International Standard

ISO 19281

Air cargo — Fire-resistant containers — Design, performance and testing requirements

Fret aérien — Conteneurs résistant au feu — Exigences de conception, performances et essais

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

This second edition cancels and replaces the first edition (ISO 19281:2016), which has been technically revised.

The main changes are as follows:

— Clause 1: revision of the scope;

— Clause 3: revision of the original term entries 3.4 and 3.5, suppression of definitions 3.6, 3.8 and 3.9;

— Clause 4: revision of the general requirements, suppression of 4.1.3, 4.2.1, 4.6.6 and 4.6.7, addition of 4.5.5 and 4.7.2;

— Clause 5: revision of performance with the addition of testing (5.2 “Environmental testing”, 5.4 “FRC full scale test”);

— Clause 8 (previous Clause 9): revision of the operator requirements with the suppression of 9.2 “Operating instructions”, 9.3 “Training and qualification” and 9.4 “Quality control”.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Fatal accidents have demonstrated the risk of uncontrolled fires occurring within cargo to transport aircraft; it is evident that the use of fire protecting devices can improve flight safety.

This document specifies the design and performance criteria and testing methods for fire-resistant containers used to provide enhanced protection against cargo fires in civil transport aircraft cargo compartments.

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, for example:

a) Class E aircraft cargo compartments according to CS-25, CCAR-25, JAS Part 3 or 14CFR Part 25 25.857 (e);

b) Class F aircraft cargo compartments according to CS-25 § 25.857(f) and AMC to CS-25.855 and 25.857, or 14CFR Part 25 § 25.857(f) and FAA Advisory Circular AC25.857-X.

NOTE Though nothing formally prevents a fire-resistant container (FRC) from being carried in a Class C aircraft cargo compartment, it is not intended for this use since its fire containment capability is redundant with that of the aircraft's fire detection and suppression system. Current regulatory guidance materials and aircraft type's Weight and Balance Manual can be consulted whenever available.

This document only specifies the flammability requirements and fire resistance performance for FRCs. Nonetheless the other applicable general standards shall be taken into account (e.g. ISO 21100, ISO 8097, ISO 10327, ISO 11242).

The containers specified in this document shall be designed and tested at both the full-scale and component levels to demonstrate performance.

The use of fire-resistant containers meeting the requirements of this document alone is not sufficient to ensure flight safety: this document is based on the assumption that the approved fire-resistant containers are built up, installed, and checked prior to aircraft loading in accordance with appropriate operating instructions, by competent, suitably trained, personnel (see Clause 8).

Recommended criteria are, while not mandatory, considered to be of primary importance in providing fire-resistant containers meeting the applicable regulatory requirements and ensuring effective protection against fires. Deviation from recommended criteria should only occur after careful consideration, extensive testing, and thorough service evaluation have shown alternate methods to be satisfactory.

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

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Air cargo — Fire-resistant containers — Design, performance and testing requirements

1 Scope

This document specifies the minimum design and performance criteria and testing methods of passive fire-resistant containers (FRCs) used in cargo compartments of civil transport aircraft to improve fire protection.

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 a specific duration.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 877-1, *Plastics — Methods of exposure to solar radiation — Part 1: General guidance*

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 8097, *Aircraft — Minimum airworthiness requirements and test conditions for certified air cargo unit load devices*

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 14186:2013, *Air cargo — Fire containment covers — Design, performance and testing requirements*

ISO 21100, *Air cargo unit load devices — Performance requirements and test parameters*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10254 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
fire containment
fire control
ensuring that a fire does not grow to a state where damage to the aeroplane or harm to passengers or crew occurs during the time for which the fire containment system is demonstrated to be effective

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3.2
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 1 to entry: Guidance addressing the use of FRCs can be provided in airworthiness regulatory guidance documents when they are one allowable means of compliance with *fire containment* (3.1) requirements in certain classes of aircraft cargo compartments.

3.3
unit load device
ULD
device for grouping, transferring, and restraining cargo for transit

Note 1 to entry: It may consist of a pallet with a net or it may be a container.

Note 2 to entry: In this document, it is a synonym of "container".

3.4
class A fire
fire 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

4 General requirements

4.1 Approval

4.1.1 The fire-resistant container's type design shall be approved for this purpose on the basis of demonstration of conformity with this document. Where the fire-resistant container is intended to constitute a means of complying with applicable airworthiness regulations, additional requirements from the airworthiness authority concerned can apply.

4.1.2 The fire-resistant container shall, in addition, be airworthiness approved under the ultimate load criteria in accordance with ISO 21100, or ISO 8097 if its size is not contained therein. The ultimate load requirements and the fire resistance requirements are not required to be met simultaneously because it is highly improbable that a cargo fire and maximum flight load condition would simultaneously occur. The ULD manufacturer is responsible for authority approval.

4.2 Construction

4.2.1 In the case of a standard container fitted with protective linings or coatings, the expression "fire-resistant container" exclusively designates throughout this document the complete assembly fully fitted with intended coating, protections, or other appurtenances. The container's manufacturer shall be solely responsible for required testing. See 4.3.1, NOTE regarding applicable approval procedures.

In this case, inner coatings or protective materials are exposed to interference from stacking cargo in the container. Specific inner damage limits are required and can present container inspection and damage assessment difficulties, see applicable requirements in 5.5.5.

4.2.2 The minimum performance requirements to be met are specified by this document and in addition the container shall satisfy all general design and testing requirements of ISO 10327 for main deck containers.

4.2.3 This document does not cover the possibility of placing over a container a fire containment cover (FCC) meeting the requirements of ISO 14186.

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