



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

NOV 9 1999

FROM: HQ AFCESA/CES
139 Barnes Drive
Tyndall AFB FL 32403-5319

SUBJECT: **Engineering Technical Letter (ETL) 99-4: Fire Protection Engineering Criteria and Technical Guidance - Emergency Lighting and Marking of Exits**

1. Purpose. This ETL provides criteria for emergency lighting and the marking methods for means of egress. Use this ETL together with guidance in MIL-HDBK 1008C.

2. Summary of Revisions. This ETL supersedes ETL 94-5, 3 Nov 1994, and incorporates the new requirements of the 1997 edition of NFPA 101, *The Life Safety Code*. It requires elimination of all radioluminous exit signs from the Air Force inventory (paragraph 6.2.2); expands recordkeeping requirements for radioluminous signs to include removal date, method of disposal, and disposition (paragraph 6.2.2.1.1); and updates references.

3. Application. Requirements of this ETL are mandatory for all new projects and all existing facilities on Air Force installations. Projects awarded for construction prior to the date of this ETL but not accepted into the Air Force inventory may be classified as existing facilities by the MAJCOM fire protection engineer.

Note: Use of "shall" indicates a mandatory requirement. "May" or "should" indicates a nonmandatory action or condition.

3.1. Authority. Air Force Instruction 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*.

3.2. Effective Date: Immediately.

3.3. Expiration: Expires five years from date of issue.

3.4. Ultimate Recipients:

- MAJCOM Civil Engineering and Fire Protection offices; medical communities.
- Base Civil Engineering and Fire Protection offices; radiation safety officer.
- Responsible Army Corps of Engineers (USACE) and Naval Facilities Engineering Command (NAVFACENGCOM) offices acting as design/construction agents for Air Force projects or facilities on Air Force property.

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3.5. Coordination:

- MAJCOM Civil Engineering and Fire Protection offices; Surgeons General

4. Referenced Publications.

4.1. Public Law:

- 49 CFR 173, Subpart I, *Class 7 (Radioactive) Materials*

Note: Prior to implementing this ETL, thoroughly review applicable revisions to publications listed in paragraphs 4.1, 4.2, and 4.3.

4.2. Department of Defense (DoD):

- MIL-HDBK 1008C, *Fire Protection for Facilities Engineering, Design, and Construction*
- AFI 40-201, *Managing Radioactive Materials in the USAF*

4.3. National Fire Protection Association(NFPA):

- NFPA 101, *The Life Safety Code*, current edition
- NFPA 110, *Emergency and Standby Power Systems*, 1999

4.4. Private Industry:

- National Institute of Safety Technology Research (NISTR) 4399, *Evaluation of Exit Signs in Clear and Smoke Conditions*, August 1990
- Interstate Commerce Commission/American National Standards Institute (ICC/ANSI) A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, 1998

5. Definitions.

5.1. *Accessible*: Easily entered or vacated by a physically disabled person.

5.2. *Accessible Area of Refuge*: An area of refuge complying with the accessible route requirements of ICC/ANSI A117.1.

5.3. *ADA*: Americans with Disabilities Act.

5.4. *Area of Refuge*: Either:

- A floor of a fully sprinklered building that has at least two accessible rooms or spaces separated from each other by smoke partitioning;

OR

- A space in a means of egress that is protected from the effects of fire and smoke, either by separation from the other spaces in the same building or by virtue of location, thereby permitting delay in egress travel from any level.

5.5. *Emergency Lighting System:* A system capable of providing minimum required illumination (average of 1 foot-candle or 10 lux) for the means of egress. It includes the lighting units, related backup power source(s), and required connections.

5.6. *Existing Facilities:* For this ETL, a facility is existing if changes to be made are cosmetic only.

5.7. *Exit Sign:* For this ETL, exit sign refers to internally illuminated exit signs only.

5.8. *Horizontal Exit:* Either:

- A passage from one building to an area of refuge and access to a means of egress (complying with NFPA 101) in another building on approximately the same level;
- A passage through or around a fire barrier (2-hour minimum) to an area of refuge with access to a means of egress (complying with NFPA 101) on approximately the same level in the same building, that affords safety from fire and smoke originating from the area of incidence and communicating areas.

5.9. *IAW:* in accordance with.

5.10. *LED:* light emitting diode.

5.11. *Listed:* Applies to equipment or materials included in a list published by an organization acceptable to the authority with jurisdiction. The organization periodically inspects production and certifies that the items meet appropriate standards or test as suitable for a specific use.

5.12. *New Construction:* For application of this ETL, a facility is new if changes to be made are more than cosmetic, such as major renovations and/or additions, or new facilities.

5.13. *NISTR:* National Institute of Safety Technology Research

5.14. *NRC:* Nuclear Regulatory Commission.

5.15. *RSO:* Radiation Safety Officer.

5.16. *Tactile Signs:* Signs perceptible by touch which provide critical egress information to the sight-impaired.

5.17. *Tested:* Materials, equipment, or systems tested by a nationally recognized testing laboratory for compliance with nationally recognized tests approved for use by the Air Force.

6. *Specific Requirements.* Emergency lighting and marking of exits are integral components of the total life safety package for any given facility, yet frequently

overused and misused. No single sign type or emergency lighting package meets all Air Force requirements. The following provides guidance for selecting equipment most appropriate for particular applications, and incorporates new NFPA 101 changes.

6.1. Emergency Lighting System. Provide emergency lighting system IAW NFPA 101, 5-9. Usually, emergency lighting is required only for designated stairs, aisles, corridors, ramps, escalators and passageways leading to an exit. Interior and/or windowless rooms which are not normally occupied (such as mechanical rooms, toilets, and telephone equipment rooms) generally do not require emergency lighting unless they qualify as an underground structure and/or a windowless structure as defined in NFPA 101, 32-7.

6.1.1. Acceptable Emergency Lighting Systems:

- Fixtures connected to a permanently installed facility electrical generator system. Install, test, and maintain these generators IAW NFPA 110.
- Fixtures with internal battery packs that are part of a drop-in light system.
- Fixtures with remote battery packs.

6.1.2. Prohibited Emergency Lighting Systems.

6.1.2.1. New Construction. Do not use fixtures with wall-mounted battery packs.

6.1.2.2. Existing Construction. Remove existing fixtures equipped with wall-mounted battery packs where such fixtures are not required by NFPA 101 or DoD regulations.

Note: Do not remove fixtures simply to eliminate wall-mounted battery packs where:

- emergency lighting is required IAW NFPA 101;
and
- fixtures meet minimum NFPA 101 requirements.

6.2. Marking of Exits.

6.2.1. Acceptable Exit Signs.

6.2.1.1. LED. Use LED exit signs with illuminated letters displayed on an opaque background.

6.2.1.1.1. Lettering on all exit signs for an installation shall be one uniform color. Each base shall establish either red or green as the standard lettering color. Installations in or near jurisdictions with established exit sign lettering colors should adopt similar red or green standards. Do not replace existing exit signs meeting minimum NFPA 101 standards simply to standardize sign colors. When signs must be replaced for other reasons, use the installation color.

6.2.1.1.2. Installations overseas may use different colors, pictorials, and/or bilingual lettering as necessary to comply with local national standards. All exit signs must be

immediately obvious as an exit marking to a recently transferred or visiting U.S. citizen, or accompanied by a marking complying with NFPA 101, 5-10. At a minimum, locate exit markings IAW NFPA 101, 5-10; additional markings are permitted to comply with host nation standards. The overseas theatre MAJCOM fire protection engineer shall publish a formal standardized policy to implement variations from NFPA 101 and this ETL.

6.2.1.1.3. If an area of refuge or accessible area of refuge requires an illuminated exit sign, identify the area with an illuminated LED sign stating "AREA OF REFUGE" and displaying the international pictograph for accessibility IAW with ICC/ANSI 117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

6.2.2. Prohibited Exit Signs.

6.2.2.1. Radioluminous. AFI 40-201, *Managing Radioactive Materials in the USAF*, discourages use of these signs. These signs, new or existing, have been prohibited on Air Force installations since June of 1996. Previously, ETL 94-5 (superseded by this ETL) required their removal (where installation is not in a code-required location) or replacement (where installed in a code-required location) with LED exit signs. Radioluminous signs contain radioactive tritium gas, which is controlled by the Nuclear Regulatory Commission (NRC). Special handling is required for transportation and disposal, IAW 49 CFR 173, Subpart I, *Class 7 (Radioactive) Materials*.

6.2.2.1.1. Records. The facility owner (base real estate office), base fire department, and base bioenvironmental engineering office shall maintain records of the exact location, manufacturer, installation and removal dates, disposal agent and disposition of each remaining sign.

6.2.2.1.2. Undamaged Signs. Return undamaged signs removed from service to the manufacturer for disposal. Some manufacturers will accept any manufacturer's signs, usually for a nominal fee. Follow transportation requirements IAW 49 CFR 173 Subpart I when returning signs. If return to a manufacturer is not possible, dispose of signs as radioactive waste. Contact San Antonio Air Logistics Center (SA-ALC/EMP), 307 Tinker Drive Suite 1 (Bldg 306), Kelly AFB TX 78241-5917, for instructions.

6.2.2.1.3. Damaged Signs. Treat damaged signs as a potential radioactive materials incident and report them immediately through the base radiation safety officer (RSO) to the Radioisotope Committee. The base RSO will direct actions necessary for health and safety.

6.2.2.2. Incandescent. Do not use signs lit by incandescent bulbs in new construction. Existing incandescent signs may remain in service. When replacement is dictated by maintenance or construction requirements, replace the signs with LED exit signs, or refit them with LED conversion units.

6.2.3. Locating Illuminated Exit Signs. Do not install exit signs on main entrance/exit doors that are clearly identifiable as exits. Do not install exit signs on other exit doors immediately obvious as exits, with the exception of assembly and mercantile occupancies. A common-sense approach is essential to proper marking of the means of egress.

Note: NFPA 101 requires floor proximity signs for certain occupancies. Refer to NFPA 101, 5-10.1.5 for specific requirements.

6.2.4. Tactile Signage.

6.2.4.1. Exits. Tactile signs are required at each door to a stair enclosure and at each exit (including horizontal exits) IAW ADA, NFPA 101, 5-10 and ICC/ANSI A117.1. Signs shall have raised or recessed lettering and pictographs (where applicable) in contrasting colors. The sign content shall be in Braille. Locate tactile signs on the latch side of the door, centered at 1524 millimeters (60 inches) above the finished floor.

Note: ADA signage requirements include more than just marking of exits and are mandatory for both new and existing facilities.

6.2.4.2. Areas of Refuge. Tactile signs displaying "AREA OF REFUGE" and the international pictograph for accessibility are also required to identify areas of refuge and accessible areas of refuge IAW ICC/ANSI A117.1.

6.2.4.3. Stair Enclosures. Use tactile signs to identify:

- the floor level;
- the terminuses at the top and the bottom of the stair enclosure;
- the floor level of and direction to the exit discharge;
and to present other identifying information (such as "East" or "West").

7. Point of Contact: Ms. Erin A.M. Oneisom, HQ AFCESA/CESM, DSN 523-6329, commercial (850) 283-6329, FAX 523-6219, or internet erin.oneisom@tyndall.af.mil.

Michael J. Cook, Colonel, USAF
Director of Technical Support

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