SLOVENSKI STANDARD
oSIST prEN 16186-8:2020

01-september-2020

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 : Aménagement et accès pour les tramways

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Ta slovenski standard je istoveten z: prEN 16186-8

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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

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EUROPEAN STANDARD

NORME EUROPÉENNE

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ICS 45.060.10; 45.140

English Version

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

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

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

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

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oSIST prEN 16186-8:2020

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN 16186-8:2020
https://standards.iteh.ai/catalog/standards/sist/fe0327b6-aab3-4407-a916-9eb0250e71a/osist-pren-16186-8-2020

oSIST prEN 16186-8:2020

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN 16186-8:2020
https://standards.iteh.ai/catalog/standards/sist/fe6527b6-aab3-4407-a916-59eb6256e71a/osist-pren-16186-8-2020

oSIST prEN 16186-8:2020

European foreword

This document (prEN 16186-8:2020) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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

— 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

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oSIST prEN 16186-8:2020
https://standards.iteh.ai/catalog/standards/sist/fe6527b6-aab3-4407-a916-59eb6256e71a/osist-pren-16186-8-2020

1) To be published

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1 Scope

This document gives design rules and requirements in order to ensure proper access, lighting, seating and exit of the driver's cab. The different dimensions are based on the anthropometric data defined in prEN 16186-5. The corresponding assessment methods are also included in this standard. 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 part of EN 16186 series applies 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.

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

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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 16116-1, *Railway applications - Design requirements for steps, handrails and associated access for staff - Part 1: Passenger vehicles, vans and locomotives*

EN 15227, *Railway applications - Crashworthiness requirements for railway vehicle bodies*

prEN 16186-5:2019[2)], *Railway applications - Driver's cabs - Part 5: External visibility for tram vehicles*

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

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

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

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2) At draft stage.

oSIST prEN 16186-8:2020

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

EN ISO 7010, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

EN ISO 2813:2014, *Paints and varnishes — Determination of gloss value at 20 degrees, 60 degrees and 85 degrees*

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 http://www.electropedia.org/

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

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

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https://standards.iteh.ai/catalog/standards/sist/fe6527b6-aab3-4407-a916-59eb6256e71a/osist-pren-16186-8-2020

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

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

4 Symbols and abbreviations

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

g	Standard acceleration due to gravity (9,81 m/s²)
FLP	Footrest Lowest Position
GU	Gloss Unit as defined in EN ISO 2813
RAL	Colour codification from Deutsches Institut für Gütesicherung und Kennzeichnung, former Reichs-Ausschuss für Lieferbedingungen
SRP	Seat Reference Point

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5 Access, egress and doors

5.1 General

5.1.1 External steps and handrails

For external steps and handrails, EN 16116-1 shall apply.

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 cab access 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

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Driver's cab internal door handles 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 point of the handle and the cab floor). The recommended value for the height of the door handles is 850 mm.

5.1.4 Threshold

oSIST prEN 16186-8:2020
https://standards.iteh.ai/catalog/standards/sist/fe6527b6-aab3-4407-a916-
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The height of door threshold shall not be more than:

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

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

5.1.5 Ergonomics

For interior handles 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 minimum 1 900 mm × 600 mm).

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

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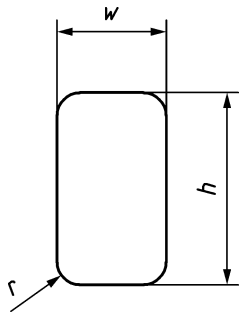

Key

w width

h height

r radius

Figure 1 — Minimum unobstructed passage dimensions

Dimension r shall have a maximum value of 20 % of the width.

Cab external doors shall not open unintentionally. External cab doors should have at least two stable positions: Fully opened and closed.

5.1.7 Internal doors giving access to the driver's cab

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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).

If direct view from passenger area into cab is possible, the driver should be able to prevent such view, e.g. by blinds.

SIST prEN 16186-8:2020
https://standards.iteh.ai/catalog/standards/sist/fe6527b6-aab3-4407-a916-59eb6256e71a/osist-pren-16186-8-2020

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 and open in longitudinal direction may have a trapezium shaped upper area with an angle of the top outer side (see Figure 2).

Dimensions in millimetres

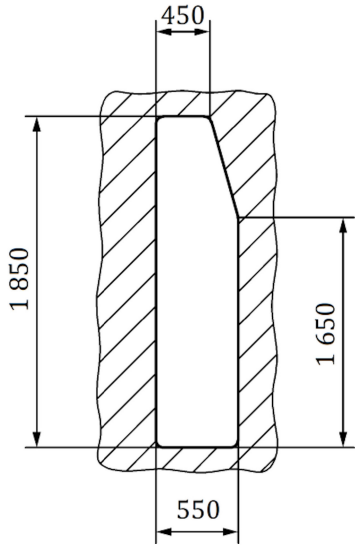

Figure 2 — Minimum door clearance for lateral internal doors

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6 Floor and flooring

6.1 Floor surface criteria

Walkable flooring and steps shall be slip resistant.

This is deemed to be fulfilled by applying the requirements of CEN/TS 16165:2016, α (shod) ≥ 9°.

NOTE 1 CEN/TS 16165 is currently being converted into an EN.

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 space under the desk;

— the area adjacent to doors (if there is a step).

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

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

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

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NOTE 2 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 Inclination, steps and slopes

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

Steps shall have a maximum height h of 250 mm and a depth of ≥ 210 mm. If more than one step is used their height shall be identical. If there are two or more steps, a handhold (e.g. a handrail or a single handle) should be provided.

7 Windows and glazing

7.1 Mechanical characteristics of glass

Glazing in cab windows shall be in accordance with EN 15152.

7.2 .Operation of opening windows

Three types of windows are considered in this standard:

— sliding horizontal;

— sliding vertical;

— hinged;

For all types of cab windows assembled but not mounted on the vehicle, the operating force shall not be higher than 80 N (recommended value < 50 N).

oSIST prEN 16186-8:2020

Vertically sliding windows shall not be capable of operating under their own weight.

8 Emergency

8.1 Driver's cab emergency exits

8.1.1 General

Driver's cab emergency exit and emergency exit clearance shall comply with the requirements of EN 45545-4:2013, 4.3.1.2.

8.1.2 Minimum escape route

The escape route shall have a minimum clearance of height 1 850 mm x width 430 mm (if possible, width should be 600 mm). This clearance is measured from the seat to the exit. The starting position is beside the seat (driver has both feet on the cab floor and no part of the body still in touch with the seat). This escape route and its floor shall be free of any obstruction. Steps are not considered as an obstruction.

8.1.3 Emergency exit opening

For opening emergency exits, no equipment shall be required with the exception of an emergency hammer if a non-opening window is used as an emergency exit.

A cabinet below an emergency exit window is not considered as an obstruction.

Driver’s cabs should have at least one interior exit opening door. If there is any risk of obstruction (baggage, passengers), the door should be of the swing type (opening outwards and/or inwards) or of the sliding type.

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The emergency escape device shall always function, irrespective of whether the door is unlocked or locked.

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In all positions of the door and the emergency escape device, there shall be a minimum clearance of 50 mm between the emergency escape device and surrounding objects in order to prevent a contusion/injury risk for the hand.

When the door is open, the minimum escape route shall be respected, even when the emergency escape device is in a normal (unpressed) position.

8.2 Emergency egress from seat

8.2.1 Seat design for escape

The driver's seat and the additional seat(s) in upright position shall not constitute an obstacle to escape in case of emergency.

The driver's seat is not regarded as an obstacle, as long as the requirements of 5.4.2.2 can be achieved.

8.2.2 Escape from seat assessment criteria

Escape from the seat to a position beside the seat (both feet on the cab floor and no part of the body still in touch with the seat) should be possible within 3 s after the requirement (e.g. a verbal command) to leave the seat and it should be assessed with the following start conditions:

— at vehicle standstill;

— driver in driving and seated position (hand on the master controller);

— both feet of the driver on the foot rest;