
**Aircraft ground equipment — Upper deck
loader — Functional requirements**

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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.

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 27471 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

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Aircraft ground equipment — Upper deck loader — Functional requirements

1 Scope

This International Standard specifies the functional and performance requirements for a self-propelled container/pallet loader capable of raising air cargo unit load devices (ULDs) to the upper deck of very large capacity freighter (VLCF) aircraft and also to the main deck of any main-line freighter aircraft.

This International Standard does not intend to provide all the design requirements applicable for aircraft upper-deck loaders. Other requirements can be found in separate standards which are also applicable:

- ISO 4116 specifies the additional requirements applicable for conveying surfaces of aircraft ground support equipment intended for handling and loading of baggage and cargo ULDs;
- 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 as 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, traffic infrastructure, staff qualification, etc.) conditions prevailing on the ramp area of the majority of international civil airports.

It is assumed that the manufacturers of aircraft upper-deck loaders define in the relevant documentation the specifically intended conditions of use and environment for each model, and that 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.

This International Standard does not specify requirements applicable to:

- any adapters or ancillary/supplemental equipment additions to in-service main-deck loaders in order to allow their occasional upper-deck use;
- any main-deck loaders fitted with optional access to upper-deck height of the front platform only (ISO 6967:2006, 4.8).

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 — Registered symbols*

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

ISO 11532, *Aircraft ground equipment — Graphical symbols*

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

ISO 14122-3, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 cycle time

<loader> time elapsed between the moment the loader reaches any reference position (e.g. ground level) and the next moment it reaches the same position, after transferring a full complement of unit load devices (ULDs) on the ground level, raising, transferring the ULDs to the aircraft, and coming down again

NOTE 1 Cycle time depends on loader performance.

NOTE 2 The addition of the necessary loader cycles constitutes the (offloading and loading) aircraft turnaround time.

3.2 cycle time

<unit load device (ULD)> loader cycle time divided by the number of ULDs carried in one cycle

NOTE 1 ULD cycle time represents the mean time to load or offload a ULD into or from the aircraft.

NOTE 2 ULD cycle time depends on both loader performance and size.

3.3 lower deck

lowest deck of either a two-deck or a three-deck very large capacity (VLCA) main-line aircraft

3.4 main deck

the highest deck of a two-deck main-line aircraft, or the intermediate deck of a three-deck very large capacity aircraft (VLCA)

3.5 main-line aircraft

civil passenger and/or freight transport aircraft with a maximum ramp mass over 50 000 kg (110 000 lb)

3.6 turnaround time

<aircraft loading> total elapsed time between the moment a fully loaded aircraft starts being offloaded and the moment it is fully loaded again

NOTE Turnaround time constitutes the primary economic objective of the operating airline.

3.7 unit load device ULD

device for grouping, transferring and restraining cargo for transit

NOTE A ULD may consist of a pallet with a net or it may be a container.

3.8 upper deck

highest deck of a three-deck very large capacity aircraft (VLCA)