BS EN 16585-3:2017

BSI Standards Publication

Railway applications — Design for PRM use — Equipment and components on board rolling stock

Part 3: Clearways and internal doors

bsi.

National foreword

This British Standard is the UK implementation of EN 16585-3:2017.

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Applications ferroviaires - Conception destinée à l'usage par les PMR - Equipements et éléments à bord du matériel roulant - Partie 3 : Passages et portes intérieures

Bahnanwendungen - Gestaltung für die Nutzung durch PRM - Ausstattung und Bauteile in Schienenfahrzeugen - Teil 3: Lichte Räume und Innentüren

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European foreword

This document (EN 16585-3:2017) 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of an identical text or by endorsement, at the latest by July 2017, and conflicting national standards shall be withdrawn at the latest by July 2017.

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For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

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Introduction

This document is part of a suite of four 'Design for PRM use' standards that have in total nine parts:

— EN 16584 is a standard that covers both infrastructure and rolling stock — Railway applications — Design for PRM use - General requirements:

  — Part 1: Contrast (EN 16584-1);

  — Part 2: Information (EN 16584-2);

  — Part 3: Optical and friction characteristics (EN 16584-3).

— EN 16585 is a standard that covers rolling stock - Railway applications - Design for PRM use - Equipment and components on board rolling stock:

  — Part 1: Toilets (EN 16585-1);

  — Part 2: Elements for sitting, standing and moving (EN 16585-2);

  — Part 3: Clearways and internal doors (EN 16585-3).

— EN 16586 is a standard that covers Rolling stock — Railway applications — Design for PRM use - Accessibility of persons with reduced mobility to rolling stock:

  — Part 1: Steps for access and egress (EN 16586-1);

  — Part 2: Boarding aids (EN 16586-2).

— EN 16587 is a standard that covers Infrastructure — Railway applications — Design for PRM use - requirements for obstacle free routes for infrastructure.

These standards aim to clarify the requirements (with clear and consistent terms and definitions) and to define the associated criteria and, where appropriate, methodologies to allow a clear pass/fail assessment.

1 Scope

This European Standard describes the specific 'Design for PRM use' requirements applying to rolling stock and the assessment of those requirements. The following applies to this standard:

— the definitions and requirements describe specific aspects of 'Design for PRM use' required by persons with disabilities and persons with reduced mobility as defined in the PRM TSI;

— this standard defines elements which are universally valid for obstacle free travelling including toilets, elements for sitting, standing and moving and clearways and internal doors. The definitions and requirements of this standard are to be used for rolling stock applications;

— this standard only refers to aspects of accessibility for PRM passengers. It does not define general requirements and general definitions;

— this standard assumes that the rolling stock is in its defined operating condition;

— where minimum or maximum dimensions are quoted these are absolute NOT nominal requirements.

The 'Equipment and components' standard is written in three parts:

— Part 1 contains:

  — toilets;

— Part 2 contains:

  — handholds;

  — seats;

  — wheelchair spaces;

— this document is Part 3 and contains:

  — clearways;

  — internal doors.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1756-2, *Tail lifts - Platform lifts for mounting on wheeled vehicles - Safety requirements - Part 2: Tail lifts for passengers*

EN 16584-1, *Railway applications — Design for PRM use - General requirements — Part 1: Contrast*

EN 16584-2, *Railway applications — Design for PRM use - General requirements — Part 2: Information*

EN 16585-1:2017, *Railway applications — Design for PRM use - Equipment and components on board rolling stock — Part 1: Toilets*

EN 16586-2, *Railway applications — Design for PRM use - Accessibility of persons with reduced mobility to rolling stock — Part 2: Boarding aids*

EN 14752:2015, *Railway applications - Body side entrance systems for rolling stock*

3 Terms and definitions

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

3.1
automatic door
powered door which opens and closes without the need for the passenger to operate a control device

3.2
clear width
clear usable width
unobstructed width of an open door or clearway to allow a PRM to pass through

3.3
clearway
unobstructed space with defined widths and heights to allow movement within a vehicle

3.4
first step
step that is the first step for a passenger to use, to overcome a height change

Note 1 to entry: For the external access/egress steps this will normally be the step that is closest to the platform edge (it may be a fixed or a moveable step), therefore this is the first step when boarding and the last step when alighting.

Note 2 to entry: In the context of steps for internal height changes (other than the external access/egress steps) this means the first usable step when ascending and the edge of the walking floor when descending.

3.5
gangway
means for passengers to pass from one vehicle of a train to the adjacent vehicle and includes the inter-vehicle connection device and any aisle (e.g. between body end cupboards, cabinets or toilets) immediately adjacent to the device

Note 1 to entry: This definition is intentionally different to EN 16286–1.

3.6
inter-vehicle gangway
articulating device allowing transit between vehicles (provided for passenger use)

3.7
handrail
continuous element with round cross section for passengers to use to aid personal stability by gripping around

3.8
last step
final step for an ascending passenger to use to overcome a height change, forming the edge of the walking floor

3.9
manual door
unpowered door which the passenger has to physically open and/or close

3.10
palm operable
operable by the palm or any part of the hand, not requiring fingers to be unclenched

Note 1 to entry: The design need is that passengers with painful conditions, which affect their joints such as arthritis, may be unable to (and are likely to experience discomfort or pain if they do) exert any force with the tip of a single finger. Many may not be able to unclench their fingers to do this or perform any pulling action.

3.11
proximity sensor
sensor that can be used to control facilities without the control device being physically touched

3.12
semi-automatic door
powered door which opens and/or closes following operation of a control device by a passenger

3.13
universal toilet
toilet designed to be used by all passengers including passengers in wheelchairs

3.14
usable width
unobstructed width of an open door or passageway allowing for passengers to pass through

3.15
wheelchair
wheeled personal mobility device

Note 1 to entry: Wheelchair characteristics are defined in EN 16585–1:2017, Annex A.

3.16
wheelchair space
designated space in the passenger compartment for the wheelchair users and their wheelchairs

Note 1 to entry: Space can be designed for two wheelchairs, one beside the other (dual).

4 Symbols and abbreviations

For purposes of this document, the symbols and abbreviations in Table 1 and Table 2 apply.

Table 1 — Abbreviations

Abbreviation	Designation
EN	European Standard (Euronorm)
ISO	International Organization for Standardization
PRM	Persons with disabilities and persons with reduced mobility
TSI	Technical Specification for Interoperability

Table 2 — Symbols

Symbols	Designation	Unit
°	Angle	degree
mm	Length	millimetre
N	Force	Newton

5 Requirements and assessment

5.1 General

Assessment of the requirements identified in Clause 5 shall be according to Annex A and Annex B. Where additional assessment criteria apply, these will be identified against the relevant clause.

All dimensions in the figures are in millimetres (mm) unless otherwise stated.

5.2 Doors

5.2.1 General

1) These requirements apply only to doors providing access to another public part of the train, with the exclusion of toilet doors.

   — When assessing these requirements they are only applicable to doors that provide access to parts of the train that are intended for use by the travelling public. (This excludes, for example, train crew only areas and equipment cupboards).

2) To latch or unlatch a manually operated door for use by the public, the control device shall:

   i. be palm operable of the hand.

      — Assessment shall be as described in Clause 6.

   ii. be operable by exerting a force not exceeding 20 N.

      — Assessment of force required to operate a control device shall be by pulling or pushing the device depending on its normal mode of operation with the representative clenched fist as described in Clause 6 with a ‘force gauge’ or 'force meter' until the door is latched or unlatched. See Annex C for an example force meter.

3) Door controls, whether manual, pushbuttons or other devices shall:

   i. contrast with the surface on which they are mounted;

      — Contrast shall be assessed according to EN 16584-1.

   ii. have visual indication, on or around it when enabled;

      — Visual indication shall be assessed according to EN 16584-2.

      — This requirement shall only be assessed for electrical devices requiring a physical force to be applied in order to operate.

iii. be palm operable of the hand exerting a force not greater than 15 N;

— Assessment of force required to operate a control device shall be by pulling or pushing the device depending on its normal mode of operation with the representative clenched fist as described in Clause 6 with a ‘force gauge’ or 'force meter' until the door is latched or unlatched. See Annex C for an example force meter.

iv. be identifiable by touch; this identification shall indicate the functionality.

— 'Identifiable by touch' in this context shall be assessed as tactile (for example tactile markings) according to EN 16584-2.

v. If both open and closed door control devices are fitted one above the other: the top button shall always be the open control. (To be subject to this requirement the buttons do not need to be directly one above the other).

For systems that are operated by proximity sensors the requirements in 5.2.1 (3) do not apply. Proximity sensors should detect objects (for example a guide dog) at a minimum of 500 mm and upwards from the walking floor.

5.2.2 Interior doors

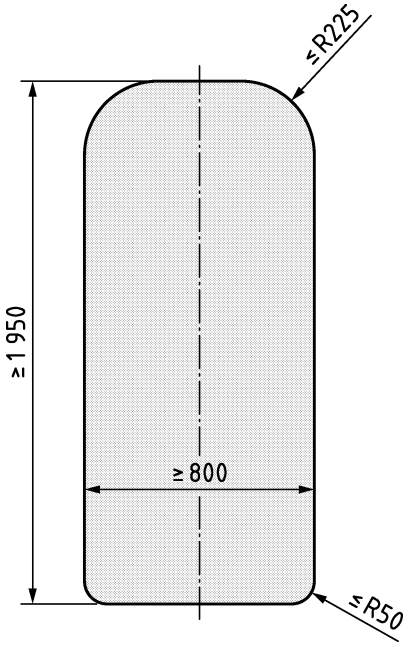
1) Internal automatic and semi-automatic doors shall incorporate devices that prevent passengers becoming trapped during operation of the doors.

— Assessment shall be according to method described in EN 14752:2015, 5.2.1.4.2.2 for Exterior doors using the following peak force: $Fp \leq 300$ N.

2) Interior doors that are made available for wheelchair users shall have a minimum clear usable width of 800 mm (see Figure 1).

— When assessing this requirement there shall be no protrusions into the minimum clear usable width of 800 mm, such as handles or other features, from the floor up to a minimum height of 1 450 mm.

Dimensions in millimetres



Minimum height of 1 950 mm is recommended.

Figure 1 — Clear usable width through an internal door

3) The force required to open or close a manual door shall not exceed 60 N.

   — Assessment of force required shall be by pulling or pushing the door relative to its normal mode of operation with a ‘force gauge’ or 'force meter' until the door is fully opened or fully closed. See Annex C for an example force meter.

   It is recommended that manual doors are not used for wheelchair accessible areas.

4) The centre of interior door controls shall be between 800 mm and 1 100 mm above the floor

   — measured vertically from the walking floor.

   If the door is to be operable by a wheelchair user: it should be shown to be within the defined reach range see EN 16585-1:2017, Figure B.2 for wheelchair occupant reach range.

5) Automatic or semi-automatic inter-vehicle connecting doors shall operate either synchronously as a pair, or the second door shall automatically detect the person moving towards it and open.

   — When assessing this requirement a difference of up to 0,2 s is allowed for synchronous operation.

6) If more than 75 % of a door’s surface is made of a transparent material, it shall be clearly marked with visual indicators.

   — Assessment shall be according to EN 16584-1.

5.3 Clearways

1) From the vehicle entrance, the section of the clearway through the vehicle shall be as follows:

i. 450 mm from floor level to a height of 1 000 mm.

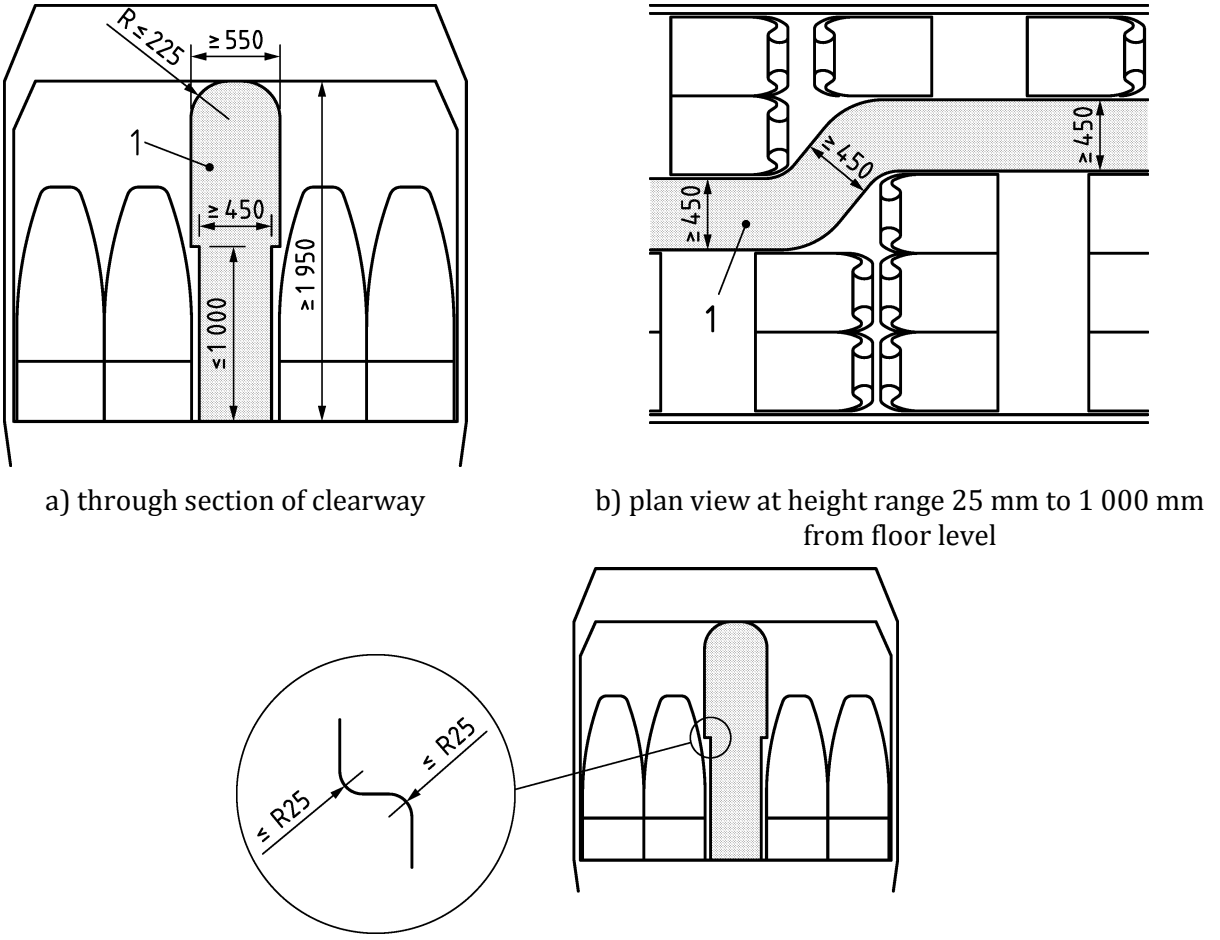
— 450 mm width shall be measured according to Figure 2a and 2b vertically at any point above the walking floor up to a height of 1 000 mm.

ii. 550 mm from a height of 1 000 mm to 1 950 mm.

— 550 mm width shall be measured according to Figure 2a vertically above the walking floor at any point from 1 000 mm up to a height of 1 950 mm.

— In all areas of double-deck vehicles, gangways and door areas of single deck vehicles the minimum height of 1 950 mm shall be replaced by the relative ceiling height provided in those areas. In those areas, reduced ceiling height is only accepted as a consequence of structural constraints (gauge, physical space).

Dimensions in millimetres



a) through section of clearway

b) plan view at height range 25 mm to 1 000 mm from floor level

c) detail to show middle and lower radii

Key

1 clearway

Figure 2 — Vehicle interior clearways

2) The clearway width between connecting vehicles of a single trainset shall maintain a minimum of 550 mm.

   — 550 mm width shall be measured on straight and level track according to Figure 3 vertically from the walking floor to a recommended height of 1 950 mm.

   — The height of 1 950 mm is not mandatory and can be replaced by the relative ceiling height provided in those areas. In those areas, reduced ceiling height is only accepted as a consequence of structural constraints (gauge, physical space).

   NOTE 1 This assessment is for the clearway through the inter-vehicle gangway.

Dimensions in millimetres

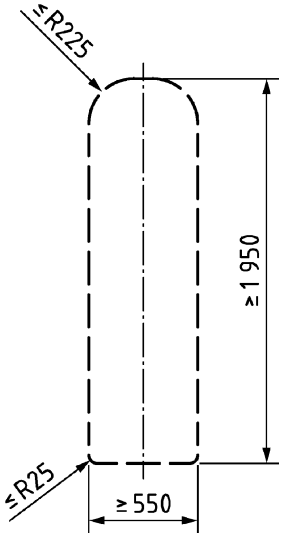


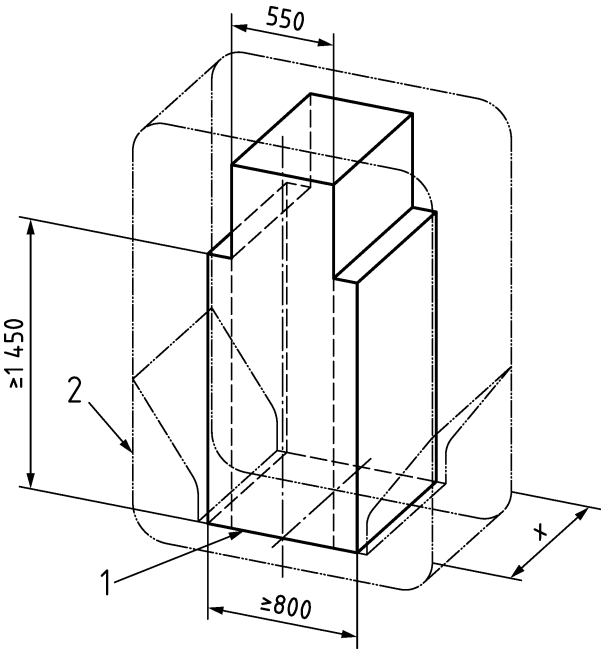
Figure 3 — Minimum clearway profile between connecting vehicles of a single trainset

3) Where a gangway is designed to allow wheelchair access between vehicles the 800 mm clearway should be maintained in each service condition as defined in EN 16286-1.

— Assessment: the volume as shown in Figure 4 shall be maintained as clearway over the length of the gangway as well as in associated gangway doors under each service condition, e.g. curves.

— Assessment: the horizontal clearway for wheelchairs shall maintain a minimum of 800 mm up to a minimum height of 1 450 mm.

Dimensions in millimetres



Key

1 top of floor
2 gangway shape
x length of the gangway

Figure 4 — Volume representing the clearway for wheelchairs between connected vehicles

4) Access to and from wheelchair accessible doors, wheelchair spaces and wheelchair accessible areas including sleeping accommodation and universal toilets if provided, shall have a minimum clearway width of 800 mm wide up to a minimum height of 1 450 mm at any point, see Figure 5.

   — 800 mm width shall be assessed according to Figure 5 vertically at any point above the walking floor up to a minimum height of 1 450 mm.

   — The clearway shall be arranged to permit unobstructed movement of the wheelchair as detailed in EN 16585-1:2017, Annex A and Annex B.

      — Assessment according to Table 3 shall be used to prove unobstructed movement.

   — 550 mm width shall be assessed according to Figure 5 vertically at any point above the walking floor up to a minimum height of 1 950 mm.

   — In all areas of double-deck vehicles, gangways and door areas of single deck vehicles the minimum height of 1 950 mm shall be replaced by the relative ceiling height provided in those areas. In those areas, reduced ceiling height is only accepted as a consequence of structural constraints (gauge, physical space).

Dimensions in millimetres

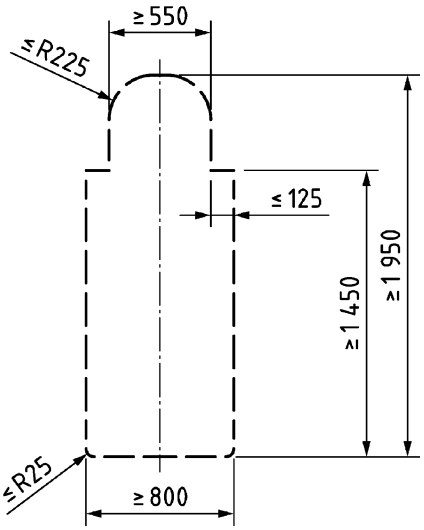


Figure 5 — Minimum clearway profile to and from wheelchair spaces

5) A turning space, with a minimum diameter of 1 500 mm shall be provided:

   i. adjacent to the wheelchair space for the wheelchair user to turn the wheelchair around.

      — The wheelchair space as defined in EN 16585-2 may be part of the turning space according to EN 16585-1:2017, Annex A.

      — Measured vertically from a height of 25 mm up to 1 450 mm above the walking floor.

      — One table, at a height of 700 mm or greater to the table underside above the floor may intrude up to 300 mm into the turning space, if the wheelchair space is part of that turning space. The design of the table installation (bracket or framework) shall ensure that there are no obstacles preventing manoeuvring and turning (for example table leg or table top).

      — Where foldable tables are fitted the assessment shall be with the table in the stowed position.

   ii. in other locations where wheelchairs are supposed to turn 180°,

      — assessed vertically from a height of 25 mm up to 1 450 mm above the walking floor.

      — A handrail or other fixtures may intrude up to 100 mm into the turning space at a height of more than 650 mm above the walking floor. The resulting minimum diameter of the turning space above 650 mm should not be less than 1 400 mm.

6) If a change in direction is required for a wheelchair user, the clearway width of both directions (for example corridor to vestibule, corridor to perpendicular corridor, corridor to door and the reciprocal movements) shall comply with Table 3.

   — Assessment: the dimensions of the two clearway widths shall be according to Table 3.

   — Assessment for dimensions in Table 3 shall be according to Figure 5.

Table 3 —Relative combined clearway widths for change in direction in wheelchair accessible areas

Dimensions in millimetres

Corridor clearway width	1 200	1 100	1 000	900	850	800
Door usable width, or a perpendicular corridor clearway width	800	850	900	1 000	1 100	1 200

5.4 Height changes

1) Internal steps (other than those for external access) shall have:

   i. a maximum height of 200 mm;

      — measured vertically at any point across the width of the step;

   ii. a minimum depth of 280 mm;

      — measured horizontally step nose to step nose at the central axis of the stairs.

      — For double deck trains it is permitted to reduce this value to 270 mm for the stairs accessing the upper deck and the lower deck.

      — Where there is a step nose that over hangs the step riser or tread this shall be no more than 10 mm to reduce risk of tripping.

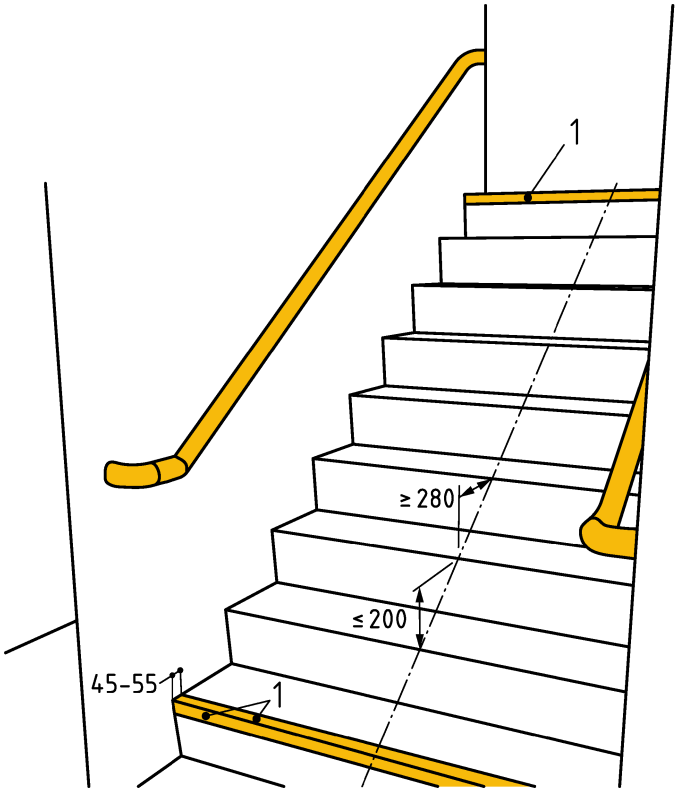
2) As a minimum, the first and the last step shall be indicated by a contrasting band with a depth of 45 mm to 55 mm, extending across the full width of the steps on both the front and the top surfaces of the step nosing. (see Figure 6).

   — All contrasting bands shall be assessed according to EN 16584-1.

   — If intermediate steps are indicated by a contrasting band then all the bands shall be the same colour, depth and width.

   First and last steps should be interpreted as the top of the first and last riser when ascending the steps. See Figure 6.

Dimensions in millimetres



Key

1 contrasting bands

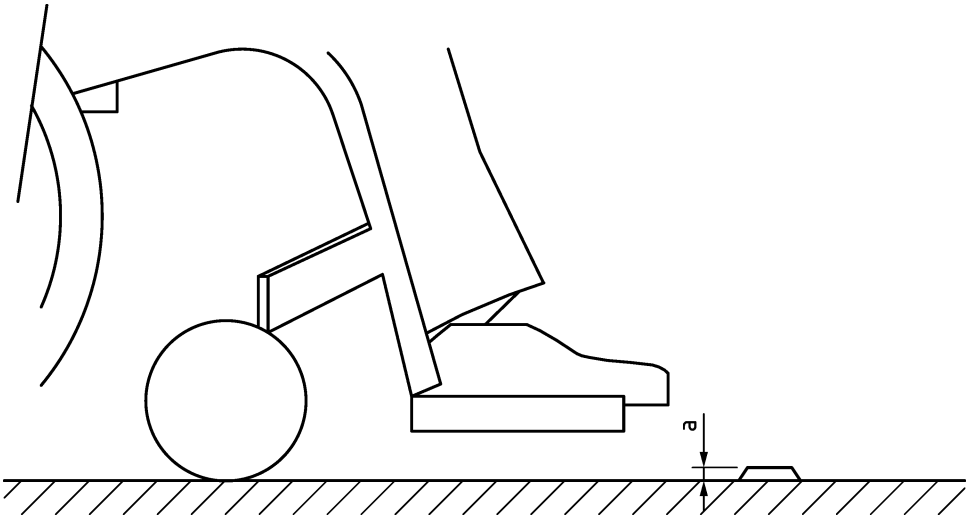
Figure 6 — Height and depth of internal steps with contrasting bands shown on the first and last steps

3) No steps are allowed between the vestibule of a wheelchair accessible exterior door, the wheelchair space, a universal sleeping compartment and the universal toilet except:

   i. for a door threshold strip that shall not exceed 15 mm in height; see Figure 7.

      — Measured vertically from the walking floor.

      Edges of door threshold strip should be rounded or bevelled.



Key

a door threshold strip height

Figure 7 — Door threshold strip

ii. where a lift is provided to overcome the step.

— The lift shall comply with relevant requirements of EN 16586-2 and EN 1756-2:

Where a lift is provided to overcome the internal height change it should be designed to be used independently by a passenger.

4) For ramps in rolling stock the maximum gradient shall not exceed the values shown in Tables 4 and 5. For corresponding graphic representations see Figure 8 and Figure 9.

— These gradients shall be assessed when the vehicle is stationary on straight and level track.

— For assessment there shall not be ramps greater than 2 % within the defined wheelchair spaces, universal toilet and wheelchair accessible sleeping accommodation other than to enter or exit those areas.

Table 4 — Maximum gradients for ramps in wheelchair accessible areas

Length of ramp millimetres	**Maximum gradient** degrees	**Maximum gradient** %
Paths between the vestibule of a wheelchair accessible exterior door, a wheelchair space, wheelchair accessible sleeping accommodation and a universal toilet		
≤ 840 in single deck carriages	6,84	12
≤ 840 in double deck carriages	8,5	15
> 840	3,58	6,25

Dimensions in millimetres

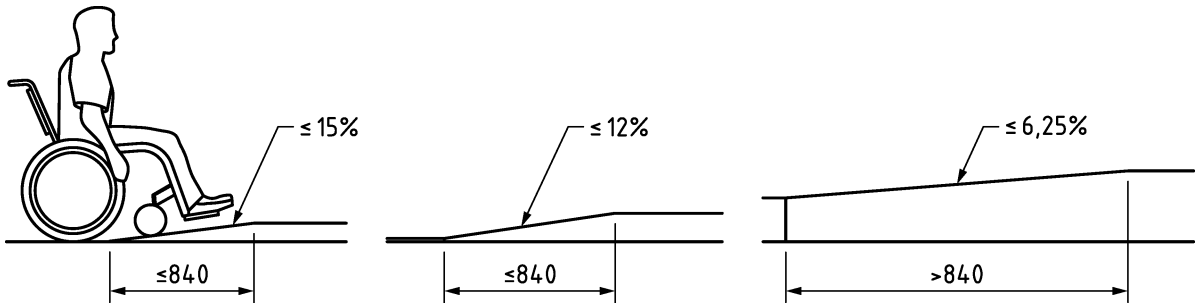


Figure 8 — Maximum gradient of internal ramps in wheelchair accessible areas

Between successive ramps there should be a minimum horizontal walking floor (landing) of 1 200 mm. The recommended horizontal walking floor (landing) is 1 500 mm. See ISO 21542.

Table 5 — Maximum gradients for ramps in other areas

Length of ramp millimetres	**Maximum gradient** degrees	**Maximum gradient** %
Other areas of the train		
> 1 000	6,84	12
600 to 1 000	8,5	15
< 600	10,2	18

Dimensions in millimetres

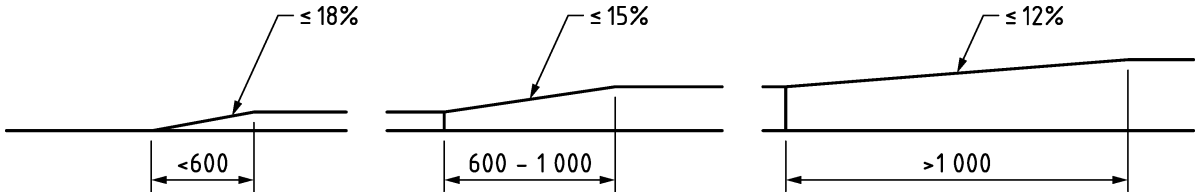


Figure 9 — Maximum gradient of internal ramps in other areas

Between successive ramps there should be a minimum horizontal walking floor (landing) of 280 mm.

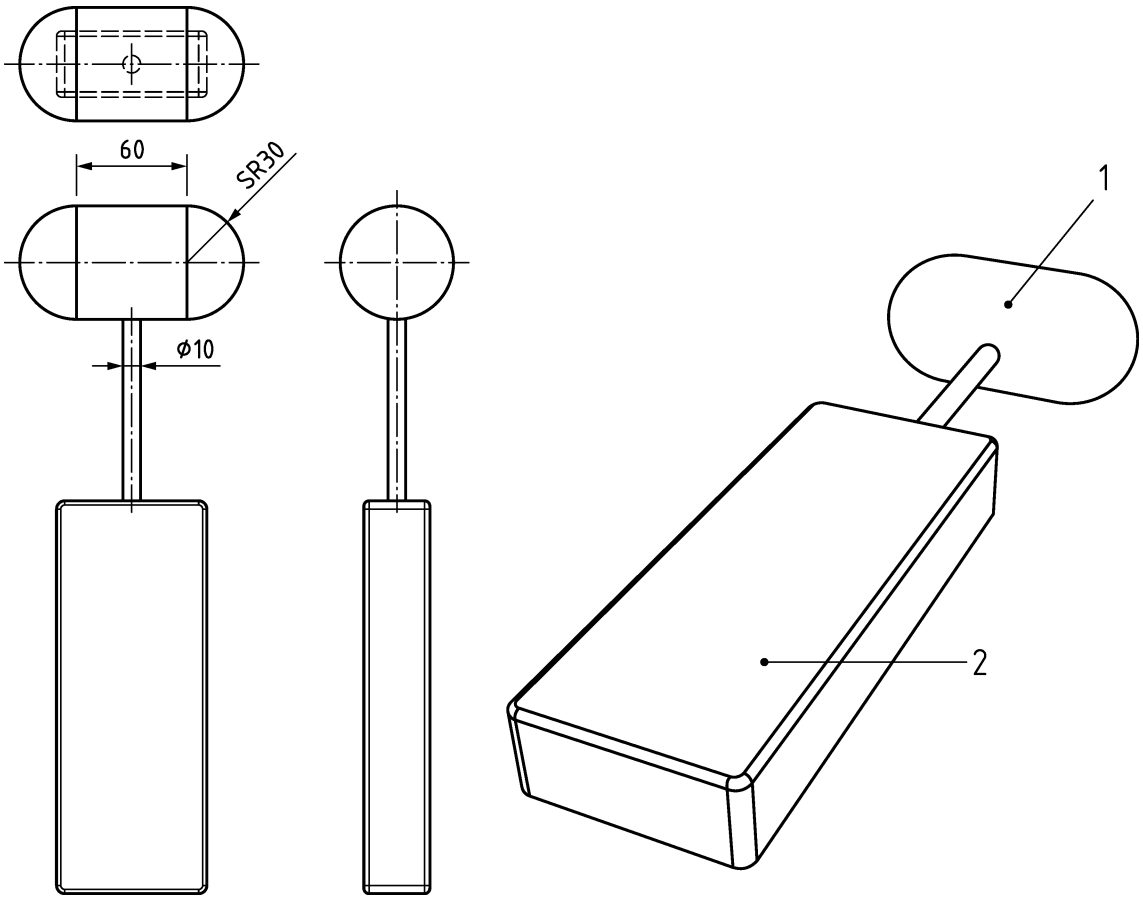
6 Methodologies

Assessment of palm operation of a control device shall be by pulling or pushing the device depending on its normal mode of operation with a clenched fist or hand (without extending fingers) as defined in Clause 3.

The following device as shown in Figure 10 (example shown in Figure 11) will be used to represent a clenched fist when assessing any need to pull or push a control, control device or component. The representative clenched fist will be manufactured from aluminium and attached to a force meter for the tests (similar to that shown in Annex C).

Ensure that the combined mass of the device does not exceed 1,5 kg.

Dimensions in millimetres



Key

1 active surface

2 indicative force meter

Figure 10 — Representative clenched fist attached to an indicative force meter

Figure 11 — Example of representative clenched fist device

Annex A
(normative)

EC verification - Interoperability constituents

A.1 Conformity assessment

An EC declaration of conformity or suitability for use shall be drawn up by the manufacturer or his authorized representative established in the Union before placing an interoperability constituent on the market.

The conformity assessment of an interoperability constituent shall be according to the prescribed module(s) of that particular constituent specified in A.2 of this standard.

A.2 Application of modules

The modules for the EC certification of conformity of interoperability constituents are listed in Table A.1.

Table A.1 — Modules for EC certification of conformity of interoperability constituents

Module CA	Internal production control
Module CA1	Internal production control plus product verification by individual examination
Module CA2	Internal production control plus product verification at random intervals
Module CB	EC-Type examination
Module CC	Conformity to type based on internal production control
Module CD	Conformity to type based on quality management system of the production process
Module CF	Conformity to type based on product verification
Module CH	Conformity based on full quality management system
Module CH1	Conformity based on full quality management system plus design examination
Module CV	Type validation by in service experience (Suitability for use)

The manufacturer or his authorized representative established within the Union shall choose one of the modules or module combinations indicated in Table A.2 for the constituent to be assessed:

Table A.2 — Combination of modules for EC certification of conformity of interoperability constituents

Clause	Constituents to be assessed	Module CA	Module CA1 or CA2[a]	Module CB +CC	Module CB +CD	Module CB +CF	Module CH[a]	Module CH1
5.2	Interface of door control device	X		X			X	

[a] Modules CA1, CA2 or CH may be used only in the case of products manufactured according to a design developed and already used to place products on the market before the application of relevant TSIs applicable to those products, provided that the manufacturer demonstrates to the notified body that design review and type examination were performed for previous applications under comparable conditions, and are in conformity with the requirements of the relevant TSI; this demonstration shall be documented, and is considered as providing the same level of proof as module CB or design examination according to module CH1

A.3 EC verification (general)

The EC verification procedure shall be performed according to the prescribed modules(s) specified in point A.4 of this standard.

For the infrastructure subsystem, if the applicant demonstrates that tests or assessments of a subsystem or parts of a subsystem are the same or have been successful for previous applications of a design, the notified body shall consider the results of these tests and assessments for the EC verification.

The approval process and the contents of the assessment shall be defined between the applicant and a notified body according to the requirements defined in the relevant TSI and in conformance with the rules set out in section 7 of that TSI.

A.4 Procedures for EC verification of a subsystem (modules)

The modules for the EC verification of subsystems are listed in Table A.3.

Table A.3 — Modules for the EC verification of subsystems

Module SB	EC-type examination
Module SD	EC verification based on quality management system of the production process
Module SF	EC verification based on product verification
Module SG	EC verification based on unit verification
Module SH1	EC verification based on full quality management system plus design examination

The applicant shall choose one of the modules or module combinations indicated in Table A.4.

Table A.4 — Combination of modules for the EC verification of subsystems

Subsystem to be assessed	Module SB+SD	Module SB+SF	Module SG	Module SH1
Rolling Stock Subsystem	X	X		X

The characteristics of the subsystem to be assessed during the relevant phases are indicated in Annex B, Table B.1 for rolling stock subsystem. The applicant shall confirm that each subsystem produced complies with the type.

Annex B
(normative)

Summary of testing requirements

The sub-system characteristics that shall be assessed in the different phases of design, development and production are marked by X in Table B.1 for interoperable constituents.

Table B.1 — Test plan for interoperable constituents

Characteristics to be assessed	Design and development phase		Production phase
	Design review and/or design examination	Type test	Verification of conformity to type
5.2 Interface of the door control device	X	X	X

The sub-system characteristics that shall be assessed in the different phases of design, development and production are marked by X in Table B.2 for Rolling stock subsystem.

Table B.2 — Test plan for rolling stock requirements

Characteristics to be assessed	Design and development phase		Production phase
	Design review and/or design examination	Type test	Routine test
5.2 Doors			
5.2.1 Doors - General	X	X	
5.2.2 Interior doors	X	X	
5.3 Clearways	X		
5.4 Height changes	X		

Annex C
(informative)

Use of force meter

Figure C.1 shows an example of a force meter in use.

Figure C.1 — Example of a force meter being used to measure the force required to push a sliding door

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/483 to provide one voluntary means of conforming to the Essential Requirements of the Directive 2008/57/EC on the interoperability of the rail system (recast) and with the associated TSIs.

Once this standard is cited in the Official Journal of the European Union under that Directive 2008/57/EC, compliance with the normative clauses of this standard given in Table ZA.1 for TSI LOC&PAS and Table ZA.2 for TSI PRM confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations and with the TSI requirements.

Table ZA.1 — Correspondence between this European Standard, the Commission regulation (EU) No 1302/2014 of 18 November 2014 concerning the technical specification for interoperability relating to the 'rolling stock locomotives and passenger rolling stock' of the rail system in the European Union (published in the *Official Journal L 356, 12.12.2014, p.228*) and Directive 2008/57/EC

Clause/subclauses of this European Standard	Chapter/§/annexes of the Technical Specification for Interoperability (TSI)	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
Clauses 3, 4, 5, 6 Annexes A, B	4. Characterization of the rolling stock subsystem 4.2. Functional and technical specification of the sub-system 4.2.5. Passenger related items	Annex III, Essential Requirements 1 General requirements 1.1 Safety Clauses 1.1.1, 1.1.5 1.2 Reliability and availability 1.3 Health 1.6 Accessibility Clause 1.6.1 2 Requirements specific to each subsystem 2.4 Rolling stock Clauses 2.4.1§4, 6 2.4.2, 2.4.3, 2.4.5	The Essential Requirements incorporate those relating to Accessibility added to Directive 2008/57/EC by Commission Directive 2013/9/EU.

Table ZA.2 — Correspondence between this European Standard, the Commission Regulation (EU) No 1300/2014 of 18 November 2014 on the technical specifications for interoperability relating to accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility and repealing Decision 2008/164/EC (published in the *Official Journal L 356, 12.12.2014, p.110*) and Directive 2008/57/EC

Clause/subclauses of this European Standard	Chapter/§/annexes of the Technical Specification for Interoperability (TSI)	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
Clauses 3, 4, 5, 6 Annexes A, B	4. Characterization of the subsystems 4.2. Functional and technical specifications 4.2.2. Rolling Stock Subsystem §4.2.2.3.1. Doors, General §4.2.2.3.3. Doors, Interior doors §4.2.2.6. Clearways §4.2.2.8. Height changes 5. Interoperability constituents 5.3 List and characteristics of constituents 5.3.2 Rolling stock §5.3.2.1. Interface of door control device 6. Assessment of conformity and/or suitability for use 6.1 Interoperability Constituents §6.1.2 Application of modules 6.2. Subsystems Appendix D: Assessment of interoperability constituents Appendix E: Assessment of the subsystems Appendix J: Diagrams of clearways Appendix K: Table of the corridor width for wheelchair accessible areas in Rolling Stock	Annex III, Essential Requirements 1 General requirements 1.1 Safety Clauses 1.1.1, 1.1.5 1.2 Reliability and availability 1.3 Health 1.6 Accessibility Clause 1.6.1 2 Requirements specific to each subsystem 2.4 Rolling stock Clauses 2.4.1§4, 6, 2.4.2, 2.4.3, 2.4.5	The Essential Requirements incorporate those relating to Accessibility added to Directive 2008/57/EC by Commission Directive 2013/9/EU.

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the products falling within the scope of this standard.

Bibliography

[1] Commission Regulation (EU) No 1300/2014 of 18 November 2014 on the technical specifications for interoperability relating to accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility; OJEU L 356, 12.12.2014

[2] EN 16286-1, *Railway applications - Gangway systems between vehicles - Part 1: Main applications*

[3] EN 16584-3, *Railway applications — Design for PRM use - General requirements — Part 3: Optical and friction characteristics*

[4] EN 16585-2, *Railway applications — Design for PRM use - Equipment and components on board rolling stock — Part 2: Elements for sitting, standing and moving*

[5] EN 16586-1, *Railway applications — Design for PRM Use - Accessibility of persons with reduced mobility to rolling stock — Part 1: Steps for access and egress*

[6] EN 16587, *Railway applications — Design for PRM use - Requirements for obstacle free routes for infrastructure*

[7] ISO 21542, *Building construction — Accessibility and usability of the built environment*

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