



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

**Subject: ELECTRICAL SUPPLIES FOR
EMERGENCY CONDITIONS**

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1. **PURPOSE.** This advisory circular (AC) provides guidance for demonstrating compliance with the transport category airplane certification requirements of § 25.1362 *Electrical supplies for emergency conditions.*

2. **APPLICABILITY.**

a. The guidance provided in this document is directed to airplane manufacturers, modifiers, foreign regulatory authorities, Federal Aviation Administration (FAA) transport airplane type certification engineers, and designees.

b. This material is neither mandatory nor regulatory in nature and does not constitute a regulation. It describes acceptable means, but not the only means, for demonstrating compliance with the applicable regulations. We will consider other methods of demonstrating compliance that an applicant may elect to present. While these guidelines are not mandatory, they are derived from extensive FAA and industry experience in determining compliance with the relevant regulations. On the other hand, if we become aware of circumstances that convince us that following this AC would not result in compliance with the applicable regulations, we will not be bound by the terms of this AC, and we may require additional substantiation as a basis for finding compliance.

c. This material does not change or create any additional regulatory requirements, nor does it authorize changes in or permit deviations from existing regulatory requirements.

d. Terms such as “shall” or “must” are used in this AC only in the sense of ensuring applicability of this particular method of compliance when the acceptable method of compliance described herein is used.

3. **DEFINITION.**

Electrical Wiring Interconnection Systems (EWIS). In part, an EWIS is any wire, wiring device, or combination of these, including termination devices, installed in any area of the airplane for the purpose of transmitting electrical energy between two or more intended termination points. The complete regulatory definition of an EWIS is in § 25.1701, reproduced in Appendix A of this AC.

4. COMPLIANCE GUIDANCE.

a. Emergency Services. The emergency services which may require an electrical supply include fuel shut-off valves, hydraulic shut-off valves, and engine/APU fire extinguisher systems. The components and installation of the components associated with providing an electrical supply for services required during emergency procedures after an emergency landing or ditching should be sufficiently robust in nature so as to minimize their potential for causing a fire under the emergency conditions considered. Probable failure scenarios should be considered when selecting the components and designing their installation to help ensure that they would not cause a fire under these failure scenarios.

b. Airplane Flight Manual Procedure (AFM). You should provide an appropriate design and/or an unambiguous AFM procedure to prevent disconnection of the electrical supply to the required services before emergency procedures are fully completed.

c. Compliance with § 25.1719. Section 25.1719(b)(7) requires that components of EWIS associated with systems to which § 25.1362 is applicable be considered an integral part of that system or systems and must be considered in showing compliance with the applicable requirements for that system.

d. Instructions for Continued Airworthiness. Instructions for Continued Airworthiness (required by §§ 25.1529 and 25.1739) must include all maintenance actions necessary to maintain the electrical supplies for emergency services throughout the expected service life of the airplane.

APPENDIX A

§§ 25.1362 and 25.1701

The text of §§ 25.1362 and 25.1701 is repeated here for the convenience of the reader.

§ 25.1362 Electrical supplies for emergency conditions.

A suitable electrical supply must be provided to those services required for emergency procedures after an emergency landing or ditching. The circuits for these services must be designed, protected, and installed so that the risk of their causing a fire under these emergency conditions is minimized.

§ 25.1701 Definition.

(a) Electrical wiring interconnection system (EWIS) means any wire, wiring device, or combination of these, including termination devices, installed in any area of the airplane for the purpose of transmitting electrical energy between two or more intended termination points. Except as provided for in paragraph (c) of this section, this includes:

- (1) Wires and cables.
- (2) Bus bars.
- (3) The termination point on electrical devices, including relays, interrupters, switches, contactors, terminal blocks, and circuit breakers and other circuit protection devices.
- (4) Connectors, including feed-through connectors.
- (5) Connector accessories.
- (6) Electrical grounding and bonding devices and their associated connections.
- (7) Electrical splices.
- (8) Materials used to provide additional protection for wires, including wire insulation, wire sleeving, and conduits that have electrical termination for the purpose of bonding.
- (9) Shields or braids.
- (10) Clamps and other devices used to route and support the wire bundle.
- (11) Cable tie devices.
- (12) Labels or other means of identification.
- (13) Pressure seals.

(b) The definition in paragraph (a) of this section covers EWIS components inside shelves, panels, racks, junction boxes, distribution panels, and back-planes of equipment racks, including, but not limited to, circuit board back-planes and wire integration units.

(c) Except for the equipment indicated in paragraph (b) of this section, EWIS components inside the following equipment, and the external connectors that are part of that equipment, are excluded from the definition in paragraph (a) of this section:

- (1) Electrical equipment or avionics that are qualified to environmental conditions and testing procedures when those conditions and procedures are—
 - (i) appropriate for the intended function and operating environment, and
 - (ii) acceptable to the FAA.
- (2) Portable electrical devices that are not part of the type design of the airplane. This includes personal entertainment devices and laptop computers.
- (3) Fiber optics.

APPENDIX B

RELATED REGULATIONS AND DOCUMENTS

Regulations. Sections of 14 CFR part 25 that prescribe requirements for design, substantiation, and certification relating to electrical supplies for emergency conditions in transport category airplanes include:

- § 25.1189 Shutoff means
- § 25.1195 Fire extinguishing systems
- § 25.1301 Function and installation
- § 25.1309 Equipment, systems, and installations
- § 25.1529 Instructions for Continued Airworthiness
- § 25.1585 Operating procedures
- § 25.1701 Definition (of EWIS)
- § 25.1703 Function and installation: EWIS
- § 25.1719 Systems and Functions: EWIS.
- § 25.1739 Instructions for Continued Airworthiness: EWIS.

Advisory Circulars.

- 25.1309-1A System Design and Analysis
- 25.17XX Certification of Electrical Wiring Interconnection Systems on Transport Category Airplanes

Reports

“Task 6 Final Report,” dated October 29, 2002, Aging Transport Systems Rulemaking Advisory Committee.