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Aircraft ground support equipment - General requirements - Part 1: Basic safety requirements

Luftfahrt-Bodengeräte - Allgemeine Anforderungen - Teil 1: Grundlegende Sicherheitsanforderungen

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Foreword

This document (prEN 1915-1:2010) has been prepared by Technical Committee CEN/TC 274 “Aircraft ground support equipment”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1915-1:2001+A1:2009.

EN 1915, *Aircraft ground support equipment — General requirements*, consists of the following parts:

— *Part 1: Basic safety requirements*

— *Part 2: Stability and strength requirements, calculations and test methods*

— *Part 3: Vibration measurement methods and reduction*

— *Part 4: Noise measurement methods and reduction*

EN 12312, *Aircraft ground support equipment — Specific requirements*, consists of the following parts:

— *Part 1 — Passenger stairs*

— *Part 2 — Catering vehicles*

— *Part 3 — Conveyor belt vehicles*

— *Part 4 — Passenger boarding bridges*

— *Part 5 — Aircraft fuelling equipment*

— *Part 6 — Deicers and deicing/antiicing equipment*

— *Part 7 — Aircraft movement equipment*

— *Part 8 — Maintenance stairs and platforms*

— *Part 9 — Container/Pallet loaders*

— *Part 10 — Container/Pallet transfer transporters*

— *Part 11 — Container/Pallet dollies and loose load trailers*

— *Part 12 — Potable water service equipment*

— *Part 13 — Lavatory service equipment*

— *Part 14 — Disabled/incapacitated passenger boarding vehicles*

— *Part 15 — Baggage and equipment tractors*

— *Part 16 — Air start equipment*

— *Part 17 — Air conditioning equipment*

— *Part 18 — Nitrogen or Oxygen units*

— *Part 19 — Aircraft jacks, axle jacks and hydraulic tail stanchions*

— *Part 20 — Electrical ground power units*

Introduction

The abbreviation GSE means a complete item of aircraft ground support equipment in the context of this European Standard.

When compiling this European Standard it was assumed that:

a) GSE is operated only by competent persons on the airport ramp;

b) components without specific requirements are:

   1) designed in accordance with the usual engineering practice and calculation codes;

   2) of sound mechanical and electrical construction;

   3) made of materials with adequate strength and of suitable quality;

   4) made of materials free of defects;

c) materials known to be harmful, such as asbestos, are not used as part of GSE;

d) components are kept in good repair and working order, so that the required characteristics remain despite wear;

e) by design of the load bearing elements, a safe operation of the machine is assured for loading ranges from zero to 100 % of the rated possibilities and during tests;

f) a negotiation took place between the user and the manufacturer concerning particular conditions for the use and places of use of the GSE;

g) the place of operation allows a safe use of GSE.

The extent to which hazards are covered is indicated in the scope of this European Standard.

Enumerations in this European Standard are not to be considered exclusive, they are compiled according to the present state of the art.

The minimum essential criteria are considered to be of primary importance in providing safe, economical and usable GSE. Deviation from the recommended methods and conditions should occur only after careful consideration, extensive testing and thorough in service evaluation have shown alternative methods or conditions to be satisfactory.

This European Standard is a Type C standard as defined in EN ISO 12100.

1 Scope

This European Standard applies to GSE when used in civil air transport as intended by the manufacturer and contains safety requirements relating to the equipment in general.

This Part of EN 1915 deals with the technical requirements to minimize the hazards listed in clause 4 which can arise during operation and maintenance of GSE as intended by the manufacturer or his authorised representative.

This Part of EN 1915 is intended to be used in conjunction with EN 1915-2, EN 1915-3 (for vehicles) and EN 1915-4, and with the relevant part of EN 12312. Where not specified in EN 12312, EN 1915-1 applies.

This Part of EN 1915 does not apply to automotive parts approved for public vehicles in the EU and EFTA, when used on GSE for the purpose for which they are designed.

This Part of EN 1915 does not establish additional requirements for the following:

— operation elsewhere than in an airport environment;

— operation in severe conditions, e.g. ambient temperature below -20 °C or over 50 °C, tropical or saturated salty atmospheric environment, strong magnetic or radiation field;

— operation subject to special rules, e.g. potentially explosive atmosphere except as regards operation in the vicinity of an aircraft fuel tank during fuelling operation;

— hazards caused by power supply other than from electrical networks;

— hazards occurring during construction, transportation, commissioning and decommissioning of the GSE;

— hazards caused by wind velocity in excess of the figures given in this European Standard;

— direct contact with food stuffs;

— earthquake, flood, landslide, lightning and more generally any natural catastrophe;

— electromagnetic compatibility (EMC);

— cableless remote control;

— hazards caused by noise and vibration, see EN 1915-3 and EN 1915-4;

— hazards caused by errors in the software.

This Part of EN 1915 is not applicable to GSE which are manufactured before the date of publication by CEN of this Standard.

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.

EN 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 894-1, *Safety of machinery — Ergonomic requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

EN 894-3, *Safety of machinery — Ergonomic requirements for the design of displays and control actuators — Part 3: Control actuators*

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and moveable guards*

EN 982, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

EN 1915-2:2001, *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*

EN 12312 (all parts), *Aircraft ground support equipment — Specific requirements*

EN 13501-1:2007, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 60073, *Basic and safety principles for man-machine interface, marking and identification — Coding principles for indication devices and actuators (IEC 60073:1996)*

EN 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60825-1, *Safety of laser products — Part 1: Equipment classification and requirements (IEC 60825-1:2007)*

EN ISO 3411, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

EN ISO 3457, *Earth-moving machinery — Guards and shields — Definitions and specifications (ISO 3457:1986)*

EN ISO 6682:1995, *Earth-moving machinery — Zones of comfort and reach for controls (ISO 6682:1986 including Amendment 1:1989)*

EN ISO 7731:2008, *Ergonomics — Danger signals for public and work areas - Auditory danger signals (ISO 7731:2003)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

prEN ISO 12100:2009, *Safety of machinery — General principles for design, risk assessment and risk reduction (ISO/DIS 12100:2009)*

EN ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13857, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO 14122-1:2001, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels (ISO 14122-1:2001)*

EN ISO 14122-2:2001, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2001)*

EN ISO 14122-3:2001, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

EN ISO 14122-4:2004, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2004)*

ISO 3795, *Road vehicles and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

ISO 3864 (all parts), *Graphical symbols — Safety colours and safety signs*

ISO 6966-1:2005, *Aircraft ground equipment — Basic requirements — Part 1: General design requirements*

DIN 51130:2004, *Testing of floor coverings — Determination of the anti-slip property — Workrooms and fields of activities with slip danger, walking method — Ramp test*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003, EN ISO 12100-2:2003, EN ISO 14122-1:2001, EN ISO 14122-2:2001, EN ISO 14122-3:2001 and EN ISO 14122-4:2004 and the following apply.

3.1
aircraft ground support equipment
GSE
mobile equipment built for the special requirements of aviation

NOTE 1 The "special requirements" result from the specific design and turnaround procedure of aircraft, giving rise to designs not generally used in other areas, in particular:

— GSE for passenger, baggage and cargo handling;

— GSE for aircraft ground handling and servicing;

— mobile parts of passenger boarding bridges (PBB).

NOTE 2 A trilingual list of GSE is given in Annex B.

3.2
passenger
any person other than a crew member, an employee of the carrier in an official capacity, an authorized representative of a national authority or a person accompanying a cargo consignment, who is carried aboard a flight handled by the GSE

NOTE Passengers exclusively use those types of GSE specifically designed for their access to and from the aircraft.

3.3
lifting/work platform
platform, cabin or workplace which is designed for lifting loads and/or persons

3.4
workplace
area where operators stay during normal operation e.g. driver/co-driver seats, passageways, fixed walkways, stairs, ladders, platforms

3.5
standing area
area on GSE where a person stands or works in an upright position during operation

3.6
walkway
area on GSE intended to be used by persons moving from one place to another

3.7
stabilizer
support used to maintain and/or increase the stability and capable of supporting and/or levelling the GSE

3.8
friction-type safeguard
safety equipment which restricts or prevents movement of parts in relation to each other by the use of frictional forces e.g. brakes, safety gears

3.9
instructions
documents supplied by the manufacturer or supplier describing the intended use of the GSE and containing information for safe operation, installation, transport and maintenance

3.10
operational use
activities, effects, processes or movements that result from intended use of the GSE

3.11
unintentional movement
any movement without operator's conscious intent e.g. caused by failure of the GSE

3.12
unit load device
ULD
assembly of components comprising one of either e.g. an aircraft pallet and pallet net, an aircraft pallet, a container with integral pallet or an aircraft container

3.13
steering system
all parts of steering equipment providing the means of transmitting steering forces including control devices and energy supply

NOTE It includes all parts from the point where the steering control effort is transformed by mechanical, hydraulic, electric or combined means.

3.14
steering control
part of the steering equipment through which the driver or operator controls steering operation

3.15
Steering control effort
force applied to the steering control in order to steer the GSE

3.16
Steering forces
all forces operating in the steering transmission

3.17
Steering angle
angle of a given position of steerable wheels with the neutral position

3.18
electric steering
steering transmission in which steering forces, somewhere in the transmission, are transmitted only by electric means

3.19
hybrid steering
steering transmission in which steering forces are transmitted by more than one means

4 List of hazards

This list of hazards (see annex A) is based on prEN ISO 12100 and contains the hazards and hazardous situations, as far as they are dealt with in this European Standard, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce risks. See also the complementary list of hazards in the other parts of EN 1915 and in the different parts of EN 12312.

5 Safety requirements and/or protective measures

5.1 General

GSE shall comply with the safety requirements and/or protective measures of this clause, with the requirements of EN 1915-2, EN 1915-3 and EN 1915-4 as relevant, as well as with the requirements of the relevant part of EN 12312. In addition, the machine shall be designed according to the principles of EN ISO 12100 for relevant but not significant hazards, which are not dealt with by this document.

For the application of EN ISO 13849-1, EN 953, EN 982 and EN 983, the manufacturer shall carry out an adequate risk assessment for the requirements thereof where choice is necessary and that are not dealt with in the part of EN 12312 series for specific type of GSE.

NOTE This specific risk assessment is part of the general risk assessment relating to the hazards not covered by this C standard.

5.2 Accommodation for driver and any other person

5.2.1 General requirements

Accommodation for driver and any other person shall have adequate space. Corners and edges in the working area shall be avoided by design or cushioned by covers.

Seats shall be designed so that damage to the human body is avoided taking into account duration, purpose and conditions of use, e.g. seats of commercial vehicles. Specific requirements are given in the Parts of the EN 12312 series, where applicable.

Vibration assessments shall be based on measurements according to EN 1915-3. Seats shall be designed so that damage to the human body is avoided taking into account duration, purpose and conditions of use, size and weight of the drivers.

5.2.2 Driver accommodation

The minimum size of the driver's envelope shall conform to the requirements of EN ISO 3411. This requirement applies with seats in their extreme positions.

The driver shall be protected against interference from vehicle wheels.

Restraint systems are required for any GSE capable of moving at a speed over 25 km/h. The requirement for restraint systems is given in the Part of EN 12312 series for the appropriate type of GSE, where applicable.

5.2.3 Accommodation for other persons

GSE intended to transport any person shall be equipped with suitable

— seats, with restraint systems, a lap type seat belt as a minimum, for any GSE capable of moving at a speed exceeding 25 km/h; or

— standing accommodation within an enclosed cabin shall be provided with adequate handholds; or

— where the standing accommodation is outside the cabin shall be provided with adequate devices for protection against falling. At least a combination of handholds and padded guard rails shall be provided.

5.3 Driver's cabin

NOTE Requirements for drivers' cabins may be applicable for operators' workplaces with cabins.

5.3.1 Drivers' cabins of GSE shall meet the following requirements:

a) Shape and arrangement of the driver's cabin shall not restrict the field of view for travel or operation. Where this cannot be directly achieved, additional means, e. g. mirrors, closed circuit TV, shall be provided.

NOTE 1 Method of measurements are given in EN ISO 13564-1.

b) The windshield shall have at least one power-operated windshield wiper.

NOTE 2 A windshield washing unit should be provided if agreed between manufacturer and user.

c) Glass in doors and windows shall be safety glass, or alternative material with at least the same performance characteristics.

NOTE 3 Technical requirements for safety glass on vehicles intended to be used on public roads are given in ECE 43.

d) All windows considered by the manufacturer to be important for the operator's field of view shall be transparent and distortion-free as far as possible.

e) There shall at least be mirrors designed and fitted in such a way that the driver is able to observe the rear sideward areas.

f) Lighting shall be arranged in such a way that no disturbing dazzling effect is caused in conjunction with the windshield and other windows that are in the driver's field of view.

g) Corners or edges shall be chamfered or rounded with a minimum radius of 3 mm.

h) The floor, upholstery and insulation of enclosed drivers' cabins shall consist of flame retardant material that has a horizontal burning rate of not greater than 250 mm per minute in accordance with ISO 3795, or classes A or B of EN 13501-1:2007.

5.3.2 Fully enclosed drivers' cabins with doors shall meet the additional following requirements:

a) Devices shall be provided to keep all windows clear that are necessary for operating the GSE, taking into account all operational and climatic conditions of the intended place of use for the GSE (see also clause 0 of the whole standard).

NOTE Devices are for example wiper, washing units, demister, window heating systems etc.

b) All doors shall be provided with securing devices to retain them in the closed and, where required, in the open position. These devices shall be installed so, that they do not create a risk of injury when the doors are open.

c) Door mechanisms shall be designed and fitted in such a way that opening is only possible with intended manual action and risk of injury is avoided.

d) An adequately sized system for ventilation shall be provided. Where appropriate provisions shall be made for heating and/or air conditioning facilities.

NOTE Due to the fact that GSE are used in a wide range of temperatures and environmental conditions it is not possible to give precise technical requirements in this European Standard.

e) Combustion air for the heating units shall not be taken from the interior of the cabin; it shall not be possible for exhaust fumes to escape into the heating air. In case of burner flame-out, fuel supply shall be cut off.

NOTE Requirements for combustion heating appliances see EU Directive 78/548/EEC.

5.4 Controls

5.4.1 Control device actuators

Control device actuators shall meet the requirements of EN 894-1 and EN 894-3. They shall be positioned within the reach of the operator in accordance with EN ISO 6682:1995 and their purpose shall be marked clearly and visible in accordance with EN 60073. They shall be constructed and mounted so as to minimize the risk of inadvertent operation.