SLOVENSKI STANDARD
SIST EN 13262:2020

01-november-2020

Nadomešča:
SIST EN 13262:2004+A2:2011

Železniške naprave - Kolesne dvojice in podstavni vozički - Kolesa - Zahtevane lastnosti proizvoda

Railway applications - Wheelsets and bogies - Wheels - Product requirements

Bahnanwendungen - Radsätze und Drehgestelle - Räder - Produktanforderungen

Applications ferroviaires - Essieux montés et bogies - Roues - Prescriptions pour le produit

Ta slovenski standard je istoveten z: **EN 13262:2020**

ICS:

45.040	Materiali in deli za železniško tehniko	Materials and components for railway engineering

SIST EN 13262:2020 **fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13262

September 2020

ICS 45.040

Supersedes EN 13262:2004+A2:2011

English Version

Railway applications - Wheelsets and bogies - Wheels - Product requirements

Applications ferroviaires - Essieux montés et bogies - Roues - Prescriptions pour le produit

Bahnanwendungen - Radsätze und Drehgestelle - Räder - Produktanforderungen

This European Standard was approved by CEN on 5 July 2020.

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, 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.

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

This document (EN 13262:2020) has been prepared by the CEN/TC 256 “Railway applications” Technical Committee, 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, by March 2021 at the latest, and all conflicting national standards shall be withdrawn no later than March 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights or similar rights. CEN and/or CENELEC shall not be held responsible for identifying all or some of these patent rights.

This document supersedes EN 13262:2004+A2:2011.

This document has been prepared within the framework of a mandate given to CEN by the European Commission and the European Free Trade Association and supports the essential requirements of Directive 2016/797/EC.

For the relationship with Directive 2016/797/EC, see informative Annex ZA, which forms an integral part of this document.

For a description of the technical changes made in this new edition, see the Introduction.

The informative annexes to this document provide additional guidance that is not mandatory but that helps to understand or use the document.

NOTE The informative annexes may contain optional requirements. For example, a test method that is optional, or presented as an example, may contain requirements, but it is not necessary to meet these requirements to be in compliance with the document.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are required 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, the Netherlands, Norway, Poland, Portugal, the Republic of North Macedonia, the Republic of Serbia, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Since its first edition in 2004, the use of this document has shown the need for clarification and improvements.

The most important changes are due to the difficulties encountered in product testing.

Some parameters were not sufficiently precise and could be misinterpreted (e.g. collection of test pieces, conditions of use, interpretation of measurement).

Another development is the introduction of a new material, ERS8, which can provide increased resistance to contact fatigue (RCF).

In order to anticipate requests for the introduction of other grades, an evaluation process for the acceptance of new materials has been added.

The product requirements have been harmonised in the three documents concerning the wheelsets, wheels and axles.

In addition, the annexes concerning the qualification of the product and the conditions of supply of the product, which were previously informative, have been modified taking the feedback into account and have become normative.

Also, the “freight wagon” and “locomotive and passenger vehicle” TSIs require the existence of a production verification process.

1 European scope

This document specifies the characteristics of railway wheels, used for all track gauges.

This document applies to heavy railway vehicles but may also apply to other applications such as light railway vehicles, trams or underground systems. Five steel grades, ER6, ER7, ER8, ERS8 and ER9, are defined in this document.

NOTE 1 Steel grade ERS8 has been introduced in this document as an optimisation of steel grades ER8 and ER9 due to contact fatigue (RCF), taking into account service feedback from Europe, for example, BS 5892-3 in force in the United Kingdom.

Some features are provided as a Category 1 or Category 2 function.

The requirements defined in this standard apply to cylindrical bores. Most requirements also apply to wheels with tapered bores. Specific requirements for tapered bores (e.g. geometrical dimensions, etc.) are defined in the technical specification.

This document applies to monobloc wheels in vacuum degassed steel, forged and rolled, with surface treated rims, which have already been the subject of extensive commercial applications on a European network or have complied with a technical approval procedure according to EN 13979 – 1: 2019 to validate their design.

Annex A describes the evaluation process for accepting new materials that are not included in this document.

This document defines the requirements to be met for wheels; the technical approval procedure is not part of the scope of this document.

NOTE 2 A "surface-treated rim" is achieved by heat treatment which aims to harden the rim and create compressive residual stress.

2 Normative references

The following documents referred to in the text constitute, for all or part of their content, requirements of this document. For dated references, only the cited edition applies. For undated references, the last edition of the reference document applies (including any amendments).

EN 10020:2000, *Definition and classification of grades of steel*

EN 13979-1:2020, *Railway Applications – Wheelsets and bogies – Monobloc wheels – Technical approval procedure – Part 1: Forged and rolled wheels*

EN ISO 148-1:2018, *Metallic materials – Charpy pendulum impact test – Part 1: Test method (ISO 148-1)*

EN ISO 1101:2017, *Geometrical product specifications (GPS) - Geometrical tolerancing - Tolerances of form, orientation, location and run-out (ISO 1101)*

EN ISO 6506-1:2014, *Metallic materials - Brinell hardness test – Part 1: Test method (ISO 6506-1:2005)*

EN ISO 6892-1:2016, *Metallic materials – Tensile testing – Part 1: Method of test at room temperature (ISO 6892-1)*

EN ISO 14284:2002, *Steel and iron - Sampling and preparation of samples for the determination of chemical composition (ISO 14284:1996)*

ASTM E399-19, *Standard test method for linear-elastic plane-strain fracture toughness KIc of metallic materials*

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

ISO 5948:2018, *Railway rolling stock material - Ultrasonic acceptance testing*

ISO 6933:1986, *Railway rolling stock material - Magnetic particle acceptance testing*

ISO/TR 9769:2018[1)], *Steel and iron - Review of available methods of analysis*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for standardisation, which can be accessed 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
Technical specification
A document describing specific parameters and/or product requirements in addition to the requirements of this document

3.2
Batch
Batch consisting of wheels assumed to have the same characteristics

Note 1 to clause: A batch consists of wheels of the same design, forged with the raw material from a single cast with the same warm forging process and a single heat treatment process. If the raw material is obtained from several casts with the expected chemical composition, the resulting wheels can be combined in a batch. In this case, it is necessary to demonstrate in the product qualification that the wheels manufactured from these different casts meet the requirements for product qualification.

1) See also CEN/TR 10261.

3.3
Wheel categories
Classification of the component, based on operational aspects, which determines the list of requirements to be applied

Note 1 to clause: Category 1 is generally selected when the traffic speed is greater than 200 km/h.

Note 2 to clause: Vehicles travelling at speeds of 200 km/h or less typically use Category 2 wheels.

Note 3 to clause: These categories can also be defined in accordance with the technical specification.

4 Product definition

4.1 Chemical composition

4.1.1 Values to be obtained

The maximum percentages of the different elements specified are given in Table 1.

Table 1 — Maximum percentages of the different elements specified

	Maximum content in % a										
Steel grade	C	Si	Min	P b	S b c	Cr	Cu	Mb	Ni	\tab V	Cr + Mo + Ni
ER6	0.48	0.40	0.75	0.020	0.015	0.30	0.30	0.08	0.30	0.06	0.50
ER7	0.52	0.40	0.80	0.020	0.015	0.30	0.30	0.08	0.30	0.06	0.50
ER8	0.56	0.40	0.80	0.020	0.015	0.30	0.30	0.08	0.30	0.06	0.50
ERS8	0.57	1.10	1.10	0.020	0.015	0.30	0.30	0.08	0.30	0.06	0.60
ER9	0.60	0.40	0.80	0.020	0.015	0.30	0.30	0.08	0.30	0.06	0.50

a For specific applications, variations of requirements within the limits of the maximum levels can be agreed in the technical specification

b A maximum content of 0.025% may be agreed in the technical specification for specific applications

c A minimum sulphur content may be agreed in the technical specification based on the steel development process to protect against hydrogen embrittlement

4.1.2 Sampling position

The sample for determining the chemical composition shall be taken from the running tread 15 mm under the running surface considered to be at nominal diameter.

Note The running tread is the nominal position on the running surface where the wheel and rail are in contact.

The chemical composition can also be determined by casting analysis. In this case, the chemical composition must be adapted in the technical specification.

4.1.3 Chemical analysis

The chemical composition analysis must be performed in accordance with ISO/TR 9769:2018 unless another standard is defined in the technical specification.

For example, ASTM E415-14 and ASTM E1019-11 can be applied.

4.2 Mechanical characteristics

4.2.1 Characteristics from the tensile testing

4.2.1.1 Values to be obtained

Characteristics in the wheel rim and plate are given in Table 2.

Table 2 — Characteristics in the wheel rim and plate

Steel grade	Rim			Plate	
	*R*eH a (MPa)	*R*m (MPa)	*A*5 %	Reduction of *R*m b (MPa)	*A*5 %
ER6	≥ 500	780/900	≥ 15	≥ 100	≥ 16
ER7	≥ 520	820/940	≥ 14	≥ 110	≥ 16
ER8	≥ 540	860/980	≥ 13	≥ 120	≥ 16
ERS8	≥ 580	900/1,020	≥ 13	≥ 110	≥ 14
ER9	≥ 580	900/1,050	≥ 12	≥ 130	≥ 14

a If there is no apparent yield strength, the conventional Rp0.2 limit must be determined.

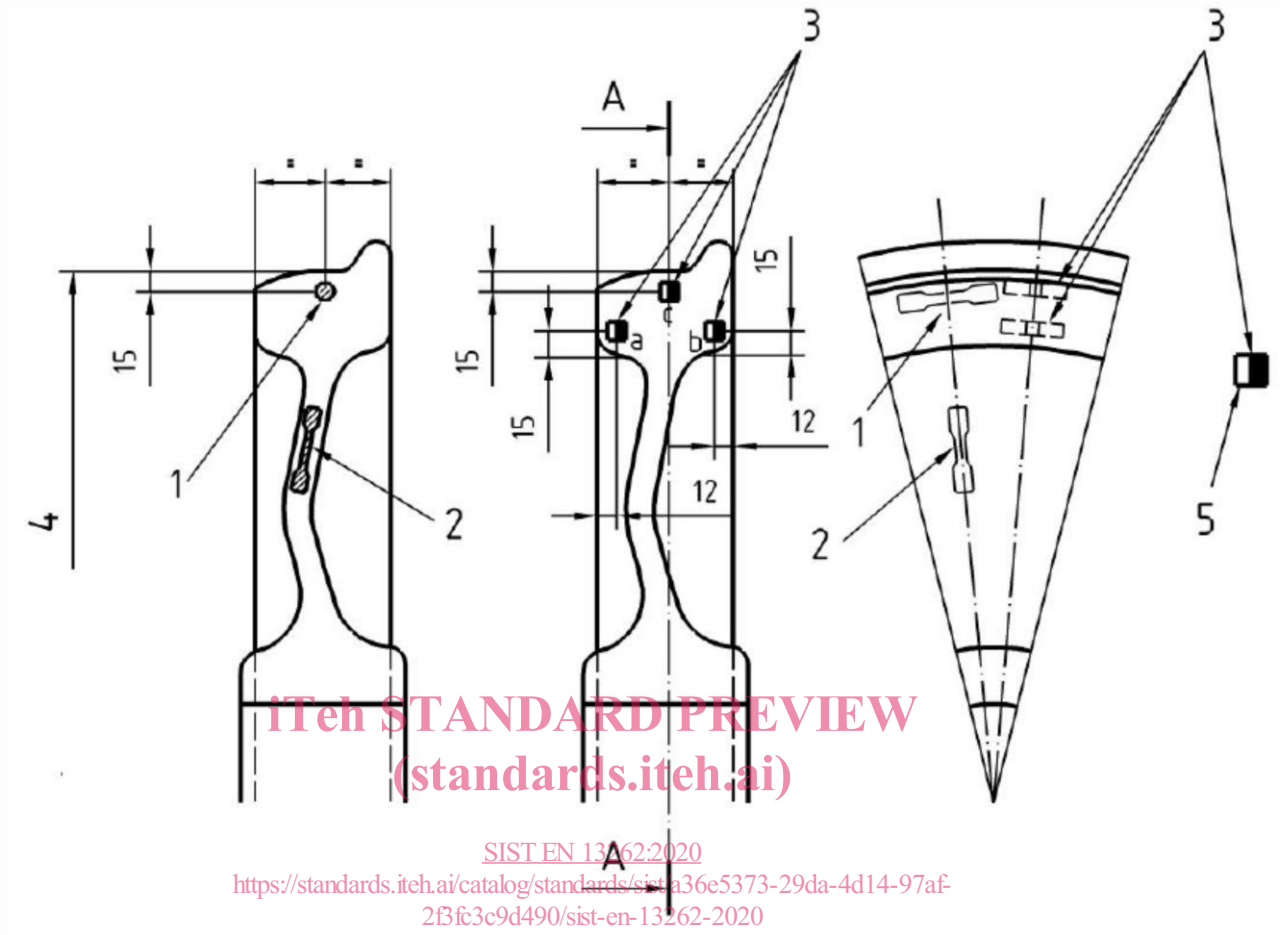
b Decrease in tensile strength of the plate relative to the rim for the same wheel.

If there are no other requirements in the technical specification, for steel grades ER7, ER8, ERS8 and ER9, a minimum value of 355 MPa for the yield strength in the plate is required. For steel grade ER6, a minimum value of 310 MPa for the yield strength in the plate is required.

4.2.1.2 Positions of the test pieces

The test pieces must be collected from the wheel rim and plate. Their positions are shown in Figure 1.

Dimensions in millimetres



Wheel rejected

1 Tensile test piece in the rim (15 mm axis under the running surface considering its nominal diameter)
2 Tensile test piece in the plate
3 Impact bending test piece
4 Nominal diameter
5 Notch

Figure 1 — Position of test pieces

4.2.1.3 Test method

The test must be carried out in accordance with the requirements of EN ISO 6892-1:2016. The nominal diameter of the test piece should be at least 10 mm and the length of the deformation gauge should be 5 times the diameter. If the test pieces cannot be taken from the plate, a smaller diameter must be agreed in the technical specification.

4.2.2 Hardness characteristics in the rim

4.2.2.1 Values to be obtained

The minimum Brinell hardness values given in Table 3 apply up to a maximum of 35 mm of wear range under the running surface. If the thickness of the wear range is greater than 35 mm, the values must be defined in the technical specification.

The hardness value at the connection between the plate and the rim (point A in Figure 2) should be at least 10 points lower than that measured at the wear range limit.

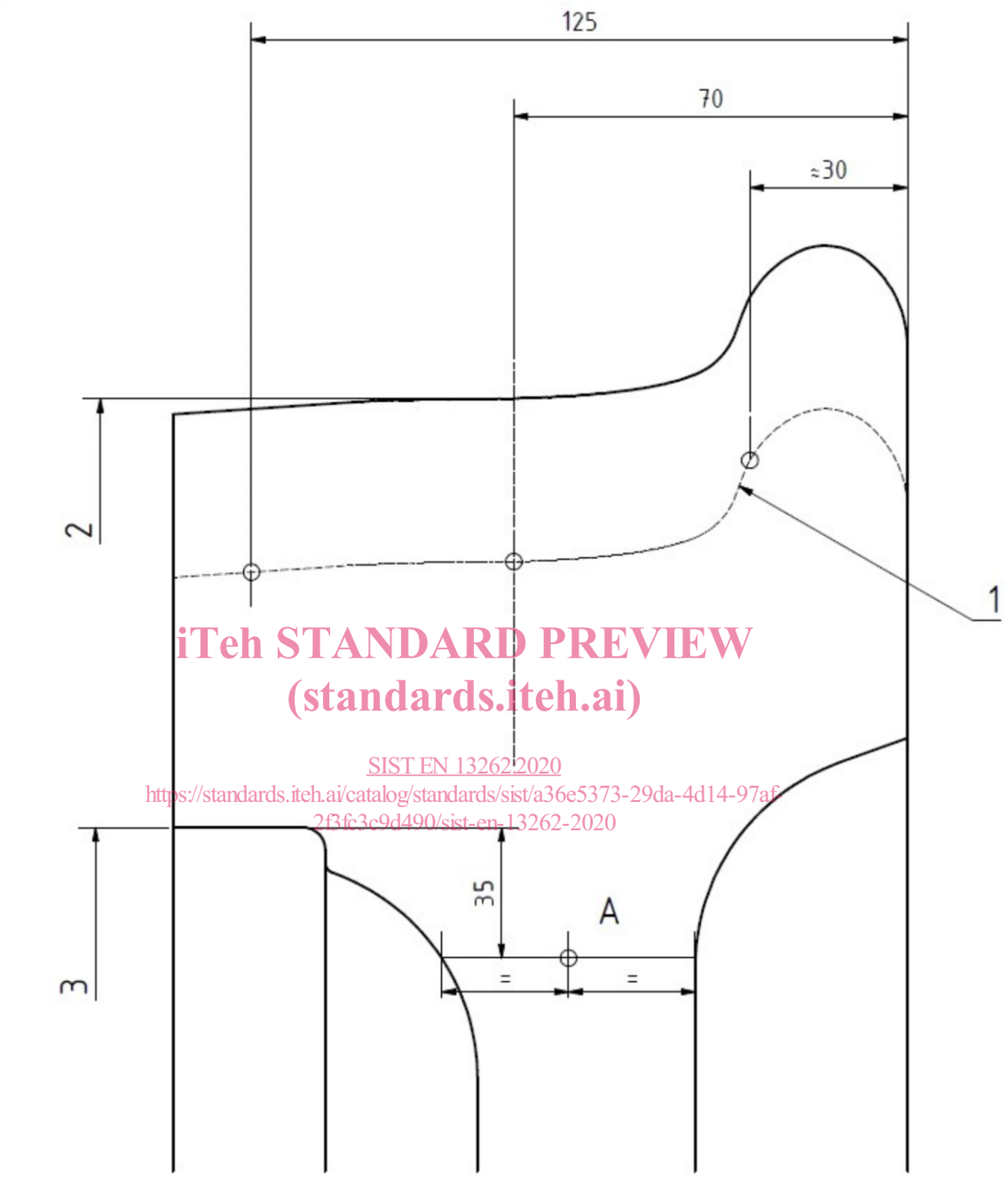
Table 3 — Values to be obtained for hardness characteristics in the rim

	Minimum Brinell hardness value	
Steel grade	**Category 1**	**Category 2**
ER6	—	225
ER7	245	235
ER8	245	245
ERS8	250	250
ER9	255	255

4.2.2.2 Position of measuring points

Four measurements are made on a radial section of the rim, as shown in Figure 2.

Dimensions in millimetres



Wheel rejected

1 Limit of wear range or diameter of last achievable re-profiling (according to technical specification).

2 Nominal diameter

3 Internal diameter (on external face)

Figure 2 — Measurements made on a radial section of the rim

The values in Figure 2 are valid for standard gauge axles and for a rim profile width of 135 mm and above. Other gauges and profiles may be defined in the technical specification.