



SLOVENSKI STANDARD

SIST EN 10277-4:2008

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Nadomešča:
SIST EN 10277-4:2000

Svetli jekleni izdelki - Tehnični dobavni pogoji - 4. del: Cementacijska jekla

Bright steel products - Technical delivery conditions - Part 4: Case hardening steels

Blankstahlerzeugnisse - Technische Lieferbedingungen - Teil 4: Einsatzstähle

Produits en acier transformés à froid - Conditions techniques de livraison - Partie 4:
Aciers pour cémentation

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Ta slovenski standard je istoveten z: EN 10277-4:2008

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ICS:

77.140.01	Železni in jekleni izdelki na splošno	Iron and steel products in general
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 10277-4

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ICS 77.140.20; 77.140.60

Supersedes EN 10277-4:1999

English Version

Bright steel products - Technical delivery conditions - Part 4: Case hardening steels

Produits en acier transformés à froid - Conditions
techniques de livraison - Partie 4: Aciers pour cémentation

Blankstahlerzeugnisse - Technische Lieferbedingungen -
Teil 4: Einsatzstähle

This European Standard was approved by CEN on 4 February 2008.

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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 Management Centre has the same status as the official versions.

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

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Foreword

This document (EN 10277-4:2008) has been prepared by Technical Committee ECISS/TC 23 “Steels for heat treatment, alloy steels and free-cutting steels - Qualities and dimensions”, 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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

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

This document supersedes EN 10277-4:1999.

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

This European Standard EN 10277 'Bright steel products - Technical delivery conditions' is subdivided as follows:

Part 1: General;

Part 2: Steels for general engineering purposes;

Part 3: Free-cutting steels;

Part 4: Case hardening steels;

Part 5: Steels for quenching and tempering.

During the preparation of the first edition of this European Standard there were not enough statistical data available concerning mechanical properties of bright bar products. Since then it has been recognized that the proof strength values in the cold drawn condition were too high. In addition, cyclic stresses that occur during straightening can reduce the proof strength (Bauschinger's effect), which was not taken into account when drafting the first edition of this standard. In this second edition the proof strength values of non-alloy and alloy grades in condition +QT+C in parts 3 and 5 have been adjusted downwards compared to the first edition.

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EN 10277-4:2008 (E)

1 Scope

This part of EN 10277 applies to bright steel bars in the drawn, turned or ground condition, in straight lengths of case hardening steels.

This EN 10277-4 is complemented by EN 10277-1.

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.

EN 10084, *Case hardening steels - Technical delivery conditions*

EN 10277-1, *Bright steel products - Technical delivery conditions - Part 1: General*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 10277-1 and the following apply.

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.

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4 Classification and designation

4.1 Classification

Steel grades C10R, C15R and C16R are non-alloy special steels. All other steel grades covered by this European Standard are alloy special steels.

4.2 Designation

See EN 10277-1.

5 Information to be supplied by the purchaser

See EN 10277-1.

6 Manufacturing process

See EN 10277-1.

7 Requirements

7.1 Chemical composition

7.1.1 Cast analysis

The chemical composition of the steel according to the cast analysis shall be as specified in Table 1.

7.1.2 Product analysis

The permissible deviations from the chemical composition as specified in Table 1 for cast analysis and the product analysis of the steel shall be as specified in Table 2.

7.2 Mechanical properties

The mechanical properties of the steels shall be as specified in Table 3 and Table 4.

7.3 Hardenability

Where steels are ordered with hardenability requirements, the requirements of EN 10084 shall apply.

7.4 Grain size

Unless otherwise agreed, the steel shall show a fine grain structure with an austenitic grain size of 5 or finer.

For verification see EN 10277-1, B.2.

7.5 Non-metallic inclusions

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7.5.1 Microscopic inclusions

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The steels shall have a degree of cleanness corresponding to the special steel quality.

For details of requirements and verification see Annex A.1 and Annex C of EN 10084.

7.5.2 Macroscopic inclusions

As freedom from macroscopic inclusions cannot be guaranteed in any steel, any requirement to verify the level present shall be agreed at the time of enquiry and order (see EN 10277-1, 7.5.2 and B.3.2).

7.6 Options

See Annex B of EN 10277-1.

8 Inspection and testing

8.1 Types and contents of inspection documents

See EN 10277-1.

8.2 Specific inspection

See EN 10277-1.

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8.3 Verification of hardenability

See EN 10084, 8.2.1.1.

9 Marking

See EN 10277-1.

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Table 1 — Steel grades and chemical composition (cast analysis)

Designation		Steel grade according to	Chemical composition, % by mass ^{a,b,c}								
Steel name	Steel number		C	Si max.	Mn	P max.	S	Cr	Mo	Ni	B
C10R	1.1207	EN 10084	0,07 to 0,13	0,40	0,30 to 0,60	0,035	0,020 to 0,040	-	-	-	-
C15R	1.1140	EN 10084	0,12 to 0,18	0,40	0,30 to 0,60	0,035	0,020 to 0,040	-	-	-	-
C16R	1.1208	EN 10084	0,12 to 0,18	0,40	0,60 to 0,90	0,035	0,020 to 0,040	-	-	-	-
16MnCrS5	1.7139	EN 10084	0,14 to 0,19	0,40	1,00 to 1,30	0,025	0,020 to 0,040	0,80 to 1,10	-	-	-
16MnCrB5	1.7160	EN 10084	0,14 to 0,19	0,40	1,00 to 1,30	0,025	≤ 0,035	0,80 to 1,10	-	-	0,0008 to 0,0050 ^d
20MnCrS5	1.7149	EN 10084	0,17 to 0,22	0,40	1,10 to 1,40	0,025	0,020 to 0,040	1,00 to 1,30	-	-	-
16NiCrS4	1.5715	EN 10084	0,13 to 0,19	0,40	0,70 to 1,00	0,025	0,020 to 0,040	0,60 to 1,00	-	0,80 to 1,10	-
15NiCr13	1.5752	EN 10084	0,14 to 0,20	0,40	0,40 to 0,70	0,025	≤ 0,035	0,60 to 0,90	-	3,00 to 3,50	-
20NiCrMoS2-2	1.6526	EN 10084	0,17 to 0,23	0,40	0,65 to 0,95	0,025	0,020 to 0,040	0,35 to 0,70	0,15 to 0,25	0,40 to 0,70	-
17NiCrMoS6-4	1.6569	EN 10084	0,14 to 0,20	0,40	0,60 to 0,90	0,025	0,020 to 0,040	0,80 to 1,10	0,15 to 0,25	1,20 to 1,50	-

^a Elements not quoted in this Table shall not be intentionally added to the steel without the agreement of the purchaser, other than for the purpose of finishing the heat. All reasonable precautions shall be taken to prevent the addition of such elements from scrap or other material used in manufacture, which affect the hardenability, mechanical properties and applicability.

^b Where requirements are made on hardenability (see EN 10084), slight deviations from the limits for the cast analysis are permitted, except for phosphorus and sulphur; these deviations shall, however, not exceed in the case of carbon ± 0,01 % and in all other cases the values acc. to Table 2.

^c Steels with improved machinability as a result of the addition of higher sulphur contents up to around 0,10% S (including resulphurized steels with controlled inclusion content (e.g. Ca-treatment)) (modern method) or lead may be supplied on request. In the first case the upper limit for the manganese content may be increased by 0,15 %.

^d Boron is in this case added not for increase of hardenability but to improve the toughness of the case hardened zone.