



SLOVENSKI STANDARD SIST EN 10137-1:1997

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Plates and wide flats made of high yield strength structural steels in the quenched and tempered or precipitation hardened conditions - Part 1: General delivery conditions

Blech und Breitflachstahl aus Baustählen mit höherer Streckgrenze im vergüteten oder im ausscheidungsgehärteten Zustand - Teil 1: Allgemeine Lieferbedingungen

Tôles et larges plats en aciers de construction a haute limite d'élasticité a l'état trempé et revenu ou durci par précipitation - Partie 1: Conditions générales de livraison

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ICS:

77.140.10	Jekla za toplotno obdelavo	Heat-treatable steels
77.140.50	Ú[[z aã\ ^} ãã á^ \ ãã][[ã á^ \ ãã	Flat steel products and semi-products

SIST EN 10137-1:1997 **en**

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

September 1995

ICS 77.140.10; 77.140.50

Descriptors: iron and steel products, metal plates, wide flats, steels, structural steels, high yield strength steels, delivery conditions, chemical composition, grades, quality, classifications, designation, mechanical characteristics, inspection, tests, marking

English version

Plates and wide flats made of high yield strength structural steels in the quenched and tempered or precipitation hardened conditions - Part 1: General delivery conditions

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Tôles et larges plats en aciers de construction à haute limite d'élasticité à l'état trempé et revenu ou durci par précipitation - Partie 1: Conditions générales de livraison

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Blech und Breitflachstahl aus Baustählen mit höherer Streckgrenze im vergüteten oder im ausscheidungsgehärteten Zustand - Teil 1: Allgemeine Lieferbedingungen

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Contents

	page
Foreword	3
1 Scope	4
2 Normative references	4
2.1 General standards	4
2.2 Standards on dimensions and tolerances	5
2.3 Standards on testing	5
3 Definitions	6
4 Information to be supplied by the purchaser	6
4.1 General	6
4.2 Options	6
5 Dimensions, mass and tolerances	7
5.1 Dimensions and tolerances	7
5.2 Mass of steel	7
6 Classification and designation	7
6.1 Classification	7
6.2 Designation	7
7 Technical requirements	8
7.1 Steel manufacturing process	8
7.2 Delivery condition	8
7.3 Chemical composition	8
7.4 Mechanical properties	9
7.5 Technological properties	10
7.6 Surface finish	11
7.7 Internal soundness	11
8 Inspection and testing	11
8.1 General	11
8.2 Sampling	11
8.3 Test units	11
8.4 Verification of chemical composition	12
8.5 Preparation of samples and test pieces	12
8.6 Test methods	13
8.7 Retests and resubmission for testing	14
8.8 Inspection documents	14
9 Marking	14
10 Disputes	15
11 Options	15
Annex A (normative) Location of test pieces	18
Annex B (informative) List of national standards which correspond with EURONORMS referenced	19



Foreword

This European Standard has been prepared by the Technical Committee ECISS/TC 10 "Structural steel - Qualities", the secretariat of which is held by NNI.

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 Mars 1996, and conflicting national standards shall be withdrawn at the latest by Mars 1996.

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 European Standard specifies requirements for plates and wide flats of high yield strength alloy special steels. Part 1 of this European Standard specifies the general delivery conditions. Part 2 of this European Standard specifies the delivery conditions for quenched and tempered steels in the grades and qualities given in table 1 (chemical composition) and tables 2 and 3 (mechanical properties) of Part 2. Part 3 of this European Standard specifies the delivery conditions for precipitation hardened steels in the grades and qualities given in table 1 (chemical composition) and tables 2 and 3 (mechanical properties) of Part 3.

The steels specified in this European Standard are especially intended for use in heavily loaded parts of welded structures such as bridges, flood gates, storage tanks, water supply tanks, buildings, crane structures, etc. for service at ambient and low temperatures.

- 1.2 This European Standard does not apply to products for pressure vessels and products for which other EURONORMS exist or European Standards dealing with steels for general structural applications exist or are being prepared:

- Hot-rolled products of non-alloy structural steels - (see EN 10025).
- Semi-finished products for forging in general purpose structural steels - (see EURONORM 30).
- Weldable fine grain structural steels - (see EN 10113 Parts 1 - 3).
- Structural steels with improved atmospheric corrosion resistance - (see EN 10155).
- Flat products in high yield strength steels for cold forming - wide flats, sheet/plate, wide and narrow strip - (see EN 10149 Parts 1 - 3).
- Steels for shipbuilding - normal and high strength qualities - (see EURONORM 156).
- Hot finished structural hollow sections (see EN 10210-1).

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.

2.1 General standards

EN 10020	Definition and classification of grades of steels
EN 10021	General technical delivery requirements 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 10052	Vocabulary of heat treatment terms for ferrous products
EN 10079	Definitions of steel products
EN 10163	Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections - Part 1: General requirements 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 10204	Metallic products - Types of inspection documents
EURONORM 168 (1986) ¹⁾	Iron and steel products - Inspection documents - Contents
ECSC IC 2 (1983) ¹⁾	Weldable fine-grained structural steels - Recommendations for processing, in particular for welding
ECISS IC 10	Designation systems for steel - Additional symbols for steel names

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2.2 Standards on dimensions and tolerances

EN 10029	Hot-rolled plates 3 mm thick or above - Tolerances on dimensions, shape and mass
EN 10048	Hot-rolled narrow steel strip - Tolerances on dimensions and shape
EN 10051	Continuously hot-rolled non-coated sheet and strip of non-alloy and alloy steels - Tolerances on dimensions and shape
EURONORM 91 (1981) ¹⁾	Hot-rolled wide flats - Tolerances on dimensions, shape and mass

2.3 Standards on testing

EN 10002-1	Metallic materials - Tensile testing - Part 1: Method of test (at ambient temperature)
EN 10045-1	Metallic materials - Charpy impact test - Part 1: Test method
EURONORM 18 (1979) ¹⁾	Selection and preparation of samples and test pieces for steel and iron and steel products
EURONORM 103 (1971) ¹⁾	Microscopic determination of the ferritic and austenitic grain size of steel
EURONORM 160 (1985) ¹⁾	Manual ultrasonic testing of plate in thickness ≥ 6 mm (reflection method)
ISO 2566-1 (1984)	Steel - Conversion of elongation values - Part 1: Carbon and low alloy steels

1) Until these EURONORMS are transformed into European Standards, they can either be implemented or reference made to the corresponding national standards, the list of which is given in Annex B to this European Standard.

3 Definitions

For the purposes of this European Standard the following definitions apply.

- 3.1 Alloy special steel as defined in EN 10020.
- 3.2 Plates and wide flats as defined in EN 10079.
- 3.3 Heat treatment terms as defined in EN 10052.
- 3.3.1 **Quenching:** Operation which consists of cooling a ferrous product more rapidly than in still air.
- 3.3.2 **Tempering:** Heat treatment applied to a ferrous product generally after quench hardening or other heat treatment to bring the properties to the required level.

It consists of heating to specific temperatures ($< A_{c1}$) and soaking one or more times followed by cooling at an appropriate rate.

- 3.3.3 **Precipitation hardening:** Hardening of a ferrous product caused by the precipitation of one or more compounds from a supersaturated solid solution.

- 4 **Information to be supplied by the purchaser**
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- 4.1 **General**

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

- a) details of the product form and quantity;
- b) reference to this European Standard;
- c) nominal dimensions and tolerances (see 5.1);
- d) the grade, quality and delivery condition of the steel (see Parts 2 and 3 of this European Standard);
- e) type of inspection document (see 8.8).

Where no specific choice is made by the purchaser concerning a), b), c), d) and e) the supplier shall refer back to the purchaser.

4.2 Options

A number of options are specified in clause 11. In the event that the purchaser does not indicate his wish to implement any of these options, the supplier shall supply in accordance with the basic specification.

5 Dimensions, mass and tolerances

5.1 Dimensions and tolerances

Dimensions and tolerances shall be in accordance with the relevant European Standards and EURONORMS (see 2.2).

5.2 Mass of steel

The calculated mass shall be determined using a volumetric mass of 7,85 kg/dm³.

6 Classification and designation

6.1 Classification

6.1.1 Classification

The steel grades specified in Parts 2 and 3 of this European Standard are alloy special steels according to EN 10020.

6.1.2 Grades and qualities

The steels for plates and wide flats specified in Parts 2 and 3 of this European Standard are subdivided into grades on the basis of the minimum specified yield strength at ambient temperature. All the grades in Parts 2 and 3 of this European Standard can be delivered in the qualities on the basis of the impact test requirements as specified in Parts 2 and 3 of this European Standard.

6.2 Designation

6.2.1 For the steel grades covered by this European Standard the steel names are allocated in accordance with EN 10027-1 and ECISS IC 10; the steel numbers are allocated in accordance with EN 10027-2.

6.2.2 The designation shall consist of the number of this European Standard (EN 10137-2 or EN 10137-3) followed by either the steel number or:

- the symbol S;
- the indication of the minimum specified yield strength for thickness ≤ 50 mm expressed in N/mm²;
- the symbol for the delivery condition (Q or A) (see Parts 2 and 3 of this European Standard)
- the symbol for the quality (L or L1, see 6.1.2 of Part 2 and L, see 6.1.2 of Part 3 of this European Standard);

EXAMPLE 1: Structural steels (S) with a specified minimum yield strength at ambient temperature of 460 N/mm² (460) in the quenched and tempered delivery condition (Q) and of quality L:

Steel EN 10137-2 - 1.8906

or

Steel EN 10137-2 - S460QL

EXAMPLE 2: Structural steels (S) with a specified minimum yield strength at ambient temperature of 500 N/mm² (500) in the precipitation hardened delivery condition (A) and of quality L:

Steel EN 10137-3 - 1.8980
or
Steel EN 10137-3 - S500AL

7 Technical requirements

7.1 Steel manufacturing process

7.1.1 The steel manufacturing process shall be at the manufacturer's option. If specified at the time of the enquiry and order the steel manufacturing process shall be reported to the purchaser. See clause 11, option 1.

7.1.2 The steels specified in this European Standard shall be fully killed. The steels shall have a fine grain structure containing nitrogen binding elements in amounts sufficient to bind the available nitrogen.

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7.2 Delivery condition (standards.iteh.ai)

7.2.1 Quenched and tempered steel SIST EN 10137-1:1997

The delivery condition for quenched and tempered steel for flat products as defined in clause 3 is given in Part 2 of this European Standard.

7.2.2 Precipitation hardened steel

The delivery condition for precipitation hardened steel for flat products as defined in clause 3 is given in Part 3 of this European Standard.

7.3 Chemical composition

7.3.1 The chemical composition determined by ladle analysis shall comply with the values in Parts 2 and 3 of this European Standard.

7.3.2 The values for the chemical composition as specified in Parts 2 and 3 of this European Standard are the permitted limits or ranges, between which the various steel grades are delivered. The manufacturer shall inform the purchaser at the time of the enquiry and order which of the alloying elements appropriate to the steel grade required will be deliberately added to the material to be delivered.

7.3.3 The product analysis shall be carried out when specified at the time of the enquiry and order. See clause 11, option 2.

7.3.4 The permissible deviations of the product analysis from the specified limits of the ladle analysis shall be as given in table 1.

7.4 Mechanical properties

7.4.1 General

7.4.1.1 Under the inspection and testing conditions as specified in clause 8 and in the delivery condition as specified in 7.2 the mechanical properties shall comply with the relevant requirements of Parts 2 and 3 of this European Standard.

NOTE: If the purchaser intends to stress relief anneal the products, he should contact the manufacturer for the tempering temperature. The purchaser shall stress relief anneal at least 30 °C below the tempering temperature. Stress relief annealing above this temperature or for over 1 hour may lead to a deterioration of the mechanical properties. If the purchaser intends to stress relief anneal the products at higher temperatures or for longer times the minimum values of the mechanical properties after such a treatment should be agreed at the time of the enquiry and order.

7.4.1.2 For the products specified in Parts 2 and 3 of this European Standard the nominal thickness shall apply.

7.4.2 Impact energy

7.4.2.1 The requirements for impact energy refer to longitudinal test pieces, unless otherwise agreed, see 7.4.2.3. Verification shall be carried out at one of the test temperatures given in table 3 of Parts 2 and 3 of this European Standard. If no test temperature is given in the order testing shall be carried out at the lowest specified temperature.

7.4.2.2 If agreed at the time of the enquiry and order transverse impact values as given in table 4 of Parts 2 and 3 of this European Standard shall apply instead of longitudinal values.
See clause 11, option 3.

7.4.2.3 At the time of the enquiry and order other temperatures as given in tables 3 and 4 of Parts 2 and 3 of this European Standard can be agreed.
See clause 11, option 4.

7.4.2.4 If the nominal product thickness is not sufficient for the preparation of full size impact test pieces, test pieces of smaller width shall be taken (see 8.5.2.3) and the applicable values shall be decreased proportionally.
Impact tests are not required for nominal thickness < 6 mm.