



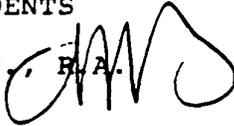
DEPARTMENT OF BUILDINGS

EXECUTIVE OFFICES  
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CHARLES M. SMITH, Jr., R.A., Commissioner  
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January 20, 1987

TO: BOROUGH SUPERINTENDENTS

FROM: Charles M. Smith Jr., R.A.,  
Commssioner 

SUBJECT: "EMERGENCY LIGHTING IN EXITS AND ACCESS FACILITIES"  
(Supersedes memorandum of February 19, 1986)

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Professional Societies and Industry have brought to our attention the difficulty in measuring the required illumination at the floor level because of incapability of instrumentation, and diversity of reflecting surfaces.

Therefore, the Departmental Memorandum dated February 19, 1986 is superseded as follows:

Illumination of at least two(2) foot candles measured at the floor level shall be maintained continuously in exits during occupancy as required by Section 27-381(a) [C26-605.1(a)]. Illumination in access facilities to such exits shall be not less than two(2) foot candles, average measured at 18 inches above the floor level which shall be maintained continuously during occupancy. However, the illumination shall not be less than that recommended in the I.E.S. Lighting Handbook 1981 Application Volume (Pages 2-45 and 2-46). Additionally the required illumination shall be remeasured if the reflective surfaces are changed.

A total of more than four(4) lights are required to be connected to an emergency power source or to storage battery equipment by Section 27-382 [C26-605.2(a)].

The following definitions shall apply:

The term "access facilities" shall mean a "corridor" or "public hallway" in multi-tenant floors; and in single tenant floors it shall mean the enclosed or unenclosed passage connecting the required floor exits and any passenger elevator serving floor to two required floor exits.

Multi-tenant floors. - Upon exiting the tenant's occupied side of the floor, the path of travel in the corridor or public hall shall be illuminated to the required exits. An illuminated path of travel shall also be provided from the elevator landing to at least 2 exits.

Single tenant floors. - The enclosed or unenclosed passage connecting the required floor exits shall be illuminated to the required exits. An illuminated path of travel shall also be provided from the elevator landing to at least 2 exits.

Also refer to the following definitions:

Corridor. - An enclosed public passage providing a means of access from rooms or spaces to an exit. (Pursuant to Subarticle 201.0 of the Article 2, Part II, Title C, Chapter 26 of the Administrative Code, enacted by Local Law 76, effective December 6, 1968).

Hallway. - a) The term "hallway" shall mean an enclosed hall or corridor leading to a stairway, fire tower or other required exit.

b) The term "public hallway" shall mean a corridor or hallway leading directly to a stairway, fire tower or other required exit, within a story of a structure which story is occupied by more than one tenant or lessee, or within a structure included in Section C26-235.0(a) (Public Buildings). (Pursuant to Section C26-81.0, Article 1, Title C, Chapter 26 of the Administrative Code, in effect for buildings constructed prior to December 6, 1968).

Exit. - A means of egress from the interior of a building to an open exterior space which is provided by the use of the following, either singly or in combination: Exterior door openings, vertical exits, exit passageways, horizontal exits, interior stairs, exterior stairs, or fire escapes; but not including access stairs, aisles, corridor doors or corridors.

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leading toward accidents. Accidents may also be prompted by the delayed eye adaptation a person experiences when moving from bright surroundings into dark ones and vice versa. Some accidents which have been attributed to an individual's carelessness could have been partially due to difficulty in seeing from one or more of the above mentioned factors. The accidents might have been avoided through the use of good lighting principles.

**Illuminance Levels.** The lighting recommendations in Fig. 2-2 provide a guide for efficient visual performance rather than for safety alone; therefore, they are not to be interpreted as requirements for regulatory minimum illuminance levels.

Fig. 2-26 has been developed to list illuminance levels regarded as *absolute minimums for safety alone*. To assure these values are maintained, higher initial levels must be provided as required by the maintenance conditions. In those areas which do not have fixed lighting, localized illumination should be provided during occupancy by portable or material handling and vehicle mounted lighting equipment.

**Other Factors.** A visually safe installation must be free of excessive glare and of uncontrolled, large differences in luminances. Appropriate guides to limiting glare and adaptation effects are given earlier in this Section in discussions of luminance ratios and visual comfort. Maximum luminance ratios are important to avoid temporarily noticeable reductions in visibility because of changes in eye adaptation when alternately looking at areas of widely different luminances.

Fig. 2-26. Illuminance Levels for Safety\*

Hazards Requiring Visual Detection	Slight		High	
	Low	High	Low	High
Normal Activity Level:				
Illuminance Levels				
Lux	5.4	11	22	54
Footcandles	0.5	1	2	5

\* Minimum illuminance for safety of people, absolute minimum at any time and at any location on any plane where safety is related to seeing conditions.

† Special conditions may require different illuminance levels. In some cases higher levels may be required as for example where security is a factor. In some other cases greatly reduced levels, including total darkness, may be necessary, specifically in situations involving manufacturing, handling, use, or processing of light-sensitive materials (notably in connection with photographic products) in these situations alternate methods of insuring safe operations must be relied upon.

Note: See specific application reports of the IES for guidelines to minimum illuminances for safety by area.

**Illumination Evaluation.** Although the proper quality and quantity of illumination may be designed for safety in an area, it is necessary to know whether the design meets requirements. A standard procedure, titled "How to Make a Lighting Survey,"<sup>34</sup> has been developed in cooperation with the U.S. Public Health Service. This standard procedure is recommended for use in surveys of lighting for safety.

## EMERGENCY LIGHTING

Consideration should be given to emergency lighting needs early in the planning stages of a building. Consultation between the owner and/or occupier of the premises, the architect, the lighting designer, the utility, and others concerned, should be arranged when, or perhaps before, the normal lighting planning is discussed. The installation contractor should be made aware of emergency lighting requirements at the earliest possible time.

**Definitions.** The following definitions are given for the terms used in this section:

**Emergency lighting:** Lighting provided for use when the power supply for the normal lighting fails, to insure that escape routes can be effectively identified and used.

**Exit:** A way out of the premises that is intended to be used at any time while the premises are occupied.

**Emergency exit:** A way out of the premises that is intended to be used only during an emergency.

**Escape route:** A route from a point inside the premises to an exit or emergency exit.

**Normal lighting:** All permanently installed electric lighting normally used when the premises are occupied.

Guides for the following are not provided here but are defined so that they are clearly excluded from this section.

**Safety lighting:** That part of emergency lighting that is provided to insure the safety of workers having to remain at work when the normal lighting fails.

**Standby lighting:** That part of emergency lighting that is sometimes provided to enable normal activities to continue.

Basic requirements for escape lighting are specified by federal codes and frequently are strengthened by local codes. The material that follows refers only to emergency lighting without regard for the type or location of the emergency

power, which may be emergency motor driven generators, central battery systems, central inverter systems, unit inverters or unit equipment.

Emergency lighting is specified by the Life Safety Code (NFPA 101)<sup>35</sup> to be necessary in certain interiors where people work or meet, in order to enable them to leave the interior safely in the event that an emergency situation arises due to the failure of the normal power. References to that code, as well as any existing local codes, should be made at all times.

### Design Requirements for Emergency Lighting.

When the normal lighting of an occupied building fails, irrespective of the cause, the emergency lighting is required to fulfill the following functions:

1. Indicate clearly and unambiguously the escape routes.
2. Provide illumination and a comforting visual environment along the escape routes sufficient to facilitate safe movement along them toward and through the exits and emergency exits provided.
3. Permit ready identification of all fire alarm call points and firefighting equipment provided along the escape routes under emergency lighting conditions.

**Escape Route Indication.** Signs are required to be illuminated in time of emergency to insure that from any point within the premises an escape route can be easily identified and followed in an emergency.

All normal exits should be illuminated at all times when the premises are occupied. This lighting should, practically speaking, be external to the exit signs themselves.

Where direct sight of an exit or emergency exit is not possible, a directional sign or series of signs should be provided. They should be so placed that a person following them will be progressed toward the nearest exit or emergency exit.

Exit signs cannot be counted on to be visible to many people at distances of more than 30 meters (100 feet), and should not be expected to be visible at longer intervals on long escape routes.

**Illumination of Exit Signs.** Either of the following methods of illumination may be used: (a) lamps external to the sign and the lamps contained within the sign. It is recommended that the method of illumination of exit signs

described under (b) be used within any area where the normal lighting may be deliberately dimmed or extinguished, e.g., places of entertainment.

In the event of failure of the supply to the normal lighting, escape route signs should receive the power needed for illumination from the emergency lighting supply. Power for exit signs should be unswitched or have the switch accessible only to authorized personnel.

**Visual Impact and Legibility of Internally Illuminated Signs.** Impact and legibility of exit signs are dependent upon luminance, size, viewing distance, contrast, positioning and uniformity.

**Luminance:** Where codes exist, an illuminance of 54 lux (5 footcandles) on the face of the sign is usually specified. Illuminance is an inappropriate parameter for internally illuminated signs. Currently research is being done along this line, but a luminance of 7 to 10 candelas per square meter (2 to 3 footlamberts) on the lighted area of the sign seems to be a reasonable level and parameter, because it appears to be adequate under emergency lighting conditions, is measurable, and provides better contrast under normal light.

**Size:** Letters must have at least a 19-millimeter (¾-inch) wide stroke and must be at least 150 millimeters (6 inches) high.

**Viewing distance:** In an emergency, an exit sign should not be expected to be useful at a distance greater than 30 meters (100 feet).

**Contrast:** Once other parameters have been met, this is a remaining important parameter. See luminance above. Transilluminated letters usually provide the best visibility. Color of letters is not an important point, so long as adequate light and contrast are provided. There seems to be little differentiation between dark letters on light background or illuminated (light) letters on dark or opaque background. Contrast is the important consideration.

**Positioning:** The location of the emergency exit sign will usually be determined by the desirable location under normal power conditions since, except for emergency exits, emergency exit signs mark the location of normal exit doors.

**Uniformity:** The exit sign face should be uniformly lighted, with a variation of not more than a factor of 2 above or below the average level over the lettered area.

All exit signs in a collective area should be of a similar color and design, as an aid to ready identification.

**Externally Illuminated Exit Signs.** Externally illuminated exit signs vary so greatly in

design, material, color and printing that standards are difficult to establish. NFPA 101 requires 54 lux (5 footcandles) on the face of the sign. However, consideration must be given to contrast, glare, veiling reflectance, as well as reliability of the emergency power source for the external light, but the minimum letter size must adhere to that given above.

### Egress Route Emergency Illumination

**Illuminance.** The horizontal illuminance of any escape route should be not less than 1 per cent of the average provided by the normal lighting, with a minimum average of 5 lux [0.5 foot-candle] at floor level.

**Illuminance Uniformity.** Illuminance uniformity is more easily achieved by using a greater number of lamps with lower light output than by employing a lesser number of more widely spaced units with higher light output.

A uniformity ratio ( $E_{max}/E_{min}$ ) of up to 20:1 along the center line of an escape route is desirable for safe movement. A value of 40:1 should not be exceeded.

**Visibility of Hazards.** By itself, illuminance is not a sufficient criterion of visibility, since it refers only to the light falling on a surface and not the amount reflected back to the eye. Luminance is really the only relevant measure.

It is recommended that all potential obstructions or hazards on an escape route be light in color with contrasting surroundings. Such hazards include the nosings of stair treads, barriers and walls at right angles to the direction of movement.

In restricted areas such as corridors, light-colored decoration throughout is an advantage and, under emergency conditions, prominent vertical surfaces can assist considerably in defining the escape route.

**Location of Egress Luminaires.** A luminaire should be provided for each exit door and emergency exit door and at points where it is necessary to emphasize the position of potential hazards, sufficient to light that area to a level of 30 lux [3 footcandles].

The floor area to be so lighted should be a square at the threshold of the point of egress that is double the width of the egress opening, or equal to the width of the corridor, whichever is less. Illuminance measurement should be on the horizontal.

Examples of such areas are:

1. Intersection of corridors.
2. Abrupt changes of direction of the egress path.
3. Staircases. Each flight of stairs should receive direct light.
4. Other changes of floor level that may constitute a hazard.
5. Outside each exit and emergency exit, and close to it.

Additional lamps, as required, should be located so as to ensure that the lighting throughout the escape routes complies with the recommendations for minimum illuminance and illuminance uniformity given above.

Windowless offices occupied by less than five people normally should not require emergency lighting, provided proper escape route light exists in the corridor.

Handicapped people and other special situations could be an exception.

A room nominally occupied by five or more people and not otherwise requiring emergency light, should have an illuminance at the door equal to the egress route, or a glass paneled door. Under these circumstances, solid doors should be avoided.

**Illumination of Fire Alarm Call Points and Fire Fighting Equipment.** Fire alarm call points and fire fighting equipment provided along escape routes should be illuminated either by emergency lighting or by normal electric lighting or daylight at all times while the premises are occupied.

### Length of Time an Emergency Lighting System Should Operate Without Recharging

The time required to evacuate a premise will depend upon its size and complexity but it should normally be possible to complete an orderly evacuation, even of the largest premises, in less than one and one half hours. An owner, architect, or engineer, may agree that a lesser time is acceptable.

With battery operated emergency lighting, adequate light must be provided without the battery voltage dropping below 87½ per cent of rated voltage within the required time.

In an emergency, evacuation times may be considerably increased; for example, some of the escape routes may have been cut off, injured people may have to be found and possibly given on-the-spot medical treatment, etc. The time for which escape lighting is required to operate will