

**NFPA LIFE SAFETY CODE – 1997**

**(National Fire Protection Association)**

**Note:** The following excerpts are provided as general information and may be useful as a guide to layout emergency lighting systems.

**Section 5-8 Illumination of Means of Egress**

**5-8.1.1 General.** Illumination of means of egress shall be provided in accordance with this section for every building and structure where required in Chapters 8 through 32. For the purposes of this requirement, exit access shall include only designated stairs, aisles, corridors, ramps, escalators, and passageways leading to an exit. For the purposes of this requirement, exit discharge shall include only designated stairs, aisles, corridors, ramps, escalators, walkways, and exit passageways leading to a public way.

**5-8.1.2 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. Artificial lighting shall be employed at such places and for such periods of time as required to maintain the illumination to the minimum criteria values herein specified.

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

**5-8.2 Sources of Illumination.** Illumination of means of egress shall be from a source of reasonably ensured reliability.

**A-5-8.2.1** An example of a power source with reasonably ensured reliability is a public utility electric service.

**Section 5-9 Emergency Lighting**

Emergency lighting is not required unless specifically called for in the appropriate occupancy chapter. Most occupancy chapters require emergency lighting in medium to large buildings.

**5-9.1 General.**

**5-9.1.1** Emergency lighting facilities for means of egress shall be provided in accordance with this section for:

- (a) Every building or structure where required in Chapters 8 through 32, and,
- (b) At doors equipped with delayed egress locks, and,
- (c) The stair shaft and vestibule of smokeproof enclosures.

A standby generator that is installed for the smokeproof enclosure mechanical ventilation equipment shall be permitted to be used for such stair shaft and vestibule power supply. For the purposes of this requirement, exit access shall include only designated stairs, aisles, corridors, ramps, escalators, and passageways leading to an exit. For the purposes of this requirement, exit discharge shall include only designated stairs, ramps, aisles, walkways, and escalators leading to a public way.

**A-5-9.1.1** The extent to which emergency lighting needs to be provided outside the building should be to either a public way or a distance away from the building that is considered safe, whichever is closest to the building being evacuated.

**5.9.1.2** Where maintenance of illumination depends upon changing from one energy source to another, there shall be no appreciable interruption of illumination during the changeover. Where emergency lighting is provided by a prime mover-operated electric generator, a delay of not more than 10 sec. shall be permitted.

**5-9.2.1** Emergency illumination shall be provided for a period of 1 1/2 hr. in the event of failure of normal lighting. Emergency lighting facilities shall be arranged to provide initial illumination that is at least an average of 1 ft-candle (10 lux) and a minimum at any point of 0.1 ft-candle (1 lux) measured along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 ft-candle (6 lux) average and a minimum at any point of 0.06 ft-candle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

**A-5-9.2.1** The illumination uniformity ratio is determined by the following formula:

$$\frac{\text{Maximum illumination at any point}}{\text{Minimum illumination at any point}}$$

**The Code requires a 1 ft-candle (10 lux) average and establishes a 0.1 ft-candle (1 lux) minimum, with a uniformity ratio maximum of 40 to 1 to prevent excessively bright and dark spots.**

**5-9.2.2** The emergency lighting system shall be arranged to provide the required illumination automatically in the event of any interruption of normal lighting, such as any failure of public utility or other outside electrical power supply; opening of a circuit breaker or fuse; or any manual act(s), including accidental opening of a switch controlling normal lighting facilities.

**5-9.3 Periodic Testing of Emergency Lighting Equipment.** A functional test shall be conducted on every required battery-powered emergency lighting system at 30-day intervals for a minimum of 30 sec. An annual test shall be conducted for a 1 1/2-hour duration. Equipment shall be fully operational for the duration of the test. Written records of visual inspections and tests shall be kept by the owner for inspection by the authority having jurisdiction.

*Exception: Self-testing/self-diagnostic, battery operated emergency lighting equipment that automatically performs a minimum 30-sec. test and diagnostic routine at least once every 30 days and indicates failures by a status indicator shall be exempt from the 30-day functional test, provided a visual inspection is performed at 30-day intervals.*

Six methods of providing emergency power are recognized in NFPA 70, National Electrical Code; however, some of these sources do not meet the requirements for emergency lighting under the Life Safety Code.

Storage batteries are an acceptable emergency source and may be used to supply continuous, required emergency lighting. For this arrangement, two separate lighting systems with independent wiring are employed. One system may be supplied from a public utility and the other from storage batteries.

Either supply source must have sufficient capacity, and emergency lighting must be designed so that adequate light is available for a specified time should one system fail.

Instead of installing two separate wiring systems, a single emergency system connected to an automatic transfer switch is often used. The two sources of power, normal and emergency, are connected to the transfer switch, which automatically switches the emergency lighting load from the normal source to the emergency source upon loss of normal power. When normal power is restored, the emergency load is transferred to the normal source.

Batteries that are used for the emergency source must be suitable for the application. Automotive-type batteries are not acceptable.

To qualify for emergency lighting, each unit equipment must have a rechargeable battery, a battery charging means, provision for one or more lamps, and a relay to energize the lamps automatically upon failure of the normal supply. Unit equipment must be connected to the same branch circuit that supplies normal lighting to the area in which it is located. Connection to this branch circuit must be ahead of, or on the line side of, any switches controlling the normal lighting.

*Exception: The National Electrical Code allows connection of unit equipment directly to a branch circuit from a panel board that also supplies a minimum of three normal lighting circuits to the area in which the unit equipment is installed. The overcurrent device protecting this unit equipment circuit must be provided with a lock-on feature that will prevent accidental disconnection.*



Where an on-site generator is the emergency power source, it is generally controlled by a transfer switch. Upon loss of normal emergency power, a signal is sent to start the generator. When the generator is running at rated speed and its output voltage is correct, the emergency load is connected to this source by operation of the automatic transfer switch. This transfer must take place in 10 seconds or less.

**Section 5-10 Marking Means of Egress**

**5-10-1.2** Exits shall be marked by an approved sign readily visible from any direction of exit access.

**5-10.1.4** Access to exits shall be marked by approved, readily visible signs in all cases where the exit or way to reach it is not readily apparent to the occupants. Sign placement shall be such that no point in the exit access corridor is more than 100 ft. (30 m) from the nearest sign.

**5-10.1.5** Where floor proximity exit signs are required in Chapters 8 through 32, exit signs shall be placed near the floor level in addition to those signs required for doors or corridors.

Because locations near the ceiling may be the first to become obstructed by smoke, this provision makes it possible for the occupancy chapters to specify floor proximity signs to supplement the regular exit signs that are usually placed over the exit doors. Such supplemental signs may be approved electroluminescent, self-luminous, or self illuminated types. They are not intended to replace standard exit signs by are designed as an extra asset to a building occupant seeking egress in a smoke-filled environment. Because they are positioned near the floor, they will be among the last signs to become obscured by the descending smoke layer.

The provisions of 5-10.1.5 can be used as guidance on placement and installation of floor proximity signs even though they may not be required.

The only occupancy currently mandating floor proximity exit signs is assembly occupancies where they are required in special amusement buildings in accordance with the provisions of 8-4.7 and 9-4.7.

**5-10.2 Size of Signs.**

**5-10-2.1** Externally illuminated signs required by 5-10.1 and 5-10.4.1.1 shall have the word "EXIT" or other appropriate wording in plainly legible letters not less than 6 in. (15.2 cm) high with the principal strokes of letter not less than 3/4 in. (1.9 cm) wide. The word "EXIT" shall have letters of a width not less than 2 in. (5 cm), except the letter "I," and the minimum spacing between letters shall be not less than 3/8 in. (1 cm).

**5-10-2.2** Internally illuminated signs required by 5-10.1 and 5-10.4.1 shall have the word "EXIT" or other appropriate wording in letters legible from a distance of at least 100 ft. (30 m) under all normal and emergency lighting conditions (30 ft-candle and 1 ft-candle respectively). Internally illuminated signs shall be listed in accordance with UL 924, Standard for Safety Emergency Lighting and Power Equipment.

Paragraph 5-10.2.2 establishes performance-based requirements for the legibility of internally illuminated signs. However, the burden for judging the acceptability of internally illuminated signs is shifted mainly to the testing laboratories because such signs are required to be listed, and such listing is according to a specific standard.

**5-10.3 Illumination of Signs.**

**A-5-10.3** The following illumination methods are defined:

*Externally Illuminated.* The light source is contained outside of the device or legend that is to be illuminated. The light source is typically

a dedicated incandescent or fluorescent source.

*Internally Illuminated.* The light source is contained inside the device or legend that is illuminated. The light source is typically incandescent, fluorescent, electroluminescent, light-emitting diodes, or self-luminous.

*Self-Luminous.* Illuminated by self-contained power sources (i.e. tritium) and operates independently of external power sources. Batteries do not qualify as a self-contained power source. The light source is typically contained inside the device.

*Electroluminescent.* A light-emitting capacitor. Alternating current excites phosphor atoms where placed between the electrically conductive surfaces and produces light. This light source is typically contained inside the device.

**5-10.3.2** Externally illuminated signs shall be illuminated by not less than 5 ft-candles (54 lux) and shall employ a contrast ratio of not less than 0.5.

**A-5-10.3.2** Colors providing a good contrast are red or green letters on matte white background. Glossy background and glossy letter colors should be avoided.

**5-10.3.3** The visibility of an internally illuminated sign shall be the equivalent of an externally illuminated sign that complies with 5-10.3.2.

**5-10.4.2 Special Signs.** Any door, passage, or stairway that is neither an exit nor a way of exit access and that is located or arranged so that it is likely to be mistaken for an exit shall be identified by a sign reading "NO EXIT." Such sign shall have the work "NO" in letters 2 in. (5 cm) high with stroke width of 3/8 in. (2.5 cm) high, with the word "EXIT" below the word "NO."

**Section 5-11 Special Provisions for Occupancies with High Hazard Contents**

**Note, the definition of high hazard contents from 4-2.2.4, which reads: "High hazard contents shall be classified as those that are likely to burn with extreme rapidity or from which explosions are likely."**

**5-11.1** In all cases where the contents are classified as high hazard, exits of such types and numbers shall be provided and arranged to permit all occupants to escape from the building or structure, or from the hazardous area thereof to the outside or to a place of safety with a travel distance of not more than 75 ft. (23 m), measure as required in 5-6.2.

**5-11.3** At least two means of egress shall be provided from each building or hazardous area thereof.

*Exception: Rooms or spaces not more than 200 sq. ft. (18.6 sq. m) and having an occupant load of not more than three persons and a travel distance to the room door of not more than 25 ft. (7.6 m).*

**Section 5-12 Mechanical Equipment Rooms, Boiler Rooms, and Furnace Rooms**

**5-12.1** Mechanical equipment rooms, boiler rooms, furnace rooms, and similar spaces shall be arranged to limit common path of travel to not more than 50 ft. (15 m).

*Exception: a common path of travel not more than 100 ft. (30 m) shall be permitted:*

- (a) In buildings protected throughout by an approved, supervised automatic sprinkler system installed in accordance with Section 7-7 or,*
- (b) In mechanical equipment room with no fuel-fired equipment or*
- (c) In existing buildings.*