SLOVENSKI STANDARD

oSIST prEN 15718:2007

01-december-2007

Železniške naprave - Monoblok kolesa - Lita kolesa

Railway applications - Monoblock wheel products - Cast wheels

Ta slovenski standard je istoveten z: prEN 15718

ICS:

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

oSIST prEN 15718:2007 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 15718

September 2007

ICS 45.040

English Version

Railway applications - Monoblock wheel products - Cast wheels

Applications ferroviaires - Roues monobloc - Roues en acier moulé

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. prEN 15718:2007: E

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Foreword

This document (prEN 15718:2007) 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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

For relationship with EC Directive(s), see informative Annex ZA, B, C or D, which is an integral part of this document.

Introduction

Normative documents that up until now have been used in Europe for wheel delivery (UIC leaflets, national standards) had, for the main purpose, a complete definition of the delivery procedures and the wheel characteristics to be measured.

Product qualification was sometimes mentioned but the procedures and the characteristics that had to be verified for the qualification were not given.

This standard addresses these issues by:

a) defining all the wheel characteristics;

NOTE These are either verified during the qualification or for the delivery of the product (see Clause 3).

b) defining qualification procedures (see Annex E);

c) defining delivery conditions (see Annex F).

NOTE A choice is given to the supplier, of either:

1) a traditional delivery procedure with a control by batch sampling as in existing documents (see F.4);

2) delivery procedure using quality assurance concepts (see F.5).

The standard defines the wheel product qualification, the technical approval procedure is not within the scope of this standard.

1 Scope

This European Standard specifies the characteristics of cast railway wheels for use on European networks.

Two steel grades; C ER7 and C ER8, are defined in this standard. For tread braked wheels; only C ER7 is used.

This standard is applicable to cast wheels which have a chilled rim[1]. The standard is only applicable to cast wheels that have satisfied the technical approval procedure according to prEN 13979-2.

This standard applies only to wheels used in freight wagon applications for speeds up to and including 120 km/h.

2 Normative references

The following referenced documents are indispensable for the application 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.

prEN 13979-2, *Railway applications — Wheelsets and bogies — Monobloc wheels — Technical approval procedure — Part 2: Cast wheels*

EN 473, *Non destructive testing — Qualification and certification of NDT personnel — General principles*

EN 10002-1, *Metallic materials — Tensile testing — Part 1: Method of test at ambient temperature*

EN 10045-1, *Metallic materials — Charpy impact test — Part 1: Test method*

EN 10293:2005, *Steel — Castings for General Engineering Uses*

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

EN ISO 6506-2, *Metallic materials — Brinell hardness test — Part 2: Verification and calibration of testing machines*

EN ISO 6506-3, *Metallic materials — Brinell hardness test — Part 3: Calibration of reference blocks*

EN ISO 9000, *Quality management systems — Fundamentals and vocabulary*

ISO 1101, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 4967:1998, *Steel — Determination of content of nonmetallic inclusions — Micrographic method using standard diagrams*

ISO 5948:1994, *Railway rolling stock material — Ultrasonic acceptance testing*

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

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1) Note “Rim Chilled” describes heat treatment of the rim, the aim of which is to harden the rim and to create circumferential compressive residual stresses in the rim.

ISO/TR 9769, *Steel and iron — Review of available methods of analysis*[2)]

ASTM E 399-90:1990, *Test method for plane-strain fracture toughness of metallic materials*

SAE J827, *High carbon cast steel shot*

SAE J442, *Test strip, holder and gage for shot peening*

SAE J443, *Procedures for using standard shot peening test strip*

SAE J444, *Cast shot and grit size specifications for peening and cleaning*

NF A 03-405

3 Product definition

3.1 Chemical composition

3.1.1 Values to be achieved

The maximum percentage contents of the various elements contained within cast wheels shall be as given in Table 1.

Table 1 — Maximum content of various element within cast wheels

Steel grade	Maximum content (unless otherwise stated) %										
	C	Si[c]	Mn	P[a]	S[a, b]	Cr	Cu	Mo[c]	Ni	V	Cr + Mo + Ni
CER7	0,52	0,6	0,80	0,020	0,02	0,30	0,30	0,12	0,30	0,06	0,52
CER8	0,56	0,6	0,80	0,020	0,02	0,30	0,30	0,12	0,30	0,06	0,52

NOTE For special applications, variations within the maximum limit of these values may be agreed.

[a] A maximum content of 0,025 % may be agreed at the time of enquiry or order (values reflect those in the master draft of EN 13262).

[b] minimum sulphur content may be agreed at the time of enquiry and at the time of order, in order to safeguard against hydrogen cracking.

[c] These values have been taken from EN 10293:2005, the supplier shall ensure that use of these values (which exceed those in EN 13262) do not adversely affect the metallurgical structure of the wheel.

3.1.2 Location of the sample

The sample used for determining the chemical composition shall be taken 15 mm below the tread at its nominal diameter.

2) See also CEN report CR 10261:1995

3.1.3 Chemical analysis

The chemical composition analysis shall be performed according to methods and definitions that are described in ISO/TR 9769.

3.2 Mechanical characteristics

3.2.1 Tensile test characteristics

3.2.1.1 Values to be achieved

Cast wheels shall have rim and web characteristics of at least the values given in Table 2.

Table 2 — Minimum tensile test values of the rim and web

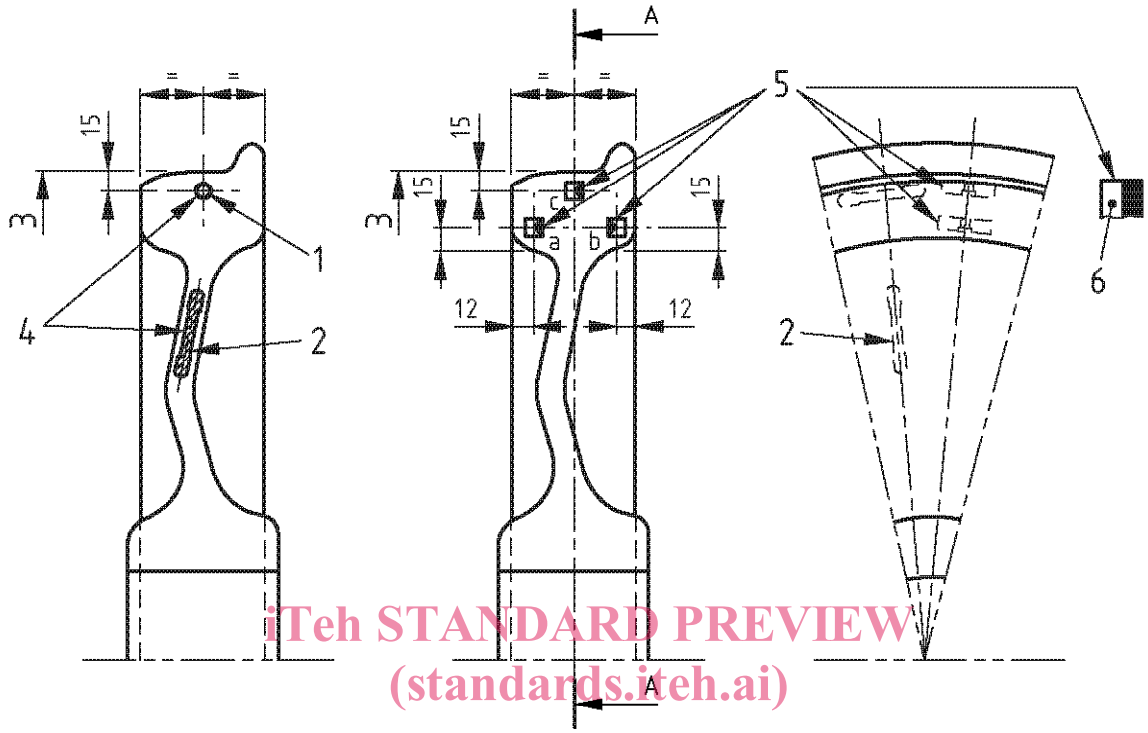
Steel grade	Rim			Web	
	$R_{eH} \geq$ [a] N/mm^2	R_m N/mm^2	$A_5 \geq$ %	Rm reduction $\geq$ [b] N/mm^2	$A_5 \geq$ %
CER7	≥ 520	820/940	≥ 14	≥ 110	≥ 16
CER8	≥ 540	860/980	≥ 13	> 120	≥ 16

[a] If no distinctive yield strength is present, the proof stress $R_{p0,2}$ shall be determined.

[b] Reduction of tensile strength as compared to that of the rim on the same wheel.

3.2.1.2 Location of test pieces

Test pieces shall be taken from the rim and the web of the wheel, as indicated in Figure 1.



Key

3	Nominal diameter	5	Impact test pieces
4	Tensile test pieces	6	Notch

NOTE Where the micro-structure of the wheel varies as a result of the casting process the test piece shall be taken from the worst-case location.

Figure 1 — Location of test pieces

3.2.1.3 Test method

This shall be performed in accordance with EN 10002-1. The test piece diameter shall be at least 10 mm in the parallel length, and the gauge length shall be 5 times the diameter.

NOTE If the wheel design prevents a sample of the stated size being taken, a smaller sized sample may be taken after agreement between the customer and supplier.

3.2.2 Hardness characteristics in the rim

3.2.2.1 Values to be achieved

Minimum values of Brinell hardness applicable to the whole wear zone of the rim shall be as given in Table 3. These values shall be achieved up to a maximum depth of 35 mm under the tread, even if the wear-depth is higher than 35 mm. These measurements shall be taken from the points defined by B, C and D on Figure 2.