SLOVENSKI STANDARD
SIST EN 15566:2022

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Nadomešča:
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Železniške naprave - Železniška vozila - Vlečna naprava in vijačna spenjača

Railway applications - Railway Rolling stock - Draw gear and screw coupling

Bahnanwendungen - Schienenfahrzeuge - Zugeinrichtung und Schraubenkupplung

Applications ferroviaires - Matériel roulant ferroviaire - Organe de traction et tendeur d'attelage

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ICS:

45.060.10	Vlečna vozila	Tractive stock

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Railway applications - Railway Rolling stock - Draw gear and screw coupling

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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

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European foreword

This document (EN 15566:2022) 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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.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 15566:2016.

Compared with EN 15566:2016 the following changes have been done:

a) Adaption in Terms and Definition at 3.3 “draw hook”;

b) Modification on Note in 6.1 to the production;

c) Revision of Annex E, particular Table E.1 and E.3.1;

d) Revision of Annex F, particular on Table F.1 and F.6.2.3, F.8.4.2 a);

e) New Annex I “Microscopic examination of steel materials using standard diagrams to assess the content of non-metallic inclusions”;

f) Adaption of Annex ZA in relastion to the new approach;

g) Adaption of this document in relation to the intersection contents on EN 16839;

h) Deleting of 4.2 “Interaction coupling/buffer”;

i) Modification of the following figures:

   Figure E.1 — Draw hook - Location of the test samples;

   Figure E.3 — Drawbar - Location of the test samples;

   Figure F.2 — Test facility for the tensile test of the screw coupling;

   Figure F.5 — Screw – test sample location;

   Figure F.6 — Shackle – test sample location;

   Figure G.1 — Elastic device – load cycle for endurance test;

   Figure G.2 — Elastic device – Set up for endurance test;

j) editorial modifications.

This document has been prepared under a standardization request addressed to CEN by the European Commission, and it aims to support essential or other requirements of EU Directive(s) or Regulation(s).

For relationship with EU Directive(s) or 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.

Introduction

This document is based on UIC 520:2003, UIC 825:1985, UIC 826:2004, UIC 827-1:1990 and UIC 827-2:1981.

1 Scope

This document specifies the requirements for the draw gear and screw coupling for the end of rolling stock that is required to couple with other rolling stock (freight wagons, locomotives, passenger vehicles, etc.).

This document covers the functionality, construction, interfaces and testing including pass/fail criteria for draw gear and screw coupling.

The document describes three categories of draw gear and screw coupling, (1 MN, 1,2 MN and 1,5 MN).

Provisions going beyond the scope of this document may be agreed in the Technical Specification. The Technical Specification is not a mandatory document.

Coupling systems between permanently coupled vehicle units are not in the scope of this document.

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 1369:2012, *Founding - Magnetic particle testing*

EN 1371-1:2011, *Founding - Liquid penetrant testing- Part 1: Sand, gravity die and low pressure die castings*

EN 10021:2006, *General technical delivery conditions for steel products*

EN 10025-2:2019, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10079:2007, *Definition of steel products*

EN 10168:2004, *Steel products - Inspection documents - List of information and description*

EN 10204:2004, *Metallic products - Types of inspection documents*

EN 10228-1:2016, *Non-destructive testing of steel forgings - Part 1: Magnetic particle inspection*

EN 10228-2:2016, *Non-destructive testing of steel forgings - Part 2: Penetrant testing*

EN 10243-1:1999, *Steel die forgings - Tolerances on dimensions - Part 1: Drop and vertical press forgings*

EN 10243-2:1999, *Steel die forgings - Tolerances on dimensions - Part 2: Upset forging made on horizontal forging machines*

EN 10308:2001, *Non destructive testing - Ultrasonic testing of steel bars*

EN ISO 148-1:2016, *Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1:2016)*

EN ISO 148-2:2016, *Metallic materials - Charpy pendulum impact test - Part 2: Verification of testing machines (ISO 148-2:2016)*

EN ISO 148-3:2016, *Metallic materials - Charpy pendulum impact test - Part 3: Preparation and characterization of Charpy V-notch test pieces for indirect verification of pendulum impact machines (ISO 148-3:2016)*

EN ISO 377:2017, *Steel and steel products - Location and preparation of samples and test pieces for mechanical testing (ISO 377:2017)*

EN ISO 643:2020, *Steels - Micrographic determination of the apparent grain size (ISO 643:2019, Corrected version 2020-03)*

EN ISO 683-1:2018, *Heat-treatable steels, alloy steels and free-cutting steels - Part 1: Non-alloy steels for quenching and tempering (ISO 683-1:2016)*

EN ISO 683-2:2018, *Heat-treatable steels, alloy steels and free-cutting steels - Part 2: Alloy steels for quenching and tempering (ISO 683-2:2016)*

EN ISO 683-3:2022, *Heat-treatable steels, alloy steels and free-cutting steels - Part 3: Case-hardening steels (ISO 683-3:2022)*

EN ISO 683-4:2018, *Heat-treatable steels, alloy steels and free-cutting steels - Part 4: Free-cutting steels (ISO 683-4:2016)*

EN ISO 683-17:2014, *Heat-treated steels, alloy steels and free-cutting steels - Part 17: Ball and roller bearing steels (ISO 683-17:2014)*

EN ISO 868:2003, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868:2003)*

EN ISO 6506-1:2014, *Metallic materials - Brinell hardness test - Part 1: Test method (ISO 6506-1:2014)*

EN ISO 6892-1:2019, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2019)*

EN ISO 6892-2:2018, *Metallic materials - Tensile testing - Part 2: Method of test at elevated temperature (ISO 6892-2:2018)*

EN ISO 9606-1:2017, *Qualification testing of welders - Fusion welding - Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012 and Cor 2:2013)*

ISO 37:2017, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48-2:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 2: Hardness between 10 IRHD and 100 IRHD*

ISO 48-3:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 3: Dead-load hardness using the very low rubber hardness (VLRH) scale*

ISO 48-4:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 4: Indentation hardness by durometer method (Shore hardness)*

ISO 48-8:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 8: Apparent hardness of rubber-covered rollers by Pusey and Jones method*

ISO 48-9:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 9: Calibration and verification of hardness testers*

ISO 188:2011, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 813:2019, *Rubber, vulcanized or thermoplastic — Determination of adhesion to a rigid substrate — 90 degree peel method*

ISO 815-1:2019, *Rubber, vulcanized or thermoplastic — Determination of compression set — Part 1: At ambient or elevated temperatures*

ISO 815-2:2019, *Rubber, vulcanized or thermoplastic — Determination of compression set — Part 2: At low temperatures*

ISO 4967:2013, *Steel — Determination of content of non-metallic inclusions — Micrographic method using standard diagrams*

ISO 4968:1979, *Steel — Macrographic examination by sulfur print (Baumann method)*

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 http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
screw coupling system
system to connect two railway vehicles consisting of draw gear, draw hook and screw coupling

Note 1 to entry: The screw coupling system defined in this document is also designated UIC coupling.

3.2
draw gear
system, able to work in traction, consisting of an assembly of mechanical parts and energy absorber, fixed on the railway vehicle, which is able to work in traction

Note 1 to entry: A representative drawing is given in Figure 3.

3.3
draw hook
part of a conventional and mechanical manual coupling system to transfer forces between draw gear and screw coupling

Note 1 to entry: In case of rescue, the draw hook is used to transfer forces between rescue coupler and draw gear.

3.4
screw coupling
mechanical system to connect to the draw hook of the adjacent railway vehicle including length adjustment

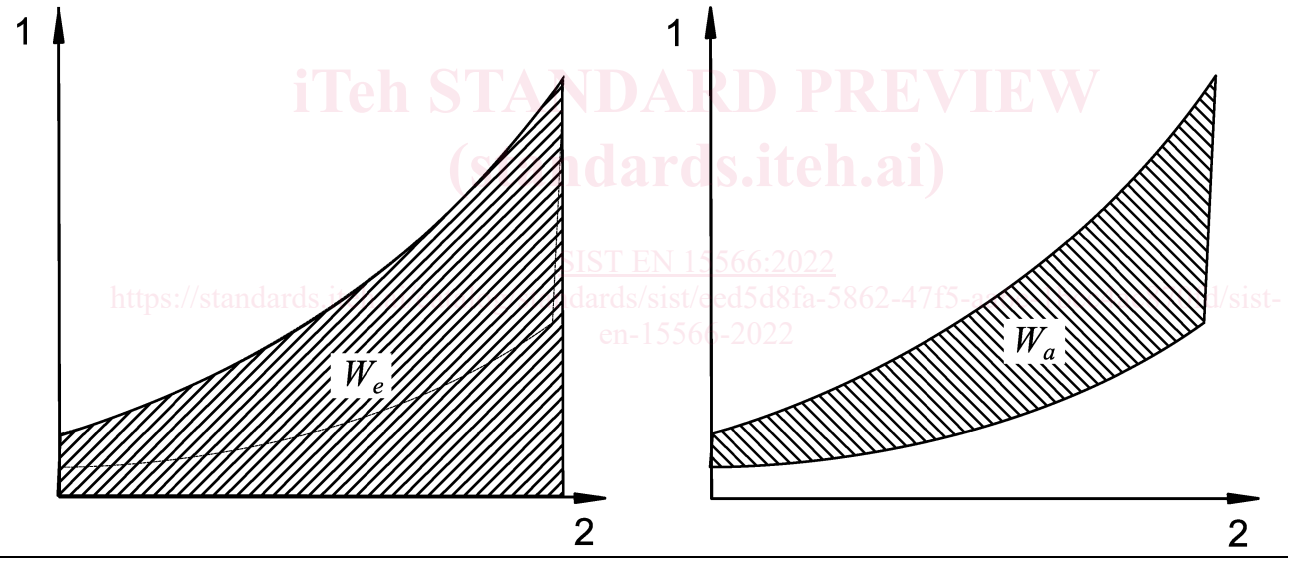
3.5
Standard screw coupling
1 MN screw coupling defined on ERRI standard drawings 100M 3220 0001 and 100M 3220 0002 [17]

3.6
stored energy
W_e
energy (W_e) stored by draw gear for a given stroke

Note 1 to entry: It is represented, on the force-stroke diagram, by the hatched area lying between the compressive curve, the axis of the abscissa and the straight line, perpendicular to the axis, corresponding to the stroke under consideration (see Figure 1 a)).

3.7
absorbed energy
W_a
energy (W_a) absorbed by a draw gear for a given stroke

Note 1 to entry: It is represented, on the force-stroke diagram, by the hatched area lying between the compressive curve and the return curve (see Figure 1 b)).



a) Stored energy W_e **b) Absorbed energy W_a**

Key

1	force, in kN
2	stroke, in mm
▨	stored energy W_e, in kJ
▨	absorbed energy W_a, in kJ

Figure 1 — Force stroke diagram for stored and absorbed energy

3.8
damping
d
absorbed energy divided by stored energy

Note 1 to entry: It is calculated using the following formula:

$$d_{\%} = \frac{W_a}{W_e} \times 100\%$$

where:

$d_{\%}$ is the damping, in %

W_a is the absorbed energy, in kJ

W_e is the stored energy, in kJ.

3.9
minimum breaking load
minimum traction force which may lead to mechanical breaking

3.10
Technical Specification
document describing specific parameters and/or product requirements as an addition to the requirements of this standard

4 Requirements for all types of draw gear and screw coupling

4.1 Classification and designation

Coupling systems are classified according to their minimum breaking load as specified in Table 1.

Table 1 — Classification and designation of coupling systems

Coupling system designation	Minimum breaking load of the screw coupling MN	Maximum breaking load of the screw coupling MN	Minimum breaking load in traction of the draw gear and draw hook MN
1 MN	0,85	0,99	1,0
1,2 MN	1,02	1,19	1,2
1,5 MN	1,35	1,49	1,5

In case of longitudinal overloading the breaking point of the screw coupling system shall be either the screw or the link of the screw coupling.

NOTE The combination of a screw coupling with draw hooks and/or draw gear with higher breaking loads is possible. The screw coupling system designation is defined by the screw coupling.

Any draw gear and any draw hook shall sustain a 0,05 MN compressive load. Draw gear and draw hooks for locomotives shall sustain a 0,3 MN compressive load.