

## **Creep resisting steels, nickel and cobalt alloys**

Creep resisting steels, nickel and cobalt alloys

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 10302:2002 sisaldab Euroopa standardi EN 10302:2002 + AC:2005 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 18.10.2002 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 10302:2002 consists of the English text of the European standard EN 10302:2002 + AC:2005.</p> <p>This document is endorsed on 18.10.2002 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>This European Standard covers the grades of wrought steels and alloys listed in Tables 1 and 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. Also heat resisting grades given in EN 10095 may be used for similar applications if so agreed. 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. 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. This European Standard does not apply to components manufactured by further processing the product forms listed in with quality characteristics altered as a result of such further processing. This European Standard is not intended for aerospace and pressure purposes. For steels and alloys with similar chemical composition, but intended for different applications, see the Bibliography.</p>	<p><b>Scope:</b></p> <p>This European Standard covers the grades of wrought steels and alloys listed in Tables 1 and 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. Also heat resisting grades given in EN 10095 may be used for similar applications if so agreed. 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. 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. This European Standard does not apply to components manufactured by further processing the product forms listed in with quality characteristics altered as a result of such further processing. This European Standard is not intended for aerospace and pressure purposes. For steels and alloys with similar chemical composition, but intended for different applications, see the Bibliography.</p>
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**Võtmesõnad:** chemical composition, cobalt alloys, definition, definitions, designations, high temperature, marking, mechanical properties, nickel alloys, production, specification (approval), specifications, steels, testing

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English version

## Creep resisting steels, nickel and cobalt alloys

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

Hochwarmfeste Stähle, Nickel- und Kobaltlegierungen

This European Standard was approved by CEN on 1 March 2002.

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 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 Management Centre 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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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## Foreword

This document EN 10302:2002 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 November 2002, and conflicting national standards shall be withdrawn at the latest by November 2002.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association. This European Standard is considered to be a supporting standard to those application and product standards which in themselves support an essential safety requirement of a New Approach Directive and which make reference to this European Standard.

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.

The annexes A to D are informative.

This European Standard contains a Bibliography.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

**1.1** This European Standard covers the grades of wrought steels and alloys listed in Tables 1 and 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.

Also heat resisting grades given in EN 10095 may 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 is not intended 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

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 (including amendments).

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 test at elevated temperature.*

EN 10020, *Definition and classification of grades of steel.*

EN 10021, *General technical delivery requirements for steels and iron products.*

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

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

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

EN 10079, *Definition of steel products.*

EN 10095, *Heat resisting steels and nickel alloys.*

EN 10163-2:1991, *Delivery requirements for surface condition of hot rolled steel plates, wide flats and sections - Part 2: Plate and wide flats.*

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

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

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

prEN 10168, *Steel products – Inspection documents – List of information and description*.

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 European Standard, the following term and definition apply in addition to the terms and definitions in EN 10020, EN 10021, EN 10052, EN 10079, EN ISO 377 and ISO 14284.

#### 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 high creep strength or high 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 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 resistant and high temperature or heat resistant nickel and cobalt alloys.