



SLOVENSKI STANDARD
SIST EN 10084:2000
01-april-2000

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Case hardening steels - Technical delivery conditions

Einsatzstähle - Technische Lieferbedingungen

Aciers pour cémentation - Conditions techniques de livraison

Ta slovenski standard je istoveten z: **EN 10084:1998**

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ICS:

77.140.10 Jekla za toplotno obdelavo Heat-treatable steels

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en

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ICS 77.140.10

Descriptors: iron and steel products, hot-rolled products, structural steels, case hardening, designation, steel grades, chemical composition, characteristics, dimensions, surface condition, heat treatment, hardenability, hardness, inspection, delivery

English version

Case hardening steels - Technical delivery conditions

Aciers pour cémentation - Conditions techniques de livraison

Einsatzstähle - Technische Lieferbedingungen

This European Standard was approved by CEN on 27 March 1998.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 23 "Steels for heat treatment, alloy steels and free-cutting steels - Qualities", 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 October 1998, and conflicting national standards shall be withdrawn at the latest by October 1998.

The United Kingdom issues a non-conflicting national addition which describes a steel used in the United Kingdom but not included in this European Standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

1.1 This European Standard gives the technical delivery requirements for

- semi-finished products, hot formed, for example blooms, billets, slabs (see notes 2 and 3)
- bars (see note 2)
- rod
- wide flats
- hot-rolled sheet/plate and strip
- hammer and drop forgings (see note 2)

manufactured from the case hardening unalloyed or alloyed steels (see note 4) listed in table 3 and supplied in one of the heat treatment conditions given for the different types of products in table 1, lines 2 to 7 and in one of the surface conditions given in table 2.

The steels are in general intended for the fabrication of case-hardened (see clause 3.) machine parts.

NOTE 1: EURONORMS or European Standards relating to steels complying with the requirements for the chemical composition in table 3 but which are supplied in other product forms or treatment conditions than given above or are intended for special applications, and EURONORMS or European Standards for similar steel grades are listed in annex B.

NOTE 2: Hammer-forged semi-finished products (blooms, billets, slabs, etc.) and hammer-forged bars are included under semi-finished products or bars and not under the term "hammer and drop forgings".

NOTE 3: Special agreements shall be made when ordering undeformed continuously cast semi-finished products.

NOTE 4: In accordance with EN 10020, the steels covered by this European Standard are special steels.

1.2 In special cases variations in these technical delivery requirements or additions to them may form the subject of an agreement at the time of enquiry and order (see annex A).

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1.3 In addition to the specifications of this European Standard, the general technical delivery requirements of EN 10021 are applicable, unless otherwise specified.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 10003-1	Metallic materials - Brinell hardness test - Part 1: Test method
EN 10020	Definition and classification of grades of steel
EN 10021	General technical delivery requirements for steel and iron products
EN 10027-1	Designation systems for steel - Part 1: Steel names, principal symbols
EN 10027-2	Designation systems for steel - Part 2: Numerical system
EN 10052	Vocabulary of heat treatment terms for ferrous products
EN 10079	Definition of steel products
EN 10109-1	Metallic materials - Hardness test - Part 1: Rockwell test (scales A, B, C, D, E, F, G, H, K) and Rockwell superficial test (scales 15N, 30N, 45N, 15T, 30T and 45T)
EN 10163-2	Delivery requirements for surface condition of hot rolled steel plates, wide flats and sections - Part 2: Plates and wide flats
EN 10204	Metallic products - Types of inspection documents (includes amendment A1:1995)
EN 10221	Surface quality classes for hot-rolled bars and rods - Technical delivery conditions
CR 10260	ECISS IC 10 - Designation systems for steel - Additional symbols for steel names
EN ISO 377	Steel and steel products - Location and preparation of test pieces for mechanical testing
EURONORM 23 ¹⁾	End quench hardenability test for steel (Jominy test)

¹⁾ It may be agreed at the time of ordering, until this EURONORM has been adopted as a European Standard, that either this EURONORM or a corresponding national standard should be applied.

EURONORM 103 ¹⁾	Microscopic determination of the ferritic or austenitic grain size of steels
ISO 14284	Steel and iron - Sampling and preparation of samples for the determination of chemical composition
DIN 50602:1985	Metallographic examination - Microscopic examination of special steels using standard diagrams to assess the content of non-metallic inclusions
NF A 04-106:1984	Iron and steel - Methods of determination of non metallic inclusions in wrought steel - Part II: Micrographic method using standard diagrams
SS 111116:1987	Steel - Methods for assessment of the content of non-metallic inclusions - Microscopic methods - Jernkontoret's inclusion chart II for the assessment of non-metallic inclusions

3 Definitions

For the purpose of this European Standard the following definition applies in addition to the definitions in EN 10020, EN 10021, EN 10052, EN 10079, EN ISO 377 and ISO 14284:

3.1 Case-hardening steels: Steels with a relatively low carbon content which are intended for carburising or carbonitriding and subsequent hardening. Such steels, after treatment, are characterised by a high hardness surface layer and a tough core.

4 Classification and designation

4.1 Classification

All steels covered by this European Standard are classified according to EN 10020. Steel grades C10E, C10R, C15E, C15R, C16E and C16R are non-alloy special steels. All other steels covered by this European Standard are alloy special steels.

4.2 Designation

4.2.1 Steel names

For the steel grades covered by this European Standard, the steel names as given in tables 3, 5 and 6 are allocated in accordance with EN 10027-1 and CR 10260.

4.2.2 Steel numbers

For the steel grades covered by this European Standard, the steel numbers as given in tables 3, 5 and 6 are allocated in accordance with EN 10027-2.

¹⁾ See page 6

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:

- a) the quantity to be delivered;
- b) the designation of the product form (e.g. round or square);
- c) the number of the dimensional standard;
- d) the dimensions and tolerances on dimensions and shape and, if applicable, letters denoting relevant special tolerances;
- e) the number of this European Standard (EN 10084);
- f) steel name or steel number (see 4.2);
- g) if appropriate, the symbol for the heat-treatment condition at delivery (see 6.4.2 and table 1);
- h) if appropriate, the symbol for the surface condition at delivery (see 6.4.3 and table 2);
- i) the standard designation for a test report (2.2) or, if required, any other type of inspection document in accordance with EN 10204 (see 8.1).

EXAMPLE:

20 rounds EURONORM 60 - 40x8000
EN 10084 - 20MnCr5+A+BC
EN 10204 -2.2

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or

20 rounds EURONORM 60 - 40x8000
EN 10084 - 1.7147+A+BC
EN 10204 - 2.2

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5.2 Options

A number of options are specified in this European Standard and listed below. If the purchaser does not indicate his wish to implement one of these options, the supplier shall supply in accordance with the basis specification of this European Standard (see 5.1).

- a) any requirement concerning minimum reduction ratio of rolled and forged products (see 6.3 and A.4),
- b) any special requirement on grain size (see 7.3.1 and 8.2.2),
- c) any requirement concerning determination of non-metallic inclusion content (see 7.3.2, tables 8 to 10, A.1 and annex D),
- d) any requirement for internal soundness (see 7.4 and A.2),
- e) any requirement relating to surface quality (see 7.5.3),
- f) any requirement concerning suitability of bars and rod for bright drawing (see 7.5.4),
- g) any requirement relating to removal of surface defects (see 7.5.5),
- h) any requirement concerning special marking of the products (see clause 9 and A.5),
- i) any verification of the product analysis (see table 12 and A.3).

6 Manufacturing process

6.1 Melting process

The type of melting process is left to the discretion of the manufacturer.

6.2 Deoxidation

All steels shall be killed.

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6.3 Manufacture of the product

The manufacturing process route of the product shall be at the manufacturer's discretion.

For minimum reduction ratio of rolled and forged products see A.4.

6.4 Heat-treatment condition and surface finish at the time of delivery

6.4.1 Normal condition at delivery

Unless otherwise agreed at the time of enquiry and order, the products shall be delivered in the untreated, i.e. hot formed, condition.

6.4.2 Particular heat-treatment condition

If so agreed at the time of enquiry and order, the products shall be delivered in one of the heat-treatment conditions given in table 1, lines 3 to 7.

6.4.3 Particular surface condition

If so agreed at the time of enquiry and order, the products shall be supplied in one of the special surface conditions given in lines 3 to 6 of table 2.

6.5 Cast separation

The products shall be delivered separated by cast.

7 Requirements

7.1 Chemical composition, hardness and hardenability

7.1.1 Table 1 gives a survey on combinations of usual heat-treatment conditions at delivery, product forms and requirements according to tables 3 to 7 (chemical composition, hardenability, maximum hardness, hardness range).

7.1.2 Where the steel is ordered according to table 3 (designation without hardenability index) the requirements for chemical composition and hardness cited in table 1, column 9, apply as appropriate for the particular heat-treatment condition. In this case the values of hardenability given in table 5 are for guidance purposes only.

7.2 Technological properties (standards.iteh.ai)

7.2.1 Machinability

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All steels are machinable in the conditions "annealed to maximum hardness requirements", "treated to hardness range" and "treated to ferrite/pearlite structure and hardness range".

Where improved machinability is required, the grades with a specified sulfur range should be ordered. (See also table 3, footnote 3.)

7.2.2 Shearability of semi-finished products and bars

7.2.2.1 Under suitable shearing conditions (preheating, application of blades with a profile adapted to that of the product, etc.) all steels are shearable in the condition