

▶ Selecting & Applying

Emergency Lighting Systems

09.1



→ Philips Emergency Lighting

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▶ Emergency Lighting

Mandated by State and Local Laws

Just like fire extinguishers, smoke alarms and other life safety equipment, emergency lighting is required in commercial, industrial and institutional buildings for times when emergency situations arise. This brochure is provided by Philips Emergency Lighting to help you understand the technical and legal aspects of emergency lighting so that you can specify it with confidence.

AC power failures occur for a variety of reasons. Storms, tornadoes, hurricanes and other extreme weather conditions can affect AC power. Vehicular accidents, fires or equipment failure can also result in power outages.

When this happens, liability concerns are inevitable. Serious accidents or mishaps could occur when occupants are left in total darkness during a power failure. In such instances, the first area of inquiry is often, "Did this building meet code?"

Laws, Codes and Regulations

Although state and local building codes vary, most are based upon:

1. National Electrical Code®, NFPA 70®, Article 700;
2. Life Safety Code®, NFPA 101®, Section 7.8-7.10;
3. Occupational Safety and Health Act (OSHA) regulations.

These codes provide complete information about emergency lighting requirements; however, a basic starting point is provided in the LSC 7.9.2.1*, which states:

Emergency illumination shall be provided for not less than 1 ½ hours in the event of failure of normal lighting. Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 ft-candle (10.8 lux) and, at any point, not less than 0.1 ft-candle (1.1 lux), measured along the path of egress at floor level. Illumination levels shall be permitted to decline to not less than an average of 0.6 ft-candle (6.5 lux) and, at any point, not less than 0.06 ft-candle (0.65 lux) at the end of the 1 ½ hours. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.



Applicable portions of the NEC, LSC and OSHA regulations are reprinted beginning on page 5.

It is important to remember that codes generally set *minimum* standards. Specifiers, building owners or facility management may choose to go beyond minimums in their effort to keep people and property safe.

Maintenance

Codes mandate periodic monitoring of emergency lighting equipment once it is installed. Emergency operation must be tested at 30-day intervals for a minimum of 30 seconds, and, for battery-powered systems, a 90-minute discharge test must be conducted once a year. Additionally, the NFPA requires that records be kept as proof of this maintenance.

Because this emergency equipment is used only on an emergency basis, it is critical that this regular maintenance be performed. Like all capital investments, upkeep is vital and provides proof when liability questions arise.

Common sense must be used in planning emergency lighting. The major objective of adequate and reliable emergency lighting is a safe, panic-free exit from a building should the normal power fail.

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▶ *Emergency illumination shall be provided for not less than 1 ½ hours in the event of failure of normal lighting.*

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▶ How to Design Emergency Lighting Systems Factors to be Considered

Proximity, Shape and Size of Exits

The configuration of walls adjoining the exit way, the amount of space devoted to exit passages and travel distance to exits should be considered when determining the number and placement of emergency lighting units. For example, it is important to place emergency lighting at an intersection of a corridor or hallway. If it is a large area, additional units may be needed to provide adequate light to see any objects blocking the exit path. (Emergency lighting should be evenly spaced.)

Color and Texture of Ceiling, Floor and Wall Coverings

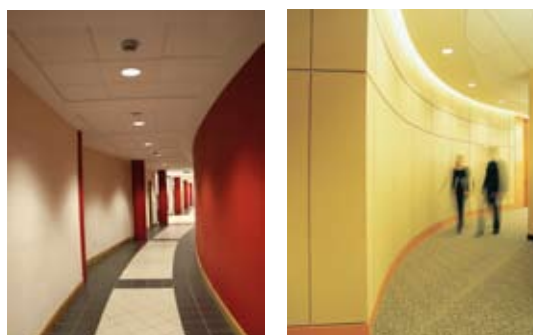
Emergency lighting levels are affected by the color and texture of surrounding areas. Light-colored walls and floors with smooth surfaces require less emergency lighting because of their reflective characteristics than do darker floors and walls with rough surfaces.

Number of Persons Expected to Occupy a Building

The number of people expected to occupy a building and their knowledge of its interior also influence the level of emergency illumination needed. Large numbers of people unfamiliar with exit paths require more emergency lighting than smaller numbers of people who know the surroundings. Consequently, auditoriums, convention halls and sports arenas often need higher levels of emergency illumination than factories, office buildings and warehouses.



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▶ *Emergency lighting levels are affected by the color and texture of surrounding areas.*
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Intended Use of a Building

Additional emergency lighting may be required depending on the types of people using a facility. Elementary school children, the elderly and the physically challenged need more emergency lighting than apartment residents, college students and factory or office workers. High security facilities and retail situations where valuable merchandise is accessible may require extra illumination. Adequate lighting can be especially critical in hospital settings such as operating and emergency rooms.

▶ Types of Emergency Lighting

▶ There are two principal types of unit equipment available: fluorescent and incandescent.

There are several types of emergency lighting including unit equipment (both fluorescent and incandescent), engine-generators, central battery systems utilizing inverters and separate circuits. Here are some important factors that should be considered when making a selection.

Unit Equipment

There are two principal types available: fluorescent and incandescent.

Fluorescent

Self-contained, fixture-mounted emergency ballasts convert fluorescent fixtures into emergency lights. Each unit consists of battery, charger, inverter and sensing circuitry. Because they are concealed in or near the fixture, they do not detract from the interior design.

- + Light produced is similar to that under normal conditions.
- + External and internal power failure can be detected.
- + Batteries that do not require maintenance are incorporated.
- + Unseen mounting deters vandalism and theft.
- + Can be used with a wide variety of fluorescent lamp and AC ballast types.
- + Power is not dependent on central distribution system.
- Power usually is limited to 90 minutes.

Incandescent

Self-contained, wall- or ceiling-mounted units utilize sealed-beam or quartz lamps. Each unit consists of a battery, charger and sensing circuitry.

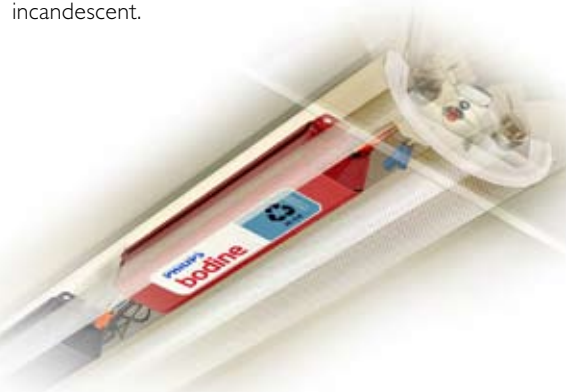


- + External and internal power failure can be detected.
- + They can be mounted in almost any location.
- + Power is not dependent on a central distribution system.
- Many models use batteries that require routine maintenance.
- Light may be aimed in a direction that produces a blinding glare and dangerous shadows. Also, light may not be directed on the path of egress.
- Distracts from the interior design.
- Wall-mounted units are vulnerable to vandalism and theft.
- Power is usually limited to 90 minutes.

Engine-Generators

Emergency power is supplied to specific lighting fixtures by an engine generator when the AC power fails.

- + Emergency power can be provided to a large number of fixtures.
- + Additional power is available for other functions such as elevators, operating rooms and life-support systems.
- + Operating time is not restricted to the 90 minutes provided by most battery-operated emergency equipment.
- Remote sensing devices are necessary to detect internal partial power failure.
- Several seconds may lapse between power failure and engine start-up.
- Engine and starting battery require routine maintenance.
- Storage of flammable fuel presents hazards.
- Damage to the central distribution system could shut off emergency lighting to any part or all of the building.



Code References

→ The following pages contain sections of the *National Fire Protection Association Life Safety Code (2006)*, *National Electrical Code (2005)* and *Occupational Safety and Health Act (June 2007)*.

Types of Emergency Lighting

Central Battery System

Normal AC voltage is automatically supplied to specific lighting fixtures from a central location utilizing a battery/inverter arrangement.

- + Fluorescent, HID and incandescent lighting fixtures may be used.
- + Emergency power is available instantly.
- + Power can be supplied to other functions that may be needed.
- Most systems incorporating batteries require routine maintenance.
- Remote sensing devices are necessary to detect internal partial power failure.
- Emergency power is usually limited to 90 minutes.
- Damage to central distribution system could shut off emergency lighting to any part or all of the building.

Separate Circuits

This method provides uninterrupted power to specific lighting fixtures and exit signs by connecting a separate circuit to the line side of the main connection.

- Protection is provided only against internal power failures, not external ones.
- LSC requirements for a reliable, alternate source of power are not met.



The following material is comprised of excerpts from the *Life Safety Code (2006)*, the *National Electrical Code (2005)* and *OSHA regulations (June 2007)*.

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NFPA 101® Life Safety Code® 2006 Edition Sections 7.8, 7.9, 7.10

7.8 Illumination of Means of Egress.

7.8.1 General.

7.8.1.1 Illumination of means of egress shall be provided in accordance with Section 7.8 for every building and structure where required in Chapter 11 through Chapter 42. For the purposes of this requirement, exit access shall include only designated stairs, aisles, corridors, ramps, escalators, and passageways leading to an exit. For purposes of this requirement, exit discharge shall include only designated stairs, aisles, corridors, ramps, escalators, walkways, and exit passageways leading to a public way.

7.8.1.2 Illumination of means of egress shall be continuous during the time that the conditions of occupancy require that the means of egress be available for use, unless otherwise provided in 7.8.1.2.2.

7.8.1.2.1 Artificial lighting shall be employed at such locations and for such periods of time as are necessary to maintain the illumination to the minimum criteria values herein specified.

7.8.1.2.2 Automatic, motion sensor-type lighting switches shall be permitted within the means of egress, provided that the switch controllers are equipped for fail-safe operation, the illumination timers are set for a minimum 15-minute duration, and the motion sensor is activated by any occupant movement in the area served by the lighting units.

7.8.1.3 The floors and other walking surfaces within an exit and within the portions of the exit access and exit discharge designated in 7.8.1.1 shall be illuminated as follows:

- (1) During the conditions of stair use, the minimum illumination for new stairs shall be at least 10 ft-candle (108 lux), measured at the walking surfaces.
- (2) The minimum illumination for floors and walking surfaces, other than new stairs during conditions of stair use, shall be to values of at least 1 ft-candle (10.8 lux), measured at the floor.
- (3) In assembly occupancies, the illumination of the floors of exit access shall be at least 0.2 ft-candle (2.2 lux) during periods of performances or projections involving directed light.
- (4) The minimum illumination requirements shall not apply where operations or processes require low lighting levels.

7.8.1.4 Required illumination shall be arranged so that the failure of any single lighting unit does not result in an illumination level of less than 0.2 ft-candle (2.2 lux) in any designated area.

7.8.1.5 The equipment or units installed to meet the requirements of Section 7.10 also shall be permitted to serve the function of illumination of means of egress, provided that all requirements of Section 7.8 for such illumination are met.

7.8.2 Sources of Illumination.

7.8.2.1 Illumination of means of egress shall be from a source considered reliable by the authority having jurisdiction.

7.8.2.2. Battery-operated electric lights and other types of portable lamps or lanterns shall not be used for primary illumination of means of egress. Battery-operated electric lights shall be permitted to be used as an emergency source to the extent permitted under Section 7.9.

7.9 Emergency Lighting.

7.9.1 General.

7.9.1.1 Emergency lighting facilities for means of egress shall be provided in accordance with Section 7.9 for the following:

- (1) Buildings or structures where required in Chapter 11 through Chapter 42
- (2) Underground and limited access structures as addressed in Section 11.7
- (3) High-rise buildings as required by other sections of this Code
- (4) Doors equipped with delay-egress locks
- (5) Stair shaft and vestibule of smokeproof enclosures, for which the following also apply
 - (a) The stair shaft and vestibule shall be permitted to include a standby generator that is installed for the smokeproof enclosure mechanical ventilation equipment.
 - (b) The standby generator shall be permitted to be used for the stair shaft and vestibule emergency lighting power supply.
- (6) New access-controlled egress doors in accordance with 7.2.1.6.2.

7.9.1.2 For the purposes of 7.9.1.1, exit access shall include only designated stairs, aisles, corridors, ramps, escalators, and passageways leading to an exit. For the purposes of 7.9.1.1, exit discharge shall include only designated stairs, ramps, aisles, walkways, and escalators leading to a public way.

7.9.2 Performance of System.

7.9.2.1 Emergency illumination shall be provided for not less than 1½ hours in the event of failure of normal lighting. Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 ft-candle (10.8 lux)



and, at any point, not less than 0.1 ft-candle (1.1 lux), measured along the path of egress at floor level. Illumination levels shall be permitted to decline to not less than an average of 0.6 ft-candle (6.5 lux) and, at any point, not less than 0.06 ft-candle (0.65 lux) at the end of the 1½ hours. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

7.9.2.2 New emergency power systems for emergency lighting shall be at least Type 10, Class 1.5, Level 1, in accordance with NFPA 110, Standard for Emergency and Standby Power Systems.

7.9.2.3 The emergency lighting system shall be arranged to provide the required illumination automatically in the event of any interruption of normal lighting due to any of the following:

- (1) Failure of a public utility or other outside electrical power supply
- (2) Opening of a circuit breaker or fuse
- (3) Manual act(s), including accidental opening of a switch controlling normal lighting facilities

7.9.2.4 Emergency generators providing power to emergency lighting systems shall be installed, tested, and maintained in accordance with NFPA 110, Standard for Emergency and Standby Power Systems. Stored electrical energy systems, where required in this Code, shall be installed and tested in accordance with NFPA 111, Standard on Stored Electrical Energy Emergency and Standby Power Systems.

7.9.2.5 Unit equipment and battery systems for emergency luminaires shall be listed to UL 924, Standard for Emergency Lighting and Power Equipment.

7.9.2.6 Existing battery-operated emergency lights shall use only reliable types of rechargeable batteries provided with suitable facilities for maintaining them in properly charged condition. Batteries used in such lights or units shall be approved for their intended use and shall comply with NFPA 70, National Electrical Code.

7.9.2.7 The emergency lighting system shall be either continuously in operation or shall be capable of repeated automatic operation without manual intervention.

7.9.3 Periodic Testing of Emergency Lighting Equipment.

7.9.3.1 Required emergency lighting systems shall be tested in accordance with one of the three options offered by 7.9.3.1.1, 7.9.3.1.2, or 7.9.3.1.3.

7.9.3.1.1 Testing of required emergency lighting systems shall be permitted to be conducted as follows:

- (1) Functional testing shall be conducted at 30-day intervals for not less than 30 seconds.
- (2) Functional testing shall be conducted annually for not less than 1½ hours if the emergency lighting system is battery powered.
- (3) The emergency lighting equipment shall be fully operational for the duration of the tests required by 7.9.3.1.1(1) and 7.9.3.1.1(2).
- (4) Written records of visual inspections and tests shall be kept by the owner for inspection by the authority having jurisdiction.

Code References

7.9.3.1.2 Testing of required emergency lighting systems shall be permitted to be conducted as follows:

- (1) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall be provided.
- (2) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall automatically perform not less than once every 30 days a test for not less than 30 seconds and a diagnostic routine.
- (3) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall indicate failures by a status indicator.
- (4) A visual inspection shall be performed at intervals not exceeding 30 days.
- (5) Functional testing shall be conducted annually for not less than 1½ hours.
- (6) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall be fully operational for the duration of the 1½ hour test.
- (7) Written records of visual inspections and tests shall be kept by the owner for inspection by the authority having jurisdiction.

7.9.3.1.3 Testing of required emergency lighting systems shall be permitted to be conducted as follows:

- (1) Computer-based, self-testing/self-diagnostic battery-operated emergency lighting equipment shall be provided.
- (2) The emergency lighting equipment shall automatically perform not less than once every 30 days a test for not less than 30 seconds and a diagnostic routine.
- (3) The emergency lighting equipment shall automatically perform annually a test for not less than 1½ hours.
- (4) The emergency lighting equipment shall be fully operational for the duration of the tests required by 7.9.3.1.3(2) and 7.9.3.1.3(3).
- (5) The computer-based system shall be capable of providing a report of the history of tests and failures at all times.

7.10 Marking of Means of Egress.

7.10.1 General.

7.10.1.1 Where Required. Means of egress shall be marked in accordance with Section 7.10 where required in Chapter 11 through Chapter 42.

7.10.1.2 Exits. Exits, other than main exterior exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign that is readily visible from any direction of exit access.



NFPA 70® National Electrical Code® 2005 Edition Article 700, Emergency Systems

I. 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, 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, power, or both, to designated areas and equipment in the event of failure of the normal supply or in the event of accident to elements of a system intended to supply, distribute, and control power and illumination essential for safety to human life.

FPN No. 1: For further information regarding wiring and installation of emergency systems in health care facilities, see Article 517.

FPN No. 2: For further information regarding performance and maintenance of emergency systems in health care facilities, see NFPA 99-2002, Standard for Health Care Facilities.

FPN No. 3: Emergency systems are generally installed in places of assembly where artificial illumination is required for safe exiting and for panic control in buildings subject to occupancy by large numbers of persons, such as hotels, theaters, sports arenas, health care facilities, and similar institutions. Emergency systems may also provide power for such functions as ventilation where essential to maintain life, fire detection and alarm systems, elevators, fire pumps, public safety communication systems, industrial processes where current interruption would produce serious life safety or health hazards, and similar functions.

FPN No. 4: For specification of locations where emergency lighting is considered essential to life safety, see NFPA 101® -2003, Life Safety Code®.

FPN No. 5: For further information regarding performance of emergency and standby power systems, see NFPA 110-2002, Standard for Emergency and Standby Power Systems.

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 equipments 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.

FPN: For testing and maintenance procedures of emergency power supply systems (EPSSs), see NFPA 110-2002, *Standard for Emergency and Standby Power Systems*.

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.

Exception: A sign shall not be required for individual unit equipment as specified in 700.12(F).

III. Sources of Power

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(A) through 700.12(E). Unit equipment in accordance with 700.12(F) shall satisfy the applicable requirements of this article.

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.

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(A) through 700.12(E) where located within assembly occupancies for greater than 1000 persons or in buildings above 23 m (75 ft) in height with any of the following occupancy classes – 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 the duration of occupancy classification, see Section 6.1 of NFPA 101-2003, *Life Safety Code*.

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 a source of power for emergency systems 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.

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 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 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.

(3) Dual Supplies. 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. 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 utility company.



(4) 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 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.

Code References

(5) 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 systems until 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 serve or 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 700.12(A) and 700.12(B).

(D) Separate Service.

Where acceptable to 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 service drop or service lateral
- (2) Service conductors sufficiently remote electrically and physically from any other service conductors to minimize the possibility of simultaneous interruption of supply

(E) 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.

(F) 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

The batteries shall be of suitable rating and capacity to supply and maintain at not less than 87½ percent of the nominal battery voltage for the total lamp load associated with the unit for a period of at least 1½ 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 1½ 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 900 mm (3 ft) 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 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.

**OSHA Regulations
Standards for General Industry
Part 1910, Occupational Safety and
Health Standards
Subpart S, Electrical
1910.308, Special Systems
June 5, 2007**

1910.308(b) Emergency power systems

1910.308(b)(1)

Scope. The provisions for emergency systems apply to circuits, systems, and equipment intended to supply power for illumination and special loads, in the event of failure of the normal supply.

1910.308(b)(2)

Wiring methods. Emergency circuit wiring shall be kept entirely independent of all other wiring and equipment and may not enter the same raceway, cable, box, or cabinet or other wiring except either where common circuit elements suitable for the purpose are required, or for transferring power from the normal to the emergency source.

1910.308(b)(3)

Emergency illumination. Where emergency lighting is necessary, the system shall be so arranged that the failure of any individual lighting element, such as the burning out of a light bulb, cannot leave any space in total darkness.

▶ Emergency Lighting Applications

Outdoor Egress

Growing emphasis is being placed on emergency lighting for outdoor egress. The path leading away from a structure may be considered part of the path of egress. When this is the case, emergency lighting is required by code. Outdoor egress conditions present a challenge for emergency lighting. Cold, damp conditions, as well as hot, dry conditions should be expected. The Philips Bodine **Cold-Pak**® line of extended-temperature FEBs is designed for extremes.

Cold-Pak linear and compact FEBs are suitable for temperatures ranging from -4° F to +131° F (-20° C to +55° C) and for damp locations. They are ideal for applications such as parking garages, canopied stairways, sconces and bollards.

Interim Lighting

Facilities often use generator systems as their backup power supply. It can take a generator up to 10 seconds to bring up lighting after normal power has been interrupted. In high security situations, such as prisons or retail outlets, or in situations where safety is vital, such as hospitals, 10 seconds is unacceptable.

Philips Bodine **GEN™ Series** fluorescent emergency backup ballasts provide instant interim lighting, filling the gap between power failure and generator start-up.

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▶ The Philips Bodine **Cold-Pak** line of extended-temperature fluorescent emergency ballasts is designed for extremes.
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Low-Profile Fixtures

The marriage of aesthetics to life safety need not be a rocky union. Form and function can co-exist harmoniously without diminishing either. Because architects and lighting designers are commonly specifying decorative lighting fixtures, Philips Emergency Lighting offers a line of low-profile fluorescent emergency ballasts designed specifically to provide code-required emergency lighting in space-limited and aesthetically sensitive fixtures.

Easy Testing Options

Testing and maintenance of emergency lighting equipment are critical activities. An interest in occupant welfare is foremost. However, liability is also an issue. Proper testing and maintenance provide proof when liability questions arise. Finally, various codes mandate testing and maintenance. They are not optional.

Despite code requirements and common-sense reasons to test and maintain equipment, testing and maintenance do not always get done as they should. Time and cost are commonly cited in compliance failure.

There are, however, ways to decrease both concerns while increasing the ease of testing. These include self-testing and remote control testing systems.

Self-Testing

Self-testing/self-diagnostic fluorescent emergency ballasts such as Philips Bodine **REDiTEST**® FEBs are designed to continually monitor their charging current and battery voltage, alert maintenance personnel to any problems that arise and test automatically for 30 seconds each month and for 90 minutes annually. The advantages are clear: **REDiTEST**® units save end-users time, money and labor.

Remote Testing

Philips Bodine **RCT** remote control testing technology is also available. It allows maintenance personnel to test emergency lighting at the ground level from up to 32 feet away using a handheld remote control transmitter instead of ladders or extension devices. The remote control testing line includes emergency ballasts, retrofit modules and the **CheckMate**™ ETI, which is designed to allow remote testing of existing exit signs and wall packs.



HID Systems

HID lamps function as the primary lighting source in many facilities, such as grocery stores, warehouses and gymnasiums. While HID lamps are a long-lasting, high-lumen choice, they are also extremely sensitive to power fluctuations. Any line disturbance of four milliseconds or longer may extinguish the lamp arc and necessitate lamp restrike.

The Philips Bodine **ARC Keeper**® detects a line disturbance and then catches and supports the lamp arc for up to two minutes. Two minutes is generally enough time for a disturbance to pass or for generator systems to engage.

Extended Run Times

While 90 minutes is the standard code-required time for emergency lighting operation, there are cases in which more than a 90-minute run time is required or desired. For example, a hospital, school or assisted living facility might benefit from a longer emergency lighting run time. Philips Emergency Lighting offers emergency ballasts with two- and four-hour run times to accommodate special applications.

▶ While HID lamps are a long-lasting, high-lumen choice, they are also extremely sensitive to power fluctuations.

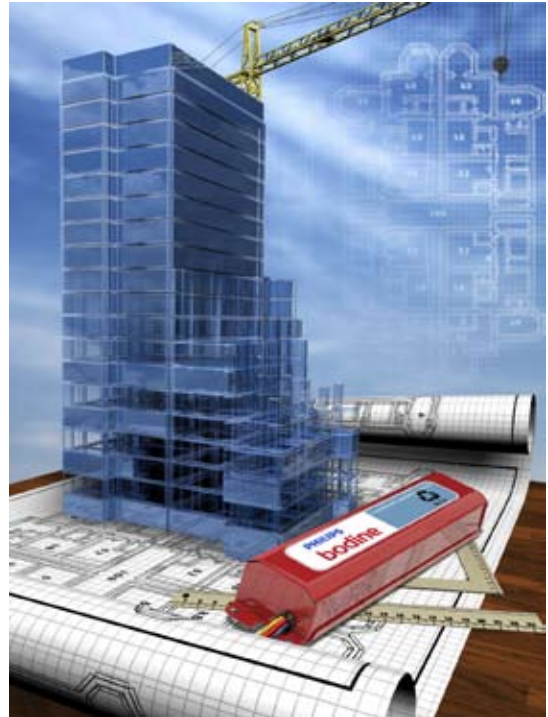
▶ Company Info

Philips Emergency Lighting designs and manufactures award-winning, innovative emergency and specialty lighting products. With almost half a century of experience, Philips Emergency Lighting is an industry leader. The company offers a diverse line that includes fluorescent emergency ballasts, HID backup ballasts, emergency LED drivers and generator-compatibles, such as **GEN™ Series** backup ballasts and the **GTD™** generator transfer device.

Philips Emergency Lighting products meet or exceed standards set by the *NFPA Life Safety Code* and the *National Electrical Code* and are UL Listed for field or factory installation or UL Component Recognized for factory installation only. In the event of a power failure, Philips Bodine-equipped emergency lighting units/systems provide instant illumination. This illumination enables occupants to follow the path of egress to safety if an evacuation is required. Philips Emergency Lighting realizes that the path of egress may include outdoor egress and has created products suitable for this application.

Philips Emergency Lighting was founded in 1962. It is headquartered just east of Memphis in Collierville, Tennessee, and is a division of Philips Electronics North America Corporation.

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 ▶ *Philips Emergency Lighting products meet or exceed standards set by the **NFPA Life Safety Code** and the **National Electrical Code**.*



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