SLOVENSKI STANDARD
oSIST prEN 10132:2020

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Hladno valjani ozki jekleni trakovi za toplotno obdelavo - Tehnični dobavni pogoji

Cold rolled narrow steel strip for heat treatment - Technical delivery conditions

Kaltband aus Stahl für eine Wärmebehandlung - Technische Lieferbedingungen

Feuillards laminés à froid pour traitement thermique - Conditions techniques de livraison

Ta slovenski standard je istoveten z: **prEN 10132**

ICS:

77.140.10	Jekla za toplotno obdelavo	Heat-treatable steels
77.140.50	Ploščati jekleni izdelki in polizdelki	Flat steel products and semi-products

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English Version

Cold rolled narrow steel strip for heat treatment - Technical delivery conditions

Kaltband aus Stahl für eine Wärmebehandlung - Technische Lieferbedingungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 459/SC 5.

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.

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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.

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

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European foreword

This document (prEN 10132:2020) has been prepared by Technical Committee CEN/TC 459/SC 5 “Steels for heat treatment, alloy steels, free-cutting steels and stainless steels”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 10132-1:2000, EN 10132-2:2000, EN 10132-3:2000, EN 10132-4:2000.

The main changes with respect to the previous editions of EN 10132-1:2000 to EN 10132-4:2000 are listed below:

a) The four parts of the previous edition were merged to one standard EN 10132;

b) Following steel grades were deleted in part 3: C30E, 25Mn4 and in part 4 48Si7;

c) Following steel grades were added: Steel grades for quenching and tempering C25E, 20MnB5, 27MnCrB5-2, 50CrMo4, Steels grades for springs C80S, 75Cr1, 95Cr1, 58CrV4, 68CrNiMo3-3;

d) Steel grade C25E was added since it could replace C22E in future;

e) The chemical composition of the steel grades for case hardening and steel grades for quenching and tempering were adapted to standards EN ISO 683-1 to −3;

f) The mechanical properties of the steels for quenching and tempering and of the spring steels were partially updated;

g) The requirements concerning the surface characteristics were completely revised;

h) Inspection certificate 3.1 is mandatory;

i) Standard completely editorially revised.

1 Scope

This document specifies the technical delivery conditions for cold rolled narrow steel strip made of non alloy and alloy steel grades in the form of coils and cut lengths in rolling widths less than 600 mm. Cold rolled narrow steel strip is available in grades of case hardening steel and of steels for quenching and tempering for general and special applications particularily springs.

— Case hardening steels in thicknesses up to and including 10 mm;

— Steels for quenching and tempering in thicknesses up to and including 6 mm in the conditions annealed (+A), annealed and skin passed (+LC) or cold rolled (+CR);

— Steels in the quenched and tempered condition (+QT) in thicknesses between 0,30 mm and 3,00 mm.

In special cases supplementary requirements or deviations with respect to this document can be agreed between the purchaser and the supplier at the time of enquiry and order (see 5.2 and Annex A).

In addition to the requirements of this document, the general technical delivery requirements specified in EN 10021 apply.

This document does not cover cold rolled flat products for which separate standards exist, e.g.:

— Cold rolled uncoated low carbon steel narrow strip for cold forming (EN 10139);

— Cold rolled steel flat products with higher yield strength for cold forming (EN 10268).

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 10020, *Definition and classification of grades of steel*

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

EN 10027-1, *Designation systems for steels - Part 1: Steel names*

EN 10027-2, *Designation systems for steels - Part 2: Numerical system*

EN 10049, *Measurement of roughness average Ra and peak count RPc on metallic flat products*

EN 10079, *Definition of steel products*

EN 10140, *Cold rolled narrow steel strip - Tolerances on dimensions and shape*

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

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

EN ISO 643, *Steels - Micrographic determination of the apparent grain size (ISO 643)*

EN ISO 3887, *Steels - Determination of the depth of decarburization (ISO 3887)*

EN ISO 4885, *Ferrous materials - Heat treatments - Vocabulary (ISO 4885)*

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

EN ISO 6508-1, *Metallic materials - Rockwell hardness test - Part 1: Test method (ISO 6508-1:2016)*

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

ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition*

3 Terms and definitions

For the purposes of this document, the following terms and definitions in EN 10020, EN 10021, EN 10079, EN ISO 377, EN ISO 4885 and ISO 14284 and the following 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
production lot
products from the same cast, with the same thickness and the same heat-treatment cycle

4 Classification and designation

4.1 Classification

The classification of the relevant steel grades is allocated in accordance with EN 10020. All steel grades according to Table 4 are non alloy special steels. All steel grades according to Table 5 are alloy special steels.

4.2 Designation

For the steel grades covered by this document, the steel names and numbers given in the relevant tables shall be allocated in accordance with EN 10027-1 and EN 10027-2.

5 Information to be supplied by the purchaser

5.1 Mandatory information

The following information shall be supplied by the purchaser at the time of enquiry and order to enable the supplier to comply with the requirements of this document:

a) the quantity to be delivered;

b) the designation of the product form (cold rolled narrow strip in coils or cold rolled narrow strip in cut lengths);

c) the number of the standard for tolerances on dimensions and shape (EN 10140);

d) the dimensions and tolerances on dimensions and shape and in the case of cut lengths, the length in millimetres, and, if applicable, letters denoting relevant special tolerances;

e) the number of this document;

f) steel name or steel number (see 4.2);

g) the delivery condition (see 6.3);

h) the tolerance for tensile strength or hardness, for delivery condition CR and QT;

i) the surface appearance and the surface finish (see 7.3)

5.2 Options

A number of options are specified in this document and listed below. If the purchaser does not indicate any of these options, the products will be supplied in accordance with the basic specification of this document (see 5.1):

1) requirements concerning other types of edges than the usually delivered slit edges: GK = geschnittene Kanten, engl. slit edges, NK = Naturkanten, engl. mill edges, SK = Sonderkanten, engl. special edges;

2) verification of the chemical composition with product analysis (see 7.1.2, 9.1 and 10.1);

3) verification of the roughness of the surface (see 7.3, Table 2 and A.7)

4) special requirements concerning bend test (see 7.1.3 and A.2);

5) special requirements relating to grain size and verification (see 7.2 and A.3);

6) requirements concerning non-metallic inclusions and verification (see 7.4 and A.4);

7) requirements concerning the depth of decarburisation and verification (see 7.5 and A.5);

8) requirements concerning the spheroidisation of carbides and verification (see 7.6 and A.6);

9) requirements concerning protection during transport and handling (see 11.1);

10) requirements on dimension(s) and/or mass of coils and in the case of cut lengths on the mass of the bundles (see 11.2);

11) requirements on the method of packaging (see 11.3);

12) special requirements on marking including bar coding and labelling (see 11.3).

5.3 Ordering examples

EXAMPLE 1 5 tons of cold rolled narrow strip according to EN 10140 with a nominal thickness of 1,50 mm normal tolerances on thickness, with a nominal width of 200 mm with slit edges (GK), normal tolerances on width according to this document made of steel grade C10E in light skin passed condition (+LC) with a bright uniform surface appearance (MB) and a matt surface finish (RM) and an inspection certificate 3.1:

5 tons cold rolled narrow strip EN 10140 – 1,50x200

EN 10132 – C10E+LC–MB–RM

EXAMPLE 2 10 tons of cold rolled narrow strip in cut lengths according to EN 10140 with a nominal thickness of 2,00 mm, normal tolerances on thickness, with a nominal width of 450 mm with slit edges (GK), normal tolerances on width, with nominal lengths of 3000 mm, normal tolerances on length, according to this document

made of steel grade C75S, in quenched and tempered condition (+QT), hardness tolerance 440 to 490 HV with a bright tempered surface and an inspection certificate 3.1:

10 tons of cold rolled narrow strip in cut lengths EN 10140 – 2,00x450x3000

EN 10132 – C75S+QT – hardness 440 to 490 HV, bright tempered

6 Manufacturing process

6.1 General

The manufacturing process of the steel and of the products is, with the restrictions given by the requirements in 6.2 and 6.4, left to the discretion of the manufacturer.

6.2 Deoxidation

All steels shall be deoxidized.

6.3 Delivery conditions

Cold rolled narrow steel strip shall be supplied in one of the following delivery conditions as indicated in Table 7:

— annealed (+A);

— annealed and skin passed (+LC);

— cold rolled (+CR) or

— quenched and tempered (+QT).

The delivery condition – annealed to achieve spheroidised carbides (+AC) – may be agreed. In such cases, limits on spheroidisation and mechanical properties may also be agreed at the time of enquiry and order.

The condition cold rolled (+CR) can also be applied to annealed material. The condition quenched and tempered (+QT) is aiming for a martensitic and/or bainitic structure. Specific structures may be agreed.

6.4 Traceability of the cast

The products shall be delivered by cast or part of a cast. Each product shall be traceable to the cast.

7 Requirements

7.1 Chemical composition and mechanical properties

7.1.1 General

The steel grades given in Tables 4 and 5 are delivered in the conditions as mentioned in 6.3. The manufacturer is responsible, using the means he thinks fit, for controlling his production from the point of view of the various quality criteria specified.

7.1.2 Chemical composition

The chemical composition determined by cast analysis shall comply with the values in Tables 4 and 5.

Permissible deviations between the limiting values for cast analysis and the values for product analysis are given in Table 6.

The product analysis shall be carried out when specified at the time of enquiry and order (see 9.1 and 10.1).

7.1.3 Mechanical properties

The mechanical properties of the products are given in Table 7. The tensile test is the usual reference test for the mechanical properties. If agreed at the time of enquiry and order, the hardness test with the values given in Table 7 may be performed instead of the tensile test (and not both at the same time).

For the delivery conditions +CR and +QT the steels are supplied with tolerance on the tensile strength with a range of 150 MPa or with tolerances on the hardness with a range of 50 HV as indicated by the purchaser at the time of enquiry and order, see also Table 7, footnotes c and d.

For thicknesses outside this range mentioned in Clause 1, the mechanical properties shall be agreed between the purchaser and the supplier.

Requirements for a bend test for steels in the annealed condition (+A) or annealed and skin passed condition (+LC) may be agreed at the time of enquiry and order, see A.2

NOTE 1 For steels for quenching and tempering guidelines for the heat treatment and the minimum hardness values in the quenched condition without tempering are shown in Table 8.

The steel may be quenched in water, oil or isothermally treated (e.g. metal bath), see Table 8.

NOTE 2 For those purchasers who specify Rockwell hardness rather than Vickers hardness or tensile strength, Table 9 shows Rockwell hardness values for information.

7.2 Grain size

Unless otherwise agreed at the time of ordering, the grain size shall be left to the discretion of the manufacturer. If a fine grain structure is required, the special requirement as detailed in A.3 shall be ordered.

7.3 Surface characteristics

Surface characteristics relate to a) surface appearance, see Table 1, for delivery conditions +A or +LC or +CR only and to b) surface finish, see Table 2 for all delivery conditions.

The appearences indicated in Table 1 for the conditions +A, +LC or +CR apply to the upper/outside surface of coils and the upper/top surface of cut lengths. The appearance of the other side shall correspond at least to surface appearance MA. These requirements to the appearances shall not apply to the first two inner and outer laps of coil or to cut lengths cut from them.

Table 1 — Surface appearances for the conditions +A, +LC and +CR

Surface appearance			
Symbol	**Characteristic**	**Field of application**	**Available surface finishes (see Table 2)**
MA	Bright, metallic clean surface; pitting grooves and scratches are permitted	All thicknesses and delivery conditions	RR rough RM matt, RL smooth
MB	Bright, metallic clean surface; pitting grooves and scratches are permitted as long as the uniform smooth appearance is not substantially impaired when viewed with the naked eye	Thicknesses ≤ 2,00 mm [a] and all delivery conditions except +A	RM matt RL smooth
[a] The supply of products of greater thicknesses with this surface appearance shall be agreed at the time of enquiry and order.			

Cold rolled flat products in conditions +A, +LC or +CR shall be ordered by the purchaser at the time of enquiry and order with surface appearance MA or MB and the available surface finish as described in Table 1 (see 5.1). If not specified in the order, the products in the conditions +A or +LC or +CR shall be supplied with a surface appearance MA and a surface finish RL (*Ra* ≤ 0,6 µm).

Cold rolled flat products in condition +QT shall be ordered with one of the available surface finishes as described in Table 2. If not specified in the order, the products shall be supplied in the condition oxide finish. Due to the processing for cold rolled narrow steel strip in the condition +QT single scratches are possible. The depth of such scratches measured in roughness *R*a shall be lower than 15 µm.

Table 2 — Surface finishes

Surface finish	**Note**	**Symbol**	**Mean surface roughness** Ra, µm
for conditions +A, +LC and +CR			
rough	–	RR	*Ra* ≥ 1,5 µm
matt	–	RM	0,6 µm < *Ra* ≤ 1,8 µm
smooth	–	RL	*Ra* ≤ 0,6 µm
for condition +QT			
oxide finish	unpolished (e.g. grey/blue)	–	*Ra* ≤ 0,6 µm
bright tempered	unpolished	–	
polished	obtained by fine grinding, abrasive brushing or other processes	–	max. *Ra* value may be agreed at the time of enquiry and order
polished and coloured	blue, yellow or other colours obtained by oxidization by heat treatment or other processes	–	

7.4 Non-metallic inclusions

The steels shall have a degree of cleanliness corresponding to the special steel quality. The degree of cleanliness and the verification may be agreed at the time of enquiry and order, see A.4.

7.5 Decarburisation

Independent of their heat treatment, all steels for quenching and tempering with a minimum carbon content ≥ 0,50 % shall not have decarburisation levels exceeding the following limits when measured at a distance of at least 10 mm from the strip edge:

— For non alloy steel grades max. 2 % of the material thickness per side;

for thicknesses lower than 0,20 mm: max. 4 µm per side;

— For alloy steel grades max. 3 % of the material thickness per side;

for thicknesses lower than 0,20 mm: max. 6 µm per side.