SLOVENSKI STANDARD
SIST EN 12312-1:2002+A1:2009

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Podporna oprema na tleh za letalski promet - Posebne zahteve - 1. del: Stopnice za potnike

Aircraft ground support equipment - Specific requirements - Part 1: Passenger stairs

Luftfahrt-Bodengeräte - Besondere Anforderungen - Teil 1: Fluggasttreppen

Matériels au sol pour aéronefs - Exigences particulières - Partie 1: Escaliers passagers

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49.100	Oprema za servis in vzdrževanje na tleh	Ground service and maintenance equipment

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EUROPEAN STANDARD

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English Version

Aircraft ground support equipment - Specific requirements - Part 1: Passenger stairs

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Contents

Foreword

This document (EN 12312-1:2001+A1:2009) has been prepared by Technical Committee CEN/TC 274 "Aircraft ground support equipment", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2009-03-01.

This document supersedes EN 12312-1:2001.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

⟨A1⟩ For relationship with EC Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1⟩

The Parts of EN 12312 Aircraft ground support equipment — Specific requirements are:

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 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 equipment
Part 15: Baggage and equipment tractors
Part 16: Air start equipment
Part 17: Air conditioning equipment
Part 18: Oxygen/Nitrogen units
Part 19: Aircraft jacks, axle jacks and hydraulic tail stanchions
Part 20: Ground power equipment

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This European Standard defines health and safety requirements, as well as some functional and performance requirements, for stairs including a built-in source of power (see Clause 1, Scope) intended for passengers embarking/disembarking aircraft.

The minimum essential criteria are considered to be of primary importance in providing safe, serviceable, economical, and practical passenger stairs. Deviations from the recommended criteria should occur only after careful consideration, extensive testing, risk assessment and service evaluation have shown alternative methods or conditions to be satisfactory.

This European standard is a Type C standard as defined in [A1] EN ISO 12100 [A1].

1 Scope

This Part of EN 12312 deals with the technical requirements to minimise the hazards listed in clause 4 which can arise during the commissioning, the operation and the maintenance of passenger stairs when carried out in accordance with the specifications given by the manufacturer or his authorised representative. It also takes into account some requirements recognized as essential by the health and safety authorities, aircraft and vehicle manufacturers as well as airlines and handling agencies.

This standard applies to:

— self-propelled stairs with seated driver (see annex A);

— pedestrian controlled stairs;

— towable stairs equipped with powered means, e.g. for height adjustment, stabilizers (see annex A);

— automatic levelling systems of stairs;

for embarking/disembarking of passengers.

NOTE 1 Powered should be also understood as manual effort stored in springs or hydraulic accumulators, etc., the dangerous action of which can be produced or can continue after the manual effort has ceased or directly applied manual effort for lifting or lowering loads.

NOTE 2 Those clauses of this standard that can apply may also be used as a guideline for the design of towable stairs without powered means.

This standard does not apply to pneumatic systems.

This standard does not establish requirements for hazards caused by noise and vibration.

This Part of EN 12312 is not applicable to passenger stairs which are manufactured before the date of publication by CEN of this standard.

[A1] This part of EN 12312 is intended to be used in conjunction with EN 1915-1, EN 1915-2, EN 1915-3 (for vehicles) and EN 1915-4.

Noise is dealt with in EN 1915-4. [A1]

2 Normative references

[A1] 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. [A1]

[A1] *deleted text* [A1]

[A1] *deleted text* [A1]

EN 1050:1996, *Safety of machinery — Principles for risk assessment*

[A1] *deleted text* [A1]

EN 1175-1:1998, *Safety of machinery — Industrial trucks — Part 1: Electrical requirements for battery powered trucks*

[A1] EN 1386, *Aluminium and aluminium alloys — Tread plate – Specifications* [A1]

EN 1837:1999, *Safety of machinery—- Integral lighting of machines*

EN 1915-1:2001, *Aircraft ground support equipment — General requirements — Part 1: Basic safety requirements*

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

[A1] EN 1915-4, *Aircraft ground support equipment – General requirements – Part 4: Noise measurement methods and reduction* [A1]

[A1] EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)* [A1]

[A1] EN ISO 12100-2:2003, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles (ISO 12100-2:2003)* [A1]

[A1] EN ISO 13850:2008, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)* [A1]

[A1] ISO 7718, *Aircraft - Main-deck passenger doors — Interface requirements for connection with passenger-boarding bridge or transfer vehicle* [A1]

[A1] ISO 16004, *Aircraft ground equipment — Passenger boarding bridge or transfer vehicle — Requirements for interface with aircraft doors* [A1]

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1915-1 and [A1] EN ISO 12100-1:2003 and EN ISO 12100-2:2003 [A1] apply together with the following:

3.1
passenger stair
stair designed for the embarking and disembarking of passengers between the aircraft and the ground

3.2
stair flight
series of steps between ground level and platform or between two platforms

3.3
riser height (R)
distance between the surface of the tread of one step and the surface of a step above or below when measured perpendicularly between the tread surfaces

3.4
tread depth (T)
distance from one step nosing to the adjacent step nosing when measured parallel to the tread surface

3.5
step width
maximum usable width measured along the nose of the step

3.6
handrail height
distance to the top surface of the handrail as measured at the nose of the step or platform and perpendicular to the tread surface

3.7
upper (main) platform
platform at the upper end of a stair flight with access to the aircraft

3.8
intermediate platform
platform between two stair flights

3.9
incline
angle of stair flight to a horizontal plane, measured across the noses of the steps

3.10
inclination
angle of the platforms and steps surfaces to a horizontal plane, measured at a right angle to the noses of the steps

3.11
bottom hinged step
foldable step at the bottom end of the stair to provide sufficient ground clearance during movement

3.12
leading edge
front end of the upper (main) platform at the aircraft door interface

3.13
auxiliary system
independent system for the operation of the passenger stair in case of power loss

4 List of hazards

The list of risks and hazards (see annex B) is based on EN 1050 : 1996 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 passenger stairs and which require action to eliminate or reduce risks. Not covered are risks and hazards due to a standard automotive chassis, the traffic, [A1] *deleted text* [A1] repair and general misuse.

5 Safety requirements and/or measures

5.1 General requirements

5.1.1 [A1] Passenger stairs shall conform to the relevant requirements of EN 1915-1, EN 1915-2, EN 1915-3 and EN 1915-4 unless otherwise specified in this standard. [A1] They shall also conform to the specific requirements of this standard.

5.1.2 Strength calculations shall be carried out in accordance with EN 1915-2.

5.1.3 For stairs to be moved on public roadways, the dimensions, laden mass and other characteristics shall meet all applicable government regulations when in fully retracted position.

NOTE Applicable government regulations depend on the airport of use.

5.1.4 Passenger stairs shall have an upper (main) platform and, where the number of risers exceeds 18, an intermediate platform.

5.1.5 Step and platform inclination in all intended operating positions shall not exceed ± 3° (5 %) when the passenger stair rests on a horizontal plane.

5.1.6 The step and platform cover material shall provide the possibility of easy elimination of water and snow, e.g. by using treadplate conforming to A1) EN 1386 (A1.

5.1.7 With the passenger stair fully stowed for movement, the lowest point of any part of the passenger stair shall not be less than 150 mm above a horizontal ground. In addition, the clearance shall allow without interference the transversing of two surfaces intersecting at an angle of 3° (5 %) either in bridging or in cresting**.**

5.1.8 Operator's cabin or driver's accommodation shall not project forward of the leading edge of the upper (main) platform when in its fully retracted position. The passenger stair shall be constructed so that the driver at the operating position is able to see the leading edge throughout its operating range.

5.1.9 Passenger stairs shall be fitted with barrier devices to prevent access to the stair flight as follows:

- passenger stairs with a maximum height of the upper (main) platform up to 2 m require one barrier at the bottom end of the passenger stairs;
- passenger stairs with a maximum height of the upper (main) platform in excess of 2 m in its fully retracted position require two barriers, one at bottom end of the passenger stair, one at the upper (main) platform.

NOTE In the context of this clause, barrier devices can be taken to mean solid rails or more flexible means such as inertial reel straps. A simple microswitch or similar system may be used to immobilize the stair.

The barrier at the upper (main) platform shall be installed at a height of 1 m.

5.1.10 Stair flights and platforms shall have illumination of a non-glare quality for floor and step treads. A minimum illumination of 50 Lux shall be provided, as measured at the centre line of the stair flight and platforms, parallel to and on the tread surface.

5.1.11 The electrical system of battery powered passenger stairs shall conform to EN 1175-1:1998.

5.1.12 The driver accommodation of self-propelled passenger stairs shall be equipped with a restraint system for the driver.

5.2 Stair flight

5.2.1 All steps of a stair flight shall be designed with the same riser height and the same tread depth.

5.2.2 Riser height and tread depth dimensions shall meet the following geometry criteria:

Riser height (R) + Tread depth (T) = 460 mm ± 10 mm

The riser height (R) shall be between 140 mm and 210 mm, the tread depth (T) shall be between 250 mm and 320 mm.

5.2.3 The incline for the stair flight shall be between 24° and 40°.

NOTE The optimum angle for the stair flight incline is between 30° and 38°.

5.2.4 The minimum usable clear width of a stair flight shall be 1 m.

5.2.5 Any hinged step that may be fitted at the bottom of the stair shall meet the criteria in 5.1.7 and 5.2.1. This step shall be easy to handle and be able to be stowed safely.

5.2.6 The distance from the ground to the tread surface of the bottom step shall not exceed 260 mm, when the stair is positioned on a horizontal supporting surface.

5.3 Platforms

5.3.1 The upper (main) platform shall have a minimum usable length of 1,2 m. The minimum width dimension shall be the width of the stair flight.

5.3.2 The leading edge of the upper (main) platform shall be designed in a manner that provides a good fit to the aircraft fuselage, i.e. a maximum gap of 100 mm along the length of the interface. Bumpers made of flexible material shall allow direct contact between leading edge and aircraft fuselage.

5.3.3 Both sides of the upper (main) platform shall be fitted with full panels supporting the handrails as per 5.4. The forward end of each side panel shall be covered by protective padding and be of such design to leave a maximum gap of 150 mm to the aircraft fuselage.

5.3.4 Where the platform internal usable width is less than 2,3 m, one or both panels together with its handrail shall be sliding but not detachable in order to allow opening and closing the aircraft doors without obstruction.

It shall be possible to actuate the sliding panel from a protected position. The effort for the actuation shall stay within the relevant borders for human beings.

5.3.5 The leading edge of the upper (main) platform shall be entirely covered by protective padding and conforming to the interface requirements given in ⟨A1⟩ ISO 7718 and ISO 16004 ⟨A1⟩.

5.3.6 The length of any intermediate platform shall be three treads minimum. Any longer platform shall have a depth equal to that of the tread multiplied by an integer.

5.4 Guard rails

5.4.1 Guard rails or hand rails with side panels, conforming to 5.12 of EN 1915-1:2001, shall be provided on both sides of the stair flight, the intermediate platform and the upper (main) platform.

5.4.2 Full continuity shall be maintained at all points between handrail segments. For overlapping handrail segments, the maximum distance between segments placed side by side shall be 150 mm.

5.4.3 Handrails shall include no projection or corners that could cause injury. They shall be smooth including the underside. Open junctions are not allowed. Edges or corners shall be rounded with a minimum radius of 5 mm.

5.4.4 Handrails shall be easily replaceable and suitably finished to preclude the possibility of damaging or soiling of persons clothings.

5.4.5 Guard rails shall include full panels up to a height of 500 mm from the nose of the step. The maximum gap between handrail and panel shall be 450 mm.

NOTE Preferably, all panels should be full.

5.4.6 The guard rails or side panels minimum height shall be as follows:

— Stair flight (measured at nose of steps) 0,9 m;

— Platforms 1,0 m.

5.4.7 Guard rails shall be designed so that they have a maximum deflection of 20 mm/m when subjected to a load of 1 000 N on each metre length equally distributed without causing any permanent deformation.

5.5 Raising devices and stability

5.5.1 Stability calculations and testing shall be carried out in accordance with EN 1915-2.

5.5.2 Telescopic height adjustment shall be performed by increments of one full step. Adjustment to intermediate heights shall only be provided by either controllable platform (see 5.1.5) or passenger stair flight inclination.

5.5.3 Reliance on the extension/retraction system, as a safety device against unintentional lowering, shall not be considered acceptable. In order to provide a fail-safe operation, a releasable positive-fit safeguard shall be incorporated to ensure that the adjusted elevation is maintained when the passenger stair is subjected to a payload.

5.5.4 Stabilizers in the retracted position shall not protrude from the passenger stair's overall width.

NOTE Preferably, the stabilizers in the operating position should not protrude either from the overall width.

The stabilizers of pedestrian controlled passenger stairs shall not protrude from the overall length within the operating range of the tiller or towbar.

5.6 Controls, monitoring devices and displays for self-propelled passenger stairs

5.6.1 For passenger stairs with joystick control, an armrest shall be provided for positioning (whether the operator is seated or standing).

5.6.2 Controls for extending and retracting the passenger stair as well as the upper (main) platform and the stabilizers shall be located at a position with visibility to the aircraft, the leading edge of the upper (main) platform, and the area around the stabilizers. Where necessary, indirect visibility aids, e.g. mirrors or cameras, shall be provided.

5.6.3 Confirmation by a visible indication shall be provided next to each stabilizer control, that the stabilizers are both fully retracted and in the extended position.

5.6.4 Emergency stops shall be provided at every operator control panel. ⟨A1⟩ They shall meet the requirements in EN ISO 13850:2008 category 0 (see 4.1.4 of EN ISO 13850:2008). ⟨A1⟩

NOTE The ermergency stop should not activate the travelling brakes of self-propelled stairs.

5.6.5 For the final approach to the aircraft, it shall be possible to position the passenger stair slowly without jerks and jolts.

5.6.6 Driving shall not be possible when any other function(s) is (are) activated**.**

5.6.7 A working light shall be provided for positioning the passenger stair to the aircraft door area for night operations. The design and installation of the light shall conform to EN 1837:1999. The minimum electrical power of the lamp shall be 25 W.

5.7 Auxiliary means for powered passenger stairs

5.7.1 The passenger stair shall be fitted with auxiliary means

— to lower the upper (main) platform and the stair flight;

— to retract the stabilizers;

allowing the passenger stair to be towed away in the event of primary power loss.