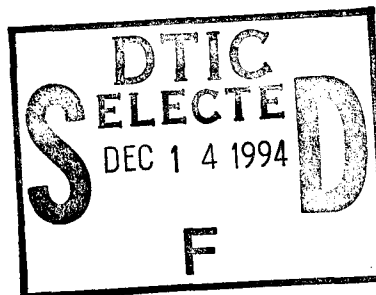




DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY



8 NOV 1994

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

SUBJECT: Engineering Technical Letter (ETL) 94-5: 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.

2. 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.

2.1. Authority. This ETL supersedes ETL 91-5, 18 Jun 1991, and incorporates the new requirements of the 1994 edition of NFPA 101. Use this letter together with guidance in MIL-HDBK 1008B.

2.2. Effective Date: Immediately. Expires five years from date of issue.

3. Referenced Publications.

3.1. MIL-HDBK 1008B, *Fire Protection for Facilities Engineering, Design, and Construction*, 15 January 1994.

3.2. National Fire Protection Association Standard 101 (NFPA 101), *The Life Safety Code*, current edition.

3.3. NISTR 4399, *Evaluation of Exit Signs in Clear and Smoke Conditions*, August 1990.

3.4. CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, 1992.



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3.5. NFPA 110, *Emergency and Standby Power Systems*, 1993.

3.6. AFI 40-201, *Managing Radioactive Materials in the USAF*, 1994.

4. Definitions.

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

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

4.3. *ADA*: Americans with Disabilities Act.

4.4. *ANSI*: American National Standards Institute.

4.5. *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.

4.6. *CABO*: Council of American Building Officials.

4.7. *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.

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

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

4.10. *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;
or
- 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.

4.11. IAW: in accordance with.

4.12. LED: light emitting diode.

4.13. 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.

4.14. 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.

4.15. NISTR: National Institute of Safety Technology Research.

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

4.17. 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.

5. 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.

5.1. Emergency Lighting. Provide emergency lighting 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 (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, 30-1.3.

5.1.1. Acceptable Emergency Lighting Systems.

- Fixtures connected to a permanently installed facility electrical generator system. Install, test, and maintain these generators IAW NFPA 110.

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- Fixtures with internal battery packs that are part of a drop-in light system.
- Fixtures with remote battery packs.

5.1.2. Prohibited Emergency Lighting Systems.

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

5.1.2.2. 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.

5.2. Marking of Exits.

5.2.1. Acceptable Exit Signs.

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

5.2.1.1.1. 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.

5.2.1.1.2. 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.

5.2.1.1.3. 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 CABO/ANSI 117.1.

5.2.2. Prohibited Exit Signs.

5.2.2.1. Radioluminous. AFI 40-201 prohibits use of these signs. Radioluminous signs contain radioactive tritium gas, which is controlled by the Nuclear Regulatory Commission (NRC). Special handling is required for transportation (IAW 49 CFR 173, Subpart I) and disposal.

5.2.2.1.1. Disposal. Signs installed before the 14 May 1986 prohibition for new installations may remain in service until replaced at the end of the ten-year service life. REPLACE ALL SIGNS NO LATER THAN 1 JUNE 1996.

5.2.2.1.2. Records. The facility owner (base real estate office), base fire department, and base bioenvironmental engineering office shall maintain records of the exact location, manufacturer, and installation date for each sign.

5.2.2.1.3. 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 SA-ALC/EMP, 307 Tinker Drive (Bldg 306), Kelly AFB TX 78241-5917, for instructions.

5.2.2.1.4. 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.

5.2.2.2. 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

5.2.3. 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.

5.2.4. Tactile Signage.

5.2.4.1. 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 CABO/ANSI 117.1. 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 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.

5.2.4.2. 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 CABO/ANSI 117.1.

5.2.4.3. 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").

6. Point of Contact: Ms. Erin A.M. Oneisom, HQ AFCESA/DFE, DSN 523-6329, commercial (904) 283-6329, or FAX 523-6499.



Rita A. Gregory, Ph.D., PE
Director of Systems Engineering

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- 2. ETL Index

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ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
83-1	Design of Control Systems for HVAC Change No. 1 to ETL 83-1, U.S. Air Force Standardized Heating, Ventilating & Air Conditioning (HVAC) Control Systems	16 Feb 83 22 Jul 87
83-3	Interior Wiring Systems, AFM 88-15, Para 7-3	2 Mar 83
83-4	EMCS Data Transmission Media (DTM) Consolidations	3 Apr 83
83-7	Plumbing, AFM 88-8, Chapter 4	30 Aug 83
83-8	Use of Air-to-Air Unitary Heat Pumps	15 Sep 83
83-9	Insulation	14 Nov 83
84-7	MCP Energy Conservation Investment Program (ECIP)	13 Jun 84
84-10	Air Force Building Construction and the Use of Termiticides	1 Aug 84
86-2	Energy Management and Control Systems (EMCS)	5 Feb 86
86-4	Paints and Protective Coatings	12 May 86
86-5	Fuels Use Criteria for Air Force Construction	22 May 86
86-8	Aqueous Film Forming Foam Waste Discharge Retention and Disposal	4 Jun 86
86-9	Lodging Facility Design Guide	4 Jun 86
86-10	Antiterrorism Planning and Design Guidance	13 Jun 86
86-14	Solar Applications	15 Oct 86
86-16	Direct Digital Control Heating, Ventilation, and Air Conditioning Systems	9 Dec 86
87-1	Lead Ban Requirements of Drinking Water	15 Jan 87
87-2	Volatile Organic Compounds	4 Mar 87
87-9	Prewiring	21 Oct 87
88-2	Photovoltaic Applications	21 Jan 88
88-3	Design Standards for Critical Facilities	15 Jun 88
88-4	Reliability & Maintainability (R&M) Design Checklist	24 Jun 88
88-6	Heat Distribution Systems Outside of Buildings	1 Aug 88
88-9	Radon Reduction in New Facility Construction	7 Oct 88
89-2	Standard Guidelines for Submission of Facility Operating and Maintenance Manuals	23 May 89
89-6	Power Conditioning and Continuation Interfacing Equipment (PCCIE) in the Military Construction Program (MCP)	7 Sep 89

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
89-7	Design of Air Force Courtrooms	29 Sep 89
90-1	Built-Up Roof (BUR) Repair/Replacement Guide Specification	23 Jan 90
90-2	General Policy for Prewired Workstations and Systems Furniture	26 Jan 90
90-3	TEMPEST Protection for Facilities Change 1 Ref: HQ USAF/LEEDE Ltr dated 20 April 90, Same Subject	23 Mar 90
90-4	1990 Energy Prices and Discount Factors for Life-Cycle Cost Analysis	24 May 90
90-5	Fuel and Lube Oil Bulk Storage Capacity for Emergency Generators	26 Jul 90
90-6	Electrical System Grounding, Static Grounding and Lightning Protection	3 Oct 90
90-7	Air Force Interior Design Policy	12 Oct 90
90-8	Guide Specifications for Ethylene Propylene Diene Monomer (EPDM) Roofing	17 Oct 90
90-9	Fire Protection Engineering Criteria for Aircraft Maintenance, Servicing, and Storage Facilities	2 Nov 90
90-10	Commissioning of Heating, Ventilating, and Air Conditioning (HVAC) Systems Guide Specification	17 Oct 90
91-1	Fire Protection Engineering Criteria Testing Halon Fire Suppression Systems	2 Jan 91
91-2	High Altitude Electromagnetic Pulse (HEMP) Hardening in Facilities	4 Mar 91
91-4	Site Selection Criteria for Fire Protection Training Areas	14 Jun 91
91-6	Cathodic Protection	3 Jul 91
91-7	Chlorofluorocarbon (CFC) Limitation in Heating, Ventilating and Air-Conditioning (HVAC) Systems	21 Aug 91
93-1	Construction Signs	11 Mar 93
93-2	Dormitory Criteria for Humid Areas	13 Jul 93
93-3	Inventory, Screening, Prioritization, and Evaluation of Existing Buildings for Seismic Risk	18 Aug 93
93-4	Fire Protection Engineering Criteria - Automatic Sprinkler Systems in Military Family Housing (MFH)	11 Aug 93

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
93-5	Fire Protection Engineering Criteria - Electronic Equipment Installations	22 Dec 93
94-1	Standard Airfield Pavement Marking Schemes	5 Apr 94
94-2	Utility Meters in New and Renovated Facilities	10 Jun 94
94-3	Air Force Carpet Standard	10 Jun 94
94-4	Energy Usage Criteria for Facilities in the Military Construction Program	19 Aug 94
94-5	Fire Protection Engineering Criteria and Technical Guidance - Emergency Lighting and Marking of Exits	8 Nov 94

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION B - OBSOLETE ETLs

ETL Number	Date	Status
82-1	10 Nov 82	Superseded by ETLs 83-10, 86-1, 87-4
82-2	10 Nov 82	Superseded by AFEPPM 88-10
82-3	10 Nov 82	Superseded by ETLs 83-5, 84-2
82-4	10 Nov 82	Superseded by ETL 84-7
82-5	10 Nov 82	Superseded by ETLs 84-1, 86-13, 86-14
82-6	30 Dec 82	Cancelled
82-7	30 Nov 82	Cancelled
83-2	16 Feb 83	Superseded by ETL 84-3
83-5	5 May 83	Superseded by ETL 84-2
83-6	24 May 83	Cancelled
83-10	28 Nov 83	Superseded by ETL 86-1
84-1	18 Jan 84	Superseded by ETL 86-14
84-2	27 Mar 84	Superseded by ETL 94-4
84-3	21 Mar 84	Cancelled
84-4	10 Apr 84	Superseded by ETLs 86-7, 86-15, 87-5
84-5	7 May 84	Superseded by ETLs 84-8, 86-11, 86-18, 88-6
84-6	Not Issued	Cancelled/Not Used
84-8	19 Jun 84	Superseded by ETL 86-11
84-9	5 Jul 84	Superseded by ETL 88-7
88-5	2 Aug 88	Superseded by ETL 91-6
86-1	3 Feb 86	Superseded by ETL 87-7
86-3	21 Feb 86	Superseded by ETL 86-4
86-6	3 Jun 86	Superseded by ETLs 86-11, 86-18, 88-6
86-7	3 Jun 86	Superseded by ETL 86-15
86-11	3 Jul 86	Superseded by ETL 88-6
86-12	3 Jul 86	Superseded by ETL 90-2
86-13	18 Aug 86	Superseded by ETL 86-14
86-15	13 Nov 86	Superseded by ETL 87-5
86-17	17 Dec 86	Superseded by ETL 89-6
86-18	18 Dec 86	Superseded by ETL 88-6
87-3	12 Mar 87	Superseded by ETLs 87-6, ETL 88-5
87-4	13 Mar 87	Superseded by ETL 94-4
87-5	13 July 87	Superseded by ETL 94-2
87-6	21 Aug 87	Superseded by ETL-88-5
87-7	14 Oct 87	Superseded by ETL 89-1
87-8	19 Oct 87	Superseded by ETL 90-1
88-1	5 Jan 88	Superseded by ETL 89-2
88-5	2 Aug 88	Superseded by ETL 91-6

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION B - OBSOLETE ETLs

ETL Number	Date	Status
88-7	24 Aug 88	Superseded by ETLs 90-3, 91-2
88-8	4 Oct 88	Superseded by ETL 91-7
88-10	29 Dec 88	Cancelled
89-1	6 Feb 89	Superseded by ETL 90-4
89-3	9 Jun 89	Superseded by ETL 93-5
89-4	6 Jul 89	Cancelled
89-5		Issued as ETL 90-7
90-4	24 May 90	Cancelled
91-3	14 Jun 91	Superseded by MIL HDBK 1008B, Jan 94
91-5	18 Jun 91	Superseded by ETL 94-5
91-8	24 Sep 91	Cancelled

CONSTRUCTION TECHNICAL LETTERS (CTL)

SECTION C - CURRENT CTLs

CTL Number	Title	Date Issued
88-2	DD Form 1354 Checklist	6 Jan 88
88-7	Constructibility Review Checklist	1 Nov 88
89-1	Thirty-Percent Design Submittal	10 Apr 89
89-2	MAJCOM Construction Management	30 May 89
89-3	Warranty and Guarantee Program	22 Sep 89
90-1	Management of the MILCON Planning and Execution Process	6 Mar 90
90-2	Definitions for Design Milestones	13 Mar 90

SECTION D - OBSOLETE CTLs

CTL Number	Status
87-1	Superseded by CTL 88-3
88-1	Superseded by CTL 90-1
88-3	Superseded by ETL
88-4	Replaced by Electronic Data File and Documentation in PDC/WIMS
88-5	Superseded by CTL 90-2
88-6	Issuance Cancelled