



**SLOVENSKI STANDARD**  
**SIST EN 16286-1:2024**

**01-december-2024**

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**Železniške naprave - Prehodni sistemi med vozili - 1. del: Glavne vrste uporabe**

Railway applications - Gangway systems between vehicles - Part 1: Main applications

Bahnanwendungen - Übergangssysteme zwischen Fahrzeugen - Teil 1:  
Hauptanwendungen

Applications ferroviaires - Systèmes d'intercirculation entre véhicules - Partie 1:  
Applications générales

**Ta slovenski standard je istoveten z: EN 16286-1:2024**

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**ICS:**

45.060.01      Železniška vozila na splošno      Railway rolling stock in  
general

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## Railway applications - Gangway systems between vehicles - Part 1: Main applications

Applications ferroviaires - Systèmes d'intercirculation  
entre véhicules - Partie 1: Applications générales

Bahnanwendungen - Übergangssysteme zwischen  
Fahrzeugen - Teil 1: Hauptanwendungen

This European Standard was approved by CEN on 2 September 2024.

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## EN 16286-1:2024 (E)

### European foreword

This document (EN 16286-1:2024) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, 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of an identical text or by endorsement, at the latest by April 2025, and conflicting national standards shall be withdrawn at the latest by April 2025.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 16286-1:2013.

EN 16286-1:2024 includes the following significant technical changes with respect to EN 16286-1:2013:

- Scope has been modified and adopted to current wording of EN 17343;
- Normative references have been updated;
- Terms and definitions have been revised;
- 7.3.1 “Outer gangway dimensions” has been revised;
- 7.3.2 “Clearway” has been revised;
- 7.3.3 “Clearway for wheelchairs” has been revised;
- 7.3.5 “Steps and ramps” has been revised;
- 7.4 “Relative movements” has been revised;
- 7.5.1 “Vertical load applied to floor system” has been revised;
- 7.5.4 “Aerodynamic loads” has been revised;
- New 7.14 “Handrails” has been added;
- 7.15 “Other requirements” (former 7.9) has been revised;
- 8.2 “Mechanical interfaces” has been revised;
- 9.2 “Movement test” has been revised;
- 9.3 “Wheelchair and service trolley test” has been revised;
- 9.4 “Pressure tightness test” has been revised;
- 9.5 “Water tightness” has been revised;
- New 9.7 “Endurance test” has been added;

- 10.4 “Cleaning of a gangway” has been revised;
- New 10.6 “Repair instructions” has been added;
- Annex A has been and changed to “informative”;
- New informative Annex C “Endurance test parameters and test criteria” has been added;
- Update of Annex ZA.

This series of European Standards EN 16286, *Railway applications — Gangway systems between vehicles*, consists of the following parts:

- *Part 1: Main applications*
- *Part 2: Acoustic measurements*

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.

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.

**EN 16286-1:2024 (E)****Introduction**

The railway system requires technical rules for train concepts with flexible connections which allow passage from one vehicle to the next vehicle (or between vehicle modules). This document describes main requirements for the design and validation of gangway systems.

The requirements set out in this document are based on long-term existing practices and procedures developed and currently in use by railway undertakings and industry. The application of these systems has changed over the years.

For many years the majority of gangway systems consisted of rubber tubes pressed together when coaches were coupled. This solution was standardized in UIC leaflet 561:1991 with the aim to reconfigure train sets. Information about the main requirements of this leaflet has been incorporated in this document as Annex A.

The aim of EN 16286-1 is to cover project-specific solutions, which have been developed for each train set; for example, for multiple units, metro vehicles or tram vehicles.

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## 1 Scope

This document specifies the technical and safety requirements applicable to gangway systems used in heavy rail and urban rail vehicles that are designed to allow passengers or staff to move between adjacent vehicles.

It also specifies

- the requirements for the safety for passengers and/or staff in the gangway while the train is running,
- the assessment methods as well as pass/fail criteria for gangways installed on vehicles.

**NOTE** Some requirements in this document may not be applicable for gangways designed for use by staff only.

This document is not intended to specify requirements for articulation systems which can be an integral part of gangway systems.

This document is not applicable for rubber tube gangways and interconnecting gangways for coaches travelling at speeds of up to 200 km/h on high-speed lines with tunnel sections. Information about these types of gangway systems are given in Annex A and Annex B.

## 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 12663-1:2010+A2:2023, *Railway applications - Structural requirements of railway vehicle bodies - Part 1: Locomotives and passenger rolling stock (and alternative method for freight wagons)*

EN 14067-5:2021, *Railway applications - Aerodynamics - Part 5: Requirements and assessment procedures for aerodynamics in tunnels*

EN 15663:2017+A1:2018, *Railway applications - Vehicle reference masses*

EN 16286-2:2023, *Railway applications - Gangway systems between vehicles - Part 2: Acoustic measurements*

EN 16585-3:2017, *Railway applications - Design for PRM use - Equipment and components on board rolling stock - Part 3: Clearways and internal doors*

EN 45545-1:2013, *Railway applications - Fire protection on railway vehicles - Part 1: General*

EN 45545-2:2020+A1:2023, *Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components*

EN 45545-3:2013, *Railway applications - Fire protection on railway vehicles - Part 3: Fire resistance requirements for fire barriers*

EN 45545-4:2013, *Railway applications - Fire protection on railway vehicles - Part 4: Fire safety requirements for rolling stock design*

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EN 50125-1:2014, *Railway applications - Environmental conditions for equipment - Part 1: Rolling stock and on-board equipment*

EN ISO 6946:2017, *Building components and building elements - Thermal resistance and thermal transmittance - Calculation methods (ISO 6946:2017, Corrected version 2021-12)*

**3 Terms and definitions**

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

ISO and IEC maintain terminological 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 General definition****3.1.1****nominal position**

gangway position on straight level track where all relative movements of the vehicles are zero

Note 1 to entry: See 7.4 for relative movements.

**3.2 nominal geometric dimensions**

NOTE Nominal dimensions are defined on straight level track, vehicle suspension in nominal condition, and mass of the vehicle in the “as built” condition (dead mass), as defined in EN 15663.

**3.2.1****length**

distance between the vehicle-connection surfaces of a gangway with the coupler or articulation at the nominal position

**3.2.2****width**

distance between lateral inner face of the gangway

Note 1 to entry: The width is often measured at shoulder height.

Note 2 to entry: See Figure 1.

**3.2.3****horizontal clearway**

unobstructed distance between lateral inner faces of the gangway at floor level

Note 1 to entry: See Figure 1.

Note 2 to entry: The horizontal clearway may be reduced above the floor level provided it maintains the minimum dimensions in 7.3.2.

**3.2.4****vertical clearway**

unobstructed distance between gangway floor level and the interior ceiling or panel of the gangway

Note 1 to entry: See Figure 1.

**3.2.5****outer gangway width**

maximum overall outer width of the gangway

Note 1 to entry: See Figure 1.

**3.2.6****outer gangway height**

overall outer height of the gangway

Note 1 to entry: See Figure 1.

**3.2.7****gangway floor height**

distance between floor level of the gangway and top of the rail

Note 1 to entry: See Figure 1.

**3.2.8****reference point**

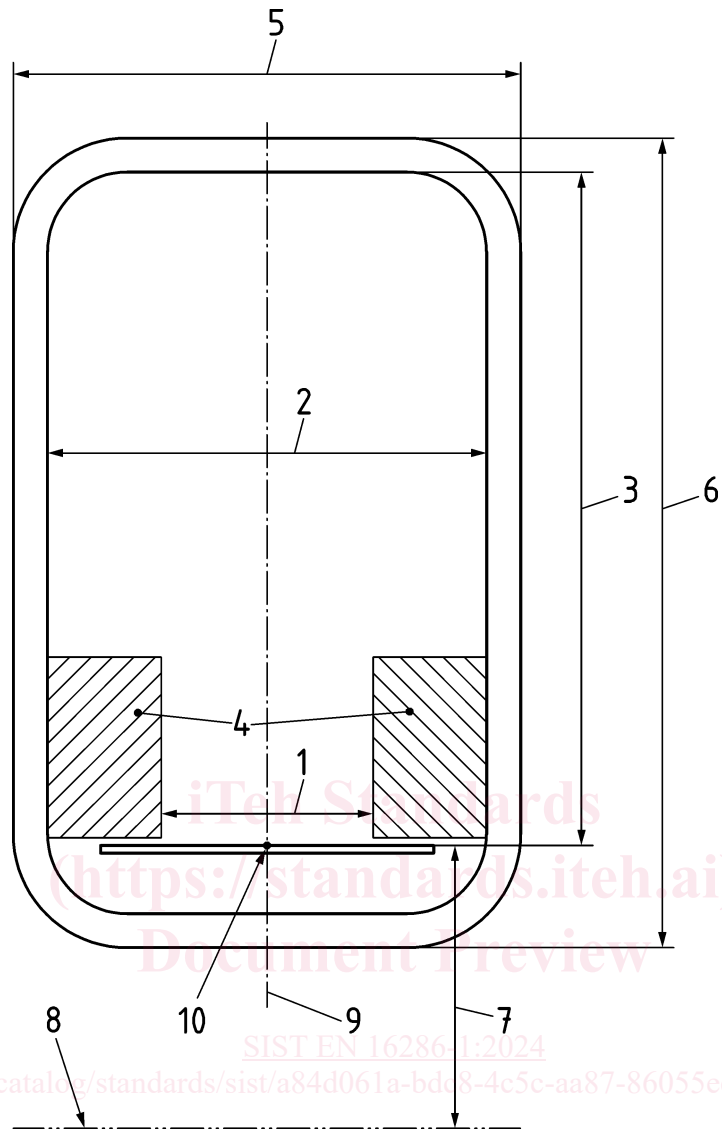
intersection of floor level with vehicle centre plane at the vehicle end

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**Key**

1	horizontal clearway	6	outer gangway height
2	width	7	gangway floor height
3	vertical clearway	8	top of the rail
4	skirts, inner panel, etc.	9	vehicle centre plane
5	outer gangway width	10	reference point

**Figure 1 — Gangway - design example**

### 3.3 relative movements of the vehicles

NOTE Real relative movements of the vehicles typically consist of any combination of the movements defined in 3.3.1 to 3.3.7.

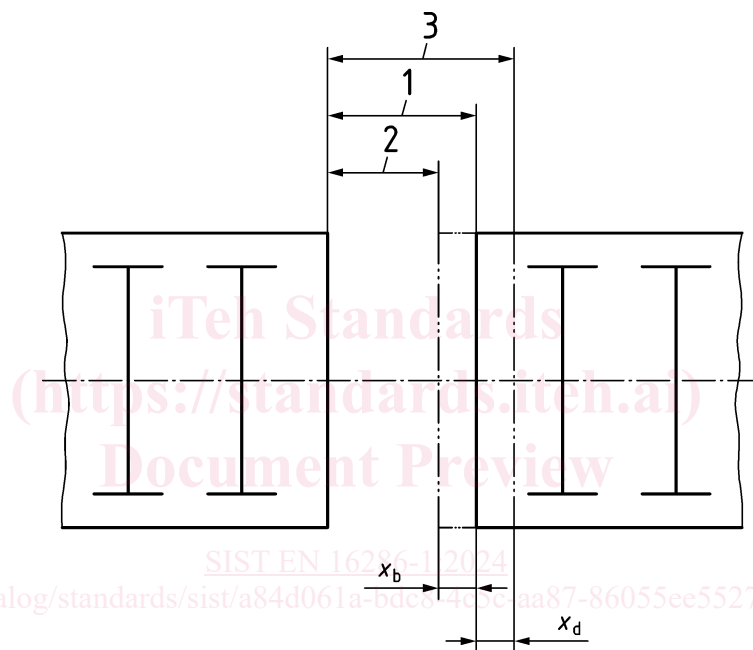
#### 3.3.1 longitudinal displacement

$x$

deflection of the length of the gangway in longitudinal direction on track

Note 1 to entry: Longitudinal displacement is the extension or compression of the nominal length, see Figure 2.

Note 2 to entry: Longitudinal displacement is generated, for example, by buff and draw of the connected coupling system.



#### Key

- 1 nominal length
- 2 compressed length
- 3 extended length
- $x_b$  longitudinal displacement (buff)
- $x_d$  longitudinal displacement (draw)

Figure 2 — Longitudinal displacement

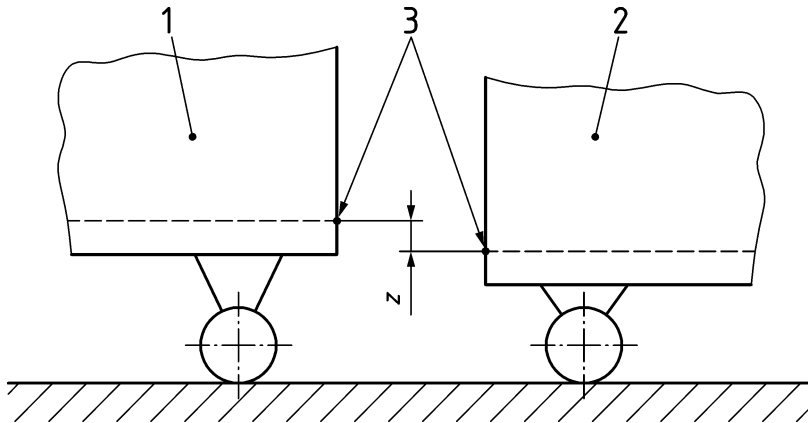
#### 3.3.2 vertical displacement

$z$

vertical distance between reference point of vehicle 1 and reference point of vehicle 2

Note 1 to entry: See Figure 3.

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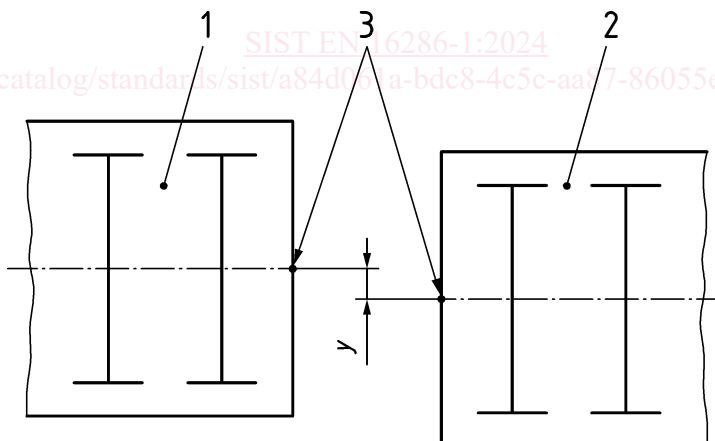
**Key**

- 1 vehicle 1
- 2 vehicle 2
- 3 reference points
- $z$  vertical displacement

**Figure 3 — Vertical displacement****3.3.3****lateral displacement** $y$ 

lateral distance between reference point of vehicle 1 and reference point of vehicle 2

Note 1 to entry: See Figure 4.

**Key**

- 1 vehicle 1
- 2 vehicle 2
- 3 reference points
- $y$  lateral displacement

**Figure 4 — Lateral displacement**