



SLOVENSKI STANDARD
oSIST prEN 16839:2020

01-november-2020

Železniške naprave - Vozna sredstva - Postavitev glavnega parka

Railway applications - Rolling stock - Head stock layout

Bahnanwendungen - Schienenfahrzeuge - Anordnung der Bauteile am Kopfstück

Applications ferroviaires - Matériel roulant ferroviaires - Agencement de la traverse de tête

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ICS:

45.040	Materiali in deli za železniško tehniko	Materials and components for railway engineering
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EUROPEAN STANDARD
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Railway applications - Rolling stock - Head stock layout

Applications ferroviaires - Matériel roulant ferroviaires
- Agencement de la traverse de tête

Bahnanwendungen - Schienenfahrzeuge - Anordnung
der Bauteile am Kopfstück

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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European foreword

This document (prEN 16839:2020) 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.

This document will supersede EN 16839:2017.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2016/797/EC.

For relationship with EU Directive 2016/797/EC, see informative Annex ZA, which is an integral part of this document.

Compared to EN 16839:2017, the following essential modifications are intended:

- a) Adaptation of the document with regard to overlapping contents to EN 15551 and EN 15566;
- b) Revision of Figure 1 – Free spaces;
- c) Revision of Figure 3 – Buffer and drilling template for wagon;
- d) Revision of Figure 7 in 6.3 "Clearances around the draw hook" with consideration of the necessary clearance for mounting the rescue coupler on locomotives;
- e) Adaptation of Annex ZA to EU Directive 2016/797/EC;
- f) Adaptation of normative references and editorial revision.

prEN 16839:2020 (E)**1 Scope**

This document is valid for rail vehicles equipped with buffers and screw coupling systems.

In order to allow operation and coupling of trainsets or vehicles, this document specifies the defined free space for the shunter called the “Berne rectangle” and the necessary free space for the installation of the rescue coupler.

This document specifies the location, fixing, and free spaces on the headstock of:

- buffers;
- screw coupling systems;
- end cocks;
- pneumatic half couplings;
- connections for electric cables.

It also specifies the calculation of the width of the buffer heads.

Unless otherwise displayed, all dimensions given in this document are nominal values.

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 13848-1:2003+A1:2008, *Railway applications - Track - Track geometry quality - Part 1: Characterisation of track geometry*

EN 14601:2005+A1:2010, *Railway applications - Straight and angled end cocks for brake pipe and main reservoir pipe*

prEN 15020:2019, *Railway applications - Rescue coupler - Performance requirements, specific interface geometry and test methods*

prEN 15551:2019, *Railway applications - Railway rolling stock - Buffers*

prEN 15566:2019, *Railway applications - Railway rolling stock - Draw gear and screw coupling*

prEN 15807:2019, *Railway applications - Pneumatic half couplings*

EN 15877-1:2012+A1:2018, *Railway applications - Marking on railway vehicles - Part 1: Freight wagons*

EN 16286-1:2013, *Railway applications - Gangway systems between vehicles - Part 1: Main applications*

EN 60529:1991¹⁾, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

ISO 3864 (all parts), *Graphical symbols - Safety colours and safety signs*

1) As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14601:2005+A1:2010, prEN 15551:2019, prEN 15566:2019, prEN 15807:2019 and the following 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

Berne rectangle

defined free space which is needed to ensure safe working conditions for the shunting staff during coupling and uncoupling of screw couplings

3.2

clearance

areas needed for moveable parts

3.3

contact plane of buffers

plane tangent to buffing surfaces of both buffer heads at the end of the vehicle perpendicular to running surface

Note 1 to entry: See EN 13848-1:2003+A1:2008, 3.1.4 and 4.1.

Note 2 to entry: Also named as “buffing plane”.

Note 3 to entry: “Running surface” sometimes also named as “Top of Rail (TOR)”

3.4

free space

area free of equipment used for protection for, e.g. shunters

3.5

headstock

part of the underframe with a vertical reference plane at the ends of the vehicle where the buffers are fixed

Note 1 to entry: Headstock includes the part where draw gear is fixed.

3.6

guidance device for draw hook

device to guide and support the draw hook

3.7

shunter

member of staff who couples and uncouples railway vehicles

3.8

symmetrical buffer

buffer, wherein the buffer head is, regardless of its contour geometry, mounted on its width dimension symmetrically to the centre-line of the buffer housing or to the predetermined nominal position of the buffer centre-line

prEN 16839:2020 (E)**4 Free spaces****4.1 General**

To ensure safe working conditions and also for easy operation for the shunters during coupling and uncoupling, it is necessary to define required free spaces.

With the exception of the shunter's handrails there shall be no devices under the buffers that limit the shunter's access for coupling operations.

Flexible connecting cables and flexible parts of hoses may penetrate these spaces.

The flexible parts of gangways according to EN 16286-1:2013 may infringe the Berne rectangle.

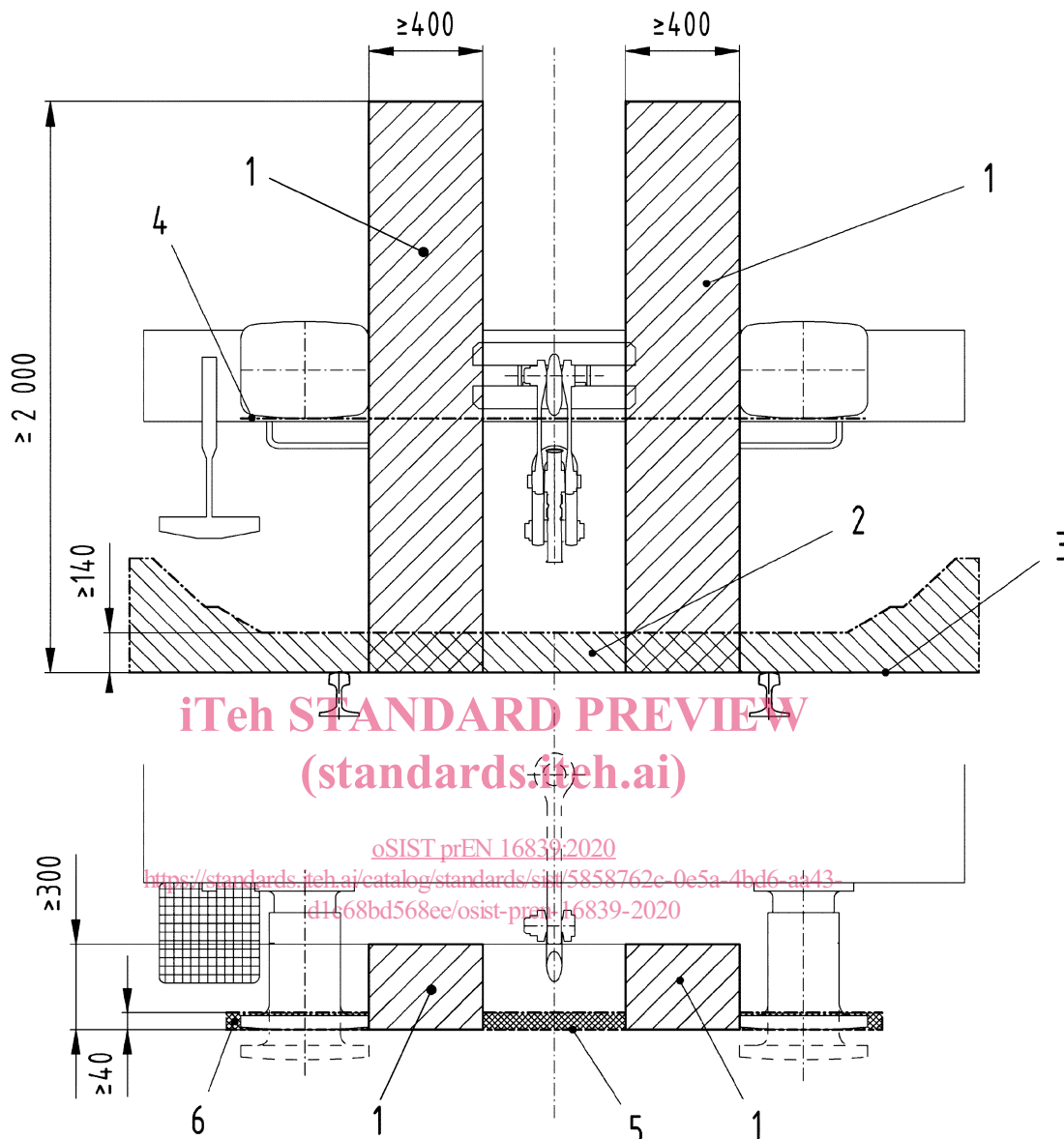
For assessment of free spaces, the coupling gear components shall be positioned on the centre-line of the vehicle.

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Dimension in millimetres

**Key**

- 1 free space for the shunter (Berne rectangle)
- 2 free space above running surface without moveable parts (e.g. couplers, pipes)
- 3 running surface
- 4 lower edge of buffer head
- 5 contact plane of fully elastic compressed buffers
- 6 free spaces, free of fixed devices behind the buffer head above its lower edge

Figure 1 — Free spaces

NOTE Steps and handrails are not part of this document. The dimensions of the shunter steps and handrails and the clearance around these arrangements are given in EN 16116-1 and EN 16116-2.

prEN 16839:2020 (E)

4.2 Berne rectangle

The free space for shunters during coupling is called “Berne rectangle”. Vehicles shall be designed in such a way that staff are not exposed to undue risk during coupling and uncoupling. The spaces shown in Figure 1 shall be free of fixed parts in all service conditions.

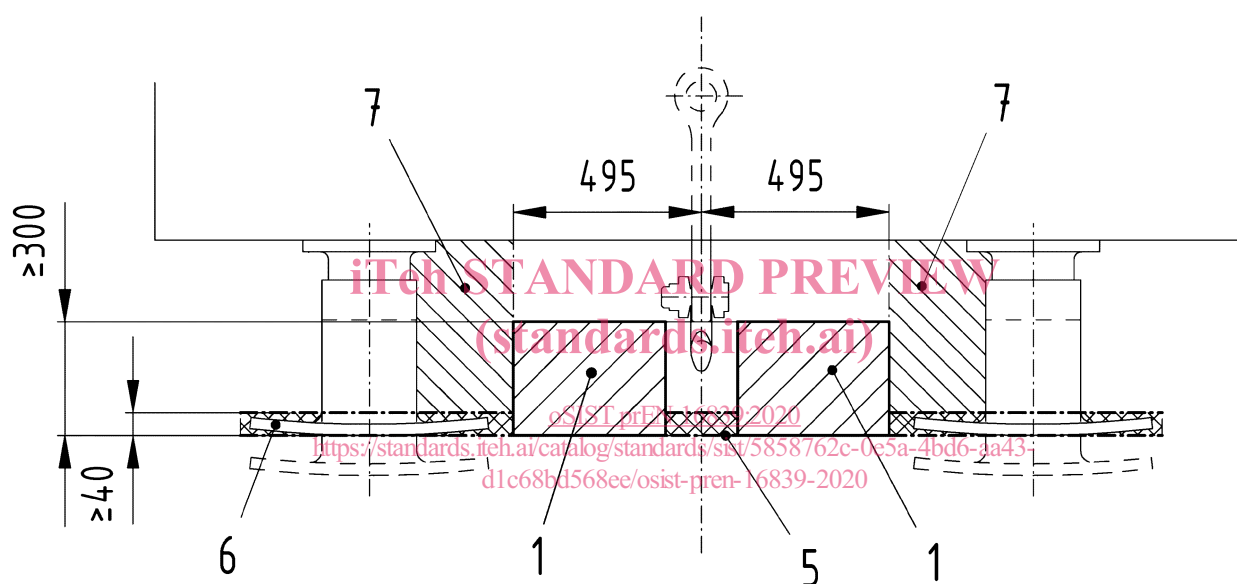
Any device fixed on a vehicle shall remain at least 40 mm behind the contact plane of fully compressed buffers above the lower edge of the buffer head.

4.3 Free spaces for coupling of coaches

See free spaces from 4.1 and Figure 2.

The limit of the securing devices for the gangway side plate (if fitted) shall be located at a minimum distance of 495 mm from the vehicle longitudinal centre-line.

Dimension in millimetres



Key

- 1 for the shunter (Berne rectangle)
- 2 not shown in this view (see Figure 1)
- 3 not shown in this view (see Figure 1)
- 4 not shown in this view (see Figure 1)
- 5 contact plane of fully elastic compressed buffers
- 6 free spaces, free of fixed devices behind the buffer head above its lower edge
- 7 free space for gangway side plate

Figure 2 — Free spaces for coupling coaches

4.4 Climb protection

On vehicles, where buffer climb protection is used (compulsory for vehicles subjected to regulations for dangerous goods), the climb protection shall not restrict the free spaces.

NOTE For buffer climb protection on vehicles subjected to regulations for dangerous goods, see also TE 25 on RID.

5 Buffers

5.1 General

The following requirements apply to vehicles equipped at least at one end with two buffers according to prEN 15551:2019, fixed symmetrically to the longitudinal centre-line of the vehicle.

5.2 Position of buffers on the headstock

5.2.1 Distance between buffers

The standard distance between buffer centre-lines shall be nominally according to Table 1.

Table 1 — Track gauge and distance between buffer centre-lines

Track gauge mm	Distance between buffer centre-lines mm
1 435	1 750 ± 10
Interchangeable 1 435/1 524	1 790 ± 10
Interchangeable 1 435/1 600	1 905 ± 3
Interchangeable 1 435/1 668	1 850 ± 10
1 524	1 830 ± 10
1 600	1 905 ± 3
1 668	1 850 ± 10

It is permitted for dual gauge units (interchangeable wheel sets) intended for running between standard gauge network 1 435 mm and broad-gauge networks to have a different value of the distance between buffer centre-lines (e.g. 1 850 mm), provided that full compatibility with buffers for standard 1 435 mm gauge is ensured.

Buffers shall be sized so that in horizontal curves and reverse curves, it is not possible for vehicles to lock buffers. The minimum horizontal overlap between buffer heads in contact shall be 25 mm.

prEN 16839:2020 (E)**5.2.2 Height of buffers above top of the rail**

The height b of the centre-line of the buffers to the top of the rail shall be in all loading and wear conditions in accordance with Table 2.

Table 2 —Height of buffers above top of the rail

Type	b mm
Locomotive	940 mm to 1 065 mm
Coach	980 mm to 1 065 mm
Freight wagon and car carrier	940 mm to 1 065 mm

5.3 Buffer fixing**5.3.1 Vehicles without crashworthy buffer systems**

The buffers shall be attached to the vehicle headstock.

The screws shall be M 24, grade 8.8, and self-locking nuts, grade 8, shall be used. The screws shall have a threaded projection of at least three threads.

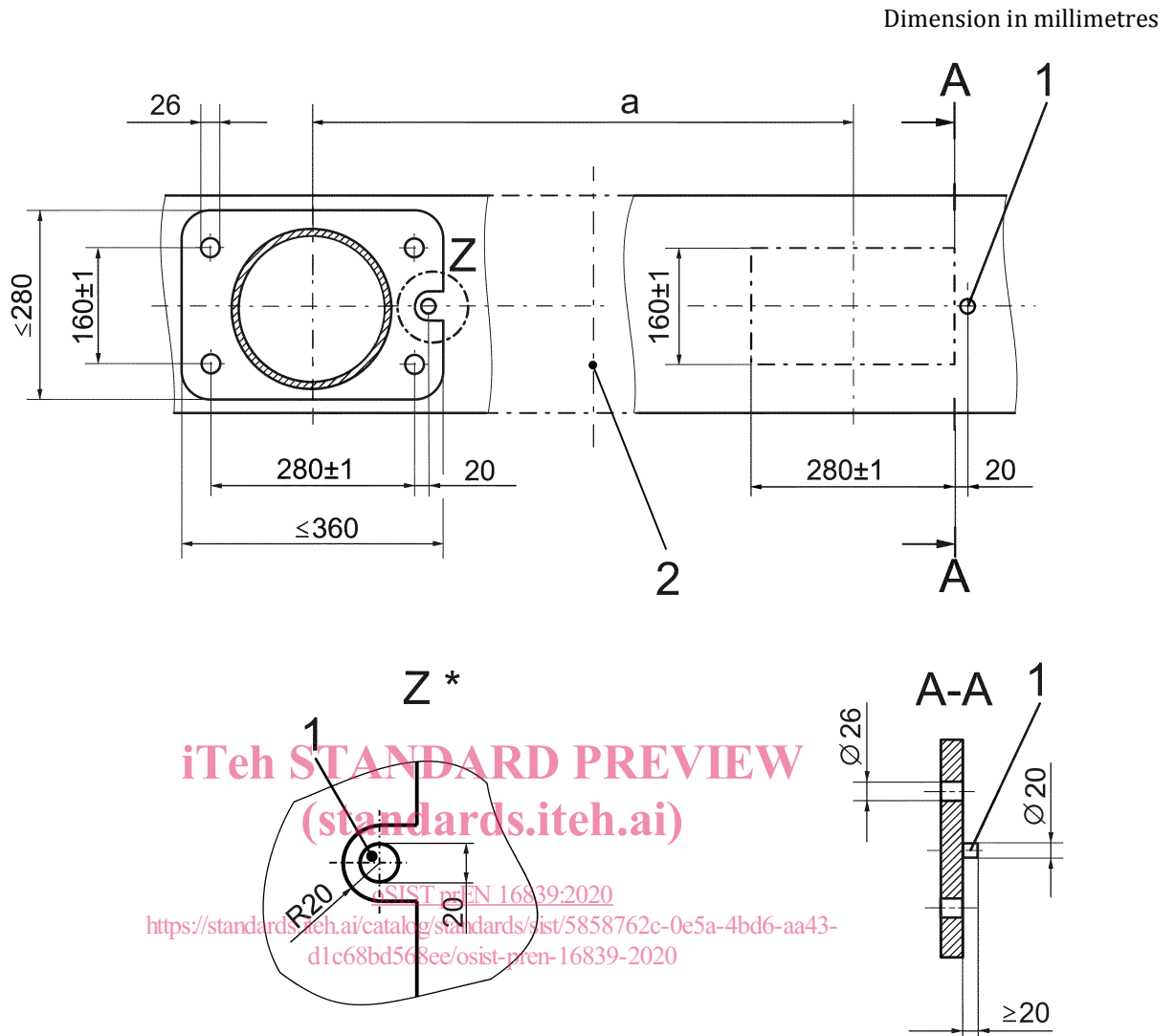
The recommended tightening torque should be 690 Nm.

For wagons, distance between holes shall be in accordance with Figure 3.

For wagons fitted with 150 mm stroke buffers, pins in the headstock, which indicate that this kind of buffer shall be used, shall be located at the right side of each buffer (looking at the buffer head) as shown in Figure 3, item 1, Section A – A. The protrusion of the pin shall be at minimum 20 mm.

NOTE To avoid confusion of buffers with different strokes, buffers with 150 mm stroke therefore have an opening at their right side, buffers with 105 mm stroke do not have this opening.

The hole spacing (280 × 160) mm for freight wagons should also be used for passenger coaches, vans and locomotives.



Key

- 1 pin only for buffer with 150 mm stroke
- 2 centre-line of the vehicle.
- A distance from buffer centre-line to buffer centre-line (see Table 1)
- * magnified section

Figure 3 — Buffer and drilling template for wagon

5.3.2 Vehicles with crashworthy buffer systems

Vehicles that use crashworthy buffers or buffers which form part of a combined system consisting of a special buffer and a deformation element may have a different mounting configuration (e.g. position of flange, thread diameter, number of screws and their position).

NOTE These vehicles are locomotives, driving trailers or passenger coaches according to EN 15227 or tank wagons according to the Regulation for Dangerous Goods.

The marking for wagons fitted with crashworthy buffer systems shall be according to EN 15877-1:2012+A1:2018.