SLOVENSKI STANDARD
SIST EN 15551:2022

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Nadomešča:
SIST EN 15551:2017

Železniške naprave - Železniška vozila - Odbojniki

Railway applications - Railway rolling stock - Buffers

Bahnanwendungen - Schienenfahrzeuge - Puffer

Applications ferroviaires - Wagons - Tampons

Ta slovenski standard je istoveten z: **EN 15551:2022**

ICS:

45.060.01	Železniška vozila na splošno	Railway rolling stock in general

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English Version

Railway applications - Railway rolling stock - Buffers

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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

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

Ref. No. EN 15551:2022 E

Contents

Page

European foreword

This document (EN 15551:2022) 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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.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 15551:2017.

Compared with EN 15551:2017 the following main changes have been done:

a) Redrawn of the following Figures:

   1) Figure 2 — Fixing dimensions of 105 mm stroke and 150 mm stroke buffers for interchangeability;

   2) Figure F.1 — Definition of heights;

   3) Figure F.2 — Representation of the stored energy;

   4) Figure F.3 — Endurance test under service load;

   5) Figure G.1 — Determination of buffer strokes for endurance test;

b) Adaption of this document in relation to the intersection contents on EN 16839:

   1) Adaption of the Scope;

   2) Deleting of 4.6 “Interaction coupling/buffer”;

   3) Adaption on 5.1 “General”;

   4) Figure 2 — Mounting of buffers with non-metallic insert or head (top view for freight wagons) is deleted

   5) Deleting of 6.2.2 “Boundary dimensions”;

   6) Adaption on 6.2.3.1 “General” and 6.2.3.2 “Buffers with stroke of 105 mm...”;

   7) The former Table 6 about standard width have been exported to EN 16839.

   8) Deleting of Annex I “Calculation of the width of buffer heads”.

c) 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 526-1:2008, UIC 526-3:2008, UIC 528:2007, UIC 573:2007, UIC 827-1:1990 and UIC 827-2:1981.

1 Scope

This document defines the requirements for buffers with 105 mm, 110 mm and 150 mm stroke for vehicles or units which use buffers and screw coupling. It covers the functionality, interfaces and testing procedures, including pass fail criteria, for buffers.

NOTE 1 Typically, buffers with a stroke of 105 mm are used on freight wagons and locomotives, buffers with a stroke of 110 mm are used on coaches and locomotives and buffers with a stroke of 150 mm are used on freight wagons.

It defines the different categories of buffers, the space envelope, static and dynamic characteristics and energy absorption.

It defines the static and dynamic characteristics of the elastic systems.

It also defines the requirements for buffers with integrated crash elements (crashworthy buffers) for tank wagons for dangerous goods.

The requirements of this document also apply to buffers of locomotives and passenger coaches which are bound to meet the crashworthiness requirements of EN 15227 for normal service only. The properties for the energy absorbing function are defined in EN 15227 and the requirements specified in Clause 7 for tank wagons for dangerous goods are not applicable to the buffers of these locomotives and passenger coaches.

Diagonal buffers are excluded from this document.

For the crashworthy buffers of locomotives, driving trailer or passenger coaches according to EN 15227, and tank wagons for dangerous goods or buffers which form part of a combined system consisting of a special buffer and a deformation element, interchangeability with freight wagon buffers is not required, and therefore the requirements of 5.3 (Buffer dimensions) do not apply, those of 5.4 (Mechanical characteristics of buffers) and 5.6 (Marking) apply with restrictions.

NOTE 2 For tank wagons subjected to dangerous goods regulation see [41].

Provisions going beyond the scope of this document may be agreed in the Technical Specification. The Technical Specification is not a mandatory 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 1370:2011, *Founding - Examination of surface condition*

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

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

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

EN 12663-2:2010, *Railway applications - Structural requirements of railway vehicle bodies - Part 2: Freight wagons*

EN 15227:2020, *Railway applications - Crashworthiness requirements for rail vehicles*

EN 16839:2022, *Railway applications — Rolling stock — Head stock layout*

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

EN ISO 6507-1:2018, *Metallic materials - Vickers hardness test - Part 1: Test method (ISO 6507-1:2018)*

EN ISO 6507-2:2018, *Metallic materials - Vickers hardness test - Part 2: Verification and calibration of testing machines (ISO 6507-2:2018)*

EN ISO 6507-3:2018, *Metallic materials - Vickers hardness test - Part 3: Calibration of reference blocks (ISO 6507-3:2018)*

EN ISO 6507-4:2018, *Metallic materials - Vickers hardness test - Part 4: Tables of hardness values (ISO 6507-4:2018)*

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

EN ISO 11469:2016, *Plastics - Generic identification and marking of plastics products (ISO 11469:2016)*

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

ISO 48:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

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

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*

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
buffer
compressible energy absorbing device, comprising a housing and an elastic system, fitted at each side of the end of vehicles which need to be in contact with other rolling stock

Note 1 to entry: For this document, buffers means side buffer.

3.2
housing
assembly consisting of a plunger, a buffer base and an anti-rotation device but without elastic system

Note 1 to entry: Casing or body are other words for housing, but only housing is used in this document.

3.3
buffer head
part of plunger with a working surface which comes in contact to the working surface of the mating buffer

Note 1 to entry: Buffer head is also known as buffer plate.

3.4
plunger
movable part of the housing consisting of a sliding and guiding tube and an active face named buffer head

3.5
base
part of the housing fixed to the rolling stock headstock

Note 1 to entry: The base consists of a guiding tube and a supporting plate (flange).

3.6
anti-rotation device
device preventing the rotation of the plunger around the longitudinal axis of the buffer

3.7
batch
group of component parts of the same type, originating from the same melt of raw material and having undergone the same process of manufacturing

3.8
elastic system
system that allows the reversible deflection of the plunger and absorbing energy during buffing or running operation

Note 1 to entry: Spring system is another common word for elastic system.

3.9
stroke
deflection of the buffer in the operating range of the elastic system

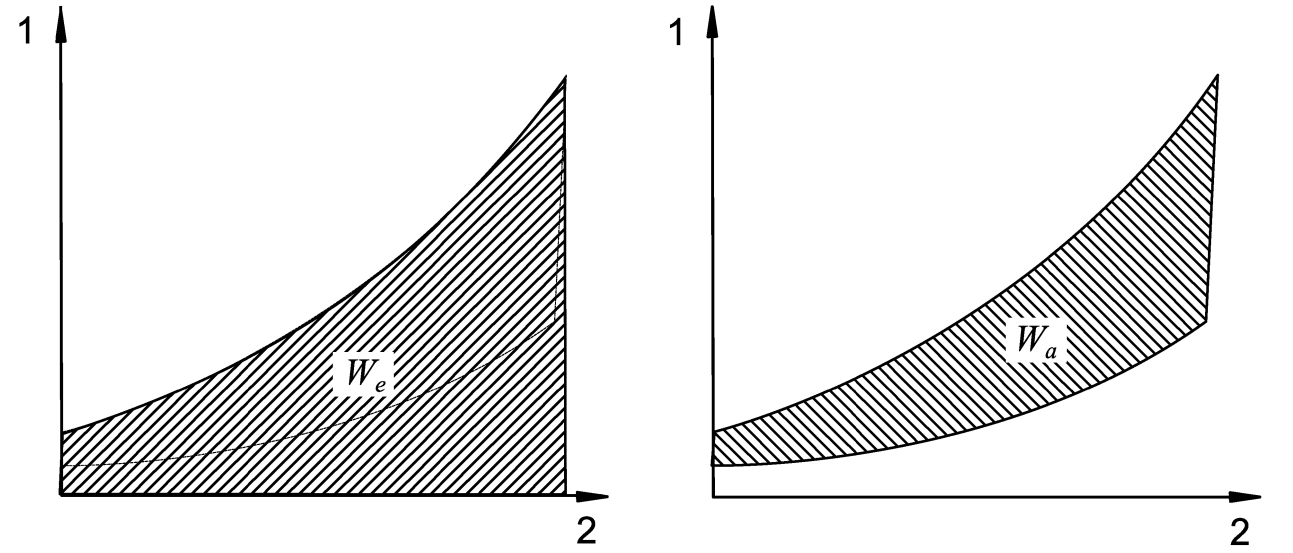
Note 1 to entry: For the purpose of this document, the plastic deformation of crashworthy buffers is not included in the stroke.

3.10
stored energy
W_e
energy (W_e) stored by a buffer for a given stroke

Note 1 to entry: The stored energy 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 1a).

3.11
absorbed energy
W_a
energy (W_a) absorbed by a buffer for a given stroke

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



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

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

Note 2 to entry: Damping is a ratio of absorbed energy divided by stored energy and it is calculated using the following formula:

$$d_{\%} = \frac{w_a}{w_e} \times 100\%$$

where

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

3.12
crashworthy buffer
buffer with an additional function to allow plastic deformation to absorb a specified energy due to abnormal impacts

3.13
static stored energy
W_{es}
stored energy during a static test

3.14
dynamic stored energy
W_{ed}
stored energy during a dynamic test