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Aircraft ground equipment — Basic requirements —

Part 1: General design requirements

Matériel au sol pour aéronefs — Exigences de base —

Partie 1: Exigences générales de conception

Reference number
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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 6966-1 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

This first edition of ISO 6966-1, together with ISO 6966-2, cancels and replaces ISO 6966:1993, which has been technically revised.

ISO 6966 consists of the following parts, under the general title *Aircraft ground equipment — Basic requirements*:

— *Part 1: General design requirements*

— *Part 2: Safety requirements*

Introduction

This part of ISO 6966 specifies the general requirements to be taken into account by manufacturers for the design of aircraft ground support equipment. It identifies the various concerns to be taken into consideration to ensure ground equipment presents the appropriate general design characteristics.

Throughout this part of ISO 6966, 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 ground support equipment. Deviation from recommended criteria should only occur after careful consideration and thorough service evaluation have shown alternative methods to provide equivalent equipment.

Aircraft ground equipment — Basic requirements —

Part 1: General design requirements

IMPORTANT — In most countries, standing government health and safety laws and regulations apply to machinery, implicitly or explicitly including aircraft ground support equipment. Nothing in this International Standard, however, shall be deemed or otherwise used to supersede any locally applicable law or regulation, unless a specific exemption has been obtained for this purpose from the appropriate authority.

1 Scope

This part of ISO 6966 specifies the minimum general design requirements applicable to aircraft ground support equipment, as defined in 3.1, in order to ensure

a) definition of aircraft ground support equipment general requirements for designers;

b) effective operation of aircraft ground support equipment.

The requirements of this part of ISO 6966 apply to any piece of aircraft ground support equipment, as defined in 3.1, used on airports.

NOTE An informative list of the most commonly used pieces of ground equipment is provided in Annex B.

This part of ISO 6966 does not provide all the design requirements applicable for aircraft ground support equipment. Other requirements apply, and can be found in separate standards:

— ISO 6966-2 specifies the safety-related requirements applicable to all aircraft ground support equipment;

— 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 (ULDs);

NOTE In addition, guidelines for efficiency of conveying surfaces of ground support equipment used to handle air cargo ULDs are provided in Annex A.

— specific standards, listed in the Bibliography, define the functional and performance requirements for certain types of aircraft ground support equipment.

This part of ISO 6966 does not apply to unmodified general-use transportation vehicles such as automobiles, vans, buses and flat-bed trucks when used on airports.

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 2328, *Fork-lift trucks — Hook-on type fork arms and fork arm carriages — Mounting dimensions*

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

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

3 Terms and definitions

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

3.1
aircraft ground support equipment
GSE
ground equipment
ramp equipment
any piece of mobile equipment, whether or not powered or self-propelled, purpose designed, built and used for ground handling, servicing or field maintenance of civil transport aircraft on the ramp area of an airport

NOTE A non-comprehensive informative list of the most commonly used pieces of ground equipment is provided in Annex B.

3.2
booted foot
foot of an operator, appropriately sheathed for protection from occupational hazards and weather conditions

3.3
dead man type control
control design such that continuous deliberate pressure on the control is necessary for activation, and such that release of that pressure will cause control deactivation

3.4
elevated working surface
any working platform or area, located 1,2 m (4 ft) or more higher than the ground or a lower working surface, on or in which an employee may be located in the performance of his/her working duties

3.5
functional
capable of effectively servicing the purpose for which it was designed

3.6
gloved hand
hand of an operator, appropriately sheathed for dexterity and protection from occupational hazards and weather conditions

3.7
guardrail
barrier erected along the exposed edges of an elevated work surface to prevent the fall of persons

3.8
handrail
member supported alongside a stairway to provide persons with a handhold

3.9
highway usage
operation of equipment on a public street or road such that national motor vehicle licensing of the vehicle is required

3.10
hydrostatic drive
vehicle transmission where hydraulic fluid, pumped by a hydraulic pump powered by an engine or electric motor, is directly fed to a hydraulic motor on the driven axle or wheels, then directly returns to the pump instead of going through a reservoir

3.11
ramp area
apron GB
zone of an airport where aircraft manœuvre and park for ground handling purposes

3.12
ramp
apron GB
tarmac US
surface of the ground in the ramp area

3.13
riser
vertical distance from the top of one tread to the top of the next higher tread in a stair or steps

3.14
rung
ladder cross-member for use as a horizontal foothold and handhold

3.15
slope
⟨ramp⟩ local angle of the ramp surface with the horizontal plane, expressed in degrees or slope percentage

3.16
stability
ability to remain in the same position and attitude

3.17
step
horizontal flat surface of a stair, ladder, or single foothold between two levels, capable of accepting a work load

3.18
step width
distance between the handrails of a stair or ladder, inside to inside

3.19
toe board
vertical barrier erected along exposed edges of elevated work surfaces to prevent materials from falling

3.20
tread depth
horizontal distance on a step, measured from the front tread edge to the riser or rear edge of the tread

3.21
unit
any single piece of equipment; or a coupled equipment set

3.22
vehicle
any piece of mobile aircraft ground equipment which is self-propelled and capable of carrying the operator

4 Materials

4.1 Materials shall be selected from those which experience and/or tests have demonstrated to be suitable and dependable for use on aircraft ground handling equipment.

4.2 Materials used shall be corrosion-resistant and protected by plating or other surface treatment, e.g. to resist the action of de-icing and hydraulic fluids.

4.3 Whenever possible, standard commercially available components shall be used.

4.4 The use of materials, design and manufacturing processes shall conform with the applicable national codes of practice.

5 Workmanship

5.1 Workmanship and methods of fabrication shall be of a high standard.

5.2 Consideration should be given to using an appropriate manufacturing quality system for this purpose.

6 Characteristics

6.1 General

6.1.1 Considerable importance is attached to having equipment into which the essential safety aspects have been incorporated as part of the basic design. It is particularly necessary when designing aircraft handling equipment to take into account the adverse conditions which frequently prevail in ramp areas, e.g. congested vehicle movement, exposure to weather, jet blast, night operation, noise from aircraft and other vehicles, and difficult communications.

6.1.2 All equipment shall meet the applicable safety requirements of ISO 6966-2.

NOTE For intended operation in Europe, additional EU Machinery Directive requirements also apply. They can be met by complying with the requirements of the following European standards.

EN 1915-1, *Aircraft ground support equipment — General requirements — Part 1: Basic safety requirements*

EN 1915-2, *Aircraft ground support equipment — General requirements — Part 2: Stability and strength requirements, calculations and test methods*

EN 1915-3, *Aircraft ground support equipment — General requirements — Part 3: Vibration measurement methods and reduction*

EN 1915-4, *Aircraft ground support equipment — General requirements — Part 4: Noise measurement methods and reduction*

6.2 Mobility

6.2.1 Any vehicle shall be manœuvrable on ice and snow, and the driving wheels should have sufficient clearance to permit installation and use of tyre chains.

6.2.2 The equipment shall be capable of operating or moving in the following conditions:

a) for operation and stability purposes, a ramp slope up to 1,5° (2,5 %);

b) for mobility purposes, a roadway slope up to 3° (5 %).

NOTE Roadway slope applicable to ramp tractors, carts and dollies can increase up to 5° (8,7 %) for access to underground baggage sorting areas at some airport terminals, to be specified by the purchaser.

6.2.3 Means shall be provided to tow a stalled vehicle clear of an aircraft.

6.2.4 Hydraulic valves and electrical circuits shall be provided with a bypass system for manual emergency operation in case of failure.

6.2.5 Vehicle speeds shall not exceed the values in Table 1 according to tyre types and suspension fitted.

Table 1 — Transport speeds

Suspension type	Tyre type							
	Solid metal		Solid rubber		Zero pressure [a]		Pneumatic	
	$km \cdot h^{-1}$	$mile \cdot h^{-1}$	$km \cdot h^{-1}$	$mile \cdot h^{-1}$	$km \cdot h^{-1}$	$mile \cdot h^{-1}$	$km \cdot h^{-1}$	$mile \cdot h^{-1}$
Unsprung	8	5	16	10	24	15	32	20
Sprung	—	—	24	15	32	20	Road speed if required	

[a] Cushion-type solid rubber tyres of pneumatic configuration.

6.2.6 The fuel tank(s) (gasoline, diesel or liquid propane gas) capacity shall be sufficient for at least eight hours continuous operation. Operating time requirements for electrically driven units are to be determined by the purchaser.

6.3 Structure

6.3.1 All threaded fasteners shall be prevented from becoming loose and/or lost from the unit.

6.3.2 Parts requiring removal for replacement, service, or maintenance shall be fastened with removable fasteners or latching devices.

6.3.3 The minimum ground clearance of the fully laden equipment shall be as follows:

a) 127 mm (5 in) at any point of the equipment's undersurface, when it sits on a flat and horizontal ground;

b) in addition, the equipment shall be able to transverse two surfaces intersecting at a minimum angle of 3° (5 %) as per 6.2.2, either in bridging or in cresting, while retaining positive clearance at any point.

Where this is not achievable for a given type of equipment, steps shall be taken to maximize ground clearance so that it is as close as possible to objectives a) and b) above.

6.3.4 Water traps and gullies permitting dirt to collect shall be avoided. Where this is not practical, adequate drainage shall be provided.

6.3.5 Vibration shall be kept to a minimum and shall have no adverse effect on the unit or the operator.

6.4 Miscellaneous equipment

6.4.1 General

Miscellaneous equipment, when installed, shall comply with the indicated standards.

6.4.2 Towing interface

6.4.2.1 The tow bar shall be attached in as horizontal a position as possible during towing.

6.4.2.2 The attachment shall provide a maximum available tow-bar rotation angle, in order to reach a minimum turn radius.

6.4.2.3 The tow-bar attachment shall be designed for maximum protection against accidental disengagement of the towing hardware when the vehicles are moving.

6.4.2.4 Where installed as part of the basic equipment function(s), towing devices shall provide at least two nominal heights of tow-bar attachment [standard heights 300 mm (11,8 in) and 400 mm (15,7 in)].

NOTE Details can be found in IATA AHM 916 (Bibliography item [23]). Towing interfaces not part of the basic equipment function (e.g. emergency towing) can, insofar as practical, also use one of the two defined standard heights.

6.4.2.5 The tow-bar interface devices shall be of the annular eye type. The minimum eye internal dimension should be 40 mm (1,6 in).

NOTE Towing attachments and tow-bar interface device details can be found in IATA AHM 916 (Bibliography item [23]).

6.4.3 Forklift tineways

Forklift tineways (pockets), if provided on equipment, shall meet the requirements of ISO 2328.

NOTE Dimensions and spacing details according to the size of the equipment can be found in IATA AHM 912 (Bibliography item [20]).

6.5 Systems

6.5.1 Hydraulic system

6.5.1.1 All pipe lines shall be coded with markings for ease of repair and maintenance.

6.5.1.2 All fittings, lines and components shall be located to provide maximum accessibility, consistent with good design practice, to attain ease of maintenance.

6.5.1.3 Relief valves shall be installed in all systems to protect against pressures in excess of rated working pressure of each system component.

6.5.1.4 System pressures shall be kept as low as possible, consistent with practical and economic design.

6.5.1.5 All pipes and lines shall be routed so that they do not pass over or adjacent to any components which could cause a fire in the event of a pipe failure. If this is not possible because of design considerations, an adequate heat shield shall be provided between the pipe and the heat source.

6.5.2 Electrical system

6.5.2.1 Wiring shall be grouped in cable or harness form and shall be routed to provide maximum protection from abrasion, road splash, grease, hydraulic fluid, oil, fuel and excessive heat.

6.5.2.2 All electrical fittings, wiring and components shall be easily accessible.

6.5.2.3 All wiring shall be coded with markings for ease of repair and maintenance.

6.5.2.4 Electrical buttons, switches, etc. shall be suitably waterproofed.

6.5.2.5 Electric shock hazards shall be placarded and minimized by the provision of suitable interlocks, grounding means, or other protective devices.

6.6 Vehicle markings

6.6.1 Equipment limitations shall be clearly and permanently marked on the vehicle.

6.6.2 The tank filler caps shall be of the following colours:

a) red for gasoline;

b) green for diesel fuel;

c) white for water and coolant;

d) yellow for oil and lubricants;

e) yellow with a blue strip for hydraulic fluid.

NOTE Details can be found in SAE ARP 1247 (Bibliography item [16]).

6.6.3 An engraved manufacturer's data plate showing at least the equipment's fabrication date, designation and serial number shall be provided.

6.7 Conveyor systems

6.7.1 All conveying surfaces of ULDs shall meet the applicable requirements of ISO 4116 and 6.7.2 to 6.7.9.

6.7.2 All walkways, beams, and other structures shall be at least 13 mm (0,5 in) below the top of the conveying surface.

6.7.3 Unless specifically exempted by the ULD configuration, the guide rails and end stops shall extend at least 100 mm (4 in) above the conveying surface.

6.7.4 For lower-deck container handling equipment, the vertical restraint stop(s) shall extend 51 mm (2 in) above the conveying surface.

6.7.5 Where vertical restraint lips are provided, they shall extend not more than 25 mm (1,0 in) and not less than 22 mm (0,875 in) horizontally over the conveying surface.

6.7.6 The vertical restraint member shall measure at least 38 mm (1,5 in) to the underside of the restraint member and shall not extend more than 51 mm (2 in) to the top of the restraint member from the top of the conveying surface.

6.7.7 Safety interlocking systems shall be provided to prevent powered load transfer when a stop or guide rail is unintentionally retracted.

6.7.8 The mechanical efficiency of powered or non-powered monodirectional conveyorized surfaces (such as roller beds) used to move ULDs should be in excess of 98 % when measured at maximum allowable load, on a horizontal surface and in a good equipment condition (see Annex A).

6.7.9 The mechanical efficiency of powered or non-powered multidirectional conveyorized surfaces (such as caster beds or ball mats) used to move ULDs should be in excess of 96 % when measured at maximum allowable load, on a horizontal surface and in a good equipment condition (see Annex A).

6.8 Environment and weather protection

6.8.1 The vehicles shall be designed and constructed so as to allow unrestricted use in all climates with the minimum of modifications. The unit shall have provisions to easily adapt to temperature variations ranging from – 40 °C to +60 °C (– 40 °F to +140 °F) and humidity of up to 100 %. Consideration shall be given to ambient temperature variations, rain and freezing precipitation, dust, salt/sea air and reasonable variations in atmospheric pressure.

6.8.2 Instruments and controls exposed to the weather shall be of a weatherproof type and shall be protected from snow and ice accumulation.

6.8.3 The unit shall be capable of being operated by day and night.

6.8.4 The noise level shall be kept to a minimum but shall not exceed 85 dBA at a distance of 4,6 m (15 ft) from the perimeter of the vehicle and 1,5 m (5 ft) above the ground.

NOTE Details of noise level measurement methods can be found in SAE ARP 1801 and EN 1915-4 (Bibliography items [17] and [27]).

6.9 Illumination

6.9.1 Motorized self-propelled vehicles shall be equipped with a minimum of two headlights and two combination stop/tail lights.

6.9.2 All instruments and control panels exclusive of driving control panels shall be lit to a level of 50 lx (5 fc) of illumination, and shall not produce a glare to the operator.

6.10 Maintenance

6.10.1 The equipment, components and systems should be designed to cover a minimum of 200 operating hours between two consecutive maintenance periods. The time between consecutive maintenance periods may be shorter if no commercially available part can achieve the recommended maintenance performance. Servicing of fuel, oil, tyre pressure, battery and water is not considered preventive maintenance.

6.10.2 All parts of the equipment, components and systems requiring a routine or periodic inspection or preventive maintenance shall be easily accessible.

6.10.3 The design criteria shall permit the assembly, disassembly and maintenance with general-purpose tools and commercially available equipment.

6.10.4 The design shall be such as to eliminate loose parts as far as practicable. Where those loose parts are unavoidable, they shall be attached to the equipment wherever possible, and fixed stowages shall be provided for their storage.

6.10.5 All components, assemblies and subassemblies incorporated into the equipment shall remain interchangeable between units of the same model. Where a new interchangeable component is introduced to the equipment and the data or parts within the new component are different, details of the changes shall be recorded through revisions to the appropriate manuals.

6.10.6 All components used in new equipment, unless mutually agreed between manufacturer and purchaser, shall be new and carry the same warranty as the equipment.

6.10.7 The covers or access doors to components or systems shall be easily opened or removed.

6.10.8 The components and systems shall, where practical, be capable of being removed from the equipment without disassembling other components.

6.10.9 A maintenance safety device shall be provided on all lifting units, such that when engaged it shall prevent inadvertent lowering of the elevated unit during maintenance operations.

6.10.10 The equipment shall be thoroughly examined on delivery before being placed in service and shall not be placed in service if the examination shows any condition adversely affecting its safety.

NOTE See ISO 6966-2 for details.

6.11 Transport

6.11.1 It shall be possible to transport the unit by road, rail or sea. It is possible that parts have to be removed to achieve the dimensions required by constraints of the selected transport mode(s) and/or rules/regulations governing such transportation. The design should also take into consideration possible air transportation.

6.11.2 Suitable lifting points shall be provided to facilitate loading and unloading of the unit during transport and to reduce damage.

6.11.3 When forklift tineways are used, they shall be installed in compliance with ISO 2328.

6.11.4 When slings are used, the sling attachment points shall be of adequate strength and clearly marked. The approximate centre of gravity (C.G.) location of the equipment should also be clearly indicated.

7 Manuals

7.1 Documents covering operation, maintenance, and spare parts shall be provided, preferably according to the ATA 101 standard (Bibliography item [15]).

7.2 Modification, improvements, and changes in original spare parts shall be presented to users by means of service bulletins, spare parts information or manual revisions.

8 Optional features

8.1 The options given in 8.2 to 8.15 should be considered by the manufacturer in the design of the unit and may be requested by the purchaser. Further specific requirements of the purchaser may be added.

8.2 Air conditioning systems for an enclosed cab vehicle.

8.3 Accommodation for a passenger.

8.4 Instrumentation:

a) ammeter;

b) engine oil pressure gauge;

c) hydraulic pump pressure gauge;

d) engine coolant temperature gauge;

e) tachometer;

f) engine-hour meter.

8.5 Gasoline, diesel, LPG (liquid propane gas) or electric vehicle prime mover.

8.6 Cold-starting aids and/or tropicalization.

8.7 High-output alternator capable of sustaining the maximum electrical load of the vehicle +10 %, with the engine set at a desired revolution rate through the use of an adjustable “ON-OFF” hand throttle.

8.8 Key or keyless type ignition.

8.9 Manual or automatic transmission.

8.10 Installed backup battery (to ensure electrical supply should the main battery become unserviceable).

8.11 Amber revolving or flashing light.

8.12 Wiring and plumbing schematic diagrams permanently affixed in convenient locations. All controls and instruments identified in an identical manner on the schematics and the corresponding placards.

8.13 Automatic audible personnel warning for vehicle reversing and/or downward movement of lift platform.

8.14 Wireless communication system.

8.15 Back view closed circuit television system.

Annex A
(informative)

Efficiency of rollerized unit load device (ULD) handling equipment

A.1 Definition of efficiency

The requirements in ISO 4116 for roller dimensions, characteristics and spacing are minimum values required to avoid damage to ULDs. Experience has demonstrated that such values can be insufficient to guarantee efficiency of rollerized pallet/container handling equipment. The term “efficiency” as used in 6.7.8, 6.7.9 and this annex is defined as the ratio

$$\frac{W - F}{F}$$

where

W is the gross weight of the ULD being handled (usually, the maximum gross weight of any type of ULD acceptable on the equipment);

F is the horizontal force which must be applied to start the ULD moving on its roller bed, when this bed is in good maintenance condition and levelled.

A.2 Efficiency objectives

Efficiency, as defined above, is an important design factor, since it will directly relate to savings in manpower (for non-powered dollies or equipment), or overall power requirements (for powered ULD equipment), and therefore also operational costs.

The following objectives should be used for rollerized ULD equipment design in order to achieve adequate savings on handling costs:

a) efficiency of rollerized conveyor systems equal to or in excess of 98 %, within the normal range of applicable ULD gross weight;

b) efficiency of multidirectional (castors or balls) conveyor systems equal to or in excess of 96 %, within the normal range of applicable ULD gross weight. In the event of a castored conveyor system, castors should be oriented randomly or against the direction of movement before measuring the force necessary to start moving the ULD.

A.3 Roller design experience

Extensive experiments have shown that such design objectives can be achieved and maintained throughout the life of the equipment by complying with the following basic criteria:

a) using continuous shaft (to avoid in-service deformations) rollers with good quality ball bearings, lubricated-for-life type, protected by adequate sealing, at both ends;

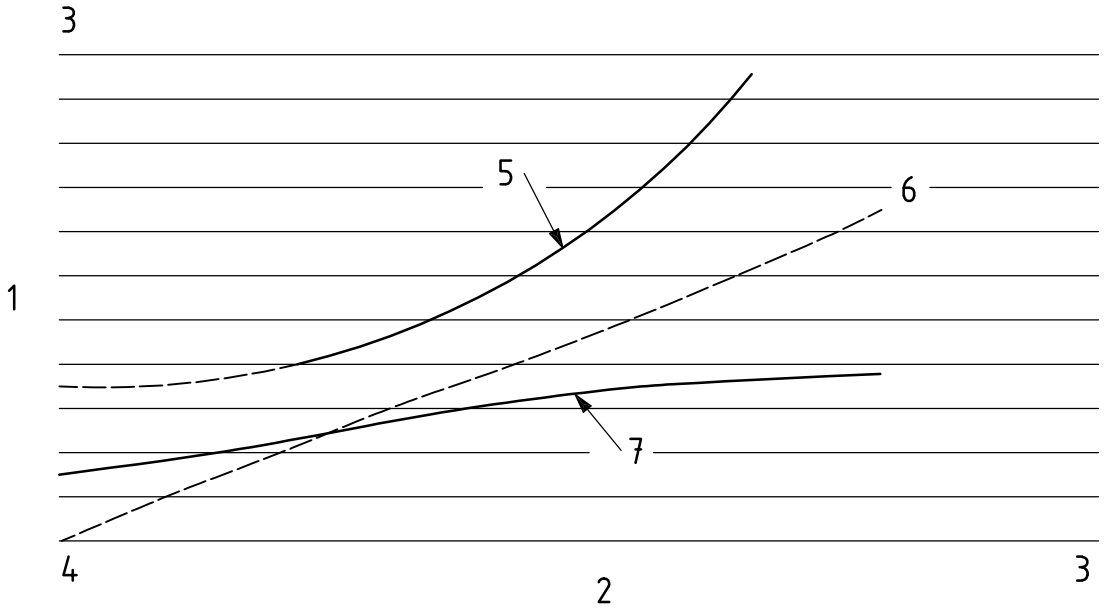
b) having a minimum 19 mm (0,75 in) shaft or inner ball-bearing diameter;

c) having a strong enough roller skin [recommended minimum thickness 2 mm (0,08 in), minimum diameter 63 mm (2,5 in)] to avoid in-service deformations.

The same experiments have demonstrated that

— increasing the number of rollers [i.e. to a spacing less than approximately 200 mm (8 in)] does not improve roller-bed efficiency when keeping the same type of rollers;

— efficiency should be measured for the whole range of ULD gross weight, rather than for its maximum value, since, for rollers in good maintenance condition, the actual efficiency ratio evolves more slowly than the gross weight of units (see Figure A.1).



Key

1 pulling force to start moving ULDs
2 ULD gross weight
3 high
4 low
5 insufficiently strong, poor maintenance condition rollers
6 reference 98 % efficiency
7 adequate, good maintenance condition rollers

Figure A.1 — Increase in efficiency as a function of the rollers and the gross weight of the unit load device (ULD)

Annex B
(informative)

List of typical aircraft ground support equipment

English	French	German
Air conditioning unit (ACU)	Climatiseur	Klimatisierungsgerät
Air starting unit (ASU)	Groupe de démarrage à air	Luftstartgerät
Aircraft tractor	Tracteur avion	Flugzeugschlepper
Axle jack	Vérin de changement de roues	Flugzeug Radwechselheber
Baggage and equipment tractor	Tracteur à bagages et matériels	Gepäck und Geräteschlepper
Catering truck	Camion commissariat	Catering Hubfahrzeug
Container/pallet dolly	Remorque porte conteneur/palette	Container/Paletten Dolly
Container/pallet loader	Chargeur de conteneurs/palettes	Container/Paletten Hubfahrzeug
Container/pallet transporter	Transporteur de conteneurs/palette	Container/Paletten Transporter
Conveyor belt vehicle	Convoyeur à bande	Förderbandwagen
De-icer	Dégivreuse	Enteiser
Disabled passenger boarding equipment	Matériel d'accès des passagers handicapés	Behinderten Transportgerät
Ground power unit (GPU)	Groupe électrique de parc	Ausrüstung zur Bodenstromversorgung
Heater	Chauffante	Warmungsgerät
Hydrant servicer	Serviceur d'oléoréseau	Betankungseinrichtung
Hydraulic tail stanchion	Monopode hydraulique	Hydraulische Heckstütze
Lavatory service equipment	Vide toilettes	Toiletten Servicegerät
Maintenance stairs	Escabeau de maintenance	Wartungstreppe
Maintenance platform	Plate-forme de maintenance	Wartungsbühne
Oxygen or nitrogen unit	Chariot à oxygène ou azote	Sauerstoff oder Stickstoffgerät
Passenger boarding bridge	Passerelle passagers	Fluggastbrücke
Passenger stairs	Escalier passagers	Fluggasttreppe
Potable water service vehicle	Matériel de plein en eau potable	Trinkwasser Servicegerät
Refuelling vehicle	Camion d'avitaillement pétrolier	Betankungseinrichtung
(Aircraft-) Tow bar	Barre de tractage (d'aéronef)	(Flugzeug-) Schleppstange

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[2] ISO 6858, *Aircraft — Ground support electrical supplies — General requirements*

[3] ISO 6967, *Aircraft ground equipment — Main deck loader — Functional requirements* [1)]

[4] ISO 6968, *Aircraft ground equipment — Lower deck loader — Functional requirements* [2)]

[5] ISO 7716, *Air cargo equipment — Unit load devices transport vehicle (UTV) — Functional requirements*

[6] ISO 9666, *Aircraft — Self-propelled lavatory-servicing vehicle — Functional requirements*

[7] ISO 9667, *Aircraft ground support equipment — Tow bars*

[8] ISO 9678, *Aircraft — Self-propelled potable-water vehicle*

[9] ISO 10841, *Aircraft — Catering vehicle for large capacity aircraft — Functional requirements*

[10] ISO 11077, *Aerospace — Self-propelled de-icing/anti-icing vehicles — Functional requirements*

[11] ISO 12056, *Aircraft — Self-propelled passenger stairs for large capacity aircraft — Functional requirements.*

[12] ISO 16004, *Aircraft ground equipment — Passenger boarding bridge or transfer vehicle — Requirements for interface with aircraft doors*

[13] ISO 20683-1, *Aircraft ground equipment — Design, test and maintenance for towbarless towing vehicles (TLTV) interfaced with nose-landing gear — Part 1: Main-line aircraft*

[14] ISO 20683-2, *Aircraft ground equipment — Design, test and maintenance for towbarless towing vehicles (TLTV) interfaced with nose-landing gear — Part 2: Regional aircraft*

[15] ATA 101, *Specification for ground equipment technical data* [3)]

[16] SAE ARP 1247, *General requirements for aerospace ground support equipment motorized and nonmotorized* [4), 5)]

[17] SAE ARP 1801, *Measurement of exterior sound level of specialized aircraft ground support equipment* [5)]

[18] IATA AHM 910, *Basic requirements for aircraft ground support equipment* [4), 6)]

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1) To be published. (Revision of ISO 6967:1994)

2) To be published. (Revision of ISO 6968:1994)

3) Specification ATA 101 can be obtained from the following address:
Air Transport Association of America, 1709 New York Avenue NW, Washington DC, 20006, USA.

4) Corresponding to this part of ISO 6966.

5) SAE Standards can be obtained from the following address:
Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale PA 15096-0001, USA.

[19] IATA AHM 911, *Ground support equipment requirements for compatibility with aircraft unit load devices* 6)

[20] IATA AHM 912, *Standard forklift pockets dimensions and characteristics for forkliftable ground support equipment intended for palletization* 6)

[21] IATA AHM 914, *Compatibility of ground support equipment with aircraft types* 6)

[22] IATA AHM 915, *Standard controls* 6)

[23] IATA AHM 916, *Basic requirements for ground support equipment towing interface* 6)

[24] EN 1915-1:2001, *Aircraft ground support equipment — General requirements — Part 1: Basic safety requirements* 7)

[25] EN 1915-2:2001, *Aircraft ground support equipment — General requirements — Part 2: Stability and strength requirements, calculations and test methods* 7)

[26] EN 1915-3:2004, *Aircraft ground support equipment — General requirements — Part 3: Vibration measurement methods and reduction* 7)

[27] EN 1915-4:2004, *Aircraft ground support equipment — General requirements — Part 4: Noise measurement methods and reduction* 7)

6) AHM 910, AHM 911, AHM 912, AHM 914, AHM 915, and AHM 916 are part of the IATA Airport Handling Manual, which can be obtained from the following address:

Publications Assistant, 800 Place Victoria, P.O. Box 113, Montréal, Québec H4Z 1M1, Canada.

7) CEN European standards constitute one means of complying with the European Machinery Directive, and can be obtained from

— Comité Européen de Normalisation, rue de Stassart 36, B1050 Bruxelles, Belgium; or

— any of the 29 European national standardization institutes, members of CEN.

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