INTERNATIONAL STANDARD

ISO 6968

Third edition
2005-11-15

Aircraft ground equipment — Lower deck loader — Functional requirements

Matériel au sol pour aéronefs — Chargeur de pont inférieur — Exigences fonctionnelles

Reference number
ISO 6968:2005(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 6968 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

This third edition cancels and replaces the second edition (ISO 6968:1994), which has been technically revised.

Introduction

This International Standard specifies the functional requirements to be taken into account by manufacturers for the design of aircraft lower deck cargo container and pallet loaders.

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 aircraft lower deck loaders. Deviation from recommended criteria should only occur after careful consideration and thorough service evaluation have shown alternative methods to provide an equivalent level of safety.

Aircraft ground equipment — Lower deck loader — Functional requirements

1 Scope

This International Standard specifies the functional requirements for a self-propelled loader capable of raising air cargo unit load devices (ULDs) with base dimensions and maximum mass as follows:

Table 1 — Base dimensions and maximum mass

ULD type	ISO 8097:2001 base size code	Length mm (in)	Width mm (in)	Maximum gross mass kg (lb)
Pallets	A	3 175 (125)	2 235 (88)	6 804 (15 000)
	B	2 743 (108)	2 235 (88)	4 536 (10 000)
	M	3 175 (125)	2 438 (96)	6 804 (15 000)
Containers	K [a, c]	1 562 (61,5) to 2 337 (92)	1 534 (60,4)	1 588 (3 500)
	L [b]	3 175 (125) to 4 724 (186)	1 534 (60,4)	3 175 (7 000)

[a] Half size container: base size 1 562 mm × 1 534 mm (61,5 in × 60,4 in).

[b] Full size container: base size 3 175 mm × 1 534 mm (125 in × 60,4 in). Smaller size containers such as sizes “P”, “Q”, and “N” can also be loaded.

[c] For contoured containers having lengthwise overhangs from the ULD base edges, the value of the overhang may vary from 368 mm (14,5 in) to 775 mm (30,5 in) according to the type of container. Examples of contoured ULD overhang values “X”: AKC: 775 mm (30,5 in), AKE: 445 mm (17,5 in). AKC and AKE are IATA ULD codes (refer to IATA ULD Technical Manual 40/1, see Bibliography).

This International Standard does not intend to provide all the design requirements applicable for aircraft lower deck loaders. Other requirements can be found in separate International Standards:

— ISO 4116 specifies the additional requirements applicable for conveying surfaces of those pieces of aircraft ground support equipment intended for handling and loading of baggage and cargo unit load devices;

— ISO 6966-1 and ISO 6966-2 specify, respectively, the general and safety-related requirements applicable to all aircraft ground support equipment.

The requirements of this International Standard were determined based on generally recognized assumptions with regard to

a) the normally intended use of aircraft ground support equipment, when used on the ramp of international civil airports in order to handle, service or maintain civil transport aircraft;

b) the environmental (surface, slope, weather, lighting, operating rules, staff qualification, etc.) conditions prevailing on the ramp area of the majority of international civil airports.

It is assumed the manufacturers of aircraft lower deck loaders define in the relevant documentation the specifically intended conditions of use and environment for each item of equipment, and the purchasers systematically review their own specific conditions of use and environment in order to determine whether those stated are adequate, or negotiate with the manufacturer appropriate modifications to ensure they are.

2 Normative references

The following referenced documents are indispensable for the application 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 4116, *Air cargo equipment — Ground equipment requirements for compatibility with aircraft unit load devices*.

ISO 6966-1, *Aircraft ground equipment — Basic requirements — Part 1: General design requirements*

ISO 6966-2, *Aircraft ground equipment — Basic requirements — Part 2: Safety requirements*

ISO 7000, *Graphical symbols for use on equipment — Index and synopsis*

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

ISO 11995:1996, *Aircraft — Stability requirements for loading and servicing equipment*

3 Requirements

3.1 General

3.1.1 On an adequate chassis, the loader shall provide two platforms:

a) a front platform capable of operating between 1 880 mm (74 in) and 3 550 mm (140 in), which is positioned at the applicable aircraft door and remains at this position during the loading/unloading operation;

b) a main platform for up and down movement between 483 mm (19 in) and 3 550 mm (140 in).

3.1.2 The overall dimensions of the loader shall be kept to a minimum.

3.1.3 The overall height of the entire loader should not exceed 3 000 mm (118 in) when being driven. The height of the front platform (top of rollers) shall not exceed 1 880 mm (74 in) in the fully down position.

3.1.4 Both platforms shall be capable of supporting and conveying their maximum capacity simultaneously.

3.1.5 When negotiating two ramps that intersect at 3° (5 %), the loader shall have adequate underneath clearance from any portion of the equipment to the ground.

3.1.6 The loader shall not interfere with the positioning of the aircraft tractor below the fuselage of the aircraft.

3.1.7 The overall dimension of the front platform shall accept one 2 438 mm × 3 125 mm (96 in × 125 in) pallet lengthwise.

3.1.8 The length of the main platform shall be adequate to accept two half-size containers or one full-size ULD lengthwise.

3.1.9 The width of both platforms shall be adequate to accept a ULD with its 2 438 mm (96 in) dimension across the platforms.

3.1.10 At its right hand side, the forward end of the front platform shall have provisions to accommodate 1 780 mm (70 in) wide container hold doors. These provisions may either consist of a retractable extension to the front platform, or be met by a front platform of adjustable width.

3.1.11 Several aircraft have flap track fairings which project from the trailing edge of the wing. If the loader, owing to its overall width, has to pass under the wing for approach to or removal from the rear lower deck compartment, the height of any portion likely to pass under the flap track fairings shall, for safety reasons, not exceed 2 800 mm (110 in). Installations, if any, extending beyond this limit shall be foldable or retractable.

3.1.12 The front platform shall be adjustable to changes in aircraft attitude with an accuracy of

a) ± 2,0° in pitch;

b) 6,4 mm (0,25 in) in height.

3.1.13 The front platform shall be designed not to interfere with the opening and closing of the aircraft doors. All component parts that may come into contact with the aircraft should be covered with a protective material, e.g. rubber "D" section. (See SAE AIR 1558 in the Bibliography.)

3.1.14 The front platform shall be accessible from the ground at all times.

3.1.15 Platform safety supports for maintenance purposes shall be provided.

3.1.16 Guard rails shall be fitted to both sides of the front platform and shall have a minimum height of 1 000 mm (40 in). These rails shall be adjustable to close the gap between the loader and the aircraft.

3.1.17 The loader's design shall meet all applicable requirements of ISO 6966-1 and ISO 6966-2.

3.2 Guide rails and stops

3.2.1 Removable, fixed or retractable guide rails shall be provided on the front and main platforms to allow loading/unloading of the following ULD widths:

— 1 534 mm (60,4 in);

— 2 235 mm (88 in);

— 2 438 mm (96 in).

3.2.2 On the front platform, side guide rails shall be located along the whole length of both sides to guide long loads into the aircraft. The guide rails shall be adjustable either manually or mechanically so that the load is aligned with the appropriate in-aircraft guides.

3.2.3 On the main platform, side guide rails shall be located 2 438 mm (96 in) + 25 mm to 50 mm (1 in to 2 in) clearance apart along the full length of both sides of the main platform. The guide rails shall be able to operate independently, and shall automatically arise when the platform is raised above 559 mm (22 in) from the ground and shall remain in this position.

When the main platform is being lowered and reaches the height of 1 520 mm (60 in) from the ground, it shall be possible for the operator to control the retraction of the guide rails by continuous intentional action. Should this action cease, the guides shall automatically arise.

For loaders with ULD rotation capability (see 4.5), the guide rails shall be able to be operated independently and/or simultaneously, and shall automatically arise when the main platform starts moving upward and remain in this position.

3.2.4 Automatic ULD stops shall be provided as follows:

a) front platform:

At the end adjacent to the main platform. These stops shall arise at the moment the main platform starts moving down and shall retract when the upcoming main platform is level with the front platform.

b) main platform:

At both ends. The rear stops shall automatically retract when the platform reaches a fully down position and arise when the platform rises. The stops at the end adjacent to the front platform shall retract when the platform lines up with the front platform, and shall arise at the moment the main platform starts moving down and remain raised in the down position. Location of these stops shall take into account the container overhang given in Table 1. A minimum clearance of 50 mm (2 in) plus "X" from the forward end of structures should be considered**.**

3.2.5 All fixed or removable guide rails shall have a minimum height of 100 mm (4 in). Retractable guide rails and stops shall have a height of not less than 50 mm (2 in).

3.3 Conveyor surface

3.3.1 The surface of the front platform shall allow for adjusting lateral movement of the ULDs.

3.3.2 The loader shall be designed for powered end and side loading of ULDs.

3.3.3 The powered system shall be able to drive ULDs at a speed of approximately 0,3 m/s (60 ft/min).

3.3.4 It shall not be possible to transfer the loaded ULDs from either platform when the stops are not properly operating.

3.3.5 The platforms conveying surfaces shall meet all applicable requirements of ISO 4116.

3.4 Platform operation and loading

3.4.1 It shall be possible to adjust the position of the ULD in a lateral direction on the front platform.

3.4.2 Platform elevating systems shall be able to hold both platforms at maximum height with full specified continuous lift capacity with no noticeable height decrease for 30 min, with and without the engine running.

3.4.3 Both the front and main platform elevating mechanisms shall incorporate safety features to prevent sudden collapse in the event of system failure.

3.4.4 The operator shall be able to open and close aircraft doors from the loader.

3.4.5 The time taken for the main platform to reach maximum height from the lowered position and vice versa, i.e. one complete cycle, shall be less than 35 s.

3.4.6 It shall not be possible to alter the height of either platform while ULDs are bridging the platform.

3.5 Mobility and stability

3.5.1 The loader shall be capable of being driven at speeds up to 16 km/h (10 mile/h) for at least 3 km (2 mile). The loader does not require the capability of being driven when loaded.

3.5.2 Power steering shall be provided.

3.5.3 The unloaded loader shall be capable of starting from rest up a 3° (5 %) incline under its own power.

3.5.4 The loader shall be capable of turning with a swept radius of less than 12,2 m (40 ft).

3.5.5 For final positioning at the aircraft door, driving at a slow, positive, non-jerking speed shall be possible.

3.5.6 In order to provide the stability required for loading/unloading operations and to unload the wheel axles, power operated stabilizers shall be installed.

3.5.7 The loader shall meet the stability objectives of ISO 11995:1996, Clause 4.

3.5.8 It shall not be possible

a) to activate the transfer system and to raise the main platform from the full down position if the stabilizers are not extended,

b) to drive the loader when the stabilizers are extended,

c) for stabilizers to collapse in the case of system failure.

3.6 Controls

3.6.1 All controls necessary to move and position the loader shall be located at the driver's position.

3.6.2 To allow control of both platforms and complete loading/unloading processes from the front platform, an electrical control panel shall be provided. This should be located adjacent to the right-hand side of the front platform, thus allowing simultaneous operation of the aircraft and loader controls.

3.6.3 Ample lighting is required to illuminate the platforms and close surroundings for night operations.

3.6.4 Normal system warning and indicator lights shall be provided.

3.6.5 All controls shall be identified, preferably by pictograms in accordance with ISO 7000. The layout of the controls on the control panels should be in accordance with IATA AHM 915 Section 2 (see [17] in the Bibliography).

NOTE Graphical symbols for use on aircraft ground equipment will form the subject of a future International Standard (ISO 11532).

3.7 Emergency

3.7.1 The loader shall be capable of being towed away from an aircraft without its own power. When required, it shall be capable of being steered under these conditions.

3.7.2 Emergency recovery facilities, e.g. platform lowering, brake release and raising of stabilizers, shall be provided.

3.7.3 Emergency stop controls shall be installed. They shall be accessible both from the driver's and/or operator's position, and from ground level.

4 Options

4.1 Front platform automatic height and roll control system to compensate for the changes in aircraft attitude. This may be accomplished by a sensing device or by physical contact of the aircraft.

4.2 Automatic audible device and/or flashing personnel warning light for movement of the main platform.

4.3 Lateral movement of the ULD by means of a powered system on the front platform.