



# SLOVENSKI STANDARD

## SIST EN 12312-4:2004+A1:2009

01-julij-2009

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Aircraft ground support equipment - Specific requirements - Part 4: Passenger boarding bridges

Luftfahrt-Bodengeräte - Besondere Anforderungen - Teil 4: Fluggastbrücken

**iTeh STANDARD PREVIEW**

Matériel au sol pour aéronefs - Exigences particulières - Partie 4: Passerelles passagers  
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Ta slovenski standard je istoveten z: **EN 12312-4:2003+A1:2009**

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**ICS:**

49.100

Oprema za servis in  
vzdrževanje na tleh

Ground service and  
maintenance equipment

**SIST EN 12312-4:2004+A1:2009**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 12312-4:2003+A1**

April 2009

ICS 49.100

Supersedes EN 12312-4:2003

English Version

## Aircraft ground support equipment - Specific requirements - Part 4: Passenger boarding bridges

Matériel au sol pour aéronefs - Exigences particulières -  
Partie 4: Passerelles passagers

Luffahrt-Bodengeräte - Besondere Anforderungen - Teil 4:  
Fluggastbrücken

This European Standard was approved by CEN on 17 January 2003 and includes Amendment 1 approved by CEN on 1 March 2009.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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## Foreword

This document (EN 12312-4:2003+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of an identical text or by endorsement, at the latest by October 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.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 12312-4:2003.

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\boxed{A_1}$   $\boxed{A_1}$ .

This document 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).

$\boxed{A_1}$  For relationship with EC Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document.  $\boxed{A_1}$

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/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 equipment
- 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: Ground power equipment

Annexes A and C are informative. Annex B is normative.

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.

**EN 12312-4:2003+A1:2009 (E)****Introduction**

This European Standard specifies health and safety requirements, as well as some functional and performance requirements, for passenger boarding bridges (PBB) intended for passenger embarking/disembarking of all aircraft types commonly in service in civil air transport.

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

This European Standard is a Type C standard as stated in **A1** EN ISO 12100 **A1**.

**1 Scope**

This European Standard specifies the technical requirements to minimise the hazards listed in clause 4 which can arise during the commissioning, operation and maintenance of PBB's when carried out in accordance with the specifications given by the manufacturer or his authorised representative. It also takes into account some requirements recognised as essential by authorities, aircraft and ground support equipment (GSE) manufacturers as well as airlines and handling agencies.

This standard applies to:

- apron-drive bridges;
- fixed-head bridges (also referred to as nose-loaders) or pedestal bridges;
- suspended bridges,

for embarking/disembarking of passengers. It is applicable from the interface of the building to the connection with the aircraft. An example of a typical PBB is shown in annex A.

This standard does not apply to:

- elevating lounges;
- passenger stairs;
- other forms of aircraft access equipment

or to the fixed building structure to which the PBB interfaces.

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

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

**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. **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**

EN 954-1:1996, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

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

ⓘ deleted text ⓘ

ⓘ EN 1386 ⓘ, *Aluminium and aluminium alloys — Tread plate — Specification*

EN 1915-1:2001, *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* ⓘ

ⓘ 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)* ⓘ

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

IEC 60332, (CENELEC HD 405), *Tests on electric cables under fire conditions*<sup>1)</sup>

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

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

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

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in ⓘ EN ISO 12100-1:2003, EN ISO 12100-2:2003 ⓘ and EN 1915-1:2001 together with the following apply.

#### 3.1

##### **passenger boarding bridge (PBB)**

enclosed adjustable passenger walkway connecting the terminal building to the aircraft

#### 3.2

##### **apron-drive bridge**

PBB with a drive unit, that can be driven across the apron within its operating range

#### 3.3

##### **pedestal bridge**

PBB without an apron drive unit

1) And all relevant parts.

**EN 12312-4:2003+A1:2009 (E)****3.4****suspended bridge**

PBB which is driven from a cantilevered structure

**3.5****rotunda**

enclosed structure about which the PBB rotates for radial movement and hinges for vertical movement

**3.6****rotunda column**

supporting structure for the rotunda

**3.7****tunnel**

enclosed walkway section

**3.8****elevating leg**

assembly for raising and lowering the PBB

**3.9****drive unit**

wheeled carriage of apron-drive bridges on which elevating legs are mounted

**3.10****bridgehead**

transitional area at the aircraft end of the PBB

**3.11****canopy**

flexible weather protection between the aircraft and the PBB

**3.12****service stair**

stair and landing allowing access from the apron to the PBB

**3.13****autoleveller**

device which ensures automatic vertical adjustment of the PBB, corresponding to vertical movement of the aircraft

**3.14****vertical drive system**

means of adjusting the height of the PBB

**3.15****horizontal drive system**

means of adjusting the position of the PBB in the horizontal plane

**3.16****telescoping system**

system used to extend or retract the PBB

**3.17****bridgehead rotation system**

means to adjust the bridgehead sill towards the fuselage of the aircraft

**3.18****translation**

movement of the PBB across an airfield apron. Movement involves elements of rotation and/or extension

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**3.19****inter-ramp**

short ramp providing a smooth transition between telescoping tunnel floors, or where a step might otherwise occur

**3.20****emergency lowering**

means of coping automatically with a sudden aircraft movement exceeding the capability of normal autolevelling

**3.21****manual mode**

mode, which allows operator-initiated control of all bridge movements

**3.22****automatic mode**

mode that initiates control of all PBB movement without intervention by the operator. This does not include autolevelling mode

**3.23****safety shoe**

pressure-sensitive switch placed underneath the open door of an aircraft to detect excessive downward motion of the aircraft

**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 PBB's and which require action to eliminate or reduce risks. Not covered are risks and hazards due to the traffic on the apron,  $\text{A}_1$  repair  $\text{A}_1$  and general misuse.

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

**5.1.1**  $\text{A}_1$  PBB's 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.  $\text{A}_1$  They shall also conform to the specific requirements of this standard.

**5.1.2** Stability and strength calculations shall be carried out in accordance with  $\text{A}_1$  EN 1915-2  $\text{A}_1$ . Resonance shall be considered.

**5.1.3** The lower parts of drive units of apron-drive bridges shall be guarded/safe-guarded by e.g. safety hoops, wheel cages, wheel coverings, switch bars.

**5.2 Controls, monitoring and warning devices**

**5.2.1** Positioning controls shall control the movement and speed of the PBB. The control devices shall ensure that the approach/docking speeds and direction can be maintained by the operator, e.g. marking of joy stick position, switch speed selector, separate control devices.

**5.2.2** An emergency stop shall be provided at the control panel.  $\text{A}_1$  It shall meet the requirements in EN ISO 13850:2008 category 0 (see 4.1.4 of EN ISO 13850:2008).  $\text{A}_1$  In addition, at least one emergency stop easily accessible from the apron, e.g. between 1,0 m and 1,5 m high and maximum 0,5 m from the outer contour shall be provided on the drive unit of apron-drive PBB's.

**5.2.3** For apron-drive PBB's, a monitoring system, e.g. camera, monitor display at the control panel allowing visibility of the area surrounding the drive unit and bottom of the service stair shall be provided. It shall be possible to distinguish a human form.

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**5.2.4** Where cameras are provided they shall be mounted below the PBB in a position to conform to 5.2.3. They shall be installed in such a manner as to ensure no misting of the camera lenses.

**5.2.5** The monitoring system shall remain on, while the PBB is manoeuvring.

**5.2.6** Intermittent amber warning light(s) shall be positioned so as to be clearly visible from all directions by persons on the apron. The minimum electrical power of lamps shall be 25 W.

**5.2.7** The warning lights shall be activated prior to, and during any movement of, the PBB.

NOTE The warning lights are not required to operate when the PBB is in autolevel mode.

**5.2.8** An audible warning device shall be activated automatically while the PBB is manoeuvring.

NOTE The audible warning device is not required to operate when the PBB is in autolevel mode.

**5.2.9** Where an audible warning device is used to indicate height adjustment while in autolevel mode, this signal shall be clearly identifiable as separate to the signal used during movement.

**5.2.10** Signals shall be clearly audible by persons on the apron, e.g. in the vicinity of the drive unit.

**5.2.11** During autolevelling the subsequent positioning of the canopy shall be automatic. The corresponding safety circuit shall be according to EN 954-1:1996, category 1.

**5.3 Vertical drive systems**

**5.3.1** Vertical drive systems for PBB's shall be designed so that the supporting structures withstand all stresses (which may occur during operation or when safety devices are tripped) at an evenly distributed working load of 3 000 N/m<sup>2</sup> without permanent deformation.

NOTE Additional loads are dependent on the site of installation, e.g. wind load, snow load (see clause 0 of EN 1915-1:2001 — negotiation).

**5.3.2** Where a PBB is supported by two lifting devices, one shall be capable of supporting the PBB under full load conditions in the event of failure of either of them. Consideration shall also be given to the effect on the whole structure. This loading condition shall be considered as exceptional.

**5.3.3** The lowering distance of 100 mm in case of failure as given in 5.20.2 of EN 1915-1:2001 shall be measured at the bridgehead sill.

**5.4 Horizontal drive systems**

**5.4.1** Where fixed electrical ground power systems for the aircraft are provided on the PBB, they shall be interlocked to the horizontal drive system to prevent movement of the PBB while the connection to the aircraft is made. The corresponding safety circuit shall be according to EN 954-1:1996, category 1.

**5.4.2** Telescoping systems shall be designed so that:

- correct alignment of the tunnels is assured;
- the tunnel end positions are secured by fixed buffered mechanical limit stops in such a way as to prevent separation of the tunnels.

**5.4.3** Telescoping systems designed with a built-in extension/retraction driving system, shall be such that when stopped the tunnel elements remain in their position. These devices shall be able to stop the telescoping movement in normal operation and in an emergency situation within 0,1 m, e.g. main power failure, activation of an emergency stop.

**5.4.4** With the exception of hydrostatic drives translation systems shall be equipped with a braking system operating automatically if the PBB is without power or not being driven. In the case of power failure, it shall be possible to release the braking system to allow the PBB to be moved from its position by auxiliary means, e.g. using a tractor. It shall be ensured that the PBB cannot be operated before resetting the braking system.

**5.4.5** Where the possibility of collision between PBB's exists, preventative safety measures shall be taken, e.g. by fixed buffered mechanical limit stops, distance detection systems.

## 5.5 Bridgehead rotation system

**5.5.1** The bridgehead rotation system shall be designed so that its end positions are secured by fixed buffered mechanical limit stops in such a way as to prevent rotation beyond the intended limits.

**5.5.2** The bridgehead rotation system shall, where non self-sustaining drives are used, be equipped with an automatic mechanical brake. This brake shall also be applied in case of power failure to the PBB and/or to the brake system. Any braking system shall stop the rotation within 1°.

**5.5.3** The leading edge of the bridgehead shall be entirely covered by protective padding and conform to the interface requirements given in  $\text{A1}$  ISO 7718 and ISO 16004  $\text{A1}$ .

## 5.6 Operating speeds

**5.6.1** The translational and built-in telescoping speed of the PBB, measured at the drive unit and the bridgehead respectively, shall be limited to a maximum of 0,5 m/s. A slow speed not exceeding 0,1 m/s shall be provided for safe final approach to the aircraft.

**5.6.2** In manual mode, raising or lowering speed of the PBB measured at the vertical drive system shall be limited to a maximum of 0,05 m/s for the docking procedure.

NOTE This speed can be increased to 0,1 m/s for pre-positioning.

**5.6.3** Rotational speed of the bridgehead shall be limited to a maximum of 3°/s.

**5.6.4** Autolevelling speed of the PBB measured at the vertical drive system shall be limited to a maximum of 0,05 m/s.

**5.6.5** The speed for emergency lowering of the PBB, initiated by the safety shoe underneath the aircraft door, measured at the vertical drive system, shall be limited to a maximum of 0,2 m/s for one second.

## 5.7 Passenger accommodation

**5.7.1** Areas for passenger movement within a PBB, i.e. the rotunda, tunnel sections and bridgehead shall be free from trip hazards. Steps shall be avoided.

**5.7.2** Slopes with respect to a horizontal plane shall not exceed 12,5 % over tunnel sections and 17 % over inter-ramps (see annex C).

NOTE Bridge inclination in relation to the horizontal plane should not exceed 10 % under intended operating conditions (see clause 0 of EN 1915-1:2001 — negotiation).

**5.7.3** Where the operational slope of any part of the PBB exceeds 12,5 %, i.e. over the inter-ramps, handrails to each side of the tunnel shall be provided in the area of that slope.

**5.7.4** The minimum continuous width of tunnel sections shall not be less than 1,4 m; localised protrusions, e.g. door handles, equipment cabinets, shall not reduce the clear width to less than 1,2 m.

NOTE Tunnel interiors should be free from protrusions where possible.

**5.7.5** The minimum clear height of all walking areas shall not be less than 2,1 m.