SLOVENSKI STANDARD
SIST EN 16186-8:2022

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Železniške naprave - Voznikova kabina - 8. del: Razpored v tramvaju in dostop

Railway applications - Driver's cab - Part 8: Tram vehicle layout and access

Bahnanwendungen - Führerraum - Teil 8: Gestaltung und Zugang bei Straßenbahnfahrzeugen

Applications ferroviaires - Cabines de conduite - Partie 8 : Amènagement et accès pour les tramways

Ta slovenski standard je istoveten z: **EN 16186-8:2022**

ICS:

45.060.10	Vlečna vozila	Tractive stock
45.140	Oprema za podzemne vlake, tramvaje in lahka tirna vozila	Metro, tram and light rail equipment

SIST EN 16186-8:2022 **en,fr,de**

EUROPEAN STANDARD

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EN 16186-8

April 2022

ICS 45.060.10; 45.140

English Version

Railway applications - Driver's cab - Part 8: Tram vehicle layout and access

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 16186-8:2022) 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of an identical text or by endorsement, at the latest by October 2022, and conflicting national standards shall be withdrawn at the latest by October 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

EN 16186 *Railway applications — Driver’s cab* consists of the following parts:

— *Part 1: Anthropometric data and visibility*

— *Part 2: Integration of displays, controls and indicators*

— *Part 3: Design of displays for heavy rail vehichles*

— *Part 4: Layout and access*

— *Part 5: External visibility for tram vehicles*

— *Part 6: Integration of displays, controls and indicators for tram vehicles*

— *Part 7: Design of displays for tram vehicles*[1]

— *Part 8: Tram vehicle layout and access*

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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[1] To be published.

1 Scope

This document gives design rules and requirements in order to ensure proper access, lighting, seating and exit of driver's cabs. The different dimensions are based on the anthropometric data defined in EN 16186-5. The corresponding assessment methods are also included in this document. It covers the following aspects:

— dimension and interior layout;

— door access, steps, floor characteristics;

— seats dimension and clearance;

— interior cab lighting;

— emergency exit;

— marking and labelling.

This document is applicable to vehicles operating on tram networks.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 894-3, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators*

EN 1005-3, *Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation*

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

EN 13272-2, *Railway applications - Electrical lighting for rolling stock in public transport systems - Part 2: Urban rail*

EN 15152, *Railway applications - Windscreens for trains*

EN 15227, *Railway applications - Crashworthiness requirements for rail vehicles*

EN 16186-5:2021, *Railway applications - Driver's cabs - Part 5: External visibility for tram vehicles*

EN 16186-6:—[2], *Railway applications - Driver's cabs - Part 6: Integration of displays, controls and indicators for tram vehicles*

EN 17530, *Railway applications - Interior glazing for rail vehicles*

[2] Under preparation: Stage at the time of publication: prEN 16186-6:2022.

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

EN ISO 2813:2014, *Paints and varnishes - Determination of gloss value at 20°, 60° and 85° (ISO 2813:2014)*

EN ISO 3385, *Flexible cellular polymeric materials - Determination of fatigue by constant-load pounding (ISO 3385)*

EN ISO 7010:2020, *Graphical symbols - Safety colours and safety signs - Registered safety signs (ISO 7010:2019, Corrected version 2020-06)*

ISO 2631-1, *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements*

ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
gloss
optical property of a surface, characterised by its ability to reflect light specularly

[SOURCE: EN ISO 2813:2014, definition 3.1 modified, the Note 1 to entry has been deleted]

3.2
primary controls
controls having high importance and/or high frequency and/or prolonged periods of use

NOTE 1 to entry: Safety related controls are high importance controls.

3.3
primary information
information having high importance and/or high frequency of checking

NOTE 1 to entry: Safety related information is high importance information.

4 Symbols and abbreviations

For the purposes of this document, the following abbreviations are used.

g	Standard acceleration due to gravity (9,81 m/s^2)
FLP	Footrest Lowest Position
GU	Gloss Unit as defined in EN ISO 2813
HP	Heel point
RAL	Colour codification from Deutsches Institut für Gütesicherung und Kennzeichnung, former Reichs-Ausschuss für Lieferbedingungen
SRP	Seat Reference Point

5 Access, egress and doors

5.1 General

5.1.1 External steps and handrails

The access steps shall be in the same vertical plane or in a plane with an angle of pitch less than 90° (except where not possible due to different mounting conditions, for example, where some steps are bogie mounted and some are body mounted). The access steps shall be located one above the other and are equidistant from one another. The vertical distance between the steps is recommended to be in between 250 mm and 350 mm, but shall not exceed 450 mm. The bottom step shall be as low as permitted by the gauge and should not be higher than 600 mm above top of rail.

The steps shall be of the same width which shall be 300 mm as a minimum. The depth of the step shall be at least 80 mm. There shall be a free space above the step, with a minimum depth of 150 mm. This space over the step should be 150 mm high but shall not be less than 120 mm high. The height may decrease to 80 mm at a depth of 150 mm.

The level of the access door does not have to comply with the requirements above.

The floor or any sealing frame at the access door needs not be considered as a step but the height of the floor level above the adjacent step shall not be more than 450 mm and it is recommended that this height is equidistant to the other steps.

A handrail shall be provided in all cases on each side of external doors and steps directly leading to a driver's cab. The handrails shall be mounted solely at each end. The distance from the lower extremity of the handrail to top of rail should not be higher than 1 100 mm, but shall not exceed 1 250 mm. The distance from the top end of the handrail to the driver's cab floor level should be 1 200 mm but shall not be less than 1 000 mm.

The handrail shall be made of round bar with a diameter of min. 20 mm to max. 35 mm and shall withstand a force applied by staff of 1,5 kN at any point in any direction without causing permanent deformation to it or its fixings.

5.1.2 Access and security

Access to the driver's cab shall be from the exterior via a direct external door, and/or through a door from an adjacent compartment or area behind the cab.

These doors shall be designed to have an operational envelope that does not conflict with the envelope of another door.

The driver's cab and its access shall be designed so that the staff are able to prevent the cab being accessed by non-authorized persons, whether the cab is occupied or not. This requirement is deemed to be fulfilled by a locking system.

An emergency escape device shall permit to open any cab door from inside the cab without using any tool or key.

Egress and access to the driver's cab shall be possible without any energy supply.

5.1.3 Door handles

Door handles on the inside of the cab which are intended to be operated from a standing position shall be located at a height between 820 mm and 1 200 mm (distance between the rotation axis of the handle and the cab floor). The recommended value for the height of the door handles is 850 mm.

The handles shall have rounded edges and the force required to operate it should be adapted to the driver's population. In all cases, the force shall not exceed 50 N.

5.1.4 Threshold

The height of door threshold shall not be more than:

— 20 mm from the floor adjacent to the door, for interior doors, from the highest adjacent floor level;

— 60 mm from the floor adjacent to the door, for exterior doors.

5.1.5 Ergonomics

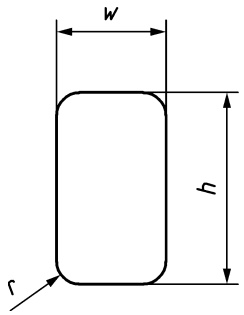
For handles inside the cab in regular use at least 40 mm clearance to surrounding surfaces shall be provided.

5.1.6 External doors

External cab doors when opened shall not infringe the intended maximal construction gauge defined from gauge rules of the vehicle.

Driver's cab external doors shall have a rectangular-like shape with a minimum unobstructed passage of 1 850 mm (height) × 550 mm (width) in accordance with Figure 1 (recommended 1 900 mm × 600 mm).

NOTE The width value is based on anthropometric data (shoulder breadth).



Key

w width
h height
r radius

Figure 1 — Minimum unobstructed passage dimensions

Dimension *r* shall not exceed 10 % of the width.

Cab external doors shall not open unintentionally. External cab doors shall have at least two stable positions (fully opened and closed) for which unwanted movement shall be prevented reliably.

5.1.7 Internal doors giving access to the driver's cab

If internal doors lead directly to the passenger area, a device to observe this area from inside the cab shall be provided, (e.g. by a spy hole or a transparent partition wall).

Internal doors shall have a rectangular-like minimum unobstructed passage height and width of 1 850 mm × 550 mm (recommended 1900 mm × 600 mm). Internal doors which are positioned left or right of the vehicle's longitudinal axis may have a trapezium shaped upper area with an angle of the top outer side (see Figure 2).

Internal cab doors shall have at least two stable positions (fully opened and closed) for which unwanted movement shall be prevented reliably.

Dimensions in millimetres

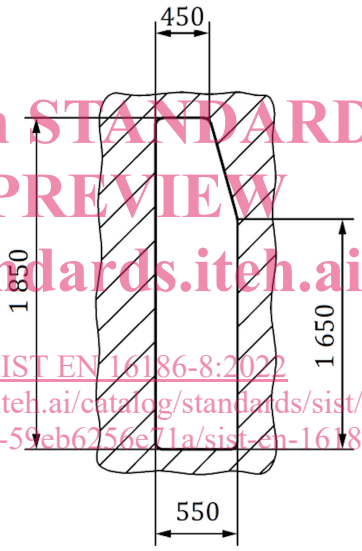


Figure 2 — Minimum door clearance for lateral internal doors

6 Floor and flooring

6.1 Floor surface criteria

Walkable area and steps shall be slip resistant.

This is deemed to be fulfilled by applying the requirement of EN 16165:2021, $\alpha_{shod} \geq 9°$.

For minimizing the tripping hazard, the walkable floor of the cab shall be level (with a tolerance of ± 2°). Exceptions are allowed in the following areas:

— area up to a maximum of 25 mm from the walls;

— the area below the desk;

— the area adjacent to doors (if there is a step) up to a distance of 25 mm.

No irregularity on the walkable floor shall protrude by more than 2 mm.

Sealing plates of door frames or sealing plates of door thresholds and maintenance openings are not considered as being a floor irregularity, but shall not exceed 5 mm in height.

Due to the application of a vertical load of 1300 N on a surface of 300 mm × 200 mm, no eslastic deflection of more than 10 mm in direction of the load shall be observed in the walkable floor, over the whole area. This can be demonstrated by calculation or by test.

NOTE No reference to EN 15663 is given, because the load is associated to the stiffness of the floor and not to the load calculation for the vehicle.

6.2 Steps

The walkable floor of the driver's cab (access to the cab and foot rest excluded) shall be without any steps. Steps are permitted between the cab and adjacent passenger area, as well as for accessing the cab from the exterior.

Steps shall not exceed a maximum height of 230 mm and should not exceed a height of 200 mm and shall have a depth of ≥ 210 mm. If more than one step is used, the height of each step shall be identical. If there are two or more steps, a handhold (e.g. a handrail or a single handle) shall be provided.

If there is a difference between the floor surface level of the cab and the passenger area level, it should not exceed 30 mm. This is not considered as a step.

If steps are provided, the first and the last step inside the cab shall be indicated by a yellow or yellow-black band with a minimum width of 25 mm along the useable width of the steps on the top surfaces of the nosing line. The yellow colour is defined in ISO 3864-4.

NOTE First step means the first usable step when ascending and the edge of the walking floor when descending.