SLOVENSKI STANDARD
SIST EN 16186-1:2015+A1:2019

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Železniške naprave - Voznikova kabina - 1. del: Antropometrični podatki in vidljivost

Railway applications - Driver's cab - Part 1: Anthropometric data and visibility

Bahnanwendungen - Führerraum - Teil 1: Anthropometrische Daten und Sichtbedingungen

Applications ferroviaires - Cabines de conduite - Partie 1: Données anthropométriques et visibilité

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This European Standard was approved by CEN on 18 October 2014 and includes Amendment 1 approved by CEN on 26 August 2018.

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European foreword

This document (EN 16186-1:2014+A1:2018) 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of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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.

This document includes Amendment 1 approved by CEN on 2018-08-26.

This document supersedes EN 16186-1:2014.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1⟩ ⟨A1].

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 [1].

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

[A1⟩ EN 16186, “*Railway applications — Driver's cab*” is written as an EN series on all the aspects to be considered when designing a driver's cab, from anthropometric data and visibility, over the integration of displays, controls and indicators as well as the design of displays to cab layout and access facilities. The background information on the anthropometric data used is provided in CEN/TR 16823. ⟨A1]

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;*

— [A1⟩ *Part 4: Layout and access* ⟨A1]

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

[A1] This part of EN 16186 applies to driver's cabs of Electrical Multiple Unit (EMU), Diesel Multiple Unit (DMU), railcars, locomotives and driving trailers.

NOTE 1 This standard applies to rolling stock in the scope of the Directive 2008/57/EC. [A1]

This part of EN 16186 applies to driver's desks installed on the left, on the right, or in a central position in the driver's cab.

For OTMs, see EN 14033-1 [A1] *deleted text* [A1] and EN 15746-1 [A1] *deleted text* [A1].

This part of EN 16186 defines:

— anthropometric data;

— visibility conditions from the driver's cab, including forward visibility and the reference positions of line-side signals to be considered;

— assessment methods.

[A1] NOTE 2 Due to railway systems constraints the level of visibility provided to the persons outside the defined anthropometric range may vary. It is up to the operator's safety management system to address the potential restriction of front visibility, if the driver uses extreme seat positions combined with extreme body heights. [A1]

[A1] The actual seating and positioning habits of drivers regarding visibility, whether drivers are in or outside the range of anthropometric data of this standard is outside the scope of this document. [A1]

[A1] This standard is not intended to be applicable for tramways, metros and light rail vehicles. [A1]

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 15152, *Railway applications — Front windscreens for train cabs*

[A1]

EN 15663, *Railway applications — Definition of vehicle reference masses*

EN 50125-1, *Railway applications — Environmental conditions for equipment — Part 1: Rolling stock and on-board equipment* [A1]

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1
driver
person tasked with operating a vehicle or a train by operating controls in a driver's cab or on a remote control unit

3.1.2
driver's cab
compartment of a vehicle which is equipped with controls and instruments with which the driver controls traction unit(s) in the train

3.1.3
vision area A
windscreen vision area represented by the trapezoid defined by the intersection of the lines of sight

Note 1 to entry: See Annex A and Annex B.

3.1.4
vision area B
windscreen vision area outside area A through which the driver may also be required to look

3.1.5
technical specification
document describing specific parameters and/or product requirements, which have to be agreed by contracting parties

3.1.6
seat reference point
SRP
reference point at the back pan of a new seat design with a horizontal distance of 135 mm and a vertical distance of 98 mm from the H point according to ISO 20176:2011 [A1] [5] [A1]

Note 1 to entry: See Figure 2.

Note 2 to entry: For existing seat designs, the SRP may be defined as an alternative via Directive 78/764/EEC [A1] [6] [A1].

3.2 Abbreviations

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

DMU	Diesel Multiple Unit
EMU	Electric Multiple Unit
OTM	On-Track Machine

4 Driver's anthropometric data

4.1 General

This clause defines the anthropometric data on which the requirements for cab forward visibility are based.

The background on these anthropometric data will be provided in CEN/TR 16823.

4.2 Data

Figure 1 and Figure 2 give the body size measures.

Dimensions in millimetres

	Min.	Max.
a[a]	1 580	1 940
b[a]	1 480	1 815
c	820	985
d	710	860
e	545	665
f[a]	510	635
g[a]	405	510
h	120	180
i	440	525

[a] Includes 30 mm allowance for shoes.

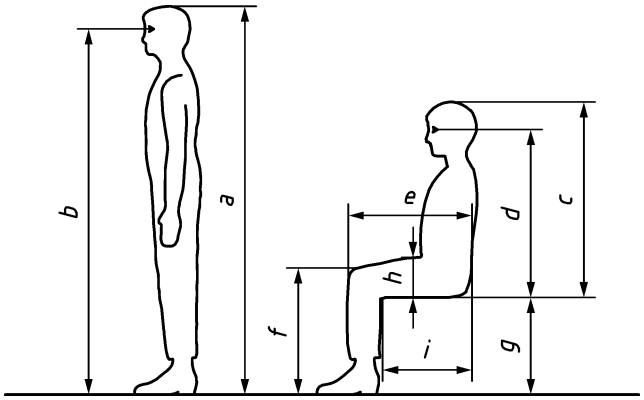
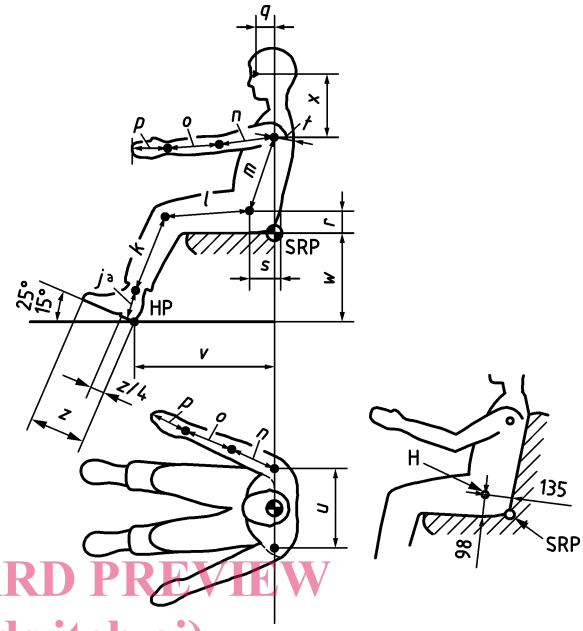


Figure 1 — Principal body size measures

Dimensions in millimetres

	Min.	Max.
j [a]	107	126
k	353	457
l	377	473
m	411	498
n	257	312
o	223	266
p	170	221
q	78	90
r	75	101
s	105	121
t	104	131
u	295	387
v	450 to 550	600 to 700
w	390 to 405	470 to 510
x	232	261
z	220	290

[a] Includes 30 mm allowance for shoes.



Key

H	source for hip point: ISO 20176:2011
HP	heel point (lowest rear point of the heel)
SRP	seat reference point
z/4	non-flexible part of the shoe pad

Figure 2 — Additional body size measures

5 Forward visibility

5.1 General

For the seated driving position the forward visibility requirements of 5.2.1 shall be ensured (see also Annex A and Annex B).

The horizontal distance from the driver's eye to the windscreen in seated position shall be a minimum of 500 mm and an absolute maximum of 1 715 mm. It is recommended to have a maximum of 1 500 mm.

The sightlines as defined in 5.2.1 shall not be infringed by any permanent equipment of the rolling stock, whether inside or outside the cab.

5.2 Forward visibility requirements

5.2.1 General

This applies for all units equipped with a cab. For rolling stock which are not covered by the Directive 2008/57/EC, other requirements may apply.

NOTE In this case, for Ireland and UK, the Annex C applies.

[A1] The forward visibility for the driver from the normal seated position is covered by the following assessment based on standard reference points and on a vehicle in design mass under normal payload conditions (in accordance with EN 15663) on a straight and level track. [A1]

The position of the eye points shall be defined by using Figure B.1 for fixed foot rest only or Figure B.2 for fixed seat only or Figure B.3 for seat and foot rest both vertically adjustable.

In case of Figure B.3, the eye points of the small driver are covered by the method defined for the tall driver as defined below:

The demonstration of forward visibility shall be done based on a drawing with theoretical lines of sight:

— to the high reference points, from the mid-point (Point A) between the tall driver's eyes;

— to the low reference points, from a check-point (Point B) vertically below this mid-point at a vertical distance that shall be at least 115 mm and should be 190 mm. As an exception for high-speed trains with a front windscreen inclined less than 35° from the horizontal, the vertical distance for Point B may be reduced to 100 mm.

It is recommended that the minimum longitudinal distance at which low reference points are visible should be reduced.

In the case of using Figure B.1 or Figure B.2, the demonstration of forward visibility shall be performed from a point mid-way between the driver's eyes for both the small and the tall drivers' positions.

The height of the above mid-point between the eyes applied in the demonstration of vertical forward visibility shall apply also for lateral forward visibility.

With this assessment all effects like track curvature, track geometry and vehicle conditions are completely covered, i.e. no additional requirements resulting from those effects shall apply.

5.2.2 Particular cases

For vehicles with centre gangway the lateral forward visibility may be demonstrated only on one side.

For vehicles with central cab the lateral forward visibility for the low reference point may be demonstrated only for the side of the driver's seat, if the movement of the driver in the cab for seeing the low reference point on the other side is not hindered while driving.

5.3 Windscreen requirements

5.3.1 General

Windscreen characteristics are defined by EN 15152.

The projection area of the windscreen (vision area A plus vision area B) on a vertical plane shall have a minimum height of 600 mm and a minimum width of 800 mm. For split windscreen (associated with lateral desk) the width may be reduced to 750 mm.

For centre gangway cabs, the minimum width of the projection area shall be 580 mm.

The minimum height of the upper limit of the transparent windscreen shall be 1 810 mm above cab floor. No permanent equipment shall infringe this limit.

For train sets (defined in TSI) with a windscreen inclined by less than 35° from the horizontal or train sets with maximum design speed greater than 190 km/h, a lower value of the upper limit of the transparent windscreen is permitted.

5.3.2 Windscreen cleaning devices

The location and function of windscreen cleaning and clearance devices shall ensure the external view according to this European Standard in most weather and operating conditions. This is deemed to be fulfilled by provision of cleaning and clearance devices as defined in this standard.

Cleaning and clearance devices shall not permanently inhibit the driver's external view.

The applicable classes as defined in EN 50125-1 [A1] *deleted text* [A1] shall be defined in the technical specification.

The wiped area shall cover at least 80 % of vision area A. It is recommended to wipe the upper middle zone and the bottom corner zones of vision area A.

If the wiping device is switched off and the cab is activated, the wiper blade shall be outside vision area A (the park position).

The wiper shall provide at least two different wiping speeds.

There shall be a windscreen washing device under control of the driver from inside the cab. Fluid windscreen washing detergents shall be usable by this device.

During windscreen washing and for two to four cycles after the washing jets have stopped, wiping shall automatically be applied.

5.3.3 Windscreen sun protection

A sun protection device shall be provided without affecting the forward visibility in its stowed position.

The position of the sun protection device shall be continuously adjustable and shall not change any adjusted position unintentionally.

If the protection depends on an external energy supply, it shall also allow manual adjustment.

If transparent panels are used for sun protection, they shall comply with the chromaticity requirements set out in EN 15152.

The sun protection device, if not transparent, should have a heat-reflective surface facing outwards.

In case of sun protection for additional use of preventing the cab from solar radiation, the following shall apply: For cabs with a windscreen inclined by more than 35° from the horizontal, the combination of fixed desk equipment from the bottom and sun protection from the top shall cover at least 90 % of the projection on a vertical plane of the vision areas A and B. For other cabs, it shall be at least 70 %.

5.3.4 Windscreen de-icing and de-misting

The windscreen shall be equipped with de-icing and de-misting devices.

Heating for the windscreen shall include the windscreen wiper’s park position.

Where the front window is heated on a permanent basis, EN 15152 requirements shall apply.