



AEROSPACE STANDARD

AS8992™

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Fire Resistant Container Design, Performance, and Testing Requirements

RATIONALE

This Aerospace Standard specifies the design, performance, and testing requirements applicable to fire resistant containers for air cargo.

INTRODUCTION

Throughout this document, the minimum essential criteria are identified by use of the key word "shall." Recommended criteria are identified by use of the key word "should" and, while not mandatory, are considered to be of primary importance in providing safe fire resistant containers. Deviation from recommended criteria should only occur after careful consideration, extensive testing and thorough service evaluations have shown alternate methods to be satisfactory.

The requirements of this document are expressed in the applicable SI units, with approximate inch-pound units conversion between brackets. Where it is deemed necessary to use exact values, the SI units are to be used.

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1. SCOPE

- 1.1 This Aerospace Standard (AS) specifies the minimum design and performance criteria and testing methods of passive fire resistant containers (FRCs) used either:
 - a. In those cargo compartments of civil transport aircraft where they constitute one means of complying with applicable airworthiness regulations, or
 - b. On a voluntary basis, when deemed appropriate by operators to improve fire protection in aircraft cargo compartments where airworthiness regulations do not mandate their use.
- 1.2 The fire resistant containers (FRCs) specified by this document are intended to be used to contain and restrain unitized cargo for loading into aircraft cargo compartments:
 - a. Either class F cargo compartments according to CS-25 § 25.857(f) and AMC to CS-25.855 and 25.857 or FAA 14 CFR Part 25 § 25.857(f), in accordance with 1.1.a, or
 - b. Class E aircraft cargo compartments according to CS-25 § 25.857(e), JAS Part 3, CCAR or 14 CFR Part 25 § 25.857(e), in accordance with 1.1.b.
- 1.3 Containers are specified in this document only insofar as their flammability requirements and fire resistance performance are concerned. They are not otherwise specified in this document, but still require meeting the applicable general standards (see Section 3).

NOTE: Though nothing prevents a fire resistant container (FRC) from being carried in a class C aircraft cargo compartment, it is not primarily intended for this use since its fire containment capability would be redundant with that of the aircraft's fire detection and suppression system.

- 1.4 This document does not cover requirements for fire detection or suppression devices. The specified fire resistant containers (FRCs) are passive devices capable of containing a fire for the specified duration without the aid of detection/suppression devices.

NOTE: Nothing, however, prevents additional use of self-contained fire detection or suppression devices within fire resistant containers (FRCs), but such active container devices are not specified herein and not part of the scope of this document. See 3.5.7.

- 1.5 The containers specified in this document are to be designed and tested at both the detail- and assembly-levels to demonstrate performance.
- 1.6 The use of fire resistant containers meeting the requirements of this document does not alone ensure flight safety: this document is based on the assumption that the fire resistant containers will be checked and loaded prior to aircraft loading in accordance with appropriate operating instructions, by competent, suitably trained, personnel as defined for example in ISO 9001:2008 sub-clause 6.2.2 (see [1] in Bibliography and Section 7).

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AIR1490	Environmental Degradation of Textiles
AS1825	Methodology of Calculating Aircraft Cargo Volumes
AS6453	Fire Containment Cover - Design, Performance, and Testing Requirements
AS33601	Track and Stud Fitting for Cargo Transport Aircraft, Standard Dimensions For
AS36100	Air Cargo Unit Load Devices - Performance Requirements and Test Parameters
AS36102	Air Cargo Unit Load Devices - Testing Methods

2.1.2 Regulatory

Available from U.S. Government Printing Office, Mail Stop SSOP, Washington, DC 20402-9325, <http://www.gpoaccess.gov>, or FAA web site <http://www.faa.gov>.

Code of Federal Regulations (CFR) Title 14 Part 25 – Airworthiness Standards: Transport Category Airplanes^{1 2}

FAA Advisory Circular AC 25.857-X, Class B and F Cargo Compartments¹

FAA Technical Standard Order TSO-C90, Cargo pallets, nets and containers (Unit Load Devices)¹

DOT/FAA/AR-0012 Aircraft Materials Fire Test Handbook (FAA William J. Hughes Technical Center Internet website at <http://www.fire.tc.faa.gov/pdf/00-12.pdf>)

Regulatory documents from other Authorities:

CAAC CCAR-25 Airworthiness Standards – Transport Category Airplanes^{2 3}

CAAC Technical Standard Order CTSO-C90, Cargo pallets, nets and containers³

EASA CS-25, Certification Specifications for Large Aeroplanes^{2 4}

EASA Acceptable Means of Compliance (AMC) to CS-25.855/25.857, Cargo or baggage compartments⁴

¹ 14 CFR Part 25 constitutes the U.S.A. government transport aircraft airworthiness approval Regulations, and can be obtained from the U.S. Government Printing Office, Mail Stop SSOP, Washington DC 20402-9328, U.S.A., or its website at <http://www.gpoaccess.gov/ecfr>.

² See paragraphs 25.855, 25.857 and Appendix F.

³ CCAR-25 constitutes the China government transport aircraft airworthiness approval Regulations, and can be obtained from CAAC.

⁴ EASA CS-25, abbreviated throughout this standard as “CS-25,” constitutes the European governments transport aircraft airworthiness approval Regulations, and can be obtained from the European Aviation Safety Agency (EASA), Otto Platz 1, Postfach 101253, D-50452 Cologne, Germany, or its web site at <http://www.easa.europa.eu>.

EASA Technical Standard Order ETSO-C90, Cargo pallets, nets and containers (Unit Load Devices)⁴

Japanese Airworthiness Standard Part 3 (Civil Aeronautics Law Article 10 § 4)^{2 5}

Japanese Technical Standard Order JTSO-C90, Cargo pallets, nets and containers

2.1.3 International Standards

2.1.3.1 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 877-1	Plastics – Methods of exposure to solar radiation – Part 1: General guidance
ISO 2685	Aircraft – Environmental test procedure for airborne equipment – Resistance to fire in designated fire zones
ISO 4892-1	Plastics – Methods of exposure to laboratory light sources – Part 1: General guidance
ISO 4892-3	Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps
ISO TR 8647	Environmental degradation of textiles used in air cargo restraint equipment
ISO 8097	Aircraft – Minimum airworthiness requirements and test conditions for certified air cargo unit load devices [NAS3610 Rev. 10 recognition]
ISO 10046	Aircraft – Methodology of calculating cargo compartment volumes
ISO 10254	Air cargo and ground equipment – Vocabulary
ISO 10327	Air cargo – Main deck containers – Design and testing
ISO 11242	Aircraft – Pressure equalization requirements for cargo containers
ISO 12236	Geosynthetics – Static puncture test (CBR test)
ISO 14186	Air cargo – Fire containment covers – Design, performance and testing requirements
ISO 19281	Air cargo – Fire resistant containers – Design, performance and testing requirements
ISO 21100	Air cargo unit load devices – Performance requirements and testing parameters

2.1.3.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization

⁵ CCAR-25 constitutes the China government transport aircraft airworthiness approval Regulations, and can be obtained from CAAC.

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 EUROCAE Publications

Available from EUROCAE Secretariat, 102 rue Etienne Dolet, 92240 Malakoff, France, Tel: +33 1 40 92 79 30, www.eurocae.net.

EUROCAE ED-14 Environmental conditions and test procedures for airborne equipment ⁶

2.2.2 RTCA Publications

Available from RTCA, Inc., 1150 18th Street, NW, Suite 910, Washington, DC 20036, Tel: 202-833-9339, www.rtca.org.

RTCA DO-160 Environmental conditions and test procedures for airborne equipment ⁷

2.2.3 IATA Publications

Available from International Air Transport Association, Publications Assistant, 800 Place Victoria, P.O. Box 113, Montreal, Quebec H4Z 1M1, Canada, Tel: 1-514-874-0202, www.iata.org.

IATA ULD Regulations Standard Specification 50/8, Fire Resistant Container

2.3 Definitions

For the purpose of this AS, the definitions of ISO 10254 and the following apply:

ACTIVE ULD: Unit load device incorporating built-in fire detection and/or fire extinguishing systems.

BURN LENGTH: Distance from the original edge to the farthest evidence of damage on a test specimen due to flame impingement, including areas of partial or complete consumption, charring or embrittlement, but not including areas sooted, stained, warped, or discolored, nor areas where material has shrunk or melted away from the heat source.

CLASS A FIRE: Fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and plastics for which the quenching and cooling effects of quantities of water, or of solutions containing a large percentage of water, are of prime importance.

FIRE CONTAINMENT/FIRE CONTROL: Ensuring that a fire does not grow to a state where damage to the airplane or harm to passengers or crew occurs during the time for which the fire containment system is demonstrated to be effective.

FIRE RESISTANT: Materials used in construction of a ULD deemed to be appropriate for containment of a fire within the ULD.

FIRE RESISTANT CONTAINER (FRC): Completely enclosed container, airworthiness approved under applicable general performance criteria, with a demonstrated additional capability to contain a possible cargo fire within it for a rated period.

NOTE: Guidance addressing the use of FRCs may be provided in airworthiness regulatory guidance documents when they are one allowable means of compliance with fire containment requirements in certain classes of aircraft cargo compartments.

PASSIVE ULD: Unit load device (e.g., FRC) or accessory thereto that includes neither fire detection nor fire extinguishing systems, and ensures fire containment by design, i.e., its use of appropriate materials and limiting the supply of air.

⁶ RTCA DO-160 is equivalent. Both are recognized by ISO 7137.

⁷ Equivalent to EUROCAE ED-14.