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Air cargo — Main deck containers — Design and testing

Fret aérien — Conteneurs de pont principal — Conception 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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is 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 10327:1995), which has been technically revised.

Introduction

The basic functions of main deck air cargo containers are

a) the unitization of cargo during ground handling and transportation, and

b) the restraint of their contents against accelerations encountered in flight.

Throughout this International Standard, 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, economical, and usable air transport containers. Deviation from recommended criteria should only occur after careful consideration and thorough service evaluation have shown alternate methods to provide an equivalent level of safety.

The requirements of this International Standard are expressed in the applicable SI units, with approximate inch-pound units conversion between brackets for convenience in those countries using that system. Where it is deemed necessary to use exact values, the SI unit ones are to be used. Per exception, the exact figures are those in inches for container base overall outside dimensions.

Air cargo — Main deck containers — Design and testing

1 Scope

1.1 This International Standard covers the minimum design and operational testing requirements for general purpose, base-restrained containers exclusively intended for the main or upper deck cargo compartments of main line civil transport aircraft, capable of being used by either airlines or shippers and requiring an airworthiness authority approval (certification).

NOTE 1 The metric equivalents for dimensions have been rounded up or down to the nearest millimetre, except in critical dimensions. Masses have been rounded up to the nearest kilogram and forces have been rounded up to the nearest 10 N.

NOTE 2 Though nothing technically prevents their being used for baggage, main deck containers are generally used only for carriage of freight.

1.2 This International Standard does not cover the performance requirements and ultimate load testing parameters for airworthiness authorities approval (certification), which are covered in ISO 21100 or, for units approved prior to 2012, ISO 8097:2001. The design and operational testing requirements of this International Standard are additional to the performance and certification testing requirements of these International Standards.

1.3 This International Standard does not cover containers with an overall height of 1 625 mm (64 in) or less, that can be loaded on the lower deck compartments of main line civil transport aircraft, which are specified in ISO 6517, nor air-surface main deck containers, which are specified in ISO 4128 and ISO 8323.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4116:1986, *Air cargo equipment — Ground equipment requirements for compatibility with aircraft unit load devices*

ISO 4128:1985, *Aircraft — Air mode modular containers*

ISO 4171:1993, *Air cargo equipment — Interline pallets*

ISO 6517:1992, *Air cargo equipment — Base-restrained certified containers exclusively for the lower deck of high-capacity aircraft*

ISO 7137:1995, *Aircraft — Environmental conditions and test procedures for airborne equipment*

ISO 7166:1985, *Aircraft — Rail and stud configuration for passenger equipment and cargo restraint*

ISO 8097:2001, *Aircraft — Minimum airworthiness requirements and test conditions for certified air cargo unit load devices*

ISO 8323:1985, *Freight containers — Air/surface (intermodal) general purpose containers — Specification and tests*

ISO/TR 8647:1990, *Environmental degradation of textiles used in air cargo restraint equipment*

ISO 10046:1996, *Aircraft — Methodology of calculating cargo compartment volumes*

ISO 11242:1996, *Aircraft — Pressure equalization requirements for cargo containers*

ISO/PAS 21100:2011, *Air cargo unit load devices — Performance requirements and test parameters*

CAAC CCAR-21, *Certification Procedures for Products and Parts*[1)]

CAAC CCAR-25, *Airworthiness Standards —Transport Category Airplanes*[1)]

CAAC CCAR-121, *Air Carriers Certification and Operations system*[1)]

CAAC Chinese Technical Standard Order CTSO C90d — *Cargo pallets, nets and containers*[1)]

EASA Part 21, *Certification of aircraft and related products, parts and appliances, and of design and production organisations* (Commission Regulation (EU) No. 748/2012)[2)]

EASA CS-25, *Certification Specifications for Large Aeroplanes*[2)]

EASA, *(European Aviation Safety Agency) EU-OPS 1035 — Quality system*[2)]

EASA, *European Technical Standard Order ETSO C90d — Cargo pallets, nets and containers (Unit Load Devices)*[2)]

Japanese Airworthiness Standard Part 3 (Civil Aeronautics Law Article 10 § 4)[3)]

U.S. Code of Federal Regulations Title 14 CFR Part 21, *Certification Procedures for Products and Parts*[4)]

U.S. Code of Federal Regulations Title 14 Part 25, *Airworthiness Standards: Transport Category Airplanes*[4)]

U.S. Code of Federal Regulations Title 14 CFR Part 121, *Air carriers certification and operation*[4)]

U.S. Federal Aviation Administration Advisory Circular AC 120-59, *Air carriers internal evaluation programs*[4)]

U.S. FAA Technical Standard Order TSO C90d, *Cargo Pallets, Nets and Containers*[4)]

EUROCAE ED-14G, *Environmental conditions and test procedures for airborne equipment*[5)]

1) Civil Aviation Administration of China (CAAC) listed documents constitute the Chinese government transport aircraft airworthiness approval Regulations.

2) The listed EASA documents constitute the European 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 www.easa.europa.eu.int.

3) Japanese Airworthiness Standard Part 3 (ISBN 4-89279-661-1) constitutes the Japanese government transport aircraft airworthiness approval Regulations, and can be obtained from the Civil Aviation Bureau (CAB) of the Ministry of Land, Infrastructure and Transport, Tokyo, Japan, or its website at www.mlit.go.jp/en.

4) The listed FAA documents constitute 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, or its website at www.gpoaccess.gov/ecfr.

5) EUROCAE ED-14G can be obtained from the European Organisation for Civil Aviation Equipment, 102 rue Etienne Dolet, 92240 Malakoff, France, or its website at www.eurocae.eu.

3 Container sizes and identification

3.1 This International Standard specifies the basic requirements for design and operational testing of containers that have the nominal base sizes shown in Table 1.

Table 1 — Sizes

Size code of base in accordance with ISO/PAS 21100	Container base size	
	mm	in
A	2 235 × 3 175	88 × 125
B	2 235 × 2 743	88 × 108
M	2 438 × 3 175	96 × 125

3.2 Maximum container contours shall be determined in accordance with ISO 10046 for the aircraft type(s) where they are intended to be carried. The resulting overall maximum dimensions are shown in Figures 4 to 6 for some of the mostly used container contours able to fit several aircraft types. Many other contours are allowed and present a large variety to adapt to specific aircraft types or aircraft configurations. The maximum contours given for examples only in Figures 4 to 6 are:

— contour A: overall height 2 438 mm (96 in), width 2 337 mm (92 in) (see Figure 4);

— contour D: overall height 2 997 mm (118 in), width 2 438 mm (96 in) (see Figure 5);

— contour Y: overall height 2 083 mm (82 in), width 3 175 mm (125 in) (see Figure 6).

Base size A and M containers with an overall height of 1 625 mm (64 in) or less of contours F, K, P, or U can be loaded on the lower deck and, regardless of their certification status, shall comply with the relevant requirements of ISO 6517 in addition to those of the present International Standard.

3.3 Container types complying with this International Standard are identified according to their ISO/PAS 21100 configuration by a type code composed of three letters[6]:

a) the first letter A denoting a certified aircraft container complying with the performance requirements of ISO/PAS 21100 type 2 or, for units approved prior to 2012, ISO 8097 type II;

b) the second letter denoting the base size, in accordance with ISO/PAS 21100;

c) the third letter denoting the contour determined, in accordance with ISO 10046 (see NOTE).

The identification code shall be prominently marked on two opposite sides of the container (see Clause 6).

EXAMPLE A certified aircraft container (A) of base size 3 175 mm × 2 438 mm (125 in × 96 in) (size M) and of overall height 2 438 mm (96 in) (contour A) shall be designated as AMA.

NOTE The containers type code's third (contour) digit is subject to change to accommodate evolving airline needs. Check the latest yearly edition of IATA Unit Load Devices Regulations Standard Specifications 40/1 and 50/0 Appendix E (see Reference [6] and Reference [7]) for any code changes.

6) The type code is, by industry consensus, under custody of and assigned by International Air Transport Association (IATA), ULD Registrar, 800 Place Victoria, P.O. Box 113, Montréal, Québec H4Z 1M1, Canada, web site www.iata.org. See IATA Standard Specification 40/1 (Reference [6] in Bibliography).