SLOVENSKI STANDARD
SIST EN 16839:2022

01-november-2022

Nadomešča:
SIST EN 16839:2017

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

Ta slovenski standard je istoveten z: **EN 16839:2022**

ICS:

45.040	Materiali in deli za železniško tehniko	Materials and components for railway engineering

SIST EN 16839:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16839

August 2022

ICS 45.040

Supersedes EN 16839:2017

English Version

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 European Standard was approved by CEN on 10 July 2022.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Ref. No. EN 16839:2022 E

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European foreword

This document (EN 16839:2022) 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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.

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 supersedes EN 16839:2017.

United Kingdom has a national deviation, which is included in Annex D.

The main changes resulting from this document will be incorporated as modifications to EN 16839:2017:

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) Complete revision of Clause 9 “Electrical connections” including the figures;

f) New Annex F “Calculation of space for shunter (Berne Rectangle) in curves when using screw couplings” – adopted from EN 16116-2;

g) Adaptation of Annex ZA to EU Directive 2016/797/EC;

h) Adaptation of normative references and editorial revision.

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(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

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.

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

1 Scope

This document is applicable to 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 14601:2005+A2:2021, *Railway applications - Straight and angled end cocks for brake pipe and main reservoir pipe*

EN 15020:2022, *Railway applications — Rescue coupler — Performance requirements, specific interface geometry and test methods*

EN 15551:2022, *Railway applications — Railway rolling stock —- Buffers*

EN 15566:2022, *Railway applications — Railway rolling stock — Draw gear and screw coupling*

EN 15807:2021, *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 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*[1]

ISO 3864 (all parts),[2] *Graphical symbols — Safety colours and safety signs*

1 Document impacted by EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/A2:2013/COR1:2019.

2 Consists of the following parts: ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings;* ISO 3864-2:2016, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels;* ISO 3864-3:2012, *Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs* ISO 3864-4:2011,

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14601:2005+A2:2016, EN 15551:2022, EN 15566:2022, EN 15807:2021 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
area needed for mounting and functional use of moveable parts

EXAMPLE Adapters, cables, etc are moveable parts.

Note 1 to entry: For definition of "running surface" see EN 13848-1:2019, 3.4

3.3
contact plane of buffers
buffing plane
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 13848-1:2019, 3.1.4 and 4.1.

Note 2 to entry: "Running surface" sometimes also named as "Top of Rail (TOR)".

3.4
free space
area free of equipment needed for occupational safety

EXAMPLE free space for coupling process and/or ergonomic (e.g. handrails, cocks)

Graphical symbols — Safety colours and safety signs — Part 4: Colorimetric and photometric properties of safety sign materials (Part 4 not relevant for this standard).

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

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.

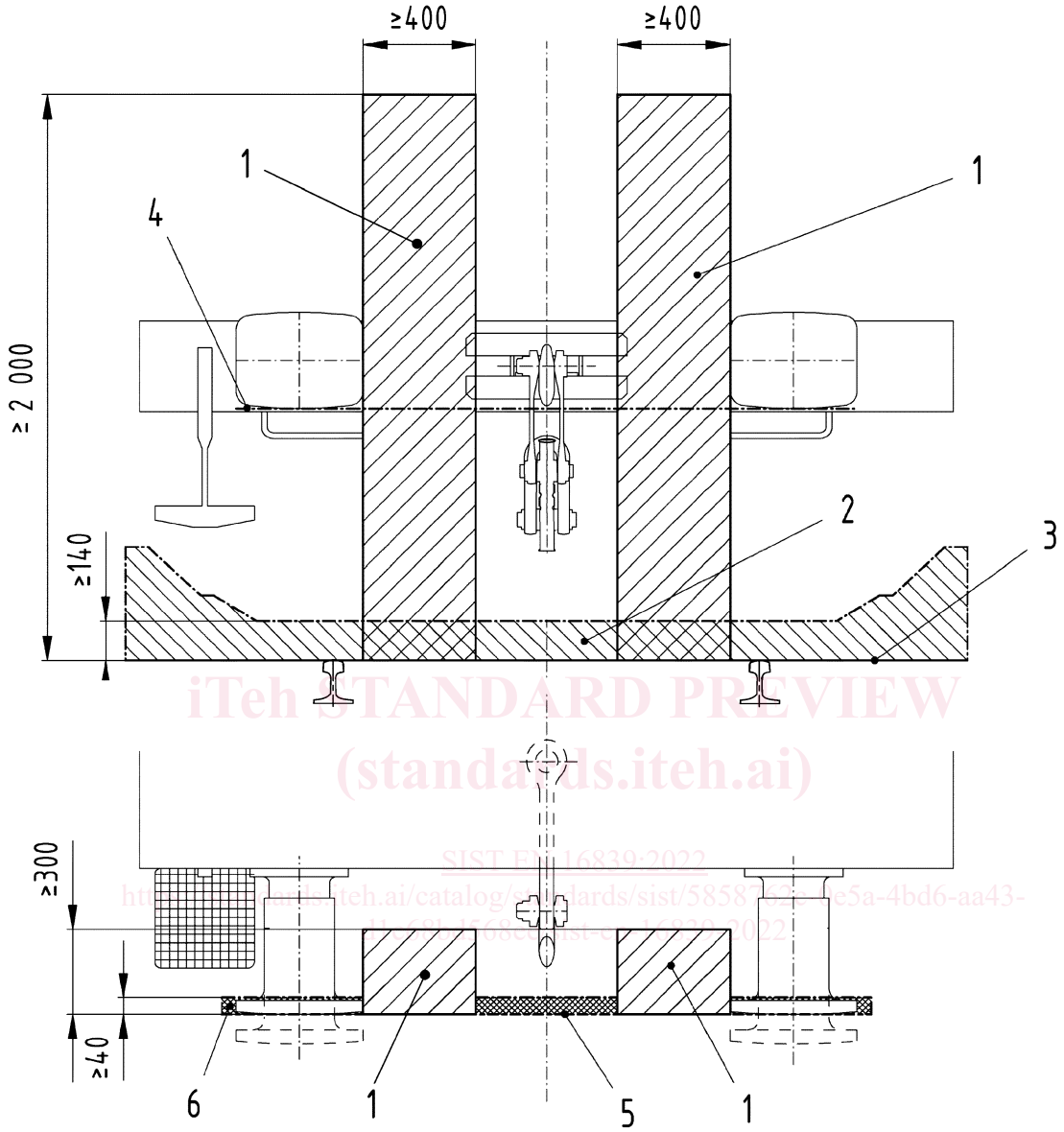
With the exception of the shunter's handrails there shall be no devices under the buffers that limit the shunter's access for coupling operations.

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.

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 free spaces around these arrangements are given in EN 16116-1:2022 and EN 16116-2:2020.

4.2 Berne rectangle

The free space for shunters during coupling is called “Berne rectangle”.

Vehicles shall be designed so that staffs are not exposed to undue risk during coupling and uncoupling. If screw couplers and side buffers are used, the required spaces shown in Figure 1 shall be free of fixed parts.

Flexible connecting cables and flexible hoses may be inside this space. With exception of the shunter handrails there shall be no devices under the buffers that hinder the access to the space.

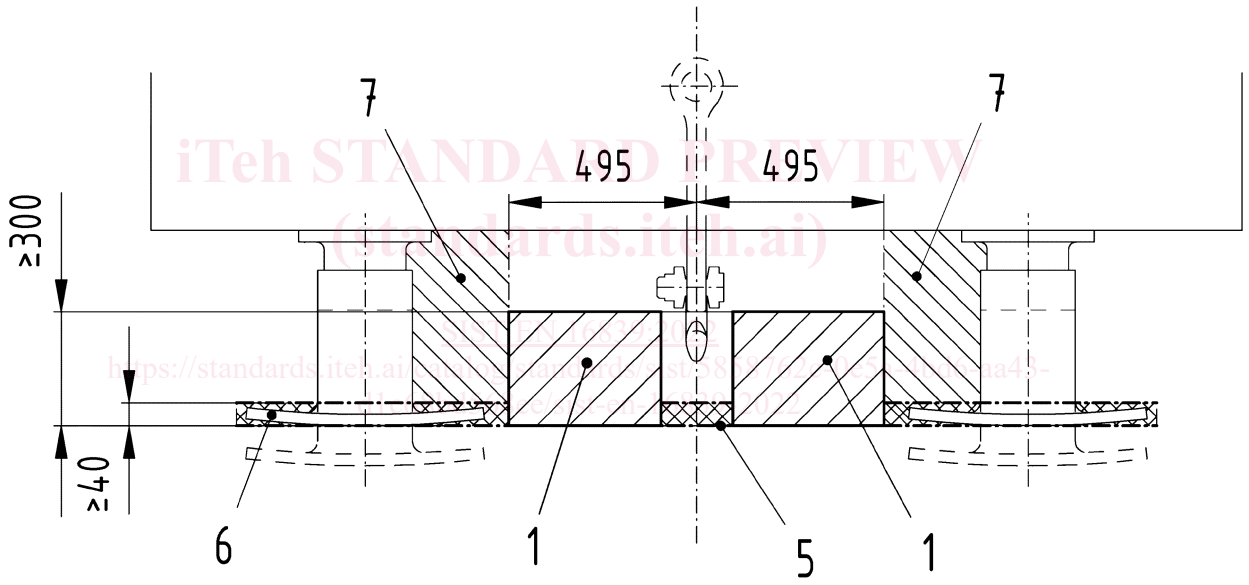
For the verification of the necessary spaces (Berne rectangle) for the coupler in S-curves, see Annex F.

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 climb protection are used (mandatory for vehicles subjected to regulations for dangerous goods), the climb protection shall not restrict the free spaces.

NOTE Information on climb protection on vehicles subjected to regulations for dangerous goods, is given in 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 EN 15551:2022, 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 wheelsets) 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. One 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.

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.

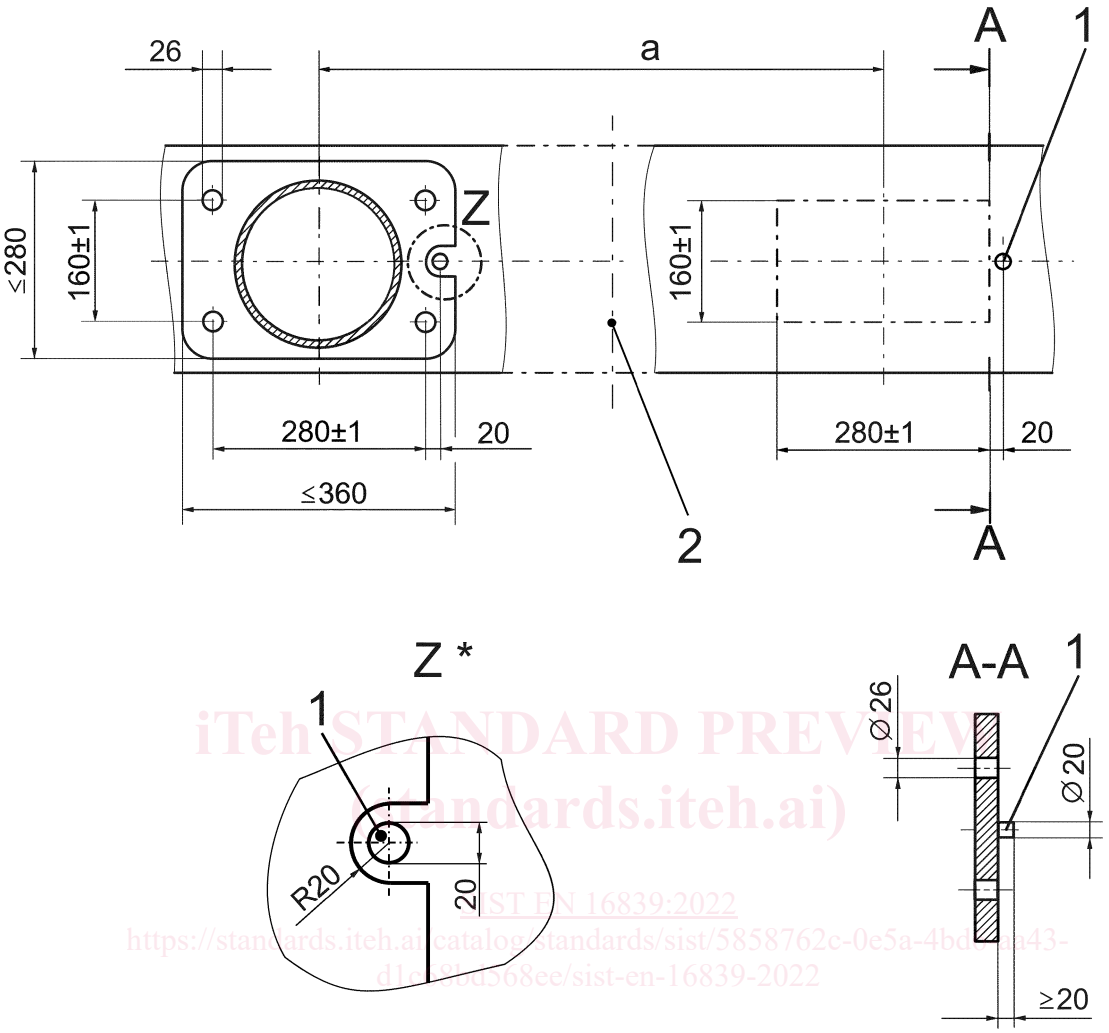
For wagons, distance between holes shall be in accordance with Figure 3.

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 least 20 mm..

NOTE To help identify buffers with different strokes, buffers with 150 mm stroke have an opening at their right side, while buffers with 105 mm stroke do not have this opening.

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

Dimension in millimetres



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 coaches according to EN 15227:2020 or tank wagons according to the Regulations concerning the International Carriage of Dangerous Goods by Rail (RID).

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

5.4 Interaction coupling/buffer

5.4.1 General

To ensure that the train is able to negotiate horizontal curves of 150 m radius safely, the static characteristics of draw gear and buffers shall be coordinated.

A guideline value of 250 kN should not be exceeded for the compression force of a pair of buffers in contact on a horizontal curve of 150 m.

Unless otherwise specified in the technical specification, the stiffest static characteristics of the buffer and draw gear combined together with the static test methods according to EN 15566:2022 and EN 15551:2022 are to apply for evidence of buffer compression force.

The age of elastic elements in operational service should also be taken into account.

Conformity to these requirements may be assessed by calculation.

NOTE 1 The technical specification can define additional conditions for tested elastic devices, as for example temperature range, which for static characteristics are to be taken into account.

NOTE 2 For new elastic devices, the available experience related assessed values may be applied.

To determine the compression force for vehicles, the calculation method shown under section 3 of UIC B 36 RP 32 may be used (the method described in this report is also applicable for coaches and locomotives). This calculation method may also allow to determine stress levels on smaller radius curves. If the coupling practice creates pretension forces, these shall be taken into account.

NOTE 3 The calculation method on curves according to UIC B36 RP 32 also gives confidence for an S-curve of 150 m with an intermediate straight of 6 m.

NOTE 4 It is confirmed that pairings of different vehicle types / configurations need not to be analysed if each vehicle complies with the 250 kN limit analysed for a pairing of same vehicle types.

5.4.2 Mounting of buffers

Two buffers with the same elastic system, category, head dimension, stroke and type of housing shall be fitted at each vehicle end. The nominal length of the buffers on each side shall be the same.

Housings which differ only in the buffer head material (steel or non-metallic insert) are considered to be identical.

When a non-metallic insert or non-metallic head is provided on one of the two buffers per vehicle end, it shall be placed diagonally according to Figure 4.