INTERNATIONAL STANDARD

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Non-certified lower-deck containers for air transport — Specification and testing

Conteneurs non certifiés de pont inférieur d'aéronefs — Spécification et essais

Reference number
ISO 4118:1996(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4118 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 4118:1980), which has been technically revised.

Annexes A, B, C, D, E, F, G, H and J form an integral part of this International Standard. Annex K is for information only.

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Introduction

In this International Standard, the minimum essential criteria are expressed by use of the word "shall". Recommended criteria are identified by use of the word "should" and, while not mandatory, are considered to be of primary importance in providing serviceable, economical and practical air transport containers. Deviation from recommended criteria should occur only after careful consideration, extensive testing and thorough service evaluation have shown alternate methods to be satisfactory.

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Non-certified lower-deck containers for air transport — Specification and testing

1 Scope

This International Standard specifies the general design, performance and testing requirements for compartment-restrained lower-deck containers for air transport which do not require airworthiness certification. The basic function of a container is to unitize and contain its load during ground handling and air transportation. Supplementary requirements will be found in the appropriate annexes.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IATA Specification 40/0, *Marking of Unit Load Devices.*[1)]

IATA Specification 40/1, *IATA Identification Code for Unit Load Devices.*[1)]

3 General characteristics

Non-certified lower-deck containers for aircraft shall meet the requirements of this International Standard and those of the manufacturer of the aircraft on which they will be loaded.

Provisions should be made for closing and sealing the container to meet customs clearance and security requirements.

4 Dimensions and ratings

External contours, dimensions and ratings of applicable non-certified containers are shown in table 1.

These dimensions embrace five contours:

Contour C: overall width from 2 337 mm (92 in)

Contour E: overall width from 2 007 mm (79 in)

Contour F: full width (except "U" shape)

Contour N: fork-liftable versions of DKE and DPE containers

Contour P: rectangular

1) IATA Specifications are given in the "ULD Technical Manual", which can be obtained from: Publications Assistant, International Air Transport Association, 2000 Peel Street, Montreal, Quebec, Canada H3A 2R4; or IATA Publications Dept., Route de l'Aéroport 33, PO Box 672, CH-1215 Genève 15 Aéroport, Switzerland.

Table 1 — Ratings and contour dimensions of non-certified containers

Name of container and nominal dimensions	**Rating** (maximum gross weight) [1]	**Contours and external dimensions,** see	**IATA identification code** (according to IATA Specification 40/1)
Half-width contoured container, 2 337 mm (92 in) wide, with base dimensions 1 534 mm × 1 562 mm (60,4 in × 61,5 in)	1 588 kg (3 500 lb)	annex A	DKC
Half-width contoured container, 2 007 mm (79 in) wide, with base dimensions 1 534 mm × 1 562 mm (60,4 in × 61,5 in)	1 588 kg (3 500 lb)	annex B	DKE, DKN
Half-width rectangular container with base dimensions 1 534 mm × 1 562 mm (60,4 in × 61,5 in)	1 588 kg (3 500 lb)	annex C	DKP
Full-width contoured container, 4 064 mm (160 in) wide, with base dimensions 1 534 mm × 3 175 mm (60,4 in × 125 in)	3 175 kg (7 000 lb)	annex D	DLF
Full-width rectangular container with base dimensions 1 534 mm × 3 175 mm (60,4 in × 125 in)	3 175 kg (7 000 lb)	annex E	DLP
Half-width contoured container, 1 562 mm (61,5 in) wide, with base dimensions 1 534 mm × 1 194 mm (60,4 in × 47 in)	1 225 kg (2 700 lb)	annex F	DPE, DPN
Full-width contoured container, 3 175 mm (125 in) wide, with base dimensions 1 534 mm × 2 438 mm (60,4 in × 96 in)	2 449 kg (5 400 lb)	annex G	DQF
Full-width rectangular container with base dimensions 1 534 mm × 2 438 mm (60,4 in × 96 in)	2 449 kg (5 400 lb)	annex H	DQP
Full-width contoured container, 4 064 mm (160 in) wide, with base dimensions 2 235 mm × 3 175 mm (88 in × 125 in)	4 627 kg (10 200 lb)	annex J	DAF

1) Actual maximum gross weight shall conform to each aircraft weight and balance manual.

5 Design requirements

5.1 General

5.1.1 The basic container shall consist of a complete enclosure (base, top, four sides) with access.

5.1.2 The structure shall be designed to provide the maximum usable internal volume available within the limits of structural design, including access closing.

5.1.3 The tare weight of the container shall be a minimum consistent with the requirements and within the limits of sound design practice.

5.1.4 If required, means for fork-lifting the container shall be provided, in accordance with the appropriate annexes.

5.1.5 Stacking capability is not required.

5.1.6 The container shall be designed to prevent the ingress of water, such as might be experienced in heavy driving rain.

5.1.7 Robustness, reliability and maintainability shall be major factors in the design, commensurate with planned service life.

5.1.8 The materials and processes used in the construction shall be capable of withstanding extremely hard usage for a cost-related life. Materials shall be suitably sealed against liquid absorption to ensure no deterioration in strength under normal environmental conditions.

5.1.9 The materials used shall be fire resistant, in accordance with appropriate regulatory requirements.

5.1.10 No surfaces or edges shall present sharp or rough edges potentially injurious to personnel or cargo.

5.1.11 Where the type of material used requires such protection, all components of the container shall be protected against deterioration or loss of strength in service due to weathering, corrosion, abrasion or other causes.

5.2 Base construction

5.2.1 The bottom surface of the base of the container shall be flat and continuous.

5.2.2 The base panel shall be smooth and free from discontinuities or projections which may be a hazard to personnel, cargo, aircraft, ramp and terminal handling equipment. The construction shall be designed for strength and durability to withstand harsh treatment during its planned service life. It shall have a high resistance to impact and wear. Attachment of the base panel to the container box (where these are not of integral construction) shall be by means of fasteners which can be assembled with normal hand tools.

5.2.3 Care shall be exercised in the design and construction of the base to ensure that flatness of the lower surface can be maintained in service and that the base is of adequate strength to minimize bowing.

5.2.4 The base edges, corners and restraint space shall have dimensions as shown in figures 1 and 2.

5.2.5 The base design shall provide for support and ease of movement at the equally distributed rating on minimum conveyor systems, as defined in 5.7.1.

5.2.6 The optional base fork-lift tine entry and separation should be designed so that the base panel of the unit imparts no more than 9 550 N/m^2 $(200\ lbf/ft^2)$ to the supporting conveyor systems.

5.3 Body construction

5.3.1 The sides, roof and access closure shall be of minimum weight to provide maximum stability during ground and airborne handling. Any attachments between the base and container box shall make a minimum intrusion into the base area with no sharp edges or bolt heads. The top of the container shall be self-draining and shall be designed for easy snow clearance.

5.3.2 Access for loading is generally required on one or both longer sides, although positions may vary to suit individual requirements. Loading may be further assisted by providing access through the roof panel.

5.3.3 Two handles, straps or hand holds shall be provided on each door for handling the door and for manual movement of the container. These devices shall be capable of withstanding a 445 daN (1 000 lbf) pull in any direction.

Each device shall provide an area equivalent to 152 mm (6 in) wide by 76 mm (3 in) deep for gripping with a gloved hand.

They shall be designed so that they cannot cause damage to adjacent units.

5.3.4 A minimum vent area of 5 cm^2 per cubic metre (0,02 in^2 per cubic foot) of the container internal volume shall be provided if the door seal venting area is not sufficient. This vent area shall be adequately protected from cargo load shift to ensure that the minimum area is maintained during emergency operations.

5.3.5 For rapid decompression in the event of an aircraft emergency, the container shall include a minimum vent area of 100 cm^2 per cubic metre (0,45 in^2 per cubic foot) of container internal volume, to become open in a duration of less than 0,2 s when submitted to a maximum pressure differential of 14 kPa $(2,0\ lb/in^2)$ from inside.

5.4 Access closures

5.4.1 Closures shall be designed to avoid finger-pinching hazards and shall be of sufficient strength to contain the load during air and ground transportation.

5.4.2 The access closures shall have a minimum number of securing devices to sustain the handling of loads at rating without unlocking. These devices are required to secure the access closures in the closed position. They should be so located that they cannot damage, or become damaged by, adjacent containers. No tools shall be required to operate the closures or the securing devices.

5.4.3 There shall be a device for the safe retention of access closures in the open position.

5.5 Tie-down fittings

Provision may be made for internal securing of the load, such as ring tie-down fittings, these being preferably attached to the base at the corners. Each tie-down fitting shall be capable of supporting a 907 kg (2 000 lb) load in any direction.

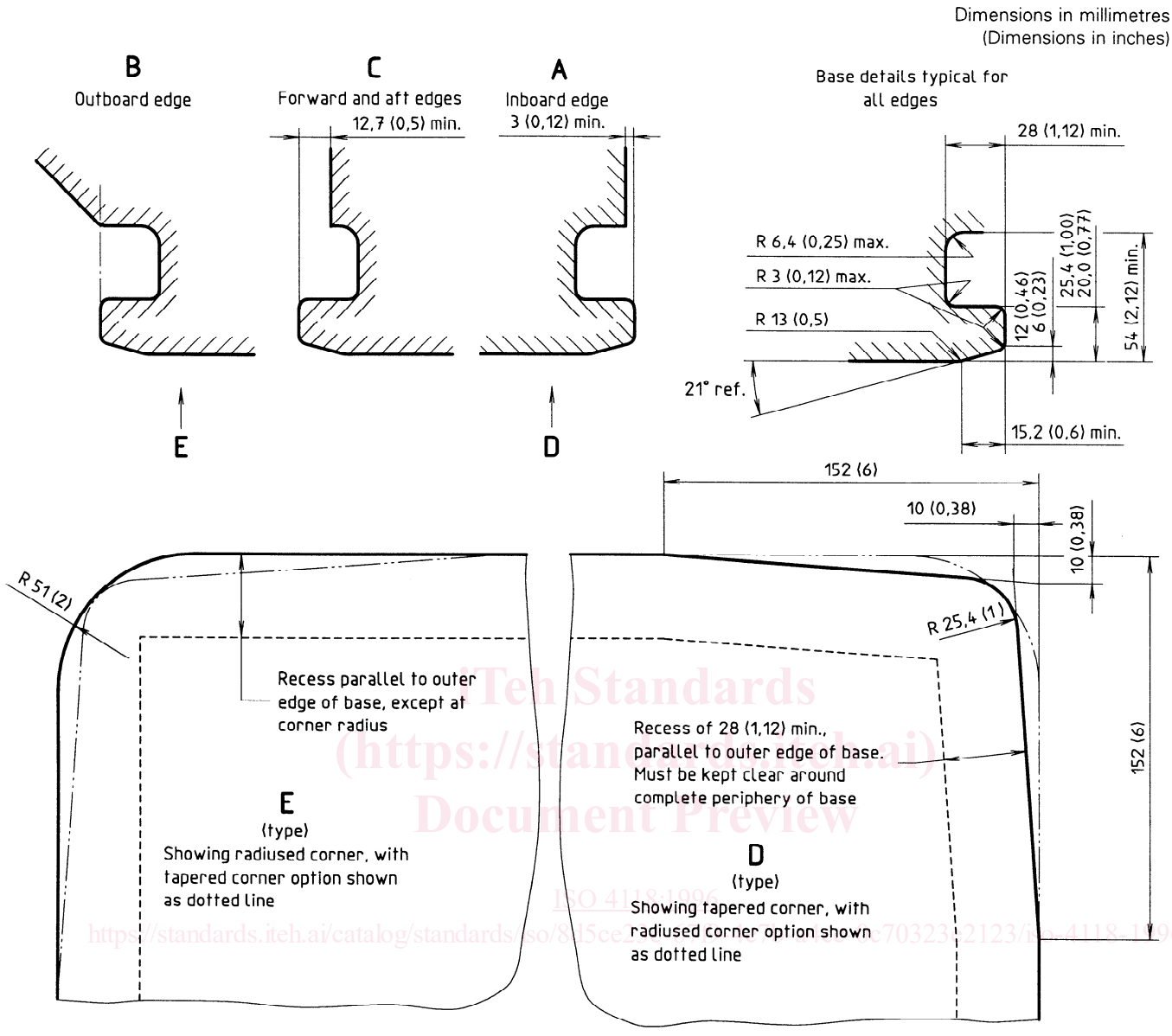

Figure 1 — Details of the container base — Option A

5.6 Placard holders

5.6.1 One or more placard holders to accept destination placards of standard size A5 [210 mm × 148 mm (8 1/4 in × 5 7/8 in)] shall be provided. The upper edge of the holder shall not be more than 1 020 mm (40 in) from the bottom of the base.

5.6.2 It is suggested that the placard holder should have the alternative capability of being used as a board for chalk or grease-pencil markings.

5.7 Operational criteria

5.7.1 Container conveyor systems

Containers should be designed to be stored upon, and manoeuvred over, conveyor surfaces consisting of rollers, inverted casters, ball-transfer units or other devices.

Typically, the units will support the container on:

a) rollers, at a pitch of up to 305 mm (12 in), in two or more rows (according to roller length), and providing support over approximately 20 % of the width of the container; or

Dimensions in millimetres
(Dimensions in inches)

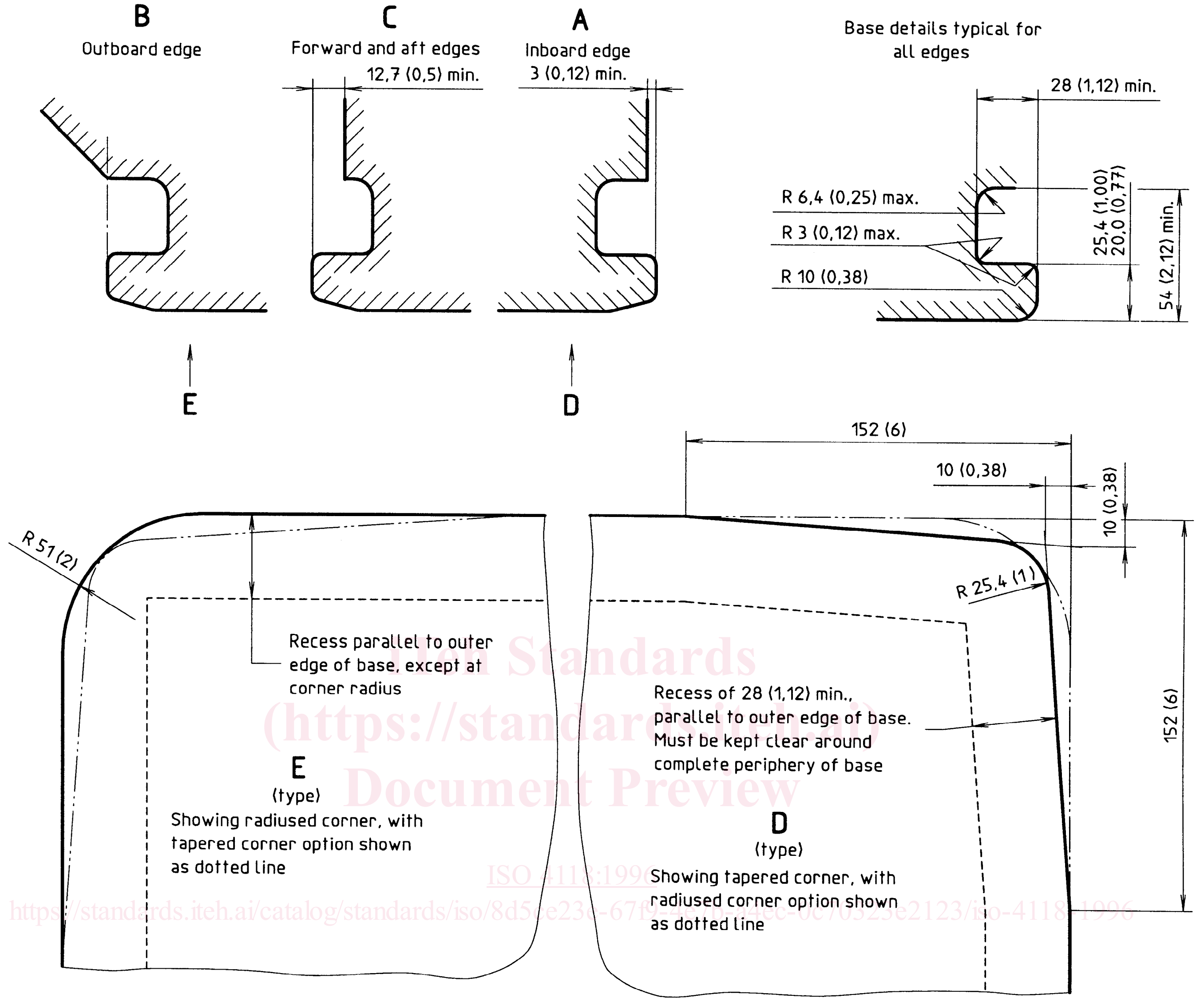

Figure 2 — Details of container base — Option B

b) inverted casters fitted on a grid pattern of approximately 305 mm × 305 mm (12 in × 12 in), according to the width, diameter and design of the caster wheels; or

c) ball-transfer units fitted on a grid pattern of at least 127 mm × 127 mm (5 in × 5 in), according to the diameter of the ball units which may vary from 25 mm (1 in) to 102 mm (4 in).

5.7.2 Bridging and cresting

The container loaded to its rating shall be capable of traversing from one item of handling equipment to another when there exists a height difference up to 152 mm (6 in) at the junction.

5.7.3 Atmospheric conditions

Insofar as atmospheric conditions may affect the performance of the container or any part thereof, it should be taken into account that during air transportation, temperatures range from – 55 °C to + 70 °C (– 65 °F to +160 °F) with relative humidity which varies from 20 % to 85 %. These are the mean temperature and humidity figures worldwide and do not take into account extremes in temperature such as those experienced in arctic, sub-polar or desert regions.

Exposure to these temperatures and relative humidities, however, is not a test requirement.

5.8 Additional design options

The following may be added as design options required by a particular airline or shipper:

a) the capability of the container to be disassembled and its components stacked;

b) component and sub-assembly interchangeability;

c) shelf capability.

6 Impact test

6.1 Procedure

The container, loaded to its maximum gross weight, with its centre of gravity at a height of at least 864 mm (34 in), shall be impacted at the base of the unit at the rate of 0,3 m/s (1 ft/s) against a vertical rigid solid bar 51 mm (2 in) high. The maximum length of the base of the unit is to be tested.

The container shall be impacted against the stop 50 times. About a quarter of these impacts shall be initiated with the container moving at an angle 15° offset to the leading edge in the direction of travel, and an additional quarter of these impacts shall be on the other corner.

6.2 Test requirements

On the completion of these tests, the container shall not discharge its contents, nor exhibit a permanent set in excess of 19 mm (0,75 in). The tests shall be repeated equally on each of the four base edges. Measurements shall be made after each test cumulatively.

7 Marking

7.1 All containers covered by this International Standard shall be classified by their IATA identification coding system (see table 1) and marked at the top of the outboard and inboard edges and, optionally, on both sides of the container in accordance with IATA Specifications 40/0 and 40/1.

7.2 The following additional manufacturer's marking shall be indicated on the container. The positioning of such markings is optional. The letters and numbers shall not be less than 4,83 mm (0,19 in) high.

Manufacturer: .....
(Name and country)
Part number: .....