



SLOVENSKI STANDARD
SIST EN 12312-1:2024

01-september-2024

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

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

Ta slovenski standard je istoveten z: EN 12312-1:2024

ICS:

49.100

Oprema za servis in
vzdrževanje na tleh

Ground service and
maintenance equipment

SIST EN 12312-1:2024

en,fr,de

EUROPEAN STANDARD

EN 12312-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2024

ICS 49.100

Supersedes EN 12312-1:2013

English Version

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

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

Luftfahrt-Bodengeräte - Besondere Anforderungen -
Teil 1: Fluggasttreppen

This European Standard was approved by CEN on 26 May 2024.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 12312-1:2024) 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of an identical text or by endorsement, at the latest by January 2025, and conflicting national standards shall be withdrawn at the latest by January 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12312-1:2013.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

The main technical changes compared to the previous version of this document are the following:

- a) the Scope was updated;
- b) Clause 2, Normative references, was updated;
- c) Clause 5, Safety requirements and/or measures, has been completely revised including the following:
 - d) 5.1, General requirements, has been revised with the deletion of the former subclauses 5.1.3, 5.1.12 and 5.1.13 as well as the addition of the new subclauses 5.1.9, 5.1.13, 5.1.14 and 5.1.15 concerning new requirements for standing drivers positions, the design of towable stairs for the pushing or pulling effort, the marking and the placement of handles on all other manually moved passenger stairs, performance levels changed in several places in the document;
- e) 5.4, Platforms, has been updated with the addition of subclause 5.4.8 concerning safety clearances for all doors/aircrafts of GSE;
- f) Clause 7, Information for use, was updated with the addition of a new requirement for markings on passenger stairs;
- g) Annex A, List of significant hazards, has been updated;
- h) the Bibliography was updated.

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

- *Part 1: Passenger stairs* (the present document);
- *Part 2: Catering vehicles*;
- *Part 3: Conveyor belt vehicles*;
- *Part 4: Passenger boarding bridges*;

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- *Part 5: Aircraft fuelling equipment;*
- *Part 6: Deicers and deicing/anti-icing equipment;*
- *Part 7: Aircraft movement equipment;*
- *Part 8: Maintenance or service 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.*

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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

Introduction

This document defines health and safety 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 should occur only after careful consideration, extensive testing, risk assessment and service evaluation have shown alternative methods or conditions to be satisfactory. Such deviations are outside the scope of this document and a manufacturer should be able to demonstrate an equivalent level of protection.

This document is a type-C standard as stated in EN ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document. The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document. When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

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1 Scope

This document specifies the technical requirements to minimize the hazards listed in Clause 4 which can arise during the commissioning, the operation and the maintenance of passenger stairs when used as intended, including misuse reasonably foreseeable by the manufacturer, when carried out in accordance with the specifications given by the manufacturer or his authorized representative. It also takes into account some requirements recognized as essential by authorities, aircraft and ground support equipment (GSE) manufacturers as well as airlines and ground handling agencies.

This document applies to:

- a) self-propelled passenger stairs with seated or standing driver with top speed above 6 km/h (Category A);
- b) towable passenger stairs, with self-propelled function at docking with top speed up to 6 km/h with drive controls from ground, remote control or standing driver position (Category B);
- c) towable stairs, with manual positioning, equipped with powered means, e.g. for height adjustment, stabilizers (Category C);
- d) automatic levelling systems of stairs for embarking/disembarking of passengers.

This document does not apply to stairs to be moved on public roadways.

“Powered” is 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.

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

This document does not establish additional requirements for the following:

- e) persons falling out of an aircraft with the passenger stairs not in position;
- f) hazards resulting from a moving stairway (escalator);
- g) aircraft upper deck door access.

No extra requirements on noise and vibration are provided other than those in EN 1915-3:2004+A1:2009 and EN 1915-4:2004+A1:2009.

NOTE EN 1915-3:2004+A1:2009 and EN 1915-4:2004+A1:2009 provide the general GSE vibration and noise requirements.

This document is not applicable to passenger stairs which are manufactured before the date of its publication.

This part of EN 12312, when used in conjunction with EN 1915-1:2023, EN 1915-2:2001+A1:2009, EN 1915-3:2004+A1:2009 and EN 1915-4:2004+A1:2009, provides the requirements for passenger stairs.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1175:2020, *Safety of industrial trucks — Electrical/electronic requirements*

EN 1837:2020, *Safety of machinery — Integral lighting of machines*

EN 1915-1:2023, *Aircraft ground support equipment — General requirements — Part 1: Basic safety requirements*

EN 1915-2:2001+A1:2009, *Aircraft ground support equipment — General requirements — Part 2: Stability and strength requirements, calculations and test methods*

EN 1915-3:2004+A1:2009, *Aircraft ground support equipment — General requirements — Part 3: Vibration measurement methods and reduction*

EN 1915-4:2004+A1:2009, *Aircraft ground support equipment — General requirements — Part 4: Noise measurement methods and reduction*

EN 16165:2021, *Determination of slip resistance of pedestrian surfaces — Methods of evaluation*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2023)*

EN ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design (ISO 13850:2015)*

EN ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2016)*

ISO 7718-1:2016, *Aircraft — Passenger doors interface requirements for connection of passenger boarding bridge or passenger transfer vehicle — Part 1: Main deck doors*

ISO 7718-2:2016, *Aircraft — Passenger doors interface requirements for connection of passenger boarding bridge or passenger transfer vehicle — Part 2: Upper deck doors*

ISO 10254:2016, *Air cargo and ground equipment — Vocabulary*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1915-1:2023, EN ISO 12100:2010, ISO 10254:2016 and ISO 7718-1:2016 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp/>

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

3.14**barrier**

movable element to prevent access into the area

4 List of hazards

The list of risks and hazards (given in Annex A, Table A.1) is based on EN ISO 12100:2010 and contains the hazards and hazardous situations, as far as they are dealt with in this document, identified by risk assessment as significant for passenger stairs and which require action to eliminate or reduce risks. Not covered are hazards due to a standard automotive chassis, the traffic and repair.

5 Safety requirements and/or measures**5.1 General requirements**

5.1.1 Passenger stairs shall conform to the relevant requirements of EN 1915-1:2023, EN 1915-2:2001+A1:2009, EN 1915-3:2004+A1:2009 and EN 1915-4:2004+A1:2009 unless otherwise specified in this document. The specific requirements of this document take precedence over those of the EN 1915 series.

5.1.2 Stability and strength calculations shall be carried out in accordance with EN 1915-2:2001+A1:2009.

5.1.3 Passenger stairs shall have an upper (main) platform and, where the number of risers exceeds 18, an intermediate platform shall be provided at least after every 18 risers. The number of risers should not exceed 40.

5.1.4 Step and platform inclination in all intended operating positions shall not exceed $\pm 3^\circ$ (5 %) when the passenger stair rests on a horizontal plane.

5.1.5 The step and platform cover material shall provide the possibility of easy elimination of water and snow, and shall be selected to minimize wear. As a deviation to EN 1915-1:2023, 5.13.1, the flooring materials shall provide a durable slip-resistant surface with a minimum R11 slip-resistance classification in the walking direction.

Slip resistance classification shall be measured in accordance with EN 16165:2021, Annex B.

5.1.6 With the passenger stair fully stowed for movement, the lowest point in the front and in the back of the GSE shall not be less than 150 mm above a horizontal ground surface. In addition, the clearance shall allow without interference the traversing of two surfaces intersecting at an angle of 3° (5 %) either in bridging or in cresting.