



**NSAI**  
Standards

Irish Standard  
I.S. EN 16839:2017

# Railway applications - Rolling stock - Head stock layout

**I.S. EN 16839:2017**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

*This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):*

*NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.*

*This document is based on:*

EN 16839:2017

*Published:*

2017-10-11

*This document was published under the authority of the NSAI and comes into effect on:*

2017-10-29

ICS number:

45.040

NOTE: If blank see CEN/CENELEC cover page

NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

## National Foreword

I.S. EN 16839:2017 is the adopted Irish version of the European Document EN 16839:2017, Railway applications - Rolling stock - Head stock layout

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

This page is intentionally left blank

EUROPEAN STANDARD

EN 16839

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2017

---

ICS 45.040

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 2 July 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>	<b>Page</b>
European foreword.....	5
<b>1 Scope</b> .....	<b>6</b>
<b>2 Normative references</b> .....	<b>6</b>
<b>3 Terms and definitions</b> .....	<b>6</b>
<b>4 Free spaces</b> .....	<b>7</b>
4.1 <b>General</b> .....	7
4.2 <b>Berne rectangle</b> .....	9
4.3 <b>Free spaces for coupling of passenger vehicles</b> .....	9
4.4 <b>Climb protection</b> .....	9
<b>5 Buffers</b> .....	<b>10</b>
5.1 <b>General</b> .....	10
5.2 <b>Position of buffers on the headstock</b> .....	10
5.2.1 <b>Distance between buffers</b> .....	10
5.2.2 <b>Height of buffers above top of the rail</b> .....	10
5.3 <b>Buffer fixing</b> .....	11
5.3.1 <b>Vehicles without crashworthy buffer systems</b> .....	11
5.3.2 <b>Vehicles with crashworthy buffer systems</b> .....	11
5.4 <b>Interaction coupling/buffer</b> .....	12
5.4.1 <b>General</b> .....	12
5.4.2 <b>Mounting of buffers</b> .....	12
5.5 <b>Requirements to avoid buffer locking</b> .....	13
5.5.1 <b>Boundary dimensions</b> .....	13
5.5.2 <b>Calculation of width of buffer heads</b> .....	14
5.5.3 <b>Verification</b> .....	16
<b>6 Screw coupling</b> .....	<b>16</b>
6.1 <b>General</b> .....	16
6.2 <b>Position of draw gear on the headstock</b> .....	17
6.2.1 <b>Height of the draw gear above top of the rail</b> .....	17
6.2.2 <b>Position of the device to hang the screw coupler when not in use</b> .....	17
6.3 <b>Clearances around the draw hook</b> .....	17
6.4 <b>Draw gear fixing</b> .....	19
<b>7 Brake pipe connections</b> .....	<b>19</b>
<b>8 Pneumatic half couplings</b> .....	<b>21</b>
<b>9 Electrical connections</b> .....	<b>21</b>
<b>Annex A (normative) Calculation of the width of buffer heads</b> .....	<b>27</b>
A.1 <b>General</b> .....	27
A.1.1 <b>Introduction</b> .....	27
A.1.2 <b>Comments on the preparation of the formulae in this annex</b> .....	27
A.1.3 <b>Track</b> .....	27
A.1.4 <b>Vehicle</b> .....	27
A.2 <b>Data used in the calculation</b> .....	28
A.3 <b>Calculation</b> .....	28
A.4 <b>Return Value</b> .....	29

<b>Annex B (normative) Validation of the calculated width of buffer heads by drawing methodology</b> .....	<b>30</b>
<b>B.1 General</b> .....	<b>30</b>
<b>B.2 Methods</b> .....	<b>30</b>
<b>B.2.1 General</b> .....	<b>30</b>
<b>B.2.2 Drawing method</b> .....	<b>32</b>
<b>B.2.3 Simulation Method</b> .....	<b>33</b>
<b>Annex C (informative) Example of location of rest for unplugged half couplings</b> .....	<b>34</b>
<b>Annex D (normative) Special national conditions</b> .....	<b>37</b>
<b>Annex E (informative) Examples for permissible arrangement of brake pipe connections</b> .....	<b>38</b>
<b>Annex ZA (informative) Relationship between this European Standard and the requirements of EU Directive 2008/57/EC aimed to be covered</b> .....	<b>48</b>
<b>Bibliography</b> .....	<b>50</b>

<b>Figures</b>	<b>Page</b>
<b>Figure 1 — Free spaces</b> .....	<b>8</b>
<b>Figure 2 — Free spaces for coupling passenger vehicles</b> .....	<b>9</b>
<b>Figure 3 — Buffer and drilling template for wagon</b> .....	<b>11</b>
<b>Figure 4 — Mounting of buffers with non-metallic insert or head (top view)</b> .....	<b>13</b>
<b>Figure 5 — Boundary dimensions and minimum surface of buffer heads</b> .....	<b>14</b>
<b>Figure 6 — Relative position between buffers and draw hook</b> .....	<b>17</b>
<b>Figure 7 — Clearances around the draw hook</b> .....	<b>18</b>
<b>Figure 8 — For information interface of rescue coupler (example) and free spaces</b> .....	<b>19</b>
<b>Figure 9 — End cock arrangement - 3D-View (example)</b> .....	<b>20</b>
<b>Figure 10 — End cock arrangement (example)</b> .....	<b>21</b>
<b>Figure 11 — Electrical connections</b> .....	<b>22</b>
<b>Figure 12 — Electrical power supply connection</b> .....	<b>23</b>
<b>Figure 13 — Electrical connection</b> .....	<b>24</b>
<b>Figure 14 — Electro pneumatic brake connection (EP-Brake)</b> .....	<b>26</b>
<b>Figure B.1 — The positions of the bogie vehicles in the track</b> .....	<b>31</b>
<b>Figure B.2 — The positions of the other vehicles (non-bogie vehicles) in the track</b> .....	<b>32</b>
<b>Figure B.3 — Buffer head interaction — Drawing method (example)</b> .....	<b>33</b>
<b>Figure C.1 — Location of rest for unplugged half coupling for brake pipe and main reservoir pipe</b> .....	<b>34</b>
<b>Figure C.2 — Details of rest (Figure C.1, Item 3) - example</b> .....	<b>35</b>
<b>Figure C.3 — Example of rest used in conjunction as pipe holder</b> .....	<b>36</b>
<b>Figure E.1 — Permissible arrangement only for vehicles (coaches, vans, wagons) fitted at 1.1.1969 with a continuous brake</b> .....	<b>39</b>

## EN 16839:2017 (E)

<b>Figure E.2 — Permissible arrangement only for vehicles (coaches, vans, wagons) fitted at 1.1.1969 with a continuous brake or only a train pipe .....</b>	<b>40</b>
<b>Figure E.3 — Permissible arrangement of air brake pipe connections for wagons.....</b>	<b>41</b>
<b>Figure E.4 — Permissible arrangement for vehicles (coaches, vans, wagons bearing the marks S and SS) fitted at 1.1.1969 with a continuous brake or only a train pipe.....</b>	<b>42</b>
<b>Figure E.5 — Obligatory arrangement only for vehicles (coaches, vans, wagons bearing the marks S and SS) fitted at 1.1.1969 with a continuous brake .....</b>	<b>43</b>
<b>Figure E.6 — Permissible arrangement only for vehicles (coaches) fitted at 1.1.1969 with a continuous brake or only a train pipe .....</b>	<b>44</b>
<b>Figure E.7 — Obligatory arrangement only for vehicles (wagons) fitted at 1.1.1969 with a continuous brake with two cocks at each side .....</b>	<b>45</b>
<b>Figure E.8 — Obligatory arrangement only for vehicles (wagons) fitted at 1.1.1969 with a continuous brake with one cock at each side for wagons only.....</b>	<b>46</b>
<b>Figure E.9 — Obligatory arrangement only for vehicles (wagons) equipped with a continuous brake and where relevant a main feed pipe with a chassis prepared for automatic couplers.....</b>	<b>47</b>

<b>Tables</b>	<b>Page</b>
<b>Table 1 —Track gauge and distance between buffer centrelines.....</b>	<b>10</b>
<b>Table 2 —Height of buffers above top of the rail .....</b>	<b>10</b>
<b>Table 3 — Standard widths of buffer heads for freight wagon .....</b>	<b>15</b>
<b>Table 4 — Widths of buffer heads for coaches.....</b>	<b>15</b>
<b>Table 5 — Vehicle specification and valid methodology .....</b>	<b>16</b>
<b>Table 6 — Distances for the arrangement of cocks.....</b>	<b>20</b>
<b>Table A.1 — Compensation value X and validation.....</b>	<b>29</b>
<b>Table ZA.1 — Correspondence between this European Standard, EU Regulation 321/2013 of the Commission dated 13 March 2013 relative to the technical interoperability specification relating to the sub-system “rolling stock - freight wagons” for rail systems within the European Union, abrogating Decision 2006/861/EC (published in JOUE L 104, 12.4.2013, p.1) and Directive 2008/57/EC.....</b>	<b>48</b>
<b>Table ZA.2 — Correspondence between this European Standard,, the Commission Regulation n°1302/2014 of 18 November 2014 concerning the technical specification for interoperability relating to the ‘rolling stock locomotives and passenger rolling stock’ of the rail system in the European Union (published in the Official Journal L 356, 12.12.2014, p.228) and Directive 2008/57/EC.....</b>	<b>49</b>



## **European foreword**

This document (EN 16839:2017) 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 April 2018, and conflicting national standards shall be withdrawn at the latest by April 2018.

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 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.

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

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.

## EN 16839:2017 (E)

### 1 Scope

This European Standard is valid for vehicles equipped with buffers and screw coupling systems.

In order to allow operation and coupling of trainsets or vehicles, this European Standard 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 European Standard 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 European Standard are nominal values.

NOTE Some parts of this EN are copied from EN 16116-1, EN 16116-2, EN 15551 and EN 15566. These parts are meant to be deleted from these ENs during their next revision.

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

EN 15020:2006+A1:2010, *Railway applications — Rescue coupler — Performance requirements, specific interface geometry and test methods*

EN 15551:2017, *Railway applications — Railway rolling stock — Buffers*

EN 15566:2016, *Railway applications — Railway rolling stock — Draw gear and screw coupling*

EN 15807:2011, *Railway applications — Pneumatic half couplings*

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

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14601, EN 15551, EN 15566, EN 15807 and the following apply.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-