AEROSPACE RECOMMENDED PRACTICE	ARP503™	REV. G
	Issued 1956-12 Revised 2015-12 Superseding ARP503F	
(R) Emergency Evacuation Illumination		

RATIONALE

This document is being revised to provide updated references, clarifications and two additional areas of information:

1. The use of Graphical EXIT signs

2. Guidance in the charging and installation of photoluminescent system components

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) provides criteria for design and location of power supplies, controls, light fixtures, and associated equipment which are used to provide emergency illumination in transport aircraft, designed to comply with 14 CFR part 25 (Reference 1) for operation under 14 CFR part 91 (Reference 11) and 14 CFR part 121 (Reference 2), and also in compliance with FAA Advisory Circulars AC25.812-1A (Reference 3) and AC25.812-2 (Reference 10).

It is not the purpose of an ARP to specify design methods to be followed in the accomplishment of the stated objectives.

1.1 Introduction

The purpose of this ARP is to provide criteria that will lead to and support existing regulatory standards of illumination for emergency evacuation in passenger or cargo transport aircraft such that the emergency illumination will facilitate egress under emergency conditions.

Consideration is given to existing requirements of the FAA and to the recommendations of aircraft operators and those involved in the manufacture or use of the Emergency Lighting System. Occupant safety is the primary objective, with appropriate provisions for crew system control taken into consideration. The criteria established herein are intended to produce an Emergency Lighting System that will comply with the Federal and International Regulations for Commercial Transport Airplanes. However, these recommendations are but one means of meeting the objective. Alternate practices may provide equivalent or superior results, although all of the recommendations within this document should still be considered when using an alternate means of compliance.

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2. REFERENCES

1. Title 14 Code of Federal Regulations, Part 25 Airworthiness Standards: Transport Category Airplanes, Amendments 25-1 thru 25-140. Emergency Lighting §25.811 & §25.812, last revision 25-88 and 25-128 respectively.

2. Title 14 Code of Federal Regulations, Part 121 Certification and Operations: Domestic, Flag and Supplemental Air Carriers and Commercial Operators of Large Aircraft, Amendments 121-1 thru 121- 363.

3. FAA Advisory Circular AC 25.812-1A, Floor Proximity Emergency Escape Path Marking 5-22-1989

4. DOT/FAA/CT-82/55, Examination of Aircraft Interior Emergency Lighting in a Postcrash Fire Environment; James Demaree, June 1982.

5. FAA/AM-80-13, Readability of Self-Illuminated Signs Obscured by Black Fuel-Fire Smoke; P. G. Rassmussen, et al, July 1980.

6. Allard's Law and Smoke-Filled Cabins, A Preliminary Report, presented at the meeting of Subcommittee A-20C, of the SAE Aircraft Lighting Committee A-20, Orlando, Florida, May 16, 1977; Ted projector.

7. FAA-AM-81-7, Emergency Cabin Lighting Installation: An Analysis of Ceiling vs Lower-Mounted Lighting During Evacuation Trials; P. G. Rassmussen, et al, February 1981.

8. ARP577, Emergency Placarding - Internal and External.

9. FAA Advisory Circular AC 20-38A, Measurement of Cabin Interior Emergency Illumination in Transport Airplanes 2-8-66

10. FAA Advisory Circular AC 25.812-2. Floor Proximity Emergency Escape Path Marking Systems Incorporating Photoluminescent Elements 7-24-97

11. Title 14 Code of Federal Regulations, Part 91 General Operating and Flight Rules.

12. European Aviation Safety Agency Certification Specifications and Acceptable Means of Compliance for Large Aeroplanes (CS25) at Amendment 15, July 21st 2014. Emergency Lighting CS25.812(b)(1)(i) and associated AMC 25.812(b)(1)

13. ELOS Memo PS07-0585-CS-10, FAA Equivalent Level Of Safety Finding (ELOS) for Graphical Exit Signs on Model 787, Boeing Commercial Airplanes Delegated Compliance Organization (BDCO) Project PS07-0585, June 2010”

14. Title 14 Code of Federal Regulations, Part 25 Airworthiness Standards: Transport Category Airplanes, General and Dynamic Evaluation of Seat Restraint Systems & Occupant Protection §25.561 & §25.562, respectively.

15. International Organization for Standardization (ISO) 3864-3, Safety Colours and Safety Signs, Part 3 - Design principles for graphical symbols, June 15th, 2012

16. International Organization for Standardization (ISO) 7010 “Graphical symbols - Safety colours and safety signs - Registered safety signs, June 1st, 2011

17. RTCA DO-160 Revision G. Environmental Conditions and Test Procedures for Airborne Electronics/Electrical Equipment and Instruments

18. Title 14 Code of Federal Regulations, Part 25 Airworthiness Standards: Transport Category Airplanes, Retention of Items of mass in passenger and crew compartments and galleys §25.789.

2.1 Definition

Emergency illumination is the lighting provided when normal illumination is unavailable in the event there is a survivable emergency. It provides the way guidance needed to egress the airplane. Emergency illumination shall be sufficient to permit passengers and crew when leaving seats to proceed to and locate emergency exits then operate and use those exits. The emergency illumination also needs to provide sufficient illumination to allow the use of life jackets, special survival equipment, egress via escape slides, life rafts and slide rafts.

This document presents minimum criteria for the design and installation of emergency lighting in commercial aircraft. The use of “shall” in this specification expresses provisions that are binding. Non-mandatory provisions use the term “should.”

There are numerous references to FAA 14 CFR Part 25 and EASA CS-25 regulations by way of guidance and ease of information access. The author recommends that the reader should obtain the latest copy of the regulations referenced to ensure that they are working with the latest revision of the text.

3. DETAILED RECOMMENDATIONS

3.1 General Provisions

3.1.1 System Description

An emergency lighting system(s) independent of the main lighting system, shall be provided for (1) interior emergency lighting which includes illumination of the cabin, exit areas, floors of the passageways leading to each passenger emergency exit, (2) exit locating and marking signs, (3) exterior emergency lighting, and (4) floor proximity escape path lighting/markings.

3.1.2 Dark Adaptation/Glare

Emergency illumination should be designed to minimize glare and not reduce dark adaptation in such a way as to compromise the ability to escape, while still providing an acceptable means of evacuation.

3.1.3 Obstruction of Light

Emergency light fixtures should be in locations that assure that devices such as open life raft compartment doors or emergency equipment doors do not obstruct the illumination of emergency equipment and escape routes.

3.1.4 Crash Protection

The emergency illumination system should be designed as specified in 3.1.10 and located in a manner that will minimize damage and prevent loss of any portion of the emergency illumination as a result of a survivable emergency landing on land or water.

3.1.5 Fuselage Transverse Vertical Separation

A single vertical transverse separation of the fuselage shall not render inoperative more than 25% of the required electrically powered emergency lights in addition to those directly damaged by the break (Reference 14 CFR/CS25.812(l)(1)). At least one required exterior emergency light on each side of the airplane shall be operative exclusive of those that are directly damaged by the separation (Reference 14 CFR/CS25.812(l)(3)). At each useable exit, each exit marking sign shall remain operative exclusive of those that are directly damaged by the separation (Reference 14 CFR/CS25.812(l)(2)). For transport aircraft with multiple decks, each deck should be considered separately when addressing the 14 CFR/CS 25.812(l) requirements.

3.1.6 Operating Duration

Both interior and exterior electrically powered emergency illumination shall be maintained at or above minimum levels for no less than 10 minutes at critical ambient conditions after an emergency landing on land or water.

Operational environmental limits shall be determined for each application as per RTCA DO-160 (Reference 17) and the limits shall be utilized for testing to satisfy this recommendation. If battery packs are used, key conditions to be considered are: cold soak at lowest ambient temperature anticipated, cabin heating for an appropriate period, passenger loading, taxi, and emergency evacuation. If battery packs are used and installed outside the heated and/or pressurized compartment the cabin heating period may not be appropriate; the landing phase after a long cruise may be more critical.

3.1.7 Control and Indication

The emergency lighting system shall provide means for manual operation of the lights from the flight crew station and from a location in the passenger compartment that is within reach of at least one flight attendant seated in an assigned seat. When the system is ARMED, the emergency lighting system design should activate the system automatically when normal aircraft power is lost.

3.1.7.1 The cockpit control device shall have OFF, ARMED and ON positions and have means to safeguard against inadvertent operation of the control device from the ARMED and from the ON positions. When either the cockpit control or the control at the cabin attendant's seat is ON, the lights should remain illuminated upon interruption of the airplane's normal electrical power source, except as noted in 3.1.5 (Fuselage vertical separation). In addition, when the cockpit control is in the ARMED position, the lights should become illuminated upon interruption of the airplane's normal electrical power sources and shall remain illuminated, except as noted in 3.1.5 (Fuselage vertical separation). Operation of the emergency lighting system should not be dependent upon normal aircraft power. The cabin control device shall have a means to safeguard against inadvertent operation and be capable of turning ON the emergency light system, even with the cockpit control device is in the OFF or ARMED position.

3.1.7.2 There shall be a flight crew warning light that illuminates when normal aircraft power is on in the airplane and the emergency lighting system is not ARMED.

3.1.8 Other Use of Emergency Lighting System Components

Illuminated signs and other portions of the emergency lighting system may be used under normal conditions, provided that depletion of the emergency illumination power supply does not impinge on the requirement defined in 3.1.6 to provide 10 minutes of emergency illumination.

3.1.9 Independent Power Source

If rechargeable batteries are used as the energy supply for the emergency lighting system, they may be recharged from the airplane's main electric power system: provided that the charging circuit is designed to preclude inadvertent battery discharge into charging circuit faults. It is desirable that the charging system be capable of recharging within 1 hour to facilitate aircraft dispatch. However, achievement of this charging rate should not take the system outside its mandated design and operational limits.

3.1.10 Inertia Forces

Components of the emergency lighting system, including batteries, wiring, relays, lamps, and switches should be capable of normal operation after having been subjected to the inertia forces acting separately relative to the surrounding structure: (a) upward 3.0 g; (b) forward 9.0 g; (c) sideward 3.0 g on the airframe and 4.0 g on the seats and their attachments; (d) downward 6.0 g; (e) rearward 1.5 g. (Reference 14). For seat mounted units 14 CFR Part 25 §25.562 Dynamic loading should be referred to (Reference 14). For the retention of items of mass in the cabin, crew rest and galleys see Reference 18.

3.1.11 Functional Testing

As a design objective, the emergency lighting system and associated equipment should be designed and installed so that functional tests of the system can be readily performed.

3.1.12 Maintainability

The emergency lighting system and equipment should be designed and qualified for ease of maintainability and highly reliable operation under the operational environmental limits determined for each application as per RTCA DO-160 (Reference 17).

3.2 Interior Illumination

3.2.1 General Emergency Illumination

3.2.1.1 Emergency illumination shall be provided in all occupiable compartments during taxi, take-off and landing to permit occupants to don life jackets, to operate escape means, and to avoid obstacles while moving toward exits.

3.2.1.2 White flood light should be provided on passenger and cargo aircraft, as applicable:

a. Illumination at 64 cm (25 inches) above the floor at each exit door of not less than 0.5 lux (0.05 ft-c) (Reference 14 CFR/CS 25.812(c)).

b. Average illumination of not less than 0.5 lux (0.05 ft-c) along the center of the main passenger aisle(s) and cross aisle(s) between main aisles (Reference 14 CFR/CS 25.812(c*).* This average should be determined from measurements made every 102 cm (40 inches) along the center of the main passenger aisle(s) at seat arm rest height. The illumination of each 102-cm (40-inch) interval should not be less than 0.1 lux (0.01 ft-c) at seat arm rest height measured parallel to the floor (Reference 14 CFR/CS 25.812(c)).

3.2.1.3 The floor of the passageway leading to each floor level passenger emergency exit, between the main aisles and the exit openings, should be provided with illumination that is not less than 0.2 lux (0.02 ft-c) measured along a line that is within 15 cm (6 inches) of and parallel to the floor and centered on the passenger evacuation path (Reference 14 CFR/CS 25.812(d)). For aircraft with passenger compartments on more than one deck level intended for occupancy during taxi, take-off or landing, the recommendations of 3.1 and 3.2 should apply to each deck level and interconnecting stairways.

3.2.1.4 Considerations for Cabin Smoke Conditions

Following the British Airways cabin fire at Manchester Airport, survivors noted that cabin emergency light sources and signs located at ceiling height were totally obscured by dense black smoke. Tests conducted under authentic postcrash cabin fire environment have also conclusively confirmed this (Reference 4). In these tests the dense black smoke from fuel fires quickly rose to the ceiling and spread longitudinally through the cabin, then progressed toward the floor. In addition to the high opacity of the smoke, high temperatures, high carbon dioxide concentrations, other harmful products of combustion were carried with the smoke.

Evacuation tests under simulated white smoke conditions confirmed that lights and signs located at ceiling height were of little or no value to passenger egress once the cabin filled with smoke (Reference 5). Both tests substantiated that while hostile smoke conditions exist in the upper portion of the cabin, survival conditions persist in the lower portion of the cabin for a significant time. Further, light sources and signs located in the lower portion of the cabin provided ample passenger awareness and enhanced evacuation (Reference 5).

3.2.1.4.1 When light sources which satisfy recommendations of 3.2.1 are located above the median between the floor and ceiling, additional light sources should be installed at locations within the lower half of the cabin to provide emergency path awareness. With the upper emergency lights extinguished, the lower emergency escape path markings should enable passengers to:

a. After leaving the passenger seats, visually identify the emergency escape path along the cabin aisle floor to the first exits or pair of exits forward and aft of the seat

b. Readily identify each exit from the emergency escape path by reference only to markings and visual features not more than 4 feet above the cabin floor

A continuous line or a greater quantity of smaller light sources closely spaced along the aisle will very significantly improve visibility of the pathway limits when attenuation due to smoke exists (Reference 6). See Appendix A for "Additional Smoke Considerations".

3.2.1.4.2 When the signs recommended by 3.2.2 are located above the median between the floor and ceiling, additional signs should be located at or below the median height (Reference 7). See Appendix A for "Additional Smoke Considerations".

3.2.2 Exit Sign Illumination

3.2.2.1 Location of each passenger exit shall be indicated by a sign(s) visible to occupants approaching along the main passenger aisle(s).

a. Exit locator signs shall be located above the aisle(s) near each exit (References 14 CFR/CS 25.811(d)(1), 25.812(b)(1)(i) and 25.812(b)(2)).

b. An exit marking sign shall be located next to each exit (References 14 CFR/CS 25.811(d)(2), 25.812(b)(1)(i) and 25.812(b)(2)).

c. Exit signs shall be located on each bulkhead or divider that prevents fore and aft vision along the passenger cabin to indicate emergency exits beyond and obscured by the bulkhead or divider. The sign may be electrically powered or self-powered (References 14 CFR/CS 25.811(d)(3) and 25.812(b)(1)(ii)).

d. Text based exit signs shall have Red letters on a white background at least 1.5 inch high as per 14 CFR section 25.812(b)(1)(i) (Reference 1).

e. Universal Symbolic Exit Signs (USES) shall use a symbol of adequate size (Reference CS 25.812(b)(1)(i) and AMC 25.812(b)(1) for EASA and ELOS for Graphical Signs on the 787 for FAA). Symbolic signs should be white, or photoluminescent if self-powered, on a green background, have a total area of at least 23 inch^2 (14,839 mm^2), and meet the requirements of Reference 11: FAA PS07-0585-CS-10 or EASA CS25.812(b)(1)(i) and AMC 25.812(b)(1) (Reference 12), based on the symbolic exit sign requirements defined in ISO 3864 and ISO 7010 (References 15 and 16).

3.2.2.2 For signs specified in 3.2.2.1 a through d, the lighted background-to-letter contrast should be at least 10:1. This value is also applicable to symbols, arrows and instructional placards.

3.2.2.3 Lettering of the word "EXIT" on exit signs should be red as per Reference 8 and be a minimum of 38.1 mm (1.5 inches) high on illuminated white background. The letter height to stroke width ratio should not be more than 7:1 nor less than 6:1. The background should have an area of at least 135.4 cm^2 (21 inch^2) excluding the letters, arrows and symbols. As per 14 CFR 25.812(b)(1)(i) Reference 1.

3.2.2.4 The background luminance of lighted areas of exit signs per 3.2.2.1 a and b should be no less than 86 cd/m^2 (25 ft-L) and the ratio of maximum to minimum luminance should be no greater than 3:1. As per 14 CFR 25.812(b)(1)(i) (Reference 1).

3.2.2.5 For self-illuminated signs, the non-lighted contrast ratio under ambient light between the text or graphic and background should be no less than 3.0.

3.2.2.6 For self-illuminated exit signs, the brightness should be at least 1.27 candela/m^2 (400 microlamberts) at the instance all other sources of illumination are extinguished (measured within 5 seconds).

3.2.3 Emergency Instructional Placards

3.2.3.1 The location of the exit opening handle and instruction for opening the exit should be illuminated. If self-illuminated, the brightness should be at least 0.51 candela/m^2 (160 microlamberts) at the instant all other sources of illumination are extinguished (measured within 5 seconds), or be conspicuously located and well illuminated by the emergency lighting. All instructional markings should be legible from a distance of 76 cm (30 inches).

3.2.3.2 Life raft and escape assist means stowage locations should be marked by self-illuminated placards or signs, with instructions as to how to operate the compartment doors. Refer to ARP577 (Reference 8) for additional placard recommendations.

a. All letters should be no less than 7.9 mm (5/16 inch) high and the luminance of lighted areas, whether floodlighted by either emergency area lighting or electrically illuminated or self-illuminated, should be no less than 0.5 cd/m^2 (0.15 ft-L).

b. If deployment and erection of the assist means is fully automatic with opening of the associated exit, illumination of the stowage locations is not necessary.

3.2.3.3 On aircraft with an overhead escape hatch emergency lighting should be provided to illuminate the hatch outline, release handle, signs and placards per 3.2.3.2. The hatch outline illumination should be measured at not less than four points around the outline. Obstructions, such as bunks or seat backs, along the escape route should be similarly illuminated.

3.2.3.4 Emergency lighting in the flight deck should be arranged so as to minimize glare and problems with dark adaptation by the flight crew.

3.2.3.5 Emergency pictorial placards can be used in place of instructional placards to eliminate any language barriers

3.3 Exterior Illumination

3.3.1 General Emergency Illumination

Evacuation demonstrations have revealed that evacuees whose vision is adapted to the relatively high intensity of normal cabin lighting may not have adequate time to adapt to the dark conditions beyond the deboarding end of the escape assist means. Designs need to provide sufficient illumination of the area beyond the assist means to permit evacuees to expeditiously move away from the exit area while avoiding inhospitable terrain, aircraft components or other objects. Levels of illumination and areas of coverage should be determined for each application. It is recommended that the brightness levels inside and outside the cabin on evacuation should be of a similar order of magnitude to mitigate against eye adaptation issues.

3.3.2 Inflatable Readiness Indicators

At all external exits that are equipped with escape assist means that incorporate readiness indicators, such indicators should be adequately illuminated by the exterior emergency lighting systems so as to be visible from within the cabin prior to the initiation of an evacuation.

3.3.3 Overwing Exits

3.3.3.1 Provide a minimum of 0.32 lux (0.03 ft-c) of illumination (measured normal to the direction of the incident light) in a 0.2 m^2 (2 $feet^2$) area where the egressing person will make his first step outside the overwing exit(s). This light source may be inside the airplane. The 0.2 m^2 (2 $feet^2$) area may include any steps that are installed to decrease the height of the first step from the exit to the wing, and the lighted area on the wing surface shall be considered to begin at the inboard edge of the shadow of the step, if the lighting is installed above the door and inside the airplane.

3.3.3.2 Provide a minimum of 0.54 lux (0.05 ft-c) of illumination (measured normal to the direction of the incident light) for a minimum width of 107 cm (42 inches) for a Type A overwing emergency exit and of 61 cm (2 feet) for all other overwing emergency exits along the 30% of the slip-resistant portion of the escape route that is farthest from the exit opening, at the point at which the path leaves the wing.

3.3.3.3 Provide a minimum of 0.32 lux (0.03 ft-c) of illumination (measured normal to the direction of the incident light) on the ground surface with the airplane in each of the attitudes corresponding to the normal ground attitude and the collapse of one or more legs of the landing gear where an evacuee using the established escape route would normally first contact with the ground. If the escape route is over the wing and no slide is used, it is recommended that the ground contact area be measured from a point projected from the exit surface of the wing to an area on the ground at least 152 cm (5 feet) and laterally 61 cm (2 feet) minimum width.

3.3.3.4 At over-wing exits not incorporating escape slides, lighting should provide illumination of the escape to the ground, and if provided, the overwing escape rope attach points.

3.3.4 Cabin Side Exits Incorporating Escape Assist Means

The means provided to assist the occupants in descending to the ground should be externally illuminated and/or self-illuminated, so that the means is visible from the airplane in dark conditions.

3.3.4.1 External illumination should be minimum of 0.32 lux (0.03 ft-c) of illumination (measured normal to the direction of incident light) at the ground end of the escape device after full deployment when the airplane is in its normal ground attitude and when any one or more legs of the landing gear are collapsed. This illumination level should be provided where an evacuee would normally make first contact with the ground. Illumination of the ground area beyond the first contact area should be considered as indicated in 3.3.1.

3.3.4.2 The light(s) specified in 3.3.4.1 should be located high enough so that they will not be submerged after an emergency landing on water in the anticipated floating attitude.

3.3.4.3 The location of the light(s) should be such as to minimize shadows or light obstruction by deplaning evacuees, escape means, door, or hatches.

3.3.4.4 The operating duration of these lights should be equivalent to the interior emergency lighting as indicated in 3.1.6.

3.3.5 Escape Assist Means with Integral Lighting

3.3.5.1 If an emergency lighting subsystem illuminating an escape assist means serves no other assist means, it may be independent of the airplane's main emergency lighting system, and should be automatically activated when the assist means is erected. The lighting system should not be adversely affected by stowage.

3.3.5.2 The assist means should be illuminated by integral emergency lighting, as recommended in 3.3.4.1.

3.3.5.3 The shelf life or replacement date of any dated components of the system should be marked in a conspicuous place on the system.

3.3.5.4 The operating duration of these lights should be equivalent to the interior emergency lighting as stated in 3.1.6.

3.4 Tail Cone Exits

3.4.1 General

If a tail cone escape arrangement is provided, then emergency lighting should be provided that will:

a. Illuminate the escape route leading to the tail cone

b. Show any obstructions

c. Illuminate the escape route to the ground and the escape assist means and the readiness indicator, if provided

3.4.2 Passageway Illumination

The passageway leading to tail cone exits should be provided with illumination. The illumination measured at each 102 cm (40 inches) interval should not be less than 0.11 lux (0.01 ft-c) at 64 cm (25 inches) above the floor and should average not less than 0.54 lux (0.050 ft-c).

3.4.3 Operating Duration

The operating duration of these should be equivalent to the interior emergency lighting as stated in 3.1.6.

3.5 Means of Compliance

Compliance with the exterior emergency lighting recommendation may be shown by the application of candlepower distribution curves of the lighting fixture to the airplane geometry under all foreseeable conditions. Refer to AC 20-38 (Reference 9) for determining compliance with FAA emergency lighting requirements.

4. NOTES

4.1 Revision Indicator

A change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications nor in documents that contain editorial changes only.

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APPENDIX A - ADDITIONAL SMOKE CONSIDERATIONS

A.1 RECOMMENDATIONS FOR LOW LEVEL LIGHTING (BELOW 4 FEET)

There is concern regarding the possible condition of obscuring smoke below the 1.2 m (4 feet) level, since certain possible scenarios result in smoke at the floor level. For example, on opening exits, the cabin effectively becomes a chimney, smoke becoming distributed from ceiling to floor. Research and development since issuance of new FAA requirements for floor proximity emergency lighting (Reference 1) have resulted in new devices and systems that provide emergency egress lighting under such conditions that is helpful (Reference 3). The following recommendations can be made:

a. A narrow beam of bright light has greater visibility range through an optically dense medium than a bright spherically emissive or planar source of light; this is because a narrow beam can result in single scattering, whereas a large cone angle beam can result in multiple scattering

b. Large foreground and background scattering of light compromise the contrast ratio of a source relative to its surroundings, in turn compromising its utility as a marker

c. Point sources of light, such as highly intense incandescent filaments, if properly spaced to allow visual discrimination between each successive light against the scattered background, can be used beneficially to mark the edges of the aisle

d. Point sources of light with narrow beams, such as LEDs, can similarly be used to mark the edges of the aisle, and in a dense smoke exhibit a minimum of scattered light with a maximum contrast ratio, thereby having a helpful visibility range

e. Planar sources, such as small electroluminescent strips, or photoluminescent strips are also useful if properly spaced to overcome compromising foreground glare, thereby improving visual discrimination of each successive marker panel

f. It is the visibility of the light source itself that is to be exploited, rather than any reflected light, for drastically adverse optical conditions; the brightly glowing filament or chip may be all that remains visible in a dense smoke condition

The recommendations above for floor proximity lighting below 1.2 m (4 feet) for a smoke condition apply also to signs. Many aircraft at exit doors and overwing exits have very little space for signs. The indicators for such exits become dictated by such constraints to whatever is practical, such as a change of color. An important consideration is that signs with letters spelled out by beamed point sources of light have greater visibility and legibility range through smoke than back or front lighted signs for the reasons summarized above.

A.2 RECOMMENDATIONS FOR A COMPLIANT FLOOR PROXIMITY SYSTEM

A.2.1 For designing a complying floor proximity emergency escape path marking system, additional guidance is given here. The FAA Advisory Circulars AC 25.812-1A (Reference 3) and AC 25.812-2 (Reference 10) provide a detailed summary of what is needed to demonstrate compliance with this rule. These ACs also lists some acceptable working devices and systems. AC 25.812-2 specifically addresses photoluminescent floor proximity lighting, where these strips have no electrical connection and are charged from ambient/cabin interior lighting. Once charged, the photoluminescent strips emit light which decays over a period of time. For these systems, the interior lighting is a required system for dispatch. The Reference 10 AC provides guidance for the required charging and how long the charge lasts (photoluminescent strips emitting enough light to still provide adequate guidance).General Recommendations

a. Strobe lights shall not be used, but modulating between high and moderate levels of brightness at exits is a good attention-getter and exit indicator.

b. No directional sequencing indicators to specific exits shall be used except where a particular exit needs such an indicator to remove the potential for missing an alternative evacuation route.

c. Indicators of nearby exits can be by color difference or by an unambiguous transition of the marking strips.

d. Sufficient illumination shall be provided at the exits, cross aisles and longitudinal aisles.