



**SLOVENSKI STANDARD**  
**oSIST prEN 15566:2019**

**01-september-2019**

---

**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

ITEH STANDARD PREVIEW  
(standards.iteh.ai)

**Ta slovenski standard je istoveten z: prEN 15566**

oSIST prEN 15566:2019

<https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019>

---

**ICS:**

45.060.10      Vlečna vozila                      Tractive stock

**oSIST prEN 15566:2019**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[oSIST prEN 15566:2019](#)

<https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 15566**

July 2019

ICS 45.060.01

Will supersede EN 15566:2016

English Version

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

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

Bahnanwendungen - Schienenfahrzeuge -  
Zugrichtung und Schraubenkupplung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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, 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 United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e->

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**Warning** : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

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

## Contents

	Page
European foreword.....	7
Introduction .....	9
<b>1 Scope.....</b>	<b>10</b>
<b>2 Normative references.....</b>	<b>10</b>
<b>3 Terms and definitions .....</b>	<b>11</b>
<b>4 Requirements for all types of draw gear and screw coupling.....</b>	<b>14</b>
4.1 Classification and designation.....	14
4.2 Interface dimension for freight wagons.....	14
4.3 Lifetime .....	15
<b>5 Draw gear.....</b>	<b>16</b>
5.1 Draw gear components .....	16
5.2 Draw hook and drawbar – Requirements .....	17
<b>6 Screw coupling .....</b>	<b>17</b>
6.1 General requirements .....	17
6.2 Screw coupling – Requirements.....	20
<b>7 Elastic device .....</b>	<b>20</b>
7.1 Characteristics of elastic device.....	20
7.2 Elastic device – Requirements.....	21
<b>Annex A (normative) Dynamic test (fatigue test) procedure.....</b>	<b>22</b>
A.1 Background.....	22
A.2 Performance of the test.....	22
A.2.1 Conditioning.....	22
A.2.2 Dynamic test (fatigue test).....	22
A.2.3 Non-destructive tests.....	24
A.2.4 Determination of residual strength.....	24
A.2.5 Macrographic and Micrographic tests.....	24
A.3 Criteria of acceptance .....	24
<b>Annex B (normative) Draw hook — dimensions .....</b>	<b>26</b>
<b>Annex C (normative) Draw gear — Interface dimension.....</b>	<b>27</b>
<b>Annex D (normative) Screw coupling components - dimensions.....</b>	<b>28</b>
<b>Annex E (normative) Draw hook and drawbar - Requirements .....</b>	<b>30</b>
E.1 Physical characteristics .....	30
E.1.1 Appearance.....	30
E.1.2 Integrity .....	30
E.1.3 Material examination .....	30
E.2 Geometrical characteristics .....	31
E.3 Mechanical characteristics .....	31
E.3.1 Tensile test on test piece .....	31
E.3.2 Resilience .....	31
E.3.3 Hardness.....	31
E.3.4 Tensile test on draw hook and drawbar .....	31
E.3.5 Compressive test on draw hook for locomotives.....	32

E.4	Marking .....	32
E.5	Manufacture.....	32
E.5.1	General on drawbars.....	32
E.5.2	General on draw hooks.....	32
E.5.3	Machining.....	32
E.5.4	Heat treatment .....	32
E.5.5	Rectification of defects.....	33
E.6	Acceptance .....	33
E.6.1	General .....	33
E.6.2	Inspection of the draw hooks.....	35
E.6.3	Inspection of drawbars.....	38
E.6.4	Conclusion of the inspections.....	39
E.7	Delivery .....	40
E.7.1	Protection against corrosion.....	40
E.7.2	Packaging.....	40
Annex F	(normative) Screw coupling and components parts — Requirements.....	41
F.1	Materials .....	41
F.2	Physical characteristics.....	41
F.2.1	Appearance .....	41
F.2.2	Soundness.....	41
F.2.3	Additional requirements for screw coupling .....	42
F.3	Geometrical characteristics.....	42
F.3.1	General .....	42
F.3.2	Dimensions limited either by two unmachined or rough machined surfaces or by one unmachined or rough machined surface.....	42
F.3.3	Dimensions limited by two machined surfaces.....	43
F.4	Mechanical characteristics.....	43
F.4.1	Heat treatment.....	43
F.4.2	Hardness.....	43
F.4.3	Values for predetermined breaking loads for the weakest part.....	43
F.4.4	Resilience.....	44
F.4.5	Requirements for screw coupling.....	44
F.4.6	Requirement for handle and trunnion .....	46
F.5	Marking .....	46
F.6	Manufacture.....	46
F.6.1	Preparation of the materials .....	46
F.6.2	Manufacture of the component parts .....	46
F.7	Acceptance .....	48
F.7.1	General .....	48
F.7.2	Inspection of the manufacture.....	48
F.8	Inspection of the materials, component parts and screw couplings.....	48
F.8.1	Materials submission for acceptance .....	48
F.8.2	Grouping into batches.....	49
F.8.3	Nature and proportion of the tests.....	49
F.8.4	Sampling and preparation of the samples and test pieces .....	50
F.8.5	Carrying out of the checks and tests .....	54
F.9	Completion of inspections .....	56
F.10	Delivery .....	56
F.10.1	Protection against oxidation .....	56
F.10.2	Packing .....	56
Annex G	(normative) Elastic device — Requirements .....	57
G.1	Rubber elastomer or other elastomer elastic device .....	57

## prEN 15566:2019 (E)

G.1.1	General.....	57
G.1.2	Metal inserts requirements.....	57
G.1.3	Elastomer requirements .....	57
G.1.4	Static test.....	59
G.1.5	Endurance test .....	59
G.1.6	Bonding.....	61
G.1.7	Inspection and tests .....	61
G.1.8	Markings.....	62
G.2	Friction spring/ Ring spring.....	63
G.2.1	Manufacturer's marks .....	63
G.2.2	Flexibility test.....	63
G.2.3	Endurance test .....	64
Annex H	(normative) Marking.....	65
H.1	Marking of the draw hook.....	65
H.2	Marking of the screw coupling.....	65
H.3	Draw gear.....	66
H.4	Drawbar.....	66
H.5	Summary of markings .....	67
Annex I	(informative) Microscopic examination of steel materials using standard diagrams to assess the content of non-metallic inclusions .....	68
I.1	General.....	68
I.1.1	Degree of purity.....	68
I.1.2	Standard diagram plate No. 1.....	68
I.2	Preparation of specimens .....	68
I.3	Structure and use of standard diagram plate No. 1.....	68
I.3.1	Use of diagram plate No. 1.....	68
I.3.2	Rating a single inclusion.....	69
I.3.3	Rating of very small inclusions.....	69
I.4	Test procedure .....	69
I.4.1	Magnification.....	69
I.4.2	Selection of inclusions .....	69
I.5	Evaluation .....	70
I.5.1	General.....	70
I.5.2	Method of evaluation .....	70
I.5.3	Calculation procedure for evaluation using method K.....	70
I.6	Example .....	72
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC aimed to be covered.....	74
Bibliography	.....	77
<b>Figures</b>		
Figure 1	— Force stroke diagram for stored and absorbed energy.....	13
Figure 2	— Support plate — Interface dimension for freight wagons .....	15
Figure 3	— Draw gear — Assembly.....	17
Figure 4	— Standard screw coupling with non-loosening hinged ball handle.....	19
Figure 5	— Standard screw coupling with hinged handle with non-loosening upper rest .....	20
Figure A.1	— Example of load cycles Step 1 and Step 2 .....	23

Figure B.1 — Draw hook.....	26
Figure C.1 — Drawbar with “fork” and safety device.....	27
Figure C.2 — Joint pin.....	27
Figure D.1 — Coupling hook pin.....	28
Figure D.2 — Handles.....	28
Figure D.3 — Shackle.....	29
Figure E.1 — Location of the test samples.....	37
Figure E.2 — Marking of the draw hook for the tensile test.....	38
Figure E.3 — Location of the test samples.....	39
Figure F.1 — Location of the measurement of the deformation of the screw coupling.....	44
Figure F.2 — Test facility for the tensile test of the screw coupling.....	45
Figure F.3 — Measurement of the screw coupling.....	45
Figure F.4 — Permitted depth of the fold in thread profile.....	47
Figure F.5 — Screw — test sample location.....	51
Figure F.6 — Shackle — test sample location.....	52
Figure F.7 — Coupling link — test sample location.....	52
Figure F.8 — Trunnion nut (link fitting) — test sample location.....	53
Figure F.9 — Trunnion nut (shackle fitting) — test sample location.....	53
Figure F.10 — Pin — Test sample location.....	54
Figure G.1 — Elastic device — <b>load cycle for endurance test</b> .....	60
Figure G.2 — Elastic device — <b>set up for endurance test</b> .....	61
Figure H.1 — Location of mark.....	66
Figure H.2 — Mark dimension.....	66
<b>Tables</b>	
Table A.1 — Pre-loading values.....	22
Table A.2 — Condition of dynamic tests for all parts except screw coupling.....	23
Table A.3 — Conditions of dynamic tests for screw coupling.....	24
Table E.1 — Requirements.....	31
Table E.2 — Checks and Tests.....	33
Table F.1 — Requirements.....	42
Table F.2 — Load of link.....	43
Table F.3 — Breaking load screw.....	44
Table F.4 — Proportion of the tests - Finished products and component parts.....	50
Table G.1 — Characteristics of the constituents.....	57
Table G.2 — Nature of inspections and tests.....	62

## prEN 15566:2019 (E)

<b>Table G.3 — Number of flexibility test per batch of spring.....</b>	<b>64</b>
<b>Table H.1 — Marking.....</b>	<b>67</b>
<b>Table I.1 — Values of factor <math>f_g</math> to be used for the evaluation using method K.....</b>	<b>71</b>
<b>Table I.2 — Diagram plate No. 1: diagrams for examining rail steels for non-metallic inclusions.....</b>	<b>72</b>
<b>Table I.3 — Example of evaluation using method K4 as described in I.5.3.....</b>	<b>73</b>
<b>Table ZA.1 — Correspondence between this European Standard, the Commission Regulation No 1299/2014 of 18 November 2014 on the technical specification for interoperability relating to the subsystem “infrastructure” of the rail system in the European Union (published in the Official Journal L356, 12.12.2014, p.1) and Directive 2008/57/EC.....</b>	<b>74</b>
<b>Table ZA.2 — Correspondence between this European Standard, the Commission Regulation (EU) No 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>75</b>

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 15566:2019](https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019)

<https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019>



## European foreword

This document (prEN 15566:2019) 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 15566:2016.

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 2008/57/EC.

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

### Modifications:

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 Subclause E.3.1;
- d) Revision of Annex F, particular on Table F.1 and Subclause 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 relation 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:
  - Figures E.1 — Draw hook - Location of the test samples;
  - Figures E.3 — Drawbar - Location of the test samples;
  - Figures F.2 — Test facility for the tensile test of the screw coupling;
  - Figures F.5 — Screw – test sample location;
  - Figures F.6 — Shackle – test sample location;
  - Figures G.1 — Elastic device – load cycle for endurance test;
  - Figures G.2 — Elastic device – Set up for endurance test;

**prEN 15566:2019 (E)**

j) editorial modifications.

**iTeh STANDARD PREVIEW  
(standards.iteh.ai)**

[oSIST prEN 15566:2019](https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019)

<https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019>

## Introduction

This document is based on UIC 520, UIC 825, UIC 826, UIC 827-1 and UIC 827-2.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 15566:2019](https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019)

<https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019>

**prEN 15566:2019 (E)****1 Scope**

This document specifies the requirements for the draw gear and screw coupling for the end of rolling stock that is bound 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 classification of draw gear and screw coupling, (1 MN, 1,2 MN and 1,5 MN).

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 1371-1:2012, *Founding — Liquid penetrant testing — Part 1: Sand, gravity die and low pressure die castings*

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

EN 10025-2:2004, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10079, *Definition of steel products*

<https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019>

EN 10083 (all parts), *Steels for quenching and tempering*

EN 10168, *Steel products — Inspection documents — List of information and description*

EN 10204, *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 (all parts), *Steel die forgings — Tolerances on dimensions*

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

EN ISO 148 (all parts), *Metallic materials — Charpy pendulum impact test (ISO 148 (all parts))*

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

EN ISO 643:2012, *Steels — Micrographic determination of the apparent grain size (ISO 643:2012)*

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

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

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

EN ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1)*

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

ISO 48 (all parts), *Rubber, vulcanized or thermoplastic — Determination of hardness*

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

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

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

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

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

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

### 3 Terms and definitions

oSIST prEN 15566:2019

(standards.iteh.ai)

standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-1bcc4ac870fd/osist-pren-15566-2019

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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 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 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.

**prEN 15566:2019 (E)****3.3****draw hook**

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

**3.4****screw coupling**

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

**3.6****Standard screw coupling**

1 MN screw coupling defined on ERRI standard drawings 100 M 3220 0001 and 100 M 3220 0002 [18]

**3.5****stored energy** **$W_e$** 

energy ( $W_e$ ) stored 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, 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

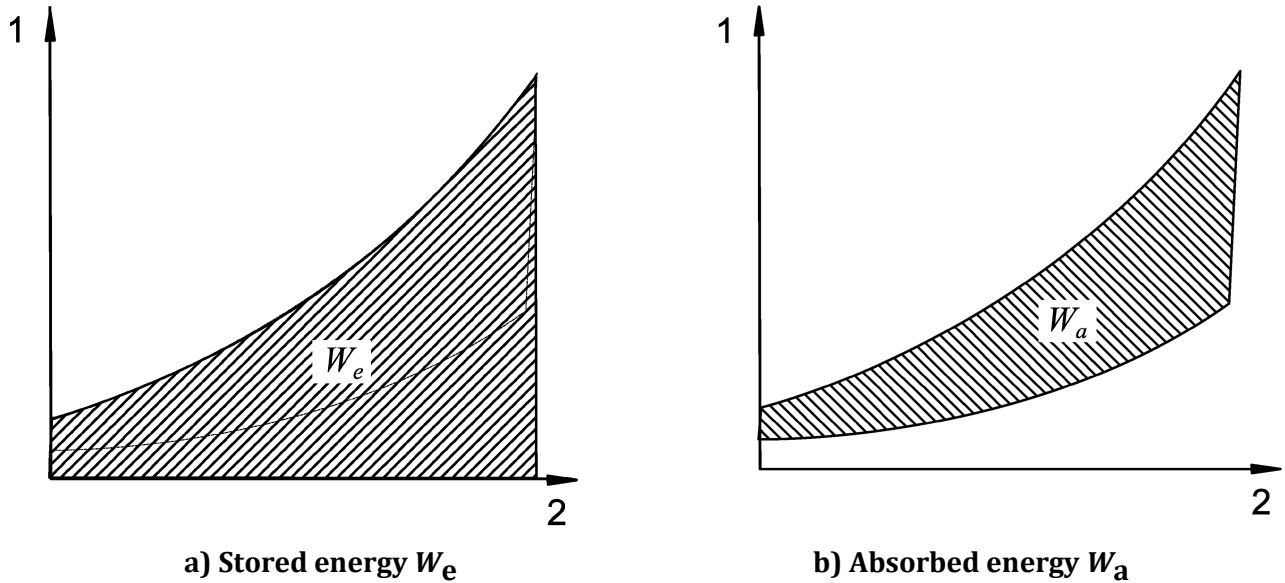
Note 1 to entry: It is represented, on the force-stroke diagram, by the hatched area lying between the compressive curve and the return curve (see Figure 1 b)).

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

oSIST prEN 15566:2019

[https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-](https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-10cc-fac67010/osist-pr-en-15566-2019)

[10cc-fac67010/osist-pr-en-15566-2019](https://standards.iteh.ai/catalog/standards/sist/eed5d8fa-5862-47f5-aa6e-10cc-fac67010/osist-pr-en-15566-2019)

**Key**

1 force, in kN

2 stroke, in mm

stored energy  $W_e$ , in kJabsorbed energy  $W_a$ , in kJ

**Figure 1 — Force stroke diagram for stored and absorbed energy**

### 3.8 damping $d$

ratio of 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