SLOVENSKI STANDARD
SIST EN 10269:2000

01-november-2000

Jekla in nikljeve zlitine za pritrdilne elemente za delo pri povišanih in/ali nizkih temperaturah

Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties

Stähle und Nickellegierungen für Befestigungselemente für den Einsatz bei erhöhten und/oder tiefen Temperaturen

Aciers et alliages de nickel pour éléments de fixation utilisés a température élevée et/ou basse température

Ta slovenski standard je istoveten z: **EN 10269:1999**

ICS:

77.120.40	Nikelj, krom in njune zlitine	Nickel, chromium and their alloys
77.140.20	Visokokakovostna jekla	Stainless steels

SIST EN 10269:2000 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 10269

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ICS 77.120.40; 77.140.20

English version

Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties

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This European Standard was approved by CEN on 1 July 1999.

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.

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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Contents

Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 22 "Steels for pressure purposes - 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 February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this 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.

NOTE: The clauses marked with a point (•) contain information relating to agreements which are to be made at the time of enquiry and order. The clauses marked with two points (••) contain information relating to agreements which may be made at the time of enquiry and order.

1 Scope

This European Standard specifies requirements for semi-finished products, bars and rods for fasteners with properties specified at elevated and/or low temperatures made of non-alloy and alloy (including stainless) steels and nickel alloys as given in table 1.

The general technical delivery conditions in EN 10021 also apply to products supplied in accordance with this European Standard.

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 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.

CR 10260	Designation systems for steel - Additional symbols for steel names (CEN-Report)
EN 10002-1	Metallic materials - Tensile testing - Part 1: Method of test (at ambient temperature)(includes amendment AC1:1990)
EN 10002-5	Metallic materials - Tensile testing - Part 5: Method of test at elevated temperatures
EN 10003-1	Metallic materials - Hardness test - Brinell - Part 1: Test method
EN 10020	Definition and classification of grades of steel
EN 10021	General technical delivery conditions 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 10045-1	Metallic materials - Charpy impact test - Part 1: Method of test
EN 10052	Vocabulary of heat treatment terms for ferrous products
EN 10079	Definitions of steel products

EN 10168[1]	Iron and steel products - Inspection and delivery documents - List of information and description
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
prEN 10272	Stainless steel bars for pressure purposes
EN ISO 377	Steel and steel products - Location of samples and test pieces for mechanical testing (ISO 377:1997)
ISO 14284	Steel and iron - Sampling and preparation of samples for the determination of chemical composition

3 Definitions

3.1 For the purpose of this European Standard the definitions in

- EN 10020 for classification of steels,
- EN 10052 for the types of heat treatment and
- EN 10079 for the various product forms

apply.

Additionally to the definitions in EN 10052 the following should be noted:

NOTE 1: Normalizing (symbol N) also includes normalizing forming.

NOTE 2: Quenching and tempering (symbol QT) also includes direct hardening plus tempering.

3.2 Purchaser: The person or organization that orders products in accordance with this standard. The purchaser is not necessarily, but may be, a manufacturer of pressure equipment in accordance with the EU Directive listed in Annex ZA. Where a purchaser has responsibilities under this EU Directive, this standard will provide a presumption of conformity with the essential requirements of the Directive so identified in Annex ZA.

4 • Dimensions and tolerances on dimensions

The nominal dimensions and tolerances on dimensions for the products shall be agreed at the time of enquiry and order with reference to the dimensional standards listed in annex E.

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1) In preparation; until this document is published as European Standard a corresponding national standard should be agreed at the time of enquiry and order.

5 Calculation of mass

The values of density given in annex A shall be used as the basis for the calculation of the nominal mass from the nominal dimensions. For grades not mentioned in annex A, the following density values apply:

- 11/12 % Cr steels: 7,7 kg/dm³
- X8Ni9 7,89 kg/dm³
- austenitic CrNiMo steels: 8,0 kg/dm³

For all other steels a density of 7,85 kg/dm³ applies.

6 Classification and designation

6.1 Classification

In accordance with EN 10020 the steel grades C35E, C45E and 20Mn5 are non-alloy special steels. All other steel grades are alloy special including austenitic steels. Additionally, austenitic nickel alloys are specified.

6.2 Designation

The steel grades specified in this European Standard are designated with steel names and steel numbers. The steel names have been allocated in accordance with EN 10027-1 and CR 10260. The corresponding steel numbers have been allocated in accordance with EN 10027-2.

NOTE: Explanation on the designation of nickel alloys

- name: The preceding chemical symbols indicate the main alloy elements and the figure immediately following indicates the average content of these alloys subsequently followed by the symbol for the other added important alloy elements.
- material number: The structure is set out according to EN 10027-2 with the number 2 for the material group number. This material group comprises chemically resisting and heat resisting or creep resisting nickel and cobalt alloys.

7 Information to be supplied by the purchaser

7.1 Mandatory information

The following information shall be supplied by the purchaser at the time of enquiry and order:

a) the quantity required (mass or number of pieces);
b) the type of product;
c) the European Standard specifying the tolerances on dimensions and shape (see clause 4) and the tolerance of mass and, if the relevant European Standard permits the purchaser certain options, e.g. regarding edge finishes or tolerance classes, specific information on these aspects;
d) the nominal dimensions of the product;
e) the number of this European Standard;

f) the material name or number;
g) the delivery condition (see 8.2.1);
h) the surface quality class (see 8.5);
i) the type of inspection document (see 9.1.1).

7.2 Options

A number of options are specified in this European Standard and listed below. If the purchaser does not indicate a wish to implement any of these options at the time of enquiry and order, the supplier shall supply in accordance with the basic specification (see 7.1).

1) special melting process (see 8.1);
2) test on simulated treated samples (see 8.2.2);
3) stress relieving treatment (see 8.2.3);
4) requirements for internal soundness (see 8.6);
5) product analysis and its extent (see table 8, footnote 2);
6) tensile test at elevated temperatures (see table 8, footnote 3);
7) impact test at room temperature for austenitic steels (see table 8, footnote 4);
8) impact test at low temperature (see table 8, footnote 5; 11.5);
9) additional tests (see table 8, footnote 6);
10) specification of an analytical method (see 11.1);
11) number of test pieces for the product analysis (see 10.1.1);
12) temperature for the tensile test at elevated temperature (see 11.4);
13) special marking (see 12.2).

7.3 Example of ordering

2 t rounds made of a steel grade with the name X8Ni9 and the number 1.5662 as specified in EN 10269 of 30 mm diameter; dimensional tolerances as specified in EURONORM 60; surface quality class B in accordance with EN 10221; inspection document 3.1.B as specified in EN 10204:

2 t rounds EURONORM 60 - 30 - Steel EN 10269 - X8Ni9
EN 10221 - class B - Inspection document 3.1.B

or

2 t rounds EURONORM 60 - 30 - Steel EN 10269 - 1.5662
EN 10221 - class B - Inspection document 3.1.B

8 Requirements

8.1 •• Melting process

Unless a special melting process is agreed at the time of enquiry and order, the melting process for the starting material in accordance with this European Standard shall be at the discretion of the manufacturer.

8.2 Delivery condition

8.2.1 • Table 3 covers delivery conditions +A, +S, +AC normally applied for further processing (such as shearing, cold heading, etc.).

Table 4 covers delivery conditions normally applied without additional heat treatment after delivery.

The purchaser shall specify in his enquiry and order the delivery condition required.

> NOTE: Depending on the type (e. g. billet) and the dimensions of the product and the intended type of further processing the material, in special cases the delivery in the untreated condition may be agreed.

8.2.2 •• When delivery in a condition not covered in table 4 is agreed, for the verification of compliance with the requirements of this European Standard tests on simulated treated samples may be agreed at the time of enquiry and order. In the case of billets, this simulated treatment may also include a hot forming operation.

8.2.3 •• By agreement at the time of enquiry and order, for the steels for quenching and tempering a stress relieving treatment after straightening may be specified. See footnote 3 to table B.1.

8.3 Chemical composition

8.3.1 The information in table 1 applies for the chemical composition according to the cast analysis.

8.3.2 The product analysis shall not deviate from the specified values of the cast analysis as specified in table 1 by more than the values given in table 2.

8.4 Mechanical properties

8.4.1 General

The hardness and mechanical properties specified in this Euopean Standard apply when billets, bars and rods are delivered in a condition given in table 3 or table 4 and where the relevant tests are carried out in accordance with the sampling and testing conditions in 10.2 and clause 11.

8.4.2 Hardness and mechanical properties at room temperature

The mechanical properties at room temperature are specified in tables 3 and 4. They apply for the relevant specified heat treatment condition and dimensions.

8.4.3 Mechanical properties at elevated temperatures

The values in table 5 apply for the 0,2 % proof strength at elevated temperatures.

The values in table 6 apply for the tensile strength at elevated temperatures.

Reference data of strength values for 1 % (plastic) creep and creep rupture are given in table C.1.

Reference data for relaxation properties are given in table D.1.

8.4.4 Mechanical properties at low temperatures

Low temperature impact energy values are specified in table 7.

NOTE 1: Austenitic steels are insensitive to brittle fracture in the solution annealed condition. Because they do not have a pronounced transition temperature, which is characteristic of other steels, they are also useful for application at cryogenic temperatures.

NOTE 2: In the case of billets verification of the capability of the material to comply with the property requirements for the bars by testing simulated heat treated test pieces may be agreed.

8.5 • Surface condition

Slight surface imperfections, inherent in the production process, are permitted.

The purchaser shall specify a surface quality class in accordance with EN 10221.

8.6 •• Internal soundness

For the internal soundness, where appropriate, requirements together with the conditions for their verification may be agreed at the time of enquiry and order.

9 Inspection

9.1 Types of inspection and inspection documents

9.1.1 • The compliance with the requirements of the order shall be checked for products in accordance with this European Standard by non-specific or specific inspection. The applicable inspection document according to EN 10204 for products in a delivery condition in accordance with table 3 is 2.2, for all other delivery conditions 3.1.B, unless otherwise agreed.

The purchaser shall state the required type of inspection document. If an inspection document 3.1.A, 3.1.C or 3.2 is ordered, the purchaser shall notify the manufacturer of the name and the adress of the organization or person who is to carry out the inspection and produce the inspection document. In the case of the inspection report 3.2 the party to issue the certificate shall be agreed.

9.1.2 If a test report 2.2 is ordered, this shall include the following information:

a) Statement that the material complies with the requirements of the order;

b) Results of the cast analysis for all elements specified in table 1 for the material grade concerned.

9.1.3 If an inspection certificate 3.1.B or another document for specific inspection is ordered, this shall include, in accordance with EN 10168, the following codes and information:

a) Information blocks A, B and Z; the tempering temperature shall also be given in the case of quenched and tempered or tempered products.

b) Results of the cast analysis in accordance with boxes C 71 to C 92.

c) Results of the tensile tests at room temperature in accordance with boxes C 00 to C 03 and C 10 to C 13.

d) Results of the impact test in accordance with boxes C 00 to C 03 and C 40 to C 43.

e) Result of the visual examination of the products (see information block D).

f) If one or several of the following options have been agreed at the time of enquiry and order, the relevant information on:

1) the melting process (section C 70),

2) the product analysis (boxes C 71 to C 92),

3) verification of the 0,2 % proof strength at elevated temperature and, in the case of austenitic steels and nickel alloys - depending on the order -, verification of the tensile strength at elevated temperature (boxes C 00 to C 03 and C 10 to C 13),

4) verification of impact properties of austenitic materials at room temperature (boxes C 00 to C 03 and C 40 to C 43),

5) verification of impact properties at low temperature (boxes C 00 to C 03 and C 40 to C 43),

6) verification of the surface quality (see information block D) and

7) non-destructive test for verification of internal soundness (information block D).

9.2 Tests to be carried out

The tests to be carried out, either mandatorily (m) or optional (o), the size of the test units, and the number of samples and test pieces to be taken are given in table 8.

9.3 Re-tests

See EN 10021.