BS EN 16585-2:2017

BSI Standards Publication

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

Part 2: Elements for sitting, standing and moving

bsi.

National foreword

This British Standard is the UK implementation of EN 16585-2:2017.

The UK committee draws users' attention to the distinction between normative and informative elements, as defined in Clause 3 of the CEN/CENELEC Internal Regulations, Part 3.

Normative: requirements conveying criteria to be fulfilled if compliance with the document is to be claimed and from which no deviation is permitted.

Informative: information intended to assist the understanding or use of the document. Informative annexes do not contain requirements, except as optional requirements, and are not mandatory. For example, a test method may contain requirements, but there is no need to comply with these requirements to claim compliance with the standard.

When speeds in km/h require unit conversion for use in the UK, users are advised to use equivalent values rounded to the nearest whole number. The use of absolute values for converted units should be avoided in these cases. In this standard the equivalent speed for 250 km/h should be taken to be 155 mph.

The UK participation in its preparation was entrusted by Technical Committee RAE/1, Railway Applications, to Subcommittee RAE/1/-/15, Railway Applications - People with Reduced Mobility.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Railway applications - Design for PRM use - Equipment and components on board rolling stock - Part 2: Elements for sitting, standing and moving

Applications ferroviaires - Conception destinée à l'usage par les PMR - Equipements et éléments à bord du matériel roulant - Partie 2 : Eléments pour position assise, position debout et déplacement

Bahnanwendungen - Gestaltung für die Nutzung durch PRM - Ausstattung und Bauteile in Schienenfahrzeugen - Teil 2: Bauteile zum Sitzen, Stehen und Fortbewegen

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CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 16585-2:2017) 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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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 EU Directive 2008/57/EC.

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;

— this document is Part 2 and contains:

  — handholds;

  — seats;

  — wheelchair spaces;

— Part 3 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 16584-1:2017, *Railway applications — Design for PRM use — General requirements — Part 1: Contrast*

EN 16584-2:2017, *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 16585-3:2017, *Railway applications — Design for PRM use — Equipment and components on board rolling stock — Part 3: Clearways and internal doors*

3 Terms and definitions

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

3.1
clearway
unobstructed space with defined widths and heights to allow movement within a vehicle

3.2
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

3.3
fixed longitudinal seat
passenger seat which are installed along the body side (not foldable or intended to tip up) facing perpendicular to the direction of travel

3.4
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 from EN 16286–1.

3.5
inter-vehicle gangway
articulating device allowing transit between vehicles (provided for passenger use)

3.6
handhold
discontinuous element designed to be gripped or held in order to aid personal stability

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
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 will not be able to unclench their fingers to do this or perform any pulling action.

3.10
priority seat
passenger seat with specific requirements designated for priority use by PRM

3.11
sharp edge
thin edge capable of cutting or an abrupt end or discontinuity of a surface which has the potential to injure a passenger in normal use

3.12
usable width
unobstructed width of an open door or passageway allowing passengers to pass through

3.13
wheelchair
wheeled personal mobility device

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

3.14
wheelchair accessible doorway
closest doorway to the wheelchair space (and wheelchair accessible sleeping accommodation, where fitted)

3.15
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

Table 1 —Abbreviations

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

Table 2 — Symbols

Symbol	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 D and Annex E. 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 Seats

5.2.1 General

1) To provide personal stability while using the aisle, all aisle-side seats shall have handholds, vertical handrails or other items unless the seat, when in the upright position, is within 200 mm of:

   — the back of another seat facing in the opposite direction which is fitted with a handhold or a vertical handrail or other items that can be used for personal stability;

   — a handrail or a partition.

2) Handholds or other items that can be used for personal stability shall:

   i. be positioned at a height of between 800 mm and 1 200 mm above the floor;

      — measured vertically from the aisle floor to the centre of the usable part of the handhold;

   ii. when designed to be gripped around, have a usable part of a handhold or other item, such as a looped handhold, a cross sectional area of minimum 490 mm^2 and a maximum of 1 250 mm^2 with a minimum radius of 10 mm over a minimum length of 100 mm to allow space for the breadth of the hand;

   iii. when designed, for the hand to rest against or hold, rather than grip the usable surface of a handhold, have a minimum usable surface area of 2 500 mm^2 measured perpendicular to the direction of travel to ensure that the correct surface is available to the passenger;

Dimensions in millimetres

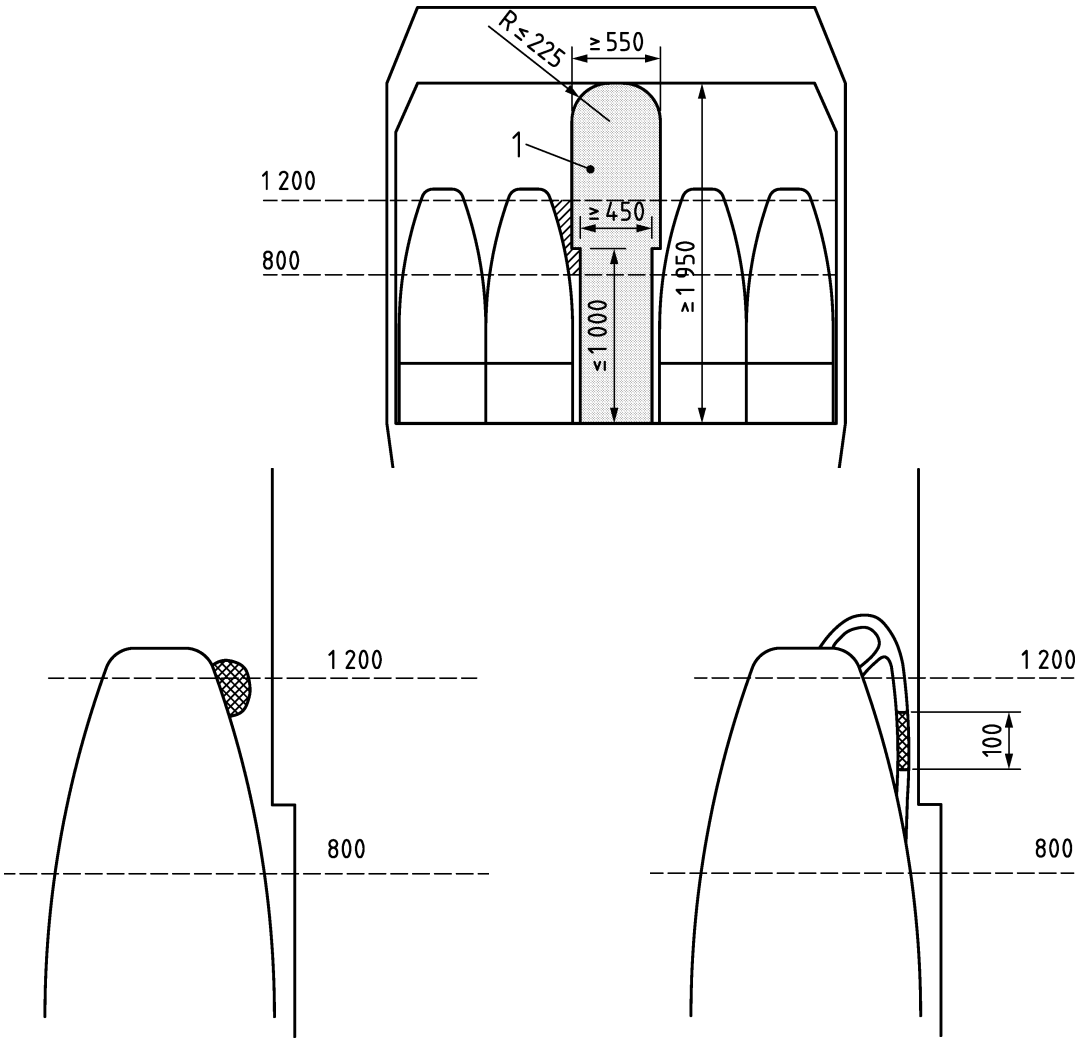


Figure 1 — Example of clearway showing 800 mm and 1 200 mm lines with hatched area for handhold

iv. not protrude into the clearway, see Figure 1;

— Clearway shall be according to EN 16585-3.

v. contrast with the seat;

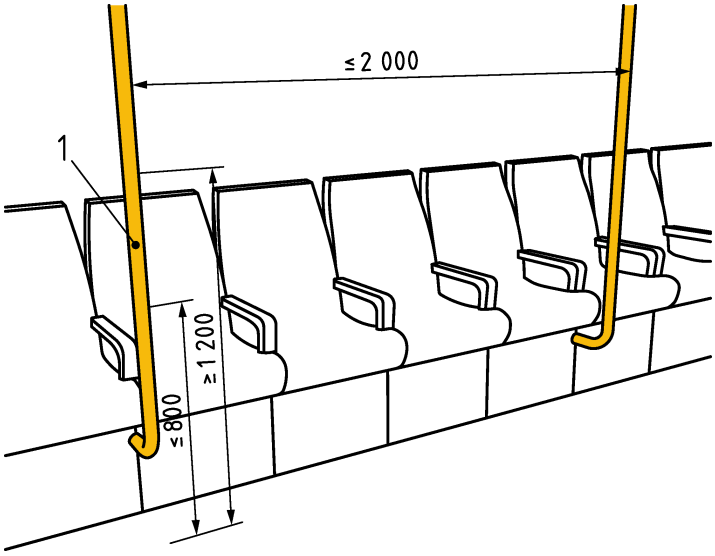
— Contrast shall be assessed according to EN 16584-1.

vi. Where the handhold or other item for personal stability extends above or below the height limit requirements, a minimum of 100 mm shall be within the 800 mm to 1 200 mm range (see Figure 1).

3) In seating areas with fixed longitudinal seats, handrails shall be used for personal stability (see Figure 2):

i. shall be at a maximum distance of 2 000 mm apart;

Dimensions in millimetres



Key

1 usable part of handrail between 800 mm and 1 200 mm above floor

Figure 2 — Height and maximum spacing of usable part of handrail

— all of the regulated usable part shall be measured by the horizontal distance between the handrails;

ii. shall be positioned at a height of between 800 mm and 1 200 mm above the floor:

— the regulated usable part shall extend between the limits specified, measured vertically from the walking floor;

iii. shall contrast with the vehicle interior surroundings and background:

— contrast shall be measured in accordance with EN 16584-1.

4) The handholds or other items for personal stability shall not have sharp edges.

5.2.2 Priority Seats

5.2.2.1 General

1) Not less than 10 % of the seats by fixed trainset, unit or individual vehicle, and by class shall be designated as priority seats for the use of PRM.

— Assessment shall make use of a train layout diagram (drawings) on which priority seats are clearly identified.

For assessment the number of seats includes all types of seats except those tip-up seats in the vestibule and regulated wheelchair spaces. Wheelchair spaces, standing supports and all other equipment where the user is not intended to sit down completely, are not considered as seats.

Where 10 % of the total number of priority seats does not produce a whole number the number of seats required shall be rounded up.

NOTE 1 For example, if the total number of seats in a vehicle is 61 to 70 then 7 of these seats will be priority seats.

2) The priority seats and vehicles containing them shall be identified by signs complying with EN 16584-2.

   — for the vehicle interior, the signs shall be located on or near to a priority seat in a way that a passenger is able to identify this seat as a priority seat at all times;

   — for the vehicle exterior, the signs shall be located on the exterior of the vehicle at each external passenger door which is in close proximity to priority seats;

   — the signs shall be visible when the door is in the open and closed positions. (see Figure 3);

Dimensions in millimetres

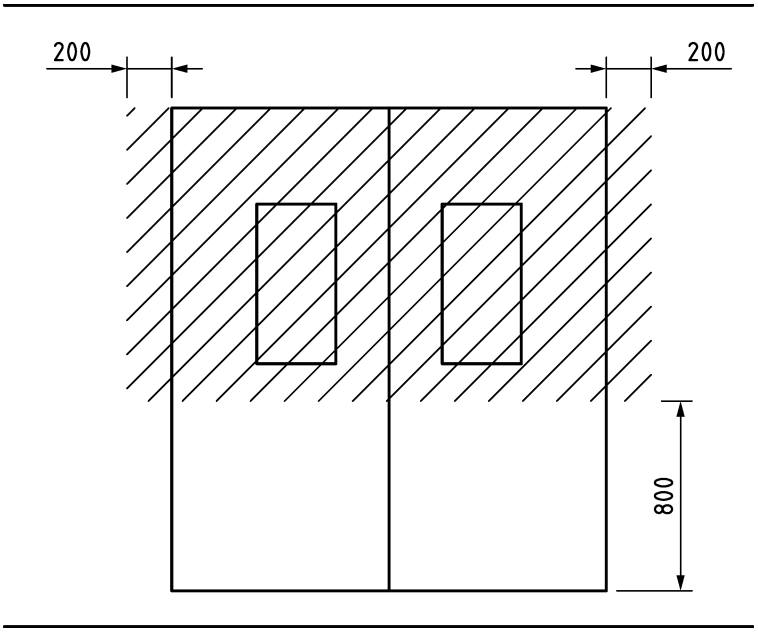


Figure 3 — Sign location zone on exterior of vehicle

   — the signs located on or near to a priority seat shall include text to state that other passengers shall make such seats available to those who are eligible to use them;

   — text shall be in accordance with EN 16584-2;

   — for vehicles with single leaf end doors the sign should be placed within 2 m of the edge of the open door leaf on the same vehicle.

3) The priority seats:

   — shall be located within the passenger saloon and in close proximity to external doors;

   Ideally, these are to be equally distributed throughout the train.

   — for a vehicle, with designated priority seats, with a single external door the priority seats shall be within the first 30 % of the fixed seats arrived at from the external door;

— for a vehicle, with designated priority seats, with multiple external doors the priority seats shall be within the first 15 % of fixed seats, in each possible direction from each external door (only where there are more than eight seats fitted);

— in addition to the requirements above, where there is an area with another class of seating within a vehicle (for example 1st class) the proportionate number of priority seats for that class shall be within the first 30 % of the fixed seats arrived at when entering that area (if entry to the area is possible from multiple directions then 15 % from each direction);

— in double deck vehicles, units or trainsets, priority seats can be present on any deck.

NOTE 2 Passage to priority seats should involve as little height change as possible, preferably on the same level as the entrance.

4) The level of equipment fitted to the priority seat shall, as a minimum, be the same as that fitted to the general seats of the same type.

— "Type" in this context is understood as, for example, first class or second class seat, in a row or face to face.

— When, for example, second class seats in a row are fitted with a tray and a magazine holder, then second class priority seats in a row shall also be fitted with a tray and a magazine holder.

5) When seats are fitted with armrests, priority seats of the same type:

— shall be fitted with movable armrests:

— "Type" in this context is understood as, for example, first class or second class seat, in a row or face to face

— This excludes armrests placed along the vehicle bodyside or along a partition wall in the case of compartments.

— The required force to move an armrest out of the way should be less than 60 N but it is recommended that it should be approximately 25 N.

— The movable armrest shall move into a position in line with the seat back cushion to enable unrestricted access to the seat or to any adjacent priority seats.

— When assessing the position that the armrest is required to move to, ensure that the armrest is not protruding from the seatback cushion but is in line with or behind the line of the cushion. Where the armrest is designed to be in line with the cushion and follow its profile a tolerance of 10 mm to that profile is permitted due to the characteristics of the foam and material variance.

6) Priority seats shall not be tip-up seats.

— Tip-up in this context includes foldable seats where a continuous action is required by a passenger in order for the seat to be maintained in the usable position (other than moving the armrest or table or reclining for access).

7) Each priority seat and the space available to its user.

— shall comply with the diagrams shown in Annex A.

— Cross sectional views (longitudinal for transverse seating and transverse for longitudinal seating) shall be taken through the centre line of the seat.

— When reclining seats are fitted, the dimensions shall be measured when the seat is in its fully upright position.

NOTE 3 Consideration should be given to provide adequate space under or adjacent to, at least one of the priority seats for a guide dog in each vehicle where priority seats are provided.

8) The whole usable sitting surface of the priority seat shall be a minimum of 450 mm wide (see Annex A).

— In the case of a seat fitted with armrests the assessed width shall be between the armrests of the seat and shall be a minimum of 450 mm.

— If a reclining control is located in the armrest, the protrusion of such control shall not be taken into account for seat width measurement.

— Where a seat is not fitted with an armrest the assessed width shall be measured between lateral edges of the seat cushion with the cushion in its uncompressed state.

— If a single cushion provides more than one seat, then each seat is considered to have an equal proportion of the space between the lateral edges of the total cushion (e.g. on a 850 mm wide cushion for two persons, it is not permissible to state that one seat has a nominal 450 mm width so that it can be designated as a priority seat).

9) The top of each priority seat cushion shall be between 430 mm and 500 mm above floor level at the front edge of the seat.

— Shall be measured from the floor covering level to the top surface of the cushion.

— Measurement shall be taken through the centre line of the seat (longitudinal), with the cushion in its uncompressed state.

10) The clear headroom above each seat shall be at least 1 680 mm from floor level (see Annex A).

— On double-decker trains where luggage racks are provided above the seats a reduced headroom of 1 520 mm is permitted for priority seats underneath the luggage racks, provided that at least 50 % of priority seats maintain a headroom of 1 680 mm.

— In Annex A the cross sectional views shown are taken through the centre line of the seat. See Annex A.

11) When reclining seats are fitted, the dimensions shall be measured when the seat is in its fully upright position.

5.2.2.2 Uni-directional seats

1) Where uni-directional priority seats are provided, the clearance in front of each seat shall comply with Figure A.2.

— Measurement shall be taken through the centre line of the seat (longitudinal), with the cushion in its uncompressed state.

2) The distance between the front surface of the seat back and the vertical plane through the rearmost part of the seat in front shall be a minimum of 680 mm, noting that the required seat pitch shall be measured from the centre of the seat 70 mm above where the cushion meets the back support.

— Measurement shall be taken through the centre line of the seat, the seat cushion and the seat back cushion shall be in their uncompressed state.

3) There shall also be a clear space between the front edge of the seat cushion and the same vertical plane for the seat in front of a minimum of 230 mm.

— Measurement shall be taken through the centre line of the seat, the seat cushions shall be in their uncompressed state.

5.2.2.3 Facing seats arrangement

1) Where facing priority seats are provided,

— the distance between the front edges of the seat cushions shall be a minimum of 600 mm (See Figure A.3).

— Such distance shall be maintained even if one of the facing seats is not a priority seat.

— Measurements (longitudinal for transverse seating and transverse for longitudinal seating) shall be taken through the centre line of the seat, the cushion shall be in its uncompressed state.

2) Where facing priority seats are equipped with a table, there shall be a minimum clear horizontal distance between the front edge of the seat cushion and the leading edge of the table of at least 230 mm (See Figure A.4).

— When one of the facing seats is not a priority seat, its distance to the table can be reduced provided that the distance between the front edges of the seat cushions remains 600 mm.

— Sidewall mounted tables whose length does not extend over the centre line of the window seat do not need to be considered for conformity with this paragraph. (See Figure A.4).

— Measurement shall be taken through the centre line of the seat (longitudinal), with the cushion in its uncompressed state.

5.3 Wheelchair spaces

1) According to the length of the unit, excluding the locomotive or power head, there shall be in that unit not less than the number of wheelchair spaces shown in Table 3.

Table 3 — Minimum number of wheelchair spaces according to unit length

Unit length (metres) **Measured over body ends of passenger carrying vehicles**	**Number of wheelchair spaces by unit**
Less than 30	1 wheelchair space
30 to 205	2 wheelchair spaces
More than 205 to 300	3 wheelchair spaces
More than 300	4 wheelchair spaces

— Assessment shall make use of a train layout diagram (drawings) on which the wheelchair spaces are clearly identified.

2) To ensure stability, the wheelchair space shall be oriented longitudinally within the vehicle. This space shall be designed for the wheelchair to be positioned against the structure or other acceptable fitting required by 5.3 6).

NOTE 1 This may result in the wheelchair being either facing or back to the direction of travel.

NOTE 2 Compliance with other requirements in this standard and EN 16584–2 (for example visibility of passenger information system, manoeuvring space and reach to call for aid device) is only assessed with the wheelchair user in this orientation.

3) The wheelchair space shall:

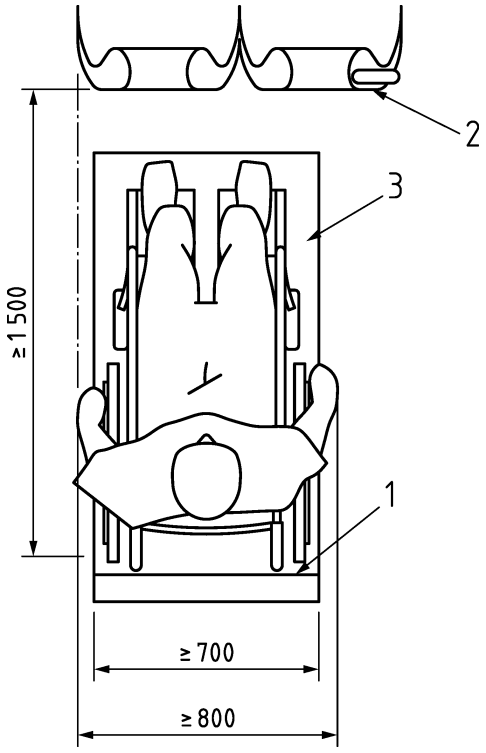
— accommodate a wheelchair and occupant with dimensions as described in EN 16585-1:2017, Annex B;

— over its full length of 1 300 mm have a width of 700 mm from floor level to a minimum height of 1 450 mm. See Figure 4;

— there shall be an additional 50 mm width either side to give clearance for hands, from a height of 400 mm to 800 mm above floor level. See Figure B.4.

The additional 50 mm should be adjacent to any obstacle that will inhibit clearance for the wheelchair users hands (e.g. wall or structure). If one side of the wheelchair is adjacent to the aisle there is no additional 50 mm requirement for that side of the wheelchair, as it is already free space.

Dimensions in millimetres



Key

1 Surface 1 - structure at end of wheelchair space

2 Surface 2 - structure in front of wheelchair space

3 minimum wheelchair space, excluding manoeuvring space

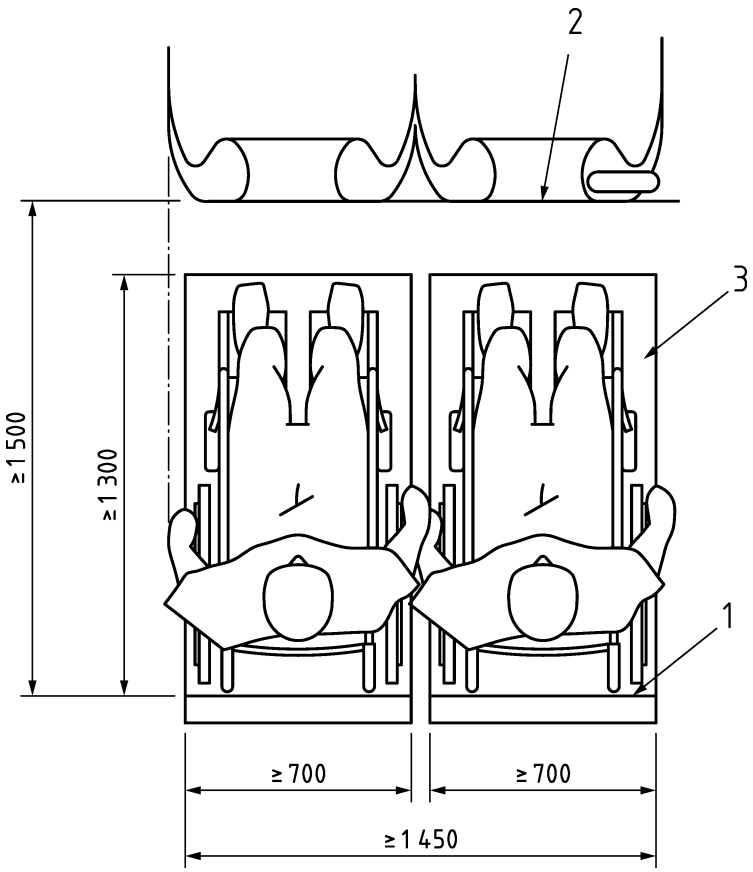
Figure 4 — Wheelchair space

— In the case where the wheelchair space is designed to accommodate two wheelchairs located one beside the other, this dual wheelchair space shall accommodate two wheelchairs and their occupants according to Figure 5: 1 300 mm length × 1 450 mm width.

NOTE 3 Dual wheelchair spaces are intended for use on renewed or upgraded rolling stock only.

The additional 50 mm should be adjacent to any obstacle that will inhibit clearance for the wheelchair users' hands (e.g. wall or structure). If one side of the wheelchair is adjacent to the aisle there is no additional 50 mm requirement for that side of the wheelchair, as it is already free space.

Dimensions in millimetres



Key

1 Surface 1 - structure at end of wheelchair space

2 Surface 2 - structure in front of wheelchair space

3 minimum dual wheelchair space, excluding manoeuvring space

Figure 5 — Dual wheelchair space

4) To allow access and egress to the wheelchair space the distance in the longitudinal plane between the back of the wheelchair space and the next surface shall have an additional manoeuvring space which shall:

— be in accordance with Figure 4 and Figure 5 and Annex B (Surface 1 in the figures may be a closed tip-up or foldable seat, structure or partition);

i. If Surface 2 is the front edge of a passenger seat cushion in a facing arrangement and if this seat can be occupied by a passenger, the minimum additional distance shall be not less than 300 mm see Figure B.1.

— The cushion shall be in its uncompressed state.

ii. If Surface 2 is a passenger seat back in a uni-directional arrangement, or a partition or a closed tip-up or foldable seat in front of wheelchair space the minimum distance shall be not less than 200 mm, see Figure B.2.

iii. If Surface 2 is another wheelchair space (face to face) the minimum distance between the two wheelchairs shall not be less than 250 mm, see Figure B.3.

5) There shall be no obstruction of the designated space between the floor and the ceiling of the vehicle other than:

i. an overhead luggage rack;

ii. a horizontal handrail attached to the wall or ceiling of the vehicle, in accordance with the requirements of 5.5;

iii. a table;

— If fitted, a table shall have a minimum clear height of 700 mm, to the surface of the table underside, measured above the walking floor. The design of the table installation (bracket or framework) shall ensure that there are no obstacles preventing manoeuvring into and positioning in the wheelchair space (for example table leg or table top).

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

6) At one end of the wheelchair space there shall be a structure or other acceptable fitting:

— which shall be at least 700 mm wide, as shown by Surface 1 in Figure 4.

700 mm is the minimum (including all tolerance considerations) width required, a wider structure is recommended where possible. It is unlikely that a single foldable or tip-up seat shall satisfy this requirement, due to insufficient width. Two foldable or tip-up seats in the same plane may be acceptable, provided there is a horizontal gap of no greater than 400 mm between the undersides of the two seats in their stowed positions.

— The height of the structure, or fitting, shall be capable of preventing a wheelchair that has been positioned with its back against the structure or fitting, from tipping over backwards.

— The structure or fitting shall extend between 200 mm and 600 mm as a minimum measured vertically above the walking floor, see Surface 1 in Figures B.1, B.2 and B.3.

7) Where tip-up or foldable seats are installed in the wheelchair space they, when in the stowed position, shall not encroach on the dimensional requirements of the wheelchair space.

— For this assessment the wheelchair space is the combination of the wheelchair space as defined in 5.3 (3) and the manoeuvring space as defined in 5.3 (4).

8) It is not permitted to install any permanent equipment such as bicycle hooks or ski racks into the wheelchair space or directly adjacent to it.

— For this assessment the wheelchair space is the combination of the wheelchair space as defined in 5.3 (3) and the manoeuvring space as defined in 5.3 (4).

— There shall be no permanent equipment installed adjacent to the wheelchair space described above that would overlap the wheelchair space in its use (for example a bicycle rack installed immediately adjacent to the wheelchair space where a stored bicycle would overlap on the wheelchair space).

9) At least one seat shall be available either adjacent to or facing to each of the wheelchair spaces for a companion to travel with the wheelchair user.

— This seat shall offer the same level of comfort as the other passenger seats, and may also be situated on the opposing side of the aisle.

NOTE 4 An inward facing seat, mounted on the bodyside, is not considered to offer the same level of comfort if the majority of other seats in the vehicle are transverse.

10) On trains with a design speed higher than 250 km/h excepting double deck trains, it shall be possible for a wheelchair user occupying a wheelchair space to transfer onto a passenger seat.

— This seat shall be equipped with a movable armrest.

— Assessment shall be according to 5.2.2.1 (5).

— In this case, the companion seat required in 5.3 (9) may be in an adjoining row.

— This requirement is only applicable for the number of wheelchair spaces per unit specified in Table 3.

— This seat shall not be a tip up seat.

— Transfer is made by the wheelchair user either autonomously or with help from their companion (personal assistant). This is not part of any assessment.

11) The wheelchair space shall be fitted with a call for aid device.

— The call for aid device shall be designed according to EN 16584-2.

— The call for aid device shall, when operated, enable a wheelchair user to inform a person who can take appropriate action.

12) The call for aid device shall be placed within the comfortable reach range of the person using the wheelchair.

— Assessment shall be according to EN 16585-1:2017, Annex B.

— The device shall be placed within the shaded area in EN 16585-1:2017, Figure B.2 in order to be considered “within reach of a person” and therefore compliant.

— The seat reference point in EN 16585-1:2017, Figure B.2 is related to the support structure and avoids variations due to different wheelchair designs.

— Where there are two adjacent wheelchair spaces as shown in Figure 5 then the requirement to fit a call for aid device within the comfortable reach range only applies to the wheelchair space closest to the device.

13) The call for aid device shall not be placed within a narrow recess which prevents immediate intentional palm operation but can be protected from unintentional use.

— Assessment shall be according EN 16585-3:2017, Clause 6.

14) The interface of the call for aid device shall:

i. be according to the relevant clauses of EN 16584-1 for contrast and EN 16584-2 for information provided.

ii. be palm operable and not require a force exceeding 30 N to operate.

— Assessment according to EN 16585-3.

15) A sign shall be:

i. placed immediately next to, or in the wheelchair space so as to identify the space as the wheelchair space.

— Assessment of the sign shall be according to EN 16584-2:2017, Annex A.

Additional text should be added to the sign to include text stating that wheelchair users have priority for the space; wheelchair users should position their wheelchair against the support structure and apply the brakes; and/or luggage should not be stored in the wheelchair space.

ii. placed adjacent to, or on the door leaf of the wheelchair accessible door outside the train.

— Assessment of the sign shall be according to EN 16584-2:2017, Annex A.

— The sign shall be visible when the door is open and closed.

— Assessment shall be according to Figure 3.

For vehicles with single leaf end doors the sign should be placed within 2 m of the edge of the open door leaf on the same vehicle.

5.4 Height changes

1) Stairs constituted of more than three steps shall:

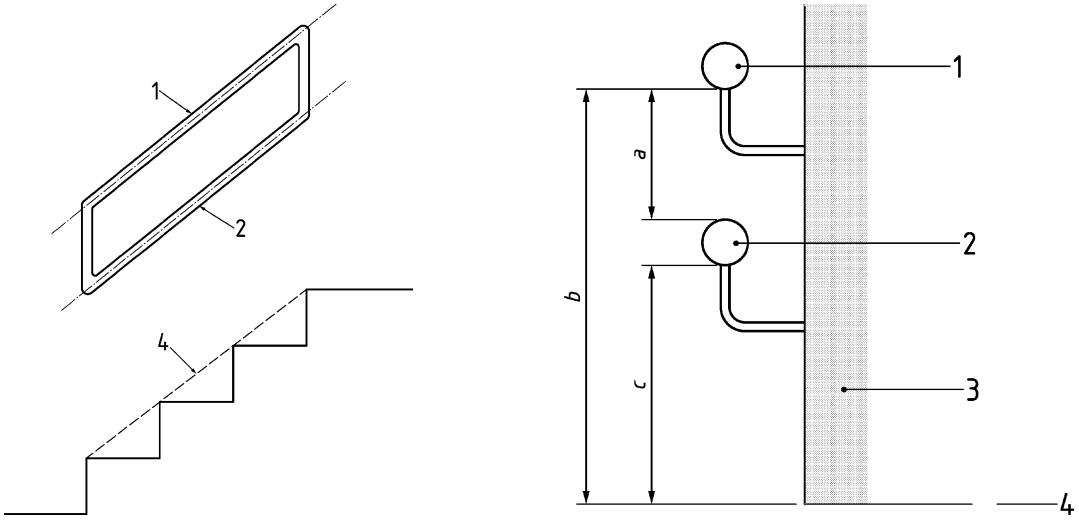
— be provided with handrails on both sides and at two levels.

— The higher handrail shall be positioned at a height of 850 mm to 1 000 mm above floor level.

— The lower handrail shall be positioned at a height of 500 mm to 750 mm above floor level.

— A minimum clearance of 150 mm shall be maintained between the higher and lower handrail positions as shown in Figure 6.

— The vertical height shall be measured vertically from the line intersecting the nosing of the steps.



Key

1 higher handrail
2 lower handrail
3 wall
4 line intersecting the nosing of the step
a minimum 150 mm
b 850 mm to 1 000 mm above floor or line parallel to step edge
c 500 mm to 750 mm above floor

Figure 6 — Examples of double hand rail for stairs of more than three steps

2) Stairs constituted of one, two or three steps shall be provided on both sides with a minimum of one handrail or other item that can be used for personal stability.

— The handrails provided can be vertical, horizontal or parallel to the line intersecting the nosing of the step(s).

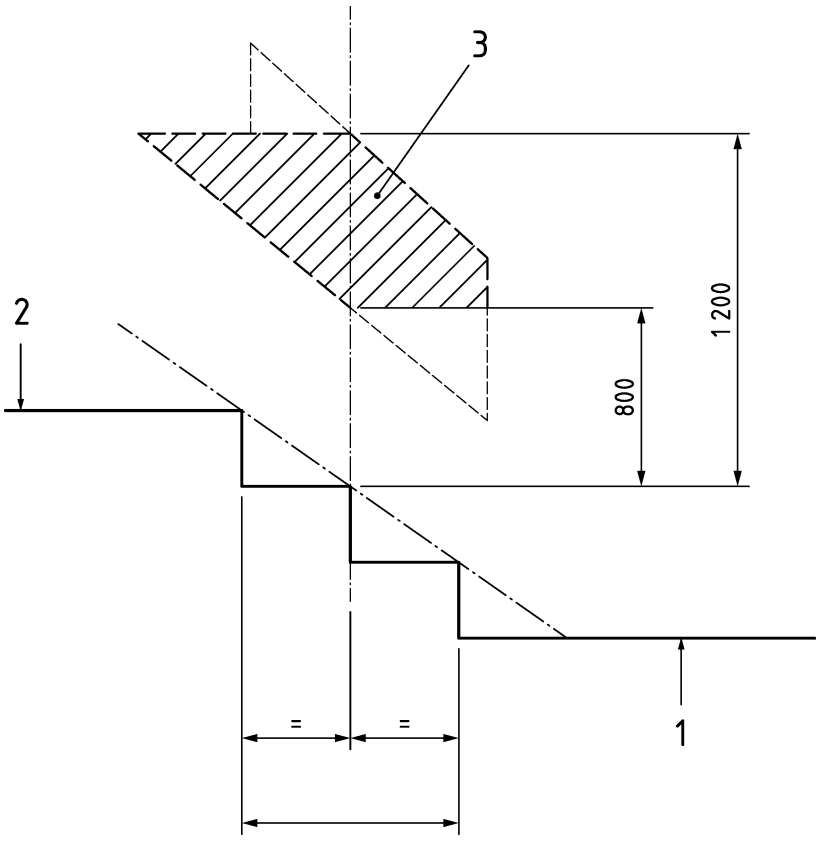
— The other items for personal stability can be for example seat handholds, partitions or fixed arm rests.

— The handrails or other items used for personal stability should be available at a height between 800 mm and 1 200 mm, measured from the line intersecting the nosing of the step(s). See Figure 7 for area in which the handrail or other items for personal stability should be placed.

NOTE The ideal solution is to provide a continuous handrail extending beyond the first and last step which should be parallel to the line intersecting the nosing of the step at a height between 800 mm and 1 200 mm. This function can also be delivered by discontinuous elements such as a mix of vertical handrail, seat back handholds, fixed armrests and transverse partitions.

3) Handrails shall be compliant with 5.5.

Dimensions in millimetres



Key

1 lower floor
2 upper floor
3 area of handhold

Figure 7 — Area where handrails or other items for personal stability should be located on stairs with one to three steps

5.5 Handrails

1) All handrails fitted to a vehicle:

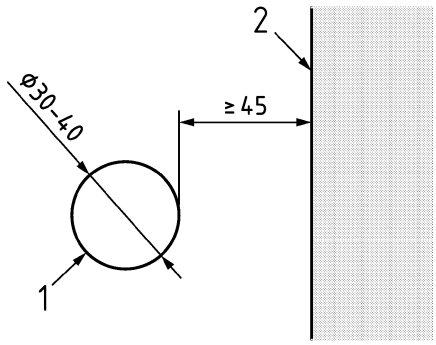
   — shall be round in section with an outside diameter of between a minimum of 30 mm and a maximum of 40 mm; and

      — Assessment methodology shall be according to Figure 8;

   — shall have a minimum clear distance of 45 mm to any adjacent surface other than its mountings;

      — Assessment methodology shall be according to Figures 8 and 9.

Dimensions in millimetres



Key

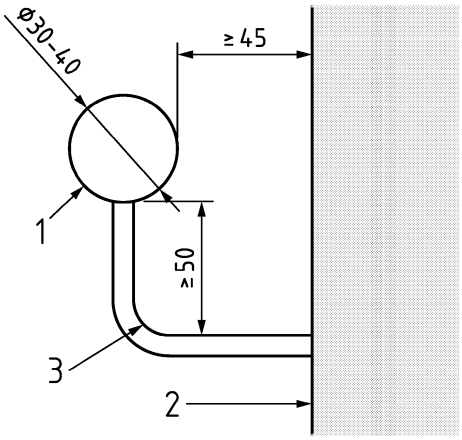
1 usable part

2 wall

Figure 8 — Handrail cross section and spacing to wall

Over the length of the handrails, there should be no fixing at the rear of the handrail that prevents continuous running of the hand along the rear surface. This is specifically for continuous horizontal handrails, horizontal handrails adjacent to stairways or handrails parallel to the step nosings on a stairway used to move along the clearway.

Dimensions in millimetres



Key

1 usable part

2 wall

3 mounting at bottom of handrail

Figure 9 — Handrail cross section and example wall mounting

2) If a handrail is curved, the radius to the inside face of the curve shall be a minimum of 50 mm.

   — Assessment methodology shall be according to Figure 10.

   NOTE 1 This applies to bends in the handrail, not the return mounting, see Figure 11.

Dimensions in millimetres

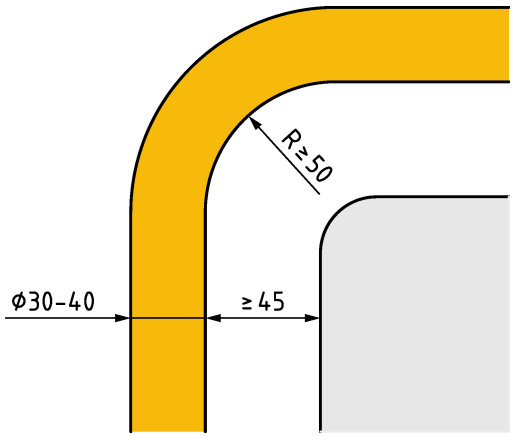


Figure 10 — handrail curvature

Dimensions in millimetres

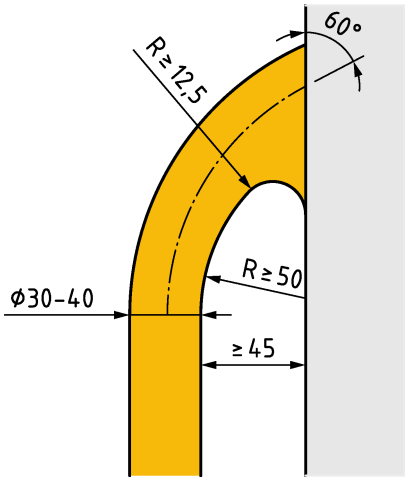


Figure 11 — Example of handrail curvature towards wall

Curvature of minimum 12,5 mm is recommended for connections to wall at angles less than 60°.

3) All handrails shall contrast with their background.

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

4) External doorways shall be:

— provided with handrails on both sides, fitted internally as close as practicable to the vehicle outer wall.

— Assessment of 'as close as practicable' gives the handrail priority over the door controls, emergency door release, passenger alarm or communication devices and non safety features, see Figure 12.

— Where wheelchair lifts are installed on one side of the entrance the requirements for handrails on that side are not then mandatory, see Figure 12, but shall still be fitted where possible.

5) Those handrails shall be:

i. Vertical handrails that shall extend from 700 mm to 1 200 mm above the threshold of the first step for all external doorways when boarding.

— The vertical height shall be measured vertically from the line intersecting the nosing of the fixed steps. See Figure 12.

ii. Additional handrails at a height of between 800 mm and 900 mm above the first usable step.

— Parallel with the line of the step nosing for doorways with more than two entrance steps, see Figure 12.

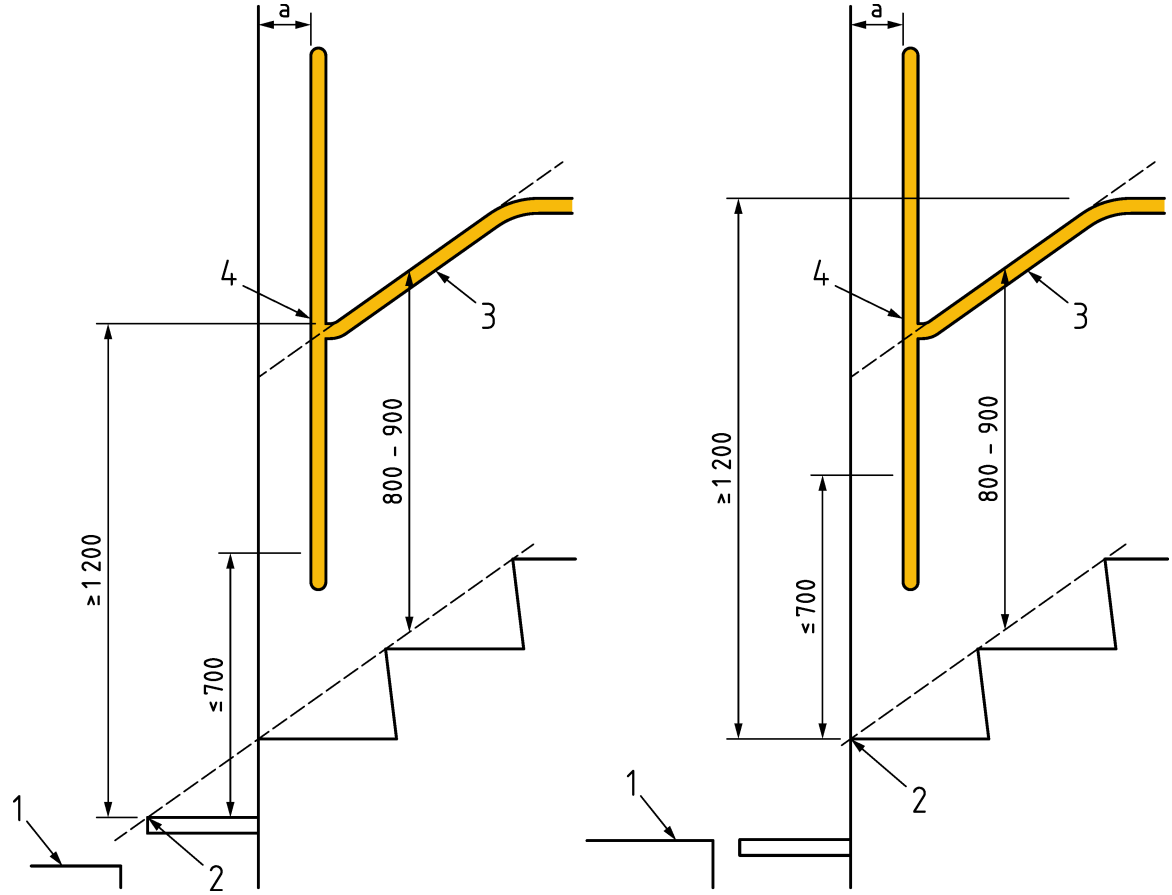
— Fitted as close as practicable to the vehicle outer wall.

— Assessment of 'as close as practicable' gives the handrail priority over the door controls, emergency door release, passenger alarm or communication devices and non-safety features, see Figure 12.

— Assessment of the first usable step for this requirement requires that the relevant platform heights be defined.

NOTE 2 This does not apply to boarding aids.

Dimensions in millimetres



Key

1 platform

2 first step

3 handrail parallel to step nosing line, 800 mm to 900 mm vertically above first usable step (measured to top of handrail)

4 usable part of vertical handrail max. 700 mm and min. 1 200 mm above first usable step

a distance to outer vehicle wall as small as practicable, max. 200 mm recommended (measured between the 700 mm to 1 200 mm portion and the outside of the vehicle)

NOTE The usable part of a vertical handrail is the vertical part of the continuous cross section (i.e. this excludes the mounting attachments where it does not comply with 5.4, 1) and 2) above.

Figure 12 — Example of heights of handrails above first step

6) Where the clearway (usable width) of the gangway is narrower than 1 000 mm and longer than 2 000 mm there shall be handrails or handholds provided in, or adjacent to, inter-vehicle gangways that are provided for passenger use.

— Handrails may be vertical (See Figure 13) or horizontal (See Figure 14)

— The regulated usable part of vertical handrails shall extend between 800 mm to 1 200 mm, measured vertically from the vehicle walking floor within the gangway area.

— Horizontal handrails and handholds shall be within 800 mm to 1 200 mm, measured vertically from the vehicle walking floor within the gangway area.

— Where vertical handrails or handholds are provided these should be a maximum distance of 2 000 mm apart.

Dimensions in millimetres

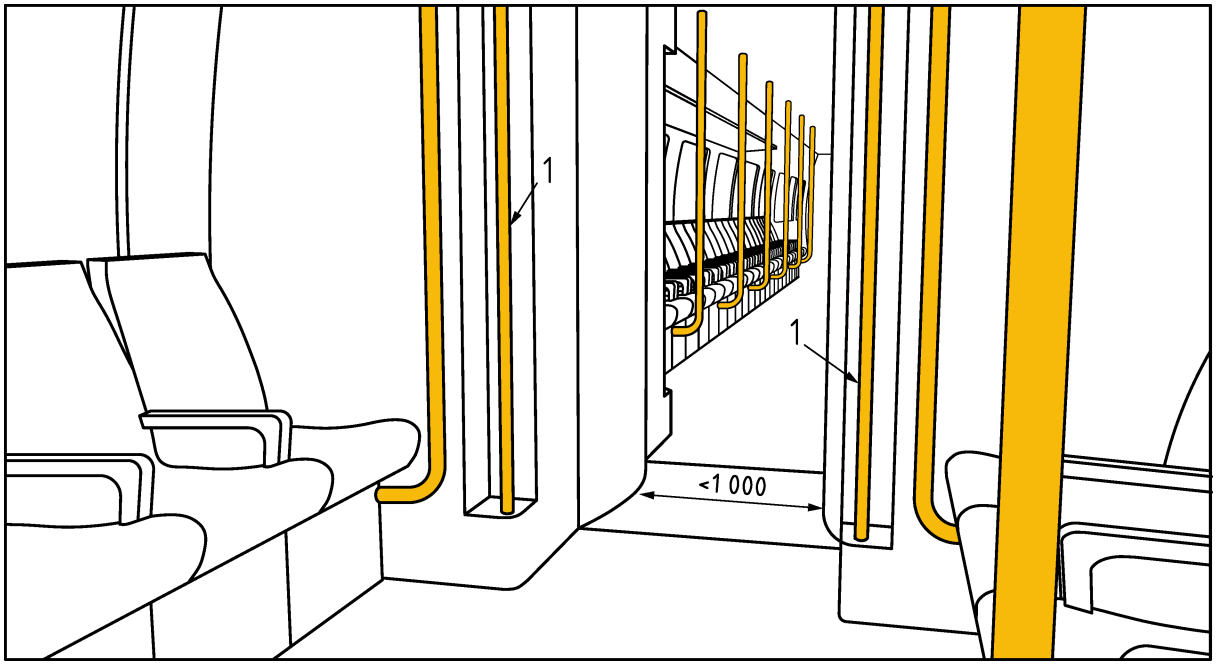
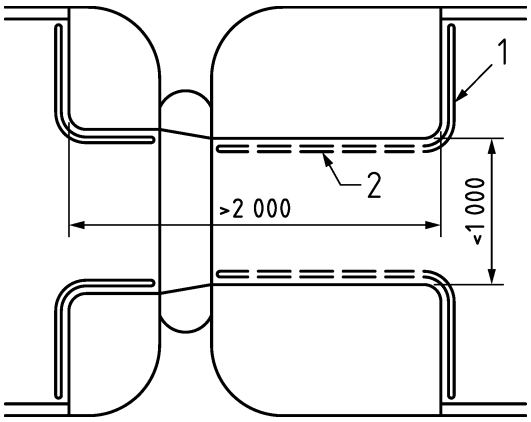


Figure 13 — Examples of handrails in narrow gangways

Dimensions in millimetres



Key

1 handrail adjacent to the gangway

2 handrail in the gangway

Figure 14 —Example of handrails in and adjacent to narrow gangways

7) Where the clearway (usable width) of the gangway is wider than or equal to 1 000 mm handrails or handholds shall be provided in the gangway, See Figure 15 for an example of a continuous handrail in the gangway.

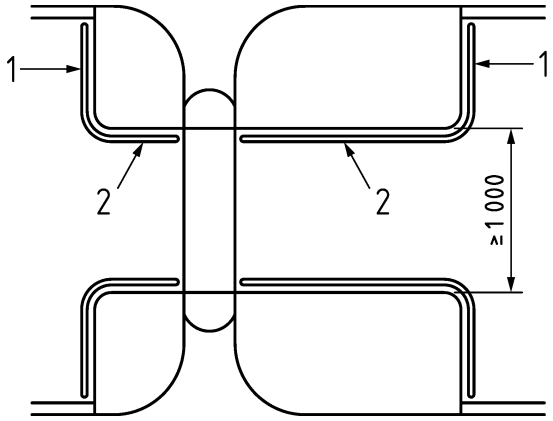
— Handrails may be horizontal (See Figure 15) or vertical.

— The regulated usable part of vertical handrails shall extend between 800 mm to 1 200 mm, measured vertically from the vehicle walking floor within the gangway area.

— Horizontal handrails and handholds shall be within 800 mm to 1 200 mm measured vertically from the vehicle walking floor within the gangway area.

— Where vertical handrails or handholds are provided these should be a maximum distance of 2 000 mm apart.

Dimensions in millimetres



Key

1 handrail shown adjacent to the gangway (this is in addition to the minimum requirement

2 handrail in the gangway (minimum requirement)

Figure 15 — Example of handrails in wide gangways

5.6 Wheelchair accessible sleeping accommodation

1) When a train provides sleeping accommodation compartments for passengers, it shall include a vehicle containing at least one compartment that is wheelchair accessible.

— The wheelchair specification is defined in EN 16585-1.

— Assessment shall make use of a train layout diagram (drawings) on which the wheelchair accessible sleeping accommodation is clearly identified.

2) If there is more than one vehicle with sleeping compartments for passengers in a train, there shall be a minimum of two wheelchair accessible sleeping compartments in that train.

— Assessment shall make use of a train layout diagram (drawings) on which the wheelchair accessible sleeping accommodation is clearly identified.

3) If a rail vehicle provides wheelchair accessible sleeping compartments:

i. the exterior of the wheelchair accessible doorway shall be marked with a sign.

— Assessment of the sign shall be according to EN 16584-2:2017, Annex A.

— The sign shall be visible when the door is open and closed.

— Assessment shall be according to Figure 3.

For vehicles with single leaf end, doors the sign should be placed within 2 m of the edge of the open door leaf on the same vehicle.

ii. the wheelchair accessible sleeping compartment door shall be marked with a sign.

— Assessment of the sign shall be according to EN 16584-2:2017, Annex A.

4) The wheelchair accessible sleeping compartment internal space shall take in consideration the requirements for actions expected from the wheelchair user in the sleeping accommodation.

— Assessment of the actions expected from the wheelchair user shall be according to EN 16585-3.

5) The sleeping accommodation shall be fitted with a minimum of two call for aid devices.

— The call for aid devices shall be designed according to EN 16584-2.

— The call for aid devices shall, when operated, enable a wheelchair user to send a signal to a person who can take appropriate action; they need not initiate a communication.

6) The interface of the call for aid device shall:

i. be according to the relevant clauses of EN 16584-1 for contrast and EN 16584-2 for information provided;

ii. be palm operable and not require a force exceeding 30 N to operate.

— Assessment according to EN 16585-3.

7) The lower call for aid device shall be:

i. placed not more than 450 mm above the floor;

— measured vertically from the surface of the walking floor to the centre of the moveable part of the control.

ii. positioned so that the control can be reached by a person lying on the floor.

— The centreline of the control shall be placed a minimum of 350 mm away from an internal corner.

— There shall be a clear floor space of 700 mm by 700 mm in front of the control

— The clear floor space shall have no obstructions up to a height of 650 mm from the walking floor.

— Figure C.1 provides a compliant example arrangement of the clear space around the lower call for aid device, the principles of which shall be used when assessing this requirement

8) The upper call for aid device shall be between 600 mm and 800 mm above the floor;

   — measured vertically from the surface of the walking floor to the centre of the moveable part of the control.

9) These two call for aid devices shall be located on different vertical surfaces of the sleeping accommodation.

10) The call for aid devices shall be distinct from any other control within the sleeping accommodation, be coloured differently from other control devices and contrast with their background.

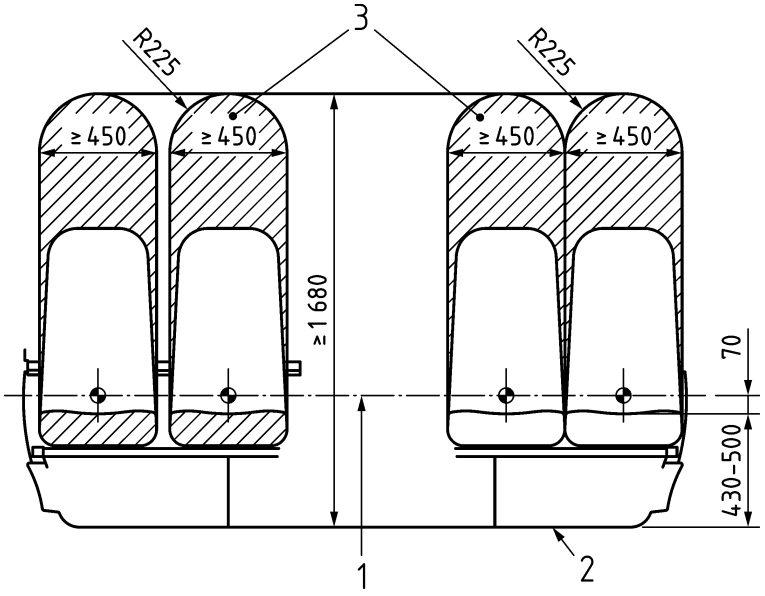
   — Assessment shall be according to EN 16584-2.

Annex A
(normative)

Priority seats

This Annex is a graphical representation of key dimensions relating to priority seats.

Dimensions in millimetres

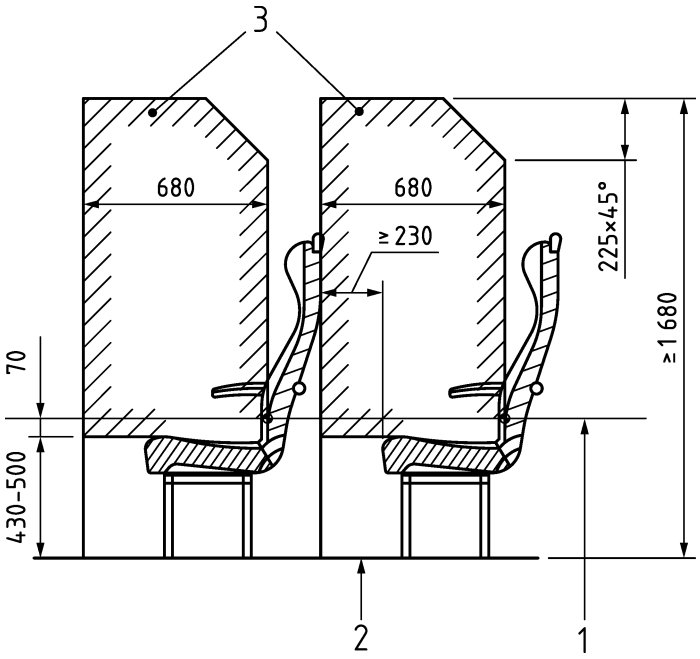


Key

1 measuring level for seat reference point (SRP)
2 floor
3 headroom above seat

Figure A.1 — Priority seat headroom

Dimensions in millimetres

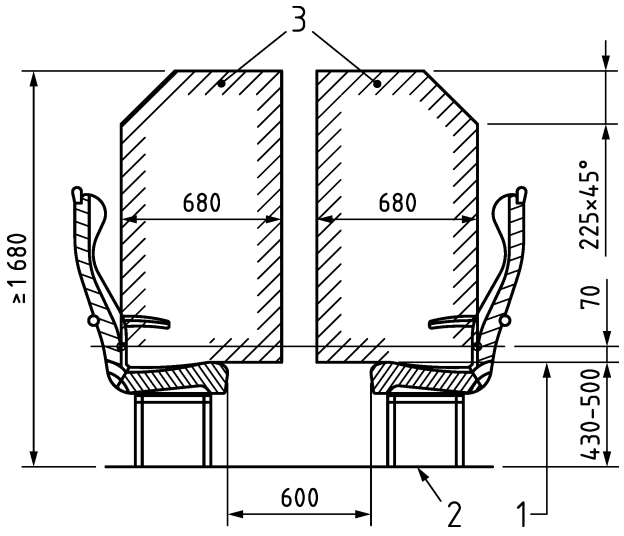


Key

1 measuring level for seat reference point (SRP)
2 floor
3 headroom above seat

Figure A.2 — Unidirectional priority seats

Dimensions in millimetres

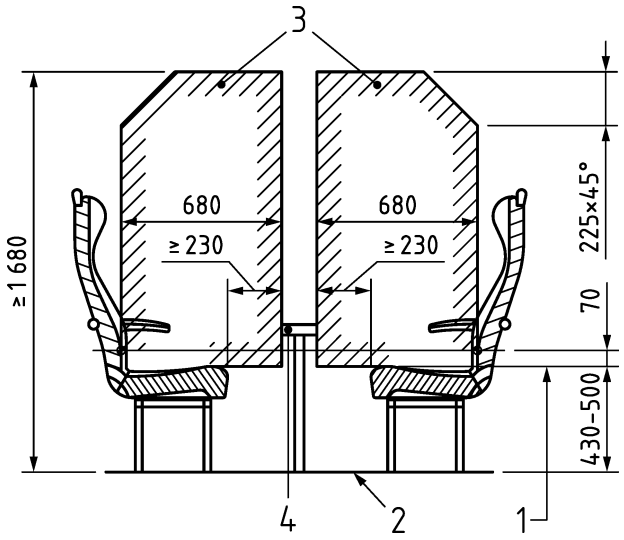


Key

1 measuring level for seat reference point (SRP)
2 floor
3 headroom above seat

Figure A.3 — Facing priority seats

Dimensions in millimetres



Key

1 measuring level for seat reference point (SRP)
2 floor
3 headroom above seat
4 table

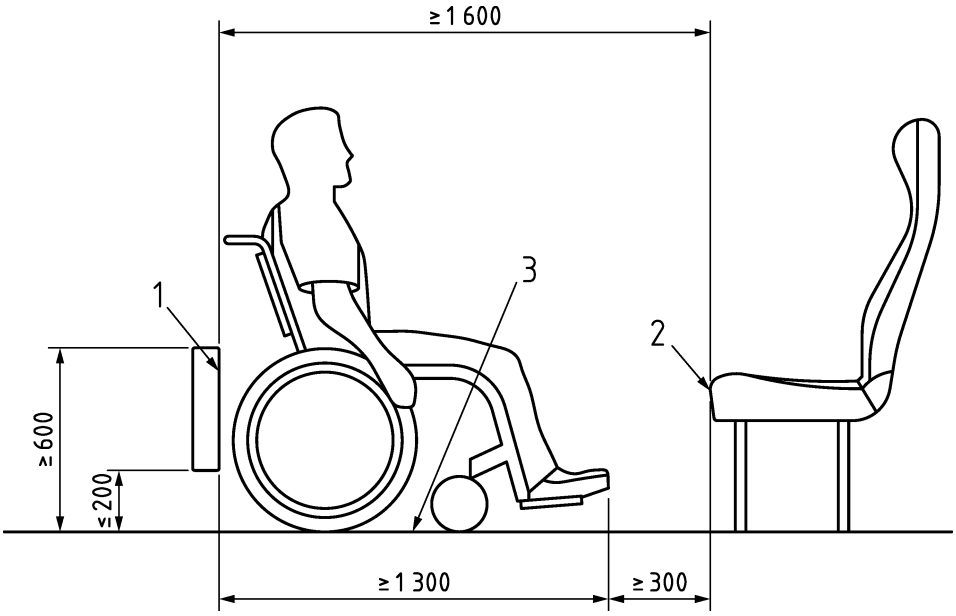
Figure A.4 — Facing priority seats with table in stored position

Annex B
(normative)

Wheelchair space

Examples of wheelchair space.

Dimensions in millimetres



Key

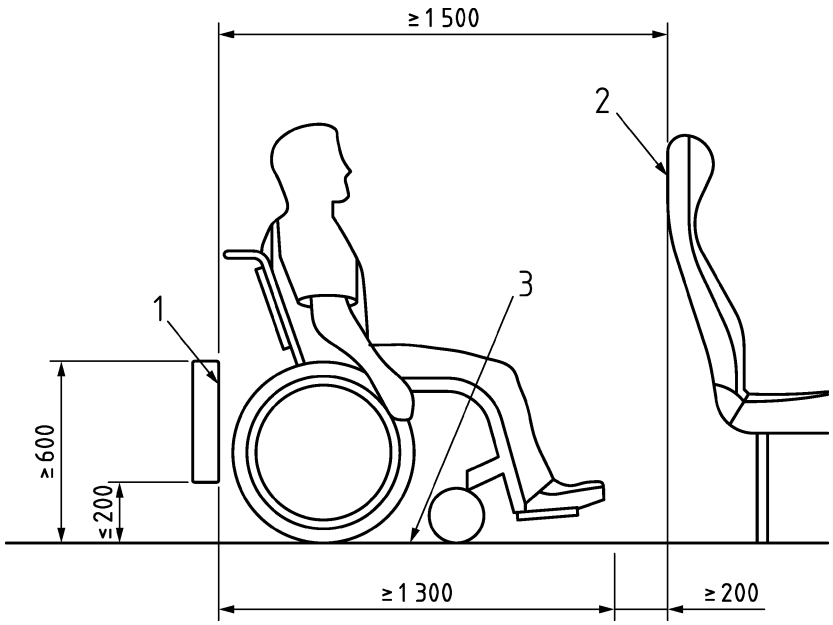
1 structure at end of wheelchair space measured above the floor is a minimum 700 mm wide (Surface 1)

2 front edge of passenger seat cushion (Surface 2)

3 wheelchair space

Figure B.1 — Wheelchair space in facing seating arrangement

Dimensions in millimetres



Key

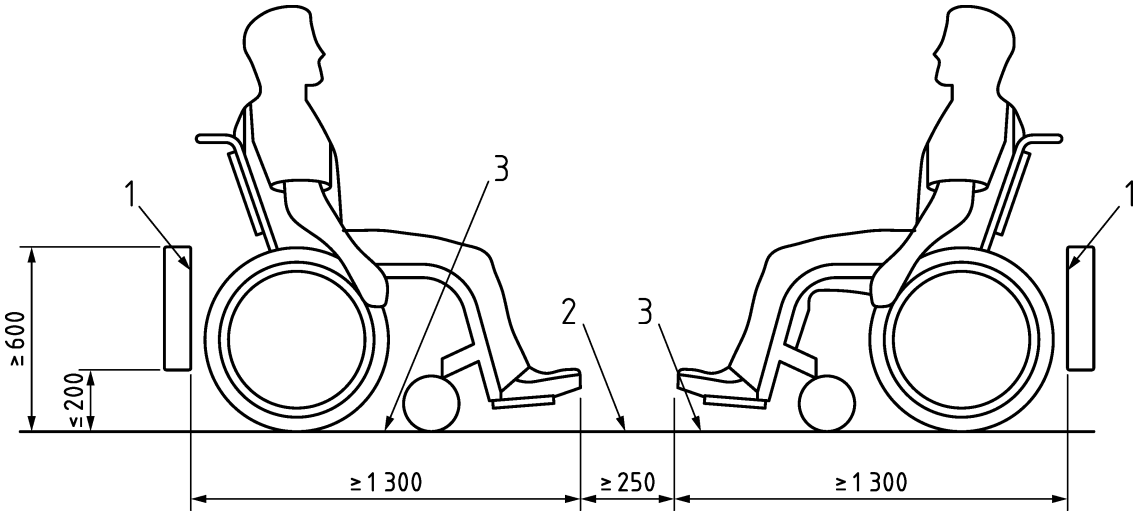
1 structure at end of wheelchair space measured above the floor is a minimum 700 mm wide (Surface 1)

2 front surface, i.e. passenger seat back, partition, closed tip-up or foldable seat (Surface 2)

3 wheelchair space

Figure B.2 — Wheelchair space in unidirectional seating arrangement

Dimensions in millimetres



Key

1 structure at end of wheelchair space measured above the floor is a minimum 700 mm wide (Surface 1)

2 minimum distance between wheelchair spaces

3 wheelchair space

Figure B.3 — Two facing wheelchair spaces

Figure B.4 shows a wheelchair position with the additional 50 mm hand space against the bodyside without increasing the minimum 700 mm at the floor.

Dimensions in millimetres

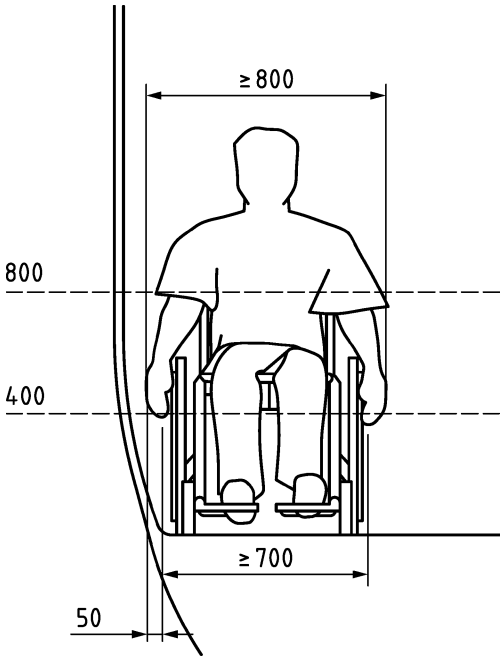


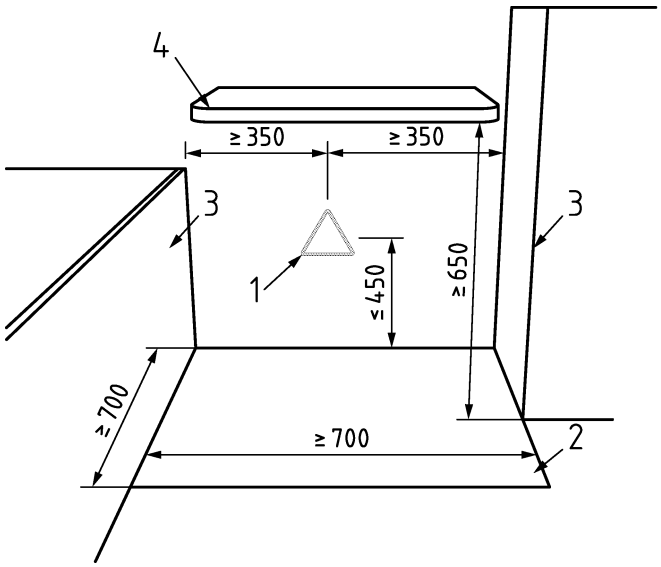
Figure B.4 —Wheelchair position with additional clearance for hands

Annex C
(normative)

Wheelchair accessible sleeping area

This annex graphically represents the key dimensions of the lower call for aid device in wheelchair accessible sleeping areas.

Dimensions in millimetres



Key

1 lower call for aid device
2 floor area
3 walls
4 obstruction (for example table or sink)

Figure C.1 — Example of a clear space around the lower call for aid device

Annex D
(normative)

EC verification

D.1 Interoperability constituents

D.1.1 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 D.1.2 of this standard.

D.1.2 Application of modules

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

Table D.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 D.2 for the constituent to be assessed:

Table D.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
5.3, 14) and 5.6, 6)	Interface of call for aid 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

D.2 EC verification

D.2.1 General

The EC verification procedure shall be performed according to the prescribed modules(s) specified in point D.2.2 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.

D.2.2 Procedures for EC verification of a subsystem (modules)

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

Table D.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 D.4.

Table D.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 E, Table E.1 for rolling stock subsystem. The applicant shall confirm that each subsystem produced complies with the type.

Annex E
(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 E.1 for interoperable constituents.

Table E.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
5.3, 14) and 5.6, 6) Interface of the Call for aid 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 E.2 for Rolling Stock subsystem.

Table E.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
5.2.1 Seats - General	X	X	
5.2.2.1 Priority seats - General	X		
5.2.2.2 Priority seats – Uni-directional seats	X	X	
5.2.2.3 Priority seats – Facing seats arrangement	X	X	
5.3 Wheelchair spaces	X	X	
5.4 Height changes	X		
5.5 Handrails	X	X	
5.6 Wheelchair accessible sleeping accommodation	X	X	

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 Annexes A, B, C, D, E	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, 5, 6, 7, 8 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 Annexes A, B, C, D, E	4. Characterization of the subsystems 4.2. Functional and technical specifications 4.2.2. Rolling Stock subsystem §4.2.2.1. Seats §4.2.2.2. Wheelchair spaces §4.2.2.7 Customer information §4.2.2.8. Height changes §4.2.2.9. Handrails §4.2.2.10. Wheelchair accessible sleeping accommodation 5. Interoperability constituents 5.3 List and characteristics of constituents 5.3.2 Rolling stock §5.3.2.6. Interface of the call for aid 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 H: Diagrams of priority seats Appendix I: Diagrams of wheelchair spaces Appendix N: PRM Signage	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, 5, 6, 7, 8, 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 Regulat¬ion (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 16584-3, *Railway applications — Design for PRM use — General requirements — Part 3: Optical and friction characteristics*

[3] 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*

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

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

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