal supply or the event of accident to elements of a system intended to supply, distribute and control power and illumination essential for safety to human life.

Exception: A sign shall not be required for individual unit equipment as specified in Section 700-12(e).

(1) Emergency Sources. A sign shall be placed at the service entrance equipment indicating type and location of on-site emergency power sources.

(b) Grounding. Where the grounded circuit conductor connected to the emergency source is connected to a grounding electrode conductor at a location remote from the generator, there shall be a sign at the grounding location that shall identify all emergency and normal sources connected at that location.

700-2. Application of Other Articles. Except as modified by this article, all applicable articles of this Code shall apply.

700-3. Equipment Approval. All equipment shall be approved for use on emergency systems.

700-4. Tests and Maintenance.

(a) Conduct or Witness Test. The authority having jurisdiction shall conduct or witness a test of the complete system upon installation and periodically afterward.

(b) Tested Periodically. Systems shall be tested periodically on a schedule acceptable to the authority having jurisdiction to ensure the systems are maintained in proper operating condition.

(c) Battery Systems Maintenance. Where battery systems or unit equipment are involved, including batteries used for starting, control, or ignition in auxiliary engines, the authority having jurisdiction shall require periodic maintenance.

(d) Written Record. A written record shall be kept of such tests and maintenance.

(e) Testing Under Load. Means for testing all emergency lighting and power systems during maximum anticipated load conditions shall be provided.

700-5. Capacity. (a) Capacity and Rating. An emergency system shall have adequate capacity and rating for all loads to be operated simultaneously. The emergency system equipment shall be rated for the maximum available fault current at its terminals.

(b) Selective Load Pickup, Load Shedding, and Peak Load Shaving. The alternate power source shall be permitted to supply emergency, legally required standby, and optional standby system loads where automatic selective load pickup and load shedding is provided as needed to ensure adequate power to (1) the emergency circuits, (2) the legally required standby circuits; and (3) the optional standby circuits, in that order of priority. The alternate power source shall be permitted to be used for peak load shaving, provided the above conditions are met.

(c) Fire Protection. Emergency systems shall meet the following additional requirements in assembly occupancies for not less than 1000 persons or in buildings above 75 ft (23 m) in height with any of the following occupancy classes: assembly, educational, residential, detention and correctional, business, and mercantile.

700-6. Transfer Equipment.

(a) General. Transfer equipment, including automatic transfer switches, shall be automatically identified for emergency use and approved by the authority having jurisdiction. Transfer equipment shall be designed and installed to prevent the inadvertent interconnection of normal and emergency sources of supply in any operation of the transfer equipment. Transfer equipment and electric power production systems installed to permit operation in parallel with the normal source shall meet the requirements of Section 706.

(b) Automatic transfer switches shall be electrically operated and mechanically held.

(c) Use. Transfer equipment shall supply only emergency loads.

700-7. Signals. Audible and visual signal devices shall be provided, where practicable, for the following purposes described in 700.7(A) through (D).

(a) Derangement. To indicate derangement of the emergency source.

(b) Carrying Load. To indicate that the battery is carrying load.

(c) Not Functioning. To indicate that the battery charger is not functioning.

(d) Ground Fault. To indicate a ground fault in solidly grounded wye emergency systems of more than 150 volts to ground and circuit protective devices rated 1000 amperes or more. The sensor for the ground-fault signal devices shall be located at, or ahead of, the main system disconnecting means for the emergency source, and the maximum setting of the signal devices shall be for a ground-fault current of 1200 amperes. Instructions on the course of action to be taken in event of indicated ground fault shall be located at or near the sensor location.

700-8. Signs.

(a) Emergency Sources. A sign shall be placed at the service entrance equipment indicating type and location of on-site emergency power sources.

(b) Grounding. Where the grounded circuit conductor connected to the emergency source is connected to a grounding electrode conductor at a location remote from the generator, there shall be a sign at the grounding location that shall identify all emergency and normal sources connected at that location.


(a) Identification. All boxes and enclosures (including transfer switches, generators, and power panels) for emergency systems shall be permanently marked so they will be readily identified as a component of an emergency circuit or system.

(b) Wiring. Unless otherwise permitted in (1) through (4), wiring from emergency source or emergency source distribution overcurrent protection to emergency loads shall be kept entirely independent of all other wiring and equipment. Wiring of two or more emergency circuits supplied from the same source shall be permitted in the same raceway, cable, box, or cabinet.

(c) Wiring Design and Location. Electrical wiring circuit shall be designed and located to minimize the hazards that might cause failure due to flooding, fire, icing, vandalism, and other adverse conditions.

(d) Evidence of Protection. Emergency systems shall meet the following additional requirements in assembly occupancies for not less than 1000 persons or in buildings above 75 ft (23 m) in height with any of the following occupancy classes: assembly, educational, residential, detention and correctional, business, and mercantile.

(e) Feeder-circuit Equipment. Feeder-circuit equipment shall be installed in buildings that are fully protected by an approved automatic fire suppression system.

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(z) Listed Equipment. Feeder-circuit equipment shall be installed in buildings that are fully protected by an approved automatic fire suppression system.

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assembly, educational, residential, detention and correctional, business, and mercantile, shall be installed either in spaces fully protected by approved automatic fire suppression systems (sprinklers, carbon dioxide systems, and so forth), or in spaces with a 1-hour fire rating.

FPN No. 1: For definition of occupancy class, see Section 4.1 of Life Safety Code, NFPA 101-2000.

FPN No. 2: Assignment of degree of reliability of the recognized emergency supply system depends on the careful evaluation of the variables at each particular installation.

(a) Storage Battery. Storage batteries used as source of power for emergency systems shall be of suitable rating and capacity to supply and maintain the total load for a period of 1 1/2 hours minimum, without the voltage applied to the load falling below 87 1/2 percent of normal.

Batteries, whether of the acid or alkali type, shall be designed and constructed to meet the requirements of emergency service and shall be compatible with the charger for that particular installation. For a sealed battery, the container shall not be required to be transparent. However, for the lead acid battery that requires water additions, transparent or translucent jars shall be furnished. Automotive-type batteries shall not be used. An automatic battery charging means shall be provided.

(b) Generator Set.

(1) Prime Mover-Driven. For a generator set driven by a prime mover acceptable to the authority having jurisdiction and sized in accordance with Section 700-5.

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 permitting a 15-minute setting shall be provided to avoid retransfer in case of short-time reestablishment of the normal source.

(2) Internal Combustion as Prime Movers. Where internal combustion engines are used as the prime mover an on-site fuel supply shall be provided with an on-premise fuel supply sufficient for not less than 2 hours full-demand operation of the system. Where a power is needed for the operation of the fuel transfer pumps delivery fuel to a generator set dry tank, this pump shall be connected to the emergency power system.

(3) Dual Supplies. Prime movers shall not be solely dependent upon a public utility gas system for their fuel supply or municipal water supply for their cooling systems. Means shall be provided for automatically transferring from one fuel supply to another where dual fuel supplies are used.

Exception: Where acceptable to 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 system.

(4) 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.

(5) Auxiliary Power Supply. Generator sets that require more than 10 seconds to develop power shall be permitted as an auxiliary power supply energizes the emergency power system. The generator can start and the generator can pick up the load.

(6) Outdoor Generator Sets. Where an outdoor housed generator set is equipped with a readily accessible disconnecting means located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors pass through the building or structure.

(c) Uninterruptible Power Supplies. Uninterruptible power supplies used to provide power for emergency systems shall comply with the applicable provisions of Sections 700-12(a) and (b).

(d) Separate Service. Where acceptable to the authority having jurisdiction as suitable for use as an emergency source, a second service shall be permitted. This service shall be in accordance with Article 230, with separate service drop or lateral, wired separately electrically and physically from the normal service, to minimize the possibility of simultaneous interruption of supply.

(e) Unit Equipment. Individual unit equipment for emergency illumination shall consist of the following: (1) a battery; (2) a battery charger; (3) one or more lamps mounted on the equipment, or shall be permitted to have terminals for remote lamps, or both; and (4) a relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment.

The batteries shall be of suitable rating and capacity to supply and maintain at least 60 percent of the nominal battery voltage for the total lamp load associated with the unit for a period of at least 1 1/2 hours, or the unit equipment shall supply and maintain not less than 60 percent of the initial emergency illumination for a period of at least 1 1/2 hours. Storage batteries, whether of the acid or alkali type, shall be designed and constructed to meet the requirements of emergency service.

Unit equipment shall be permanently fixed in place (i.e., not portable) and shall have all wiring to each unit installed in accordance with the requirements of any of the wiring methods in Chapter 3. Flexible cord and plug connection shall be permitted, provided that the cord does not exceed 3 ft (900 mm) in length. The branch circuit feeding the unit equipment shall be the same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches. The branch circuit that feeds unit equipment shall be clearly identified at the distribution panel. Emergency luminaires’ (illumination fixtures) that obtain power from a unit equipment and are not part of the unit equipment shall be wired to the unit equipment as required by Section 700-9 and by one of the wiring methods of Chapter 3.

Exception: In a separate and uninterrupted area supplied by a minimum of three normal lighting circuits, a separate branch circuit for unit equipment shall be permitted if it originates from the same panelboard as that of the normal lighting circuits and is provided with a lock-on feature.

D. Emergency System Circuits for Lighting and Power

700-15. Loads on Emergency Branch Circuits. No appliances and no lamps, other than those specified as required for emergency use, shall be supplied by emergency lighting circuits.

700-16. Emergency Illumination. Emergency illumination shall include all required means of egress lighting, illuminated exit signs, and all other lights specified as emergency lights upon the event of failure of the general lighting system supply, or (2) two or more separate and complete systems with independent power supply, each system providing sufficient current for emergency lighting purposes.

Unless both systems are used for regular lighting purposes and are both kept lighted, means shall be provided for automatically energizing either system upon failure of the other. Either or both systems shall be permitted to be a part of the general lighting system of the protected occupancy if circuits supplying lights for emergency illumination are installed in accordance with other sections of this article.

700-18. Circuits for Emergency Power. For branch circuits that supply equipment classed as emergency, there shall be an emergency supply source to which the load will be transferred automatically upon the failure of the normal supply.

E. Control—Emergency Lighting Circuits

700-20. Switch Requirements. The switch or switches installed in emergency lighting circuits shall be arranged so that only authorized persons will have control of the emergency lighting.

Exception No. 1: Where two or more single-toggle switches are connected in parallel to control a single circuit, at least one of these switches shall be accessible only to authorized persons.

Exception No. 2: Additional switches that act only to put emergency lights into operation but not disconnect them shall be permissible.

Switches connected in series or 3- and 4-way switches shall not be used.

700-21. Switch Location. All manual switches for controlling emergency circuits shall be in locations convenient to authorized persons responsible for their actuation. In places of assembly, such as theaters, a switch for controlling emergency lighting circuits shall be located in the lobby or at a place conveniently accessible thereto. In no case shall a control switch for emergency lighting in a theater, or motion-picture theater or place of assembly be placed in a motion picture projection booth or on a stage or platform.

Exception: Where multiple switches are provided, one such switch shall be permitted in such locations where arranged so that it can energize the circuit only, but cannot de-energize the circuit.

700-22. Exterior Lights. Those lights on the exterior of a building that are not required for illumination when there is sufficient daylight shall be permitted to be designed as automatically energized means of egress lighting.

F. Overcurrent Protection

700-25. Accessibility. The branch-circuit overcurrent devices in emergency circuits shall be accessible to authorized persons only.

(FPN): Fuses and circuit breakers for emergency circuit overcurrent protection shall be coordinated to ensure selective clearing of fault currents, increase overall reliability of the system.

700-26. Ground-Fault Protection of Equipment. The alternate source for emergency systems shall not be required to have ground-fault protection of equipment with automatic disconnecting means provided. Emergency indication of the emergency source shall be provided per Section 700-7(d).