



SLOVENSKI STANDARD
oSIST prEN 16286-1:2023
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Železnice - 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: prEN 16286-1

ICS:

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general

oSIST prEN 16286-1:2023

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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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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prEN 16286-1:2023 (E)**European foreword**

This document (prEN 16286-1:2023) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 16286-1:2013.

prEN 16286-1:2023 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;
- 7.5.2 “Vertical load applied to floor system” has been revised;
- 7.5.5 “Aerodynamic loads” has been revised;
- New subclause 7.14 “Handrails” has been added;
- 9.2 “Movement test” has been revised;
- 9.3 “Wheelchair and service trolley test” has been revised;
- 9.5 “Water tightness” has been revised;
- New subclause 9.7 “Endurance test” has been added;
- New subclause 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 given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s)/Regulation(s).

For relationship with EU Directive(s)/Regulation(s), see informative Annex ZA, which is an integral part of this document.

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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. Main requirements of this leaflet have been incorporated in this document as Annex A.

UIC Leaflet 561:1991 was the only reference document available, but did not cover project specific solutions, which have been developed for each train set; for example, for multiple units, metros or tramways. The aim of EN 16286-1 is to close this gap and to cover the complete range of gangway systems.

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1 Scope

This document defines 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 defines

- 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 define 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+A1:2014, *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 test procedures for aerodynamics in tunnels*

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

prEN 16286-2:2022, *Railway applications — Gangway systems between vehicles — Part 2: Acoustic measurements*

prEN 16585-3:2022, *Railway applications — Design for PRM use — Equipment and components on board rolling stock — Part 3: Clearways and internal doors*

EN 45545 (all parts), *Railway applications — Fire protection on railway vehicles*

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

3.1 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.

3.1.1 length

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

3.1.2 width

distance between lateral inner face of the passage

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

Note 2 to entry: See Figure 1.

3.1.3 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.

3.1.4 vertical clearway

unobstructed distance between gangway floor level to the top of the passage (panel, ceiling, etc.)

Note 1 to entry: See Figure 1.

3.1.5 outer gangway width

overall outer width of the gangway

Note 1 to entry: See Figure 1.

3.1.6 outer gangway height

overall outer height of the gangway

Note 1 to entry: See Figure 1.

3.1.7

gangway floor height

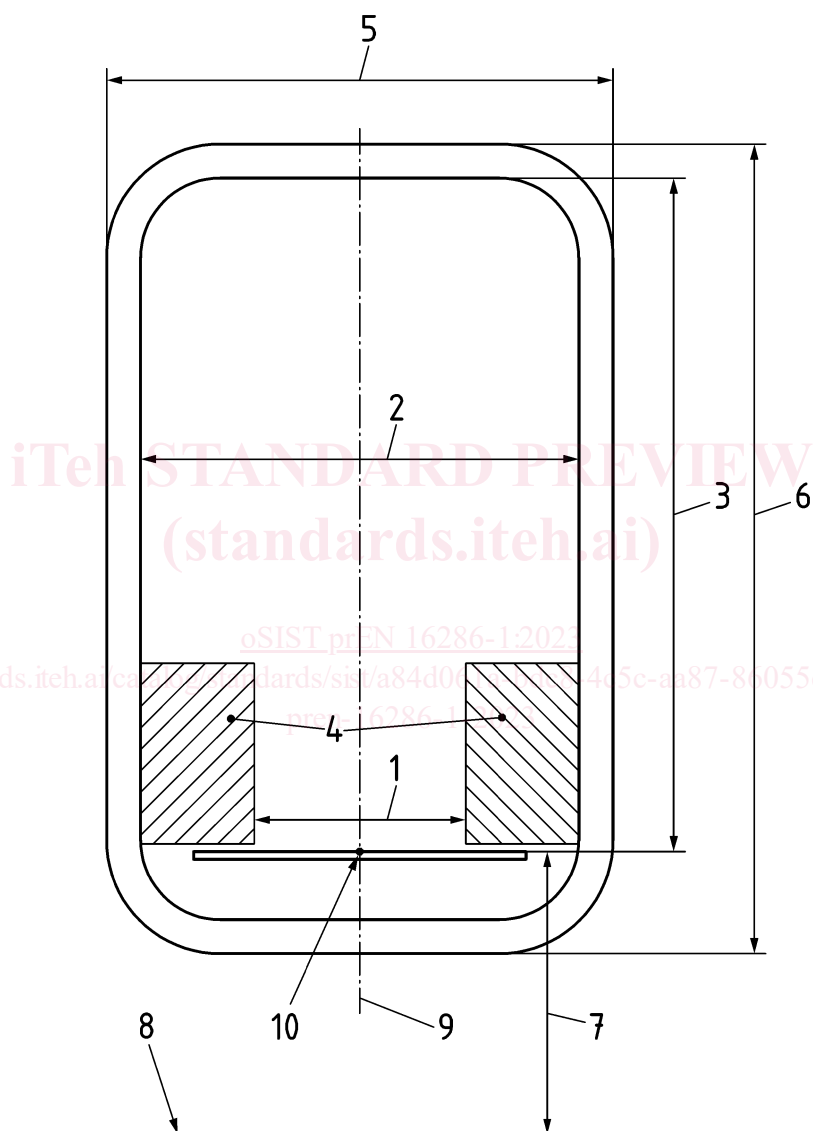
distance between floor level of the gangway and top of the rail

Note 1 to entry: See Figure 1.

3.1.8

reference point

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



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 | centre plane |
| 5 | outer gangway width | 10 | reference point |

Figure 1 — Design example

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3.2 relative movements of the vehicles

NOTE Real relative movements of the vehicles typically consist of any combination of the movements defined in 3.2.1 up to and including 3.2.7.

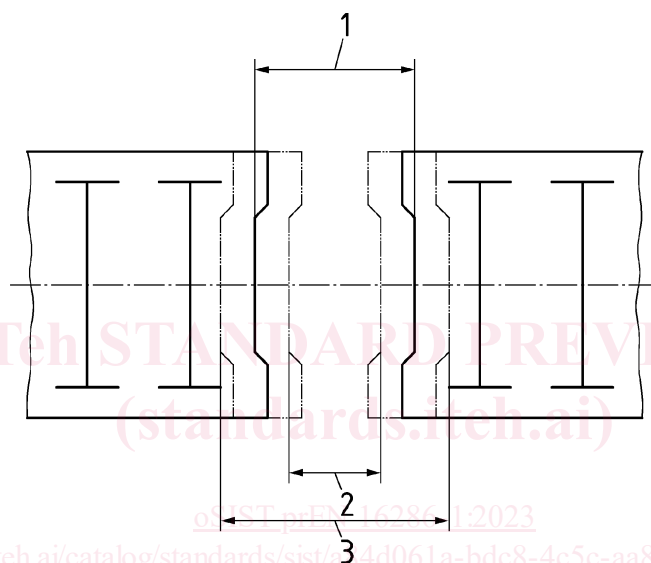
3.2.1

longitudinal displacement

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

Note 1 to entry: Longitudinal displacement is the increase or decrease 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 x_b
- 3 extended length x_d

Figure 2 — Longitudinal displacement

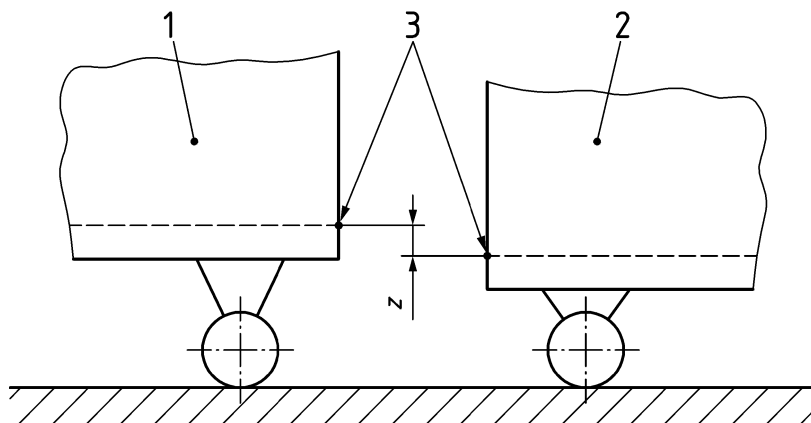
3.2.2

vertical displacement

z

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

Note 1 to entry: See Figure 3.

**Key**

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

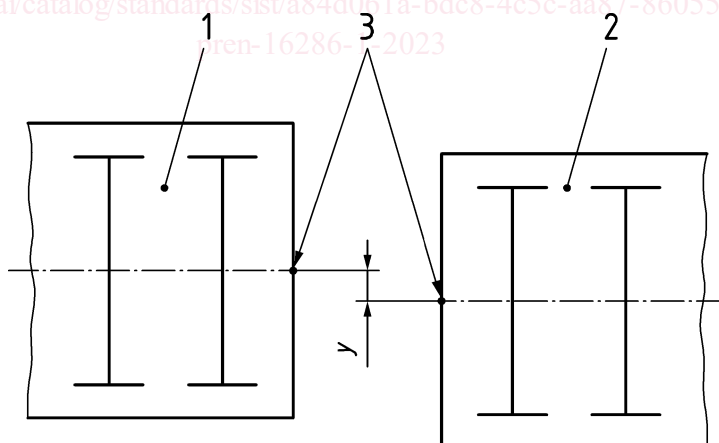
Figure 3 — Vertical displacement**3.2.3****lateral displacement****y**

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

Note 1 to entry: See Figure 4.

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**Key**

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

Figure 4 — Lateral displacement

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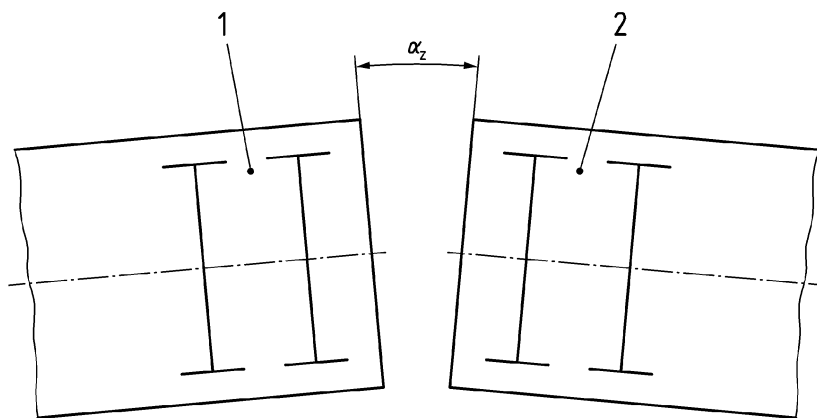
3.2.4

yaw angle

α_z

angle between the vehicle ends measured around z-axis

Note 1 to entry: See Figure 5



Key

1 vehicle 1

2 vehicle 2

α_z yaw angle

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Figure 5 — Yaw angle

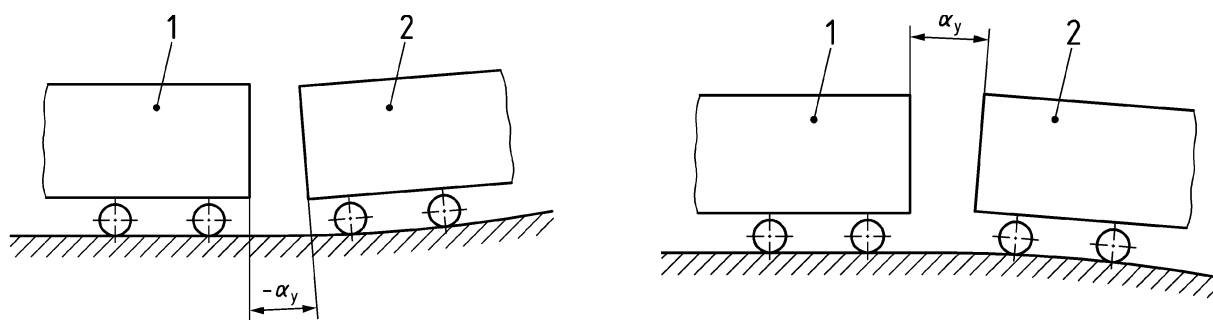
3.2.5

pitch angle

α_y

negative or positive angle between vehicle ends, measured around the y-axis

Note 1 to entry: See Figure 6.



a) negative angle (concave)

b) positive angle (convex)

Key

1 vehicle 1

2 vehicle 2

α_y pitch angle

Figure 6 — Pitch angle

3.2.6**roll angle** α_x

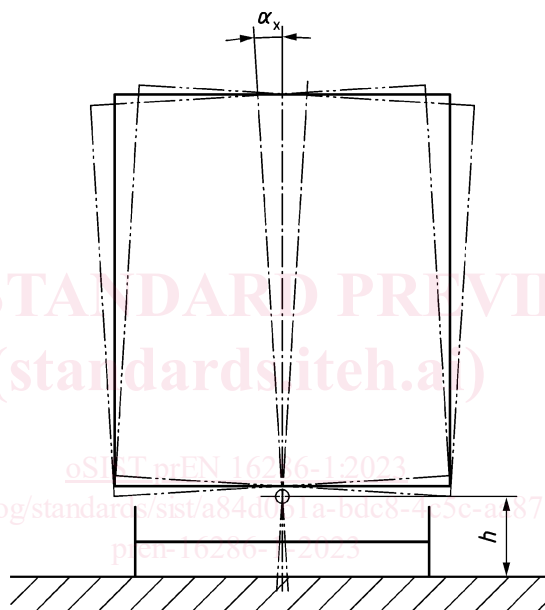
rotation around the longitudinal x-axis (roll centre) that defines the angle between vehicle centre plane 1 and vehicle centre plane 2

Note 1 to entry: See Figure 7.

3.2.7**roll centre height** h

vertical distance from top of rail to the roll centre

Note 1 to entry: See Figure 7.

**Key**

h roll centre height

α_x roll angle

Figure 7 — Roll angle

3.3 vehicle connection types**3.3.1****vehicle connection by coupling system**

vehicle connection where the relative movements of vehicles are influenced by more than one pivot point

3.3.2**vehicle connection by articulation**

vehicle connection where the relative movements of vehicles are influenced by one pivot point