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Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip for general purposes

Nichtrostende Stähle - Teil 2: Technische Lieferbedingungen für Blech und Band für allgemeine Verwendung

Aciers inoxydables - Partie 2: Conditions techniques de livraison des tôles et bandes pour usage général

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ICS:

77.140.20	Visokokakovostna jekla	Stainless steels
77.140.50	Ú[z æå\ ^} å å^ \ å][å å^ \ å	Flat steel products and semi-products

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EUROPEAN STANDARD

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NORME EUROPÉENNE

EUROPÄISCHE NORM

April 1995

ICS 77.140.20; 77.140.50

Descriptors: iron- and steel products, hot rolled products, cold rolled products, stainless steels, metal plates, steel strips, delivery, designation, dimensions, dimensional tolerances, chemical composition, grades : quality, classifications, mechanical properties, tests, marking

English version

**Stainless steels - Part 2: Technical delivery
conditions for sheet/plate and strip for general
purposes**

iTeh STANDARD PREVIEW

Aciers inoxydables - Partie 2: Conditions
techniques de livraison des tôles et bandes
pour usage général

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CEN

European Committee for Standardization
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Foreword

This European Standard has been prepared by SC 1 "Stainless steels" of Technical Committee ECISS/TC 23 "Steels for treatment, alloy steels and free-cutting steels - Qualities" of which the secretariat is held by DIN.

This European Standard replaces:

EU 88-2:1986 Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip for general purposes

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of an identical text or by endorsement, at the latest by October 1995, and conflicting national standards shall be withdrawn at the latest by October 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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1 Scope

1.1 This part of EN 10 088 specifies the technical delivery conditions for hot or cold rolled sheet/plate and strip of standard grades and special grades of stainless steels for general purposes.

NOTE:

Here and in the following are understood

- under the term "general purposes" purposes other than the special purposes mentioned in Annex C;
- under the term "standard grades" grades with a relative good availability and a wider range of application;
- under the term "special grades" grades for special use and/or with limited availability.

1.2 The general technical delivery conditions specified in EN 10 021 apply in addition to the specifications of this European Standard, unless otherwise specified in this European Standard.

1.3 This European Standard does not apply to components manufactured by further processing the product forms listed in 1.1 with quality characteristics altered as a result of such further processing.

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.

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 10003-1 ¹⁾	Metallic materials - Hardness test - Brinell - Part 1: Test method

¹⁾ At present at the stage of draft.

EURONORM 5 ²⁾	Vickers hardness test for steel
EURONORM 18 ²⁾	Selection and preparation of samples and test pieces for steel and iron and steel products
EN 10021	General technical delivery requirements for steel and steel 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 10045-1	Metallic materials - Charpy impact test - Part 1: Method of test
EN 10052	Vocabulary of heat treatment terms for ferrous products
EN 10079	Definition of steel products
EN 10088-1	Stainless steels - Part 1: List of stainless steels
EN 10109-1	Metallic materials - Hardness test - Part 1: Rockwell methods (scales A, B, C, D, E, F, G, H, K) and methods N and T (scales 15N, 30N, 45N, 15T, 30T, 45T) <small>https://standards.iteh.ai/catalog/standards/sist/01f54591-d856-48a8-b318-3376911012/sist-en-10088-2-1997</small>
EURONORM 114 ²⁾	Determination of the resistance to intergranular corrosion of austenitic stainless steels: corrosion test in a sulphuric acid-copper sulphate medium (Monypenny-Strauss test)
EN 10163-1	Delivery requirements for surface condition of hot rolled steel plates, wide flats and sections - Part 1: General requirements
EN 10163-2	Delivery requirements for surface condition of hot rolled steel plates, wide flats and sections - Part 2: Plates and wide flats

²⁾ It may be agreed at the time of ordering, until this EURONORM has been adopted as a European Standard, that either this EURONORM or a corresponding national standard should be applied.

- EURONORM 168²⁾ Iron and steel products
 - Inspection documents
 - Contents
- EN 10204 Metallic products - Types of inspection documents
- See also Annex B.

3 Definitions

3.1 Stainless steels

The definition in EN 10088-1 applies.

3.2 Product forms

The definitions in EN 10079 apply.

3.3 Types of heat treatment

The definitions in EN 10052 apply.

4 Dimensions and tolerances on dimensions

The dimensions and the tolerances on dimensions are to be agreed at the time of enquiry and order, as far as possible with reference to the dimensional standards listed in Annex B. EN 10029 shall normally only be applied for product form P (individually rolled plates, "quarto plates") and not for product form H (continuously rolled strip and plate), for which EN 10051 is to be applied. When applying EN 10029, thickness tolerance class A shall apply, unless specifically agreed otherwise at the time of enquiry and order.

5 Calculation of mass and tolerances on mass

5.1 When calculating the nominal mass from the nominal dimensions the values given in EN 10088-1 shall be used as a basis for the density of the steel concerned.

5.2 If the tolerances on mass are not specified in the dimensional standard listed in Annex B, they may be agreed at the time of enquiry and order.

²⁾ See page 5

6 Designation and ordering

6.1 Designation of steel grades

The steel names and steel numbers (see Tables 1 to 4) were formed in accordance with EN 10027-1 and EN 10027-2 respectively.

6.2 Designation to be used on ordering

The complete designation for ordering a product according to this European Standard shall contain the following information:

- the desired quantity;
- the type of manufacture (hot rolled or cold rolled) and the product form (strip or sheet/plate);
- where an appropriate dimensional standard is available (see Annex B) the number of the standard, plus any choice of requirements;
if there is no dimensional standard, the nominal dimensions and tolerances required;
- the type of material (steel);
- the number of this European Standard;
- the steel name or steel number;
- if for the relevant steel in the table for the mechanical properties more than one treatment condition is covered, the symbol for the desired heat treatment or cold worked condition;
- the desired process route (see symbols in Table 6);
- if an inspection document is required, its designation acc. to EN 10204. <https://standards.iteh.ai/catalog/standards/sist/01f54591-d856-48a8-b318-33e7681e4912/sist-en-10088-2-1997>

Example:

10 plates of a steel grade with the name X5CrNi18-10 and the number 1.4301 as specified in EN 10088-2 with nominal dimensions, thickness = 8 mm, width = 2000 mm, length = 5000 mm; tolerances on dimensions, shape and mass as specified in EN 10029 with thickness tolerance class A and "normal" flatness tolerance class, in process route 1D (see table 6), inspection document 3.1.B as specified in EN 10204:

10 plates EN 10029-8A x 2000 x 5000
 Steel EN 10088-2 - X5CrNi18-10+1D
 Inspection document 3.1.B
 or
 10 plates EN 10029-8A x 2000 x 5000
 Steel EN 10088-2 - 1.4301+1D
 Inspection document 3.1.B

7 Classification of grades

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

- ferritic steels,
- martensitic steels,
- precipitation hardening steels,
- austenitic steels,
- austenitic-ferritic steels.

See also NOTE in 1.1 and Annex B to EN 10088-1.

8 Requirements

8.1 Production process

Unless a special steel-making process is agreed when ordering, the steel-making process for steels conforming to this European Standard shall be at the discretion of the manufacturer.

8.2 Delivery condition

The products shall be supplied in the delivery condition agreed in the order by reference to the process route given in Table 6 and, where different alternatives exist, to the treatment conditions given in Tables 7 to 11 and 18 (see also Annex A).

8.3 Chemical composition

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8.3.1 The chemical composition requirements given in Tables 1 to 4 apply in respect of the chemical composition according to the cast analysis.

8.3.2 The product analysis may deviate from the limiting values for the cast analysis given in Tables 1 to 4 by the values listed in Table 5.

8.4 Chemical corrosion properties

Referring to resistance to intergranular corrosion as defined in EURONORM 114, for ferritic, austenitic and austenitic-ferritic steels the specification in Tables 7, 10 and 11 apply.

NOTE 1: EURONORM 114 is not applicable for testing martensitic and precipitation hardening steels.

NOTE 2: The corrosion resistance of stainless steels is very dependant on the type of environment and can therefore not always be clearly ascertained through laboratory tests. It is therefore advisable to draw on the available experience of the use of the steels.

8.5 Mechanical properties

8.5.1 The mechanical properties at room temperature as specified in Tables 7 to 11 apply for the relevant specified heat treatment condition. This does not apply to the process route 1U (hot rolled, not heat treated, not descaled).

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 Tables 7, 8, 9, 10 and 11 shall be obtainable from reference test pieces which have received the appropriate heat treatment (simulated heat treatment).

For cold worked products, the mechanical properties at room temperature as specified in Table 17 apply. The availability of steel grades in the cold worked condition is indicated in Table 18.

NOTE: 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.

8.5.2 The values in Tables 12 to 16 apply for the 0,2 % and 1 % proof strength at elevated temperatures.

8.6 Surface quality

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

When products are delivered in coil form, the degree and extent of such imperfections may be expected to be greater, due to the impracticability of removing short lengths of coil. For hot-rolled quarto-plates (symbol P in tables 7 to 11), the specifications in EN 10163-2, class A3, apply unless otherwise agreed. For other products, where necessary, more precise requirements on surface quality may be agreed at the time of enquiry and order.

8.7 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 Testing

9.1 General

The manufacturer shall carry out appropriate process control, inspection and testing to assure himself that the delivery complies with the requirements of the order.

This includes the following:

- A suitable frequency of verification of the dimensions of the products.
- An adequate intensity of visual examination of the surface quality of the products.
- An appropriate frequency and type of test to ensure that the correct grade of steel is used.

The nature and frequency of these verifications, examinations and tests is determined by the manufacturer, in the light of the degree of consistency that has been determined by the evidence of the quality system. In view of this, verifications by specific tests for these requirements are not necessary unless otherwise agreed.

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9.2 Agreement on tests and inspection documents

9.2.1 At the time of ordering the issue of one of the inspection documents in accordance with EN 10204 may be agreed for each delivery.

9.2.2 If it is agreed to issue a test report 2.2 in accordance with EN 10204 it shall indicate the following information:

- a) the information groups A, B and Z of Euronorm 168;
- b) the results of the cast analysis in accordance with the code numbers C71 to C92 in Euronorm 168.

9.2.3 If the issuing of an inspection certificate 3.1.A, 3.1.B or 3.1.C according to EN 10204 or of an inspection report 3.2 according to EN 10204 has been agreed, specific inspections according to 9.3 are to be carried out and the following informations shall be given in the inspection document with the code numbers and details required by EURONORM 168:

- a) } As under 9.2.2 a) and b)
- b)

- c) The results of the mandatory tests marked in Table 19, second column, by a m.
- d) The result of any optional test or inspections agreed when ordering.

9.3 Specific inspection and testing

9.3.1 Extent of testing

The tests to be carried out, either mandatorily (m) or by agreement (o) and the composition and size of the test units, and the number of sample products, samples and test pieces to be taken are given in Table 19.

9.3.2 Selection and preparation of samples and test pieces

9.3.2.1 The specifications of Euronorm 18 shall be observed in sampling and sample preparation. The stipulations in 9.3.3.2 apply additionally for the mechanical tests.

9.3.2.2 The test samples for the tensile test shall be taken in accordance with Figure 1 in such a way that they are located halfway between the centre and a longitudinal edge. If it has been agreed that impact tests shall be carried out, the test samples shall be taken from the same location.

The samples shall be taken from products in the delivery condition. If agreed, the samples may be taken before flattening. For samples to be given a simulated heat treatment the conditions for annealing, hardening and tempering shall be agreed.

9.3.2.3 Samples for the hardness test and for the resistance to intergranular corrosion test, where requested, shall be taken from the same locations as those for the mechanical tests. For direction of bending the test piece in the resistance to intergranular corrosion test, see Figure 2.

9.4 Test methods

9.4.1 Unless otherwise agreed when ordering, the choice of a suitable physical or chemical method of analysis to determine the product analysis is at the discretion of the manufacturer. In cases of dispute the analysis shall be carried out by a laboratory approved by the two parties. The method of analysis to be used shall be agreed, where possible with reference to appropriate European Standards or EURONORMS.