# SLOVENSKI STANDARD

**SIST EN 10028-1:2001**

**01-november-2001**

**Nadomeġļa:**

**SIST EN 10028-1:1996**

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**Ploġļ ati jekleni izdelki za tlaļ ne posode - 1. del: Sploġne zahteve**

Flat products made of steels for pressure purposes - Part 1: General requirements

Flacherzeugnisse aus Druckbehälterstählen - Teil 1: Allgemeine Anforderungen

Produits plats en aciers pour appareils a pression - Partie 1: Prescriptions générales



**Ta slovenski standard je istoveten z:** **EN 10028-1:2000**



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**ICS:**

77.140.30

77.140.50

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 10028-1

April 2000

ICS 77.140.30; 77.140.50

Supersedes EN 10028-1:1992

English version

# Flat products made of steels for pressure purposes - Part 1: General requirements

Produits plats en aciers pour appareils à pression - Partie 1: Prescriptions générales

Flacherzeugnisse aus Druckbehälterstählen - Teil 1: Allgemeine Anforderungen

This European Standard was approved by CEN on 29 October 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**



Ref. No. EN 10028-1:2000 E

**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 supersedes EN 10028-1:1992 considering further standards of the EN 10028 series.

The other parts of this European Standard are:

Part 2: Non-alloy and alloy steels with specified elevated temperature properties

Part 3: Weldable fine grain steels, normalized

Part 4: Nickel-alloy steels with specified low temperature properties

Part 5: Weldable fine grain steels, thermomechanically rolled

Part 6: Weldable fine grain steels, quenched and tempered

Part 7: Stainless steels

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 2000, and conflicting national standards shall be withdrawn at the latest by October 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 EN 10028-1 specifies the general technical delivery conditions for flat products used principally for the construction of pressure equipments.

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.

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|---|---|
| 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) |
| EN 10002-5 | Metallic materials - Tensile testing - Part 5: Method of test at elevated temperatures |
| EN 10020 | Definition and classification of grades of steel |
| EN 10021 | General technical delivery conditions for steel and steel 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 10028-7 | Flat products made of steels for pressure purposes - Part 7: Stainless steels |
| EN 10029 | Hot rolled plates 3 mm thick or above - Tolerances on dimensions, shape and mass |
| EN 10045-1 | Metallic materials - Charpy impact test - Part 1: Method of test |
| EN 10048 | Hot rolled narrow steel strip; tolerances on dimensions and shape |
| EN 10051 | Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels - Tolerances on dimensions and shape |
| EN 10052 | Vocabulary of heat treatment terms for ferrous products |
| EN 10079 | Definitions of steel products |
| EN 10088-1 | Stainless steels - Part 1: List of stainless steels |

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|---|---|
| EN 10160 | Ultrasonic testing of steel flat product of thickness equal to or greater than 6 mm (reflection method) |
| EN 10163-2 | Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections - Part 2: Plates and wide flats |
| EN 10164 | Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions |
| EN 10168[1] | Iron and steel products - Inspection documents- List and description of the information |
| EN 10204 | Metallic products - Types of inspection documents (includes amendment A1:1995) |
| EN 10258 | Cold-rolled stainless steel narrow strip and cut lengths - Tolerances on dimensions and shape |
| EN 10259 | Cold-rolled stainless steel wide strip and plate/sheet - Tolerances on dimensions and shape |
| EN ISO 377 | Steel and steel products - Location and preparation of samples and test pieces for mechanical testing (ISO 377:1997) |
| EN ISO 3651-2 | Determination of resistance to intergranular corrosion of stainless steels - Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels - Corrosion test in media containing sulfuric acid (ISO 3651-2:1998) |
| EN ISO 2566-1 | Steel - Conversion of elongation values - Part 1: Carbon and low alloy steels (ISO 2566-1:1984) |
| EN ISO 2566-2 | Steel - Conversion of elongation values - Part 2: Austenitic steels *(ISO 2566-2:1984)* |
| ISO 14284 | Steel and iron - Sampling and preparation of samples for the determination of chemical composition |



## 3 Definitions



For the purpose of this European Standard the definitions in

- EN 10020 for classification of steels,

[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.

- EN 10079 for product forms and
- EN 10052 for types of heat treatment

apply.

3.1 deviates from EN 10052, and 3.2 is additional to EN 10052. The following are defined:

**3.1** Normalizing rolling is a rolling process in which the final deformation process is carried out in a certain tempera-ture range leading to a material condition equivalent to that obtained after normalizing so that the specified values of the mechanical properties are retained even after normalizing. The symbol for this delivery condition and for the normalized condition is N.

**3.2** Additionally to the definitions for thermomechanical treatment and quenching and tempering the following should be noted:

NOTE 1: Thermomechanical rolling (symbol M) may include processes of increased cooling rates with or without tempering including self-tempering but excluding definitively direct quenching and tempering.

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

**3.3 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 below.

**4.1** For non-continuously hot-rolled flat products, refer to EN 10029.

•• Unless otherwise agreed at the time of enquiry and order, class B as specified in EN 10029 applies to the tolerance on thickness of plates.



**4.2** For continuously hot-rolled coil or sheet/plate cut from coils (rolled width 600 mm or above) and hot-rolled slit coil in widths less than 600 mm, refer to EN 10051.



**4.3** For hot-rolled narrow strip (rolled width less than 600 mm) refer to EN 10048.

**4.4** For stainless cold-rolled sheet/plate, cold-rolled coil and slit coil (rolled width 600 mm or above) refer to EN 10259 and for stainless cold-rolled coil and slit coil in rolled widths less than 600 mm refer to EN 10258.

NOTE: EN 10258 and EN 10259 contain options providing wider dimensional choice.

## 5 Calculation of mass

A density of 7,85 kg/dm³ shall be used as the basis for the calculation of the nominal mass from the nominal dimensions of all steels of EN 10028-2 to EN 10028-6. For density of austenitic corrosion-resisting steels, see annex A of EN 10088-1. For density of austenitic creep-resisting steels, see annex A of EN 10028-7.

## 6 Classification and designation

### 6.1 Classification

**6.1.1** The classification of the steel grades in accordance with EN 10020 is given in the specific parts of EN 10028.

**6.1.2** Steels covered in EN 10028-7 are additionally classified according to their structure into

- ferritic steels,
- martensitic steels,
- austenitic steels,
- austenitic-ferritic steels.

NOTE: For more details see EN 10088-1.

### 6.2 Designation

The steel grades specified in the individual parts of EN 10028 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.

## 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;

b) the type of flat product;

c) the European Standard specifying the tolerances on dimensions, shape and mass (see clause 4) 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 steel name or number;

g) the delivery condition, if it differs from the usual condition specified in the individual parts of EN 10028; for stainless steels - the process route selected from the relevant table of EN 10028-7;

h) inspection document to be issued (see 9.1.1).

### 7.2 Options

A number of options are specified in this part of EN 10028 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 products shall be supplied in accordance with the basic specification (see 7.1).

a) Deviating tolerance class (see 4.1);
b) Specification of the steelmaking process (see 8.1.1);
c) Mechanical properties after additional heat treatment (see 8.4.1);
d) Specification of special classes for the reduction of area (see 8.4.2);
e) Additional tests (see 9.2.2);
f) Deviating frequency of testing (see 10.1.1 and 10.1.3);
g) Deviating delivery condition (see 10.2.1.3);
h) Use of longitudinal test pieces for the impact test (see 10.2.2.3);
i) Specification of an analytical method (see 11.1);
j) Temperature of the tensile test at elevated temperature (see 11.3);
k) Deviating testing temperature for the impact test (see 11.4);
l) Marking method (see 12.1);
m) Special marking (see 12.2 and 12.3);
n) Information to be given by marking (see table 1).



## 8 Requirements

### 8.1 Steelmaking process



**8.1.1** •• Unless a special steelmaking process has been agreed at the time of enquiry and order, the steelmaking process for steels in accordance with this European Standard shall be at the discretion of the manufacturer.

**8.1.2** Steels other than stainless steels shall be fully killed.