

# SVENSK STANDARD

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### Krypbeständiga stål, nickel- och koboltlegeringar

### Creep resisting steels, nickel and cobalt alloys

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Denna standard ersätter SS-EN 10302, utgåva 1.

The European Standard EN 10302:2008 has the status of a Swedish Standard. This document contains the official English version of EN 10302:2008.

This standard supersedes the Swedish Standard SS-EN 10302, edition 1.

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 10302**

March 2008

ICS 77.120.01; 77.140.01; 77.150.01

Supersedes EN 10302:2002

English Version

## Creep resisting steels, nickel and cobalt alloys

Aciers et alliage à base de nickel et de cobalt résistant au fluage

Warmfeste Stähle, Nickel- und Cobaltlegierungen

This European Standard was approved by CEN on 10 February 2008.

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 CEN Management Centre 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 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

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

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## Foreword

This document (EN 10302:2008) has been prepared by Technical Committee ECISS/TC 23 “Stainless steels”, 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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.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 10302:2002.

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.

**NOTE** The clauses marked with a point (●) contain information relating to agreements which are to be made at the time of ordering. The clauses marked with two points (●●) contain information relating to agreements which may be made at the time of ordering.

## SS-EN 10302:2008 (E)

### 1 Scope

**1.1** This European Standard covers the grades of wrought steels and alloys listed in Table 1 and Table 2, which are usually employed for components and equipment, for which the main requirement is their creep resistance under mechanical long-time stressing at temperatures above 500 °C.

NOTE Heat resisting grades given in EN 10095 [9] may also be used for similar applications if so agreed.

**1.2** This European Standard specifies the technical delivery conditions for semi-finished products, for hot or cold rolled sheet/plate and strip, hot or cold formed (cold drawn) bars, rods, wire and sections.

**1.3** The general technical delivery conditions specified in EN 10021 apply in addition to the specifications of this European Standard, unless otherwise specified in this European Standard.

**1.4** This European Standard does not apply to components manufactured by further processing the product forms listed in 1.2 with quality characteristics altered as a result of such further processing.

**1.5** This European Standard shall not be used for aerospace and pressure purposes.

**1.6** For steels and alloys with similar chemical composition, but intended for different applications, see the Bibliography.

### 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 10002-1, *Metallic materials - Tensile testing - Part 1: Method of test (at ambient temperature)*

EN 10002-5, *Metallic materials - Tensile testing - Part 5: Method of testing at elevated temperature*

EN 10020:2000, *Definition and classification of grades of steel*

EN 10021:2006, *General technical delivery conditions for steels products*

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

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

EN 10052:1993, *Vocabulary of heat treatment terms for ferrous products*

EN 10079:2007, *Definition of steel products*

EN 10163-2, *Delivery requirements for surface condition of hot rolled steel plates, wide flats and sections - Part 2: Plate and wide flats*

EN 10168:2004, *Steel products – Inspection documents – List of information and description*

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

EN 10221, *Surface quality classes for hot-rolled bars and rods - Technical delivery conditions*

prCEN/TR 10261, *Iron and steel - Review of available methods of chemical analysis*

EN ISO 377:1997, *Steel and steel products - Location and preparation of samples and test pieces for mechanical testing (ISO 377:1997)*



EN ISO 14284:2002, *Steel and iron - Sampling and preparation of samples for the determination of chemical composition (ISO 14284:1996)*

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 10020:2000, EN 10021:2006, EN 10052:1993, EN 10079:2007, EN ISO 377:1997 and EN ISO 14284:2002 and the following apply.

#### 3.1

##### **creep resisting materials**

steels, nickel- or cobalt-alloys with a minimum of 8 % chromium, which are characterised by good mechanical behaviour at temperatures above 500 °C under long-range service conditions; i.e. primarily by creep strength to 1 % plastic strain or creep rupture strength during long-time stressing

NOTE For supplementary information on creep resisting steels and alloys see Annex B.

### 4 Classification and designation

#### 4.1 Classification

Materials covered in this European Standard are classified according to their structure into:

- martensitic steels;
- austenitic steels;
- nickel alloys; and
- cobalt alloys.

#### 4.2 Designation

The names and numbers of the steels (see Table 1) were formed in accordance with EN 10027-1 and EN 10027-2 respectively.

NOTE Explanation on the designation of nickel and cobalt alloys (see Table 2).

- name: The preceding chemical symbols indicate the main alloy elements and the figure immediately following indicates the average content of these alloys which is subsequently followed by the symbol for the other important alloying elements added.
- 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 resistant and high temperature or heat resistant nickel and cobalt alloys.

## SS-EN 10302:2008 (E)

### 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) quantity to be delivered;
- b) designation of the product form (e.g. bar or rod, strip or plate);
- c) where an appropriate dimensional standard is available (see Annex A) the number of the standard and the indications required by this, also the nominal dimensions and tolerances;
- d) type of material (steel, cobalt or nickel alloy);
- e) number of this European Standard (EN 10302:2008);
- f) name or number of the steel grade, nickel or cobalt alloy (see 4.2);
- g) if for the relevant material in the table more than one treatment condition for the mechanical properties is covered, the symbol for the desired heat treatment condition or work hardened condition;
- h) desired process route (see symbols in Table 5 and Table 6).

#### 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 any of these options, the supplier shall supply in accordance with the basic specification of this European Standard (see 5.1).

- a) any requirement concerning a special melting or forming process (see 6.1);
- b) any requirement relating to surface condition (see 7.4);
- c) any requirement concerning tolerances on mass not specified in the dimensional standard (see 7.7.2);
- d) any requirement to determine the product analysis (see Table 11, footnote b);
- e) any requirement concerning the method of product analysis (see 8.4.1);
- f) any requirement concerning elevated temperature tensile testing (see 8.4.3);
- g) any requirement concerning special marking of the products (see 9.2, 9.3 and Table 12);
- h) any requirement concerning the issue of an inspection document (see 8.2).

#### EXAMPLE

10 t rounds of a steel grade with the name X6NiCrTiMoVB25-15-2 and the number 1.4980 as specified in EN 10302 of 50 mm diameter, dimensional tolerances as specified in EN 10060, in process route 1D (see Table 6).

10 t rounds EN 10060–50  
steel EN 10302 - X6NiCrTiMoVB25-15-2+1D

or

10 t rounds EN 10060–50  
steel EN 10302-1.4980+1D

## 6 Manufacturing process

### 6.1 General ●●

Unless a special melting or forming process is agreed when ordering, the production process for steels and alloys conforming to this European Standard shall be at the discretion of the manufacturer.

### 6.2 Delivery condition ●

The products shall be supplied in the delivery condition agreed in the order by reference to the process route given in Table 5 and Table 6 and to the treatment conditions given in Table B.1 and Table B.2.

## 7 Requirements

### 7.1 Chemical composition

**7.1.1** The chemical composition requirements given in Table 1 and Table 2 apply in respect to the cast analysis.

**7.1.2** The product analysis may deviate from the limiting values for the cast analysis given in Table 1 and Table 2 by the values listed in Table 3 and Table 4.

### 7.2 Mechanical properties

#### 7.2.1 Mechanical properties at room temperature

The mechanical properties at room temperature as specified in Table 7 and Table 8 apply for each specified heat treatment condition. This does not apply to the process route 1U (hot rolled, not heat treated, not descaled) and to semi-finished products.

- If by agreement at the time of ordering the products are to be supplied in a non-heat-treated condition, the mechanical properties specified in Table 7 and Table 8 shall be obtainable from reference test pieces which have received the appropriate heat treatment (simulated heat treatment).

#### 7.2.2 Mechanical properties at elevated temperatures

The mechanical properties at elevated temperature as specified in Table 9 and Table 10 apply for each specified heat treatment condition. This does not apply to the process route 1U (hot rolled, not heat treated, not descaled) and to semi-finished products.

- If by agreement at the time of ordering the products are to be supplied in a non-heat-treated condition, the mechanical properties specified in Table 9 and Table 10 shall be obtainable from reference test pieces which have received the appropriate heat treatment (simulated heat treatment).

### 7.3 Creep properties

The creep strength to 1 % plastic strain or creep rupture strength values as specified in Annex C apply for each specified heat treatment condition. This does not apply to the process route 1U (hot rolled, not heat treated, not descaled) and to semi-finished products.

### 7.4 Surface condition

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

- If more exact requirements for the surface quality are necessary, this shall be agreed at the time of enquiry and order.