



SLOVENSKI STANDARD
oSIST prEN 15551:2019
01-september-2019

Železniške naprave - Železniška vozila - Odbojniki

Railway applications - Railway rolling stock - Buffers

Bahnanwendungen - Schienenfahrzeuge - Puffer

Applications ferroviaires - Wagons - Tampons

Ta slovenski standard je istoveten z: prEN 15551

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Applications ferroviaires - Wagons - Tampons

Bahnanwendungen - Schienenfahrzeuge - Puffer

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European foreword

This document (prEN 15551:2019) 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 15551:2017.

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.

Modifications:

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) Deleting of 5.2 "Fixing on vehicle and interchangeability";
- 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) Deleting of Annex I "Calculation of the width of buffer heads".

c) editorial modifications.

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Introduction

This document is based on UIC 526-1, UIC 526-3, UIC 528, UIC 573, UIC 827-1 and UIC 827-2.

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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, cab cars 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 [35].

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, *Founding — Examination of surface condition*

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

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

EN 10204, *Metallic products — Types of inspection documents*

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

EN 12663 (all parts), *Railway applications — Structural requirements of railway vehicle bodies*

EN 15227, *Railway applications — Crashworthiness requirements for railway vehicle bodies*

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

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

EN ISO 148-3, *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)*

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

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

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

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

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

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

EN ISO 11469, *Plastics — Generic identification and marking of plastics products (ISO 11469)*

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

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

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

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*

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:

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

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.

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3.10

stored energy

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

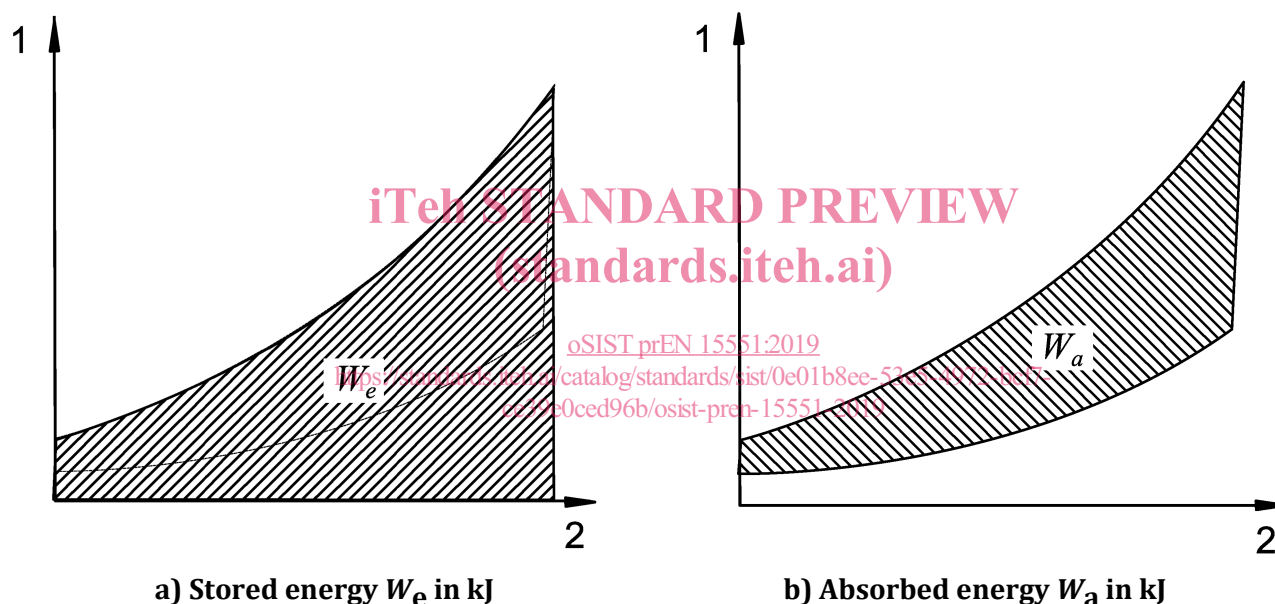
Note 1 to entry: The stored energy is represented on the force stroke diagram, by the hatched area lying between the compressive curve, the axis of the abscissa and the straight line, perpendicular to the axis, corresponding to the stroke under consideration, see Figure 1a).

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).



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

3.15

static absorbed energy

W_{as}

absorbed energy during a static test

3.16

dynamic absorbed energy

W_{ad}

absorbed energy during a dynamic test

3.17

technical specification

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

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4 Classification and designation

4.1 General

Buffers are classified by their stroke and their dynamic energy capacity W_{ed} .

4.2 Buffers with buffer stroke 105 mm (Categories A, B and C)

These buffers are classified according to their energy capacity W_{ed} as specified in Table 1.

Table 1 — Buffer stroke 105 mm

Buffer category	Dynamic energy capacity W_{ed} kJ
A	≥ 30
B	≥ 50
C	≥ 70

105 mm stroke buffers are designated by the letter of their buffer category.