# SLOVENSKI STANDARD
# oSIST prEN 10025-1:2014

**01-julij-2014**

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**Vroče valjani izdelki iz konstrukcijskih jekel - 1. del: Splošno**

Hot rolled products of structural steels - Part 1: General

Warmgewalzte Erzeugnisse aus Baustählen - Teil 1: Allgemeines

Produits laminés à chaud en aciers de construction - Partie 1 : Générales



**Ta slovenski standard je istoveten z:** **prEN 10025-1**

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**ICS:**

| | | |
|---|---|---|
| 77.140.10 | Jekla za toplotno obdelavo | Heat-treatable steels |
| 77.140.50 | Ploščati jekleni izdelki in polizdelki | Flat steel products and semi-products |

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EUROPEAN STANDARD

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**WHITE DRAFT**
**prEN 10025-1**

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ICS 77.140.10; 77.140.50

Will supersede EN 10025-1:2004

English Version

# Hot rolled products of structural steels - Part 1: General

Produits laminés à chaud en aciers de construction - Partie 1 : Générales

Warmgewalzte Erzeugnisse aus Baustählen - Teil 1: Allgemeines

This draft European Standard is submitted to ECISS/COCOR before submission to CEN members for formal vote. It has been drawn up by the Technical Committee ECISS/TC 103.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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-CENELEC Management Centre has the same status as the official versions.



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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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# Foreword

This document (prEN 10025-1:2014) has been prepared by Technical Committee ECISS/TC 103 “Structural steels other then reinforcements”, the secretariat of which is held by DIN.

This document is currently submitted to the COCOR Vote.

This document 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)/EU Regulation(s).

For relationship with EU Directive(s)/EU Regulation(s), see informative Annex ZA, which is an integral part of this document.

This document will supersede EN 10025-1:2004.

The main changes with respect to the previous edition are listed below:

— document completely revised taking into account requirements of the Regulation (EU) 305/2011.

EN 10025 consists of the following parts:

*Part 1: General*



*Part 2: Technical delivery conditions for non-alloy structural steels*

*Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*



*Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels*

*Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance*

*Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition*

# 1 Scope

This document specifies product characteristics, test methods and performance criteria for flat (plates, strips, sheets, wide flats) and long (sections, bars, rod) products of hot rolled structural steels excluding structural hollow sections and tubes.

The steels specified in this document are intended for use in welded, bolted and riveted structures.

This document does not apply to coated products.

# 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.

## 2.1 General standards

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

prEN 10025-2:2014, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

prEN 10025-3:2014, *Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*



prEN 10025-4:2014, *Hot rolled products of structural steels - Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels*

prEN 10025-5:2014, *Hot rolled products of structural steels - Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance*



prEN 10025-6:2014, *Hot rolled products of structural steels - Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition*

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

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

EN 10079:2007, *Definition of steel products*

## 2.2 Standards on dimensions and tolerances (see 4.2)

EN 10017, *Steel rod for drawing and/or cold rolling - Dimensions and tolerances*

EN 10024, *Hot rolled taper flange I sections - Tolerances on shape and dimensions*

EN 10029, *Hot rolled steel plates 3 mm thick or above - Tolerances on dimensions and shape*

EN 10034, *Structural steel I and H sections - Tolerances on shape and dimensions*

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 10055, *Hot-rolled steel equal flange tees with radiused root and toes - Dimensions and tolerances on shape and dimensions*

EN 10056-1, *Structural steel equal and unequal leg angles - Part 1: Dimensions*

EN 10056-2, *Structural steel equal and unequal leg angles - Part 2: Tolerances on shape and dimensions*

EN 10058, *Hot rolled flat steel bars for general purposes - Dimensions and tolerances on shape and dimensions*

EN 10059, *Hot rolled square steel bars for general purposes - Dimensions and tolerances on shape and dimensions*

EN 10060, *Hot rolled round steel bars - Dimensions and tolerances on shape and dimensions*

EN 10061, *Hot rolled hexagon steel bars - Dimensions and tolerances on shape and dimensions*

EN 10067, *Hot rolled bulb flats - Dimensions and tolerances on shape, dimensions and mass*

EN 10279, *Hot rolled steel channels - Tolerances on shape, dimensions and mass*

### 2.3 Standards on testing

EN 10315, Routine method for analysis of high alloy steel by X-ray Fluorescence Spectrometry (XRF) by using a near by technique

CEN/CR 10320, *Optical emission analysis of low alloy steels (routine method) – Method for determination of C, Si, S, P, Mn, Cr, Ni and Cu*



EN ISO 148-1, *Metallic materials – Charpy pendulum impact test – Part 1: Test method (ISO 148-1:2009)*



EN ISO 377, *Steel and steel products - Location and preparation of samples and test pieces for mechanical testing (ISO 377:2013)*



EN ISO 2566-1, *Steel - Conversion of elongation values - Part 1: Carbon and low alloy steels (ISO 2566-1:1984)*

EN ISO 6892-1:2009, *Metallic materials – Tensile testing – Part 1: Method of testing at room temperature (ISO 6892-1:2009)*

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

EN ISO 15350, *Steel and iron – Determination of total carbon and sulphur content – Infrared absorption method after combustion in an induction furnace (routine method) (ISO 15350:2000)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10079:2007 and the following apply:

**3.1 product range**
means group of products produced by one manufacturer for which the test results for one or more characteristics from any one product within the range are valid for all other products within this range

## 4 Product characteristics

### 4.1 General

The following product characteristics apply when sampling, preparation of test pieces and testing specified in Clauses 5 are carried out.

## 4.2 Dimensions, tolerances on dimensions and shape

Dimensions, tolerances on dimensions and shape shall be in accordance with the requirements given in the relevant documents according to 2.2.

Dimensions, tolerances on dimensions and shape of profiles not covered by a document or hot rolled patterned plates shall be in accordance with a national standard valid in the intended place of use of the product.

## 4.3 Mechanical properties (yield strength, tensile strength, elongation and impact strength)

### 4.3.1 General

Under the inspection and testing conditions as specified in Clauses 5 the yield strength, the tensile strength, the elongation and the impact strength shall comply with the relevant requirements specified in prEN 10025-2 to prEN 10025-6.

### 4.3.2 Impact strength

Using test pieces of width less than 10 mm the minimum values given in prEN 10025-2 to prEN 10025-6 shall be reduced in direct proportion to the cross-sectional area of the test piece.

Impact tests shall not be required for:

— nominal thickness < 6 mm for flat products and sections,

— nominal diameter < 16 mm for products with round cross-section,

— nominal thickness < 12 mm for bars and rod with rectangular cross-section.



See Annex A.



## 4.4 Weldability

General requirements for weldability shall be as given in prEN 10025-2 to prEN 10025-6.

For determining the carbon equivalent value the following IIW (International Institute of Welding) formula shall be used:

$$CEV = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

## 4.5 Durability (chemical composition)

The chemical composition determined by ladle analysis shall comply with the values in the relevant table of prEN 10025-2 to prEN 10025-6.

For elements not defined in tables for the chemical composition for ladle analysis, limit values of Table 1 of EN 10020:2000 shall apply as maximum values.

## 4.6 Dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets. In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction web site on EUROPA accessed through: http://ec.europa.eu/enterprise/construction/cpd-ds/.

# 5 Testing, assessment and sampling methods

## 5.1 Tolerances on dimensions and shape

The verification on dimensions and shape shall be carried out on products to be delivered in conformance with the appropriate standard given in 4.2.

## 5.2 Mechanical properties

### 5.2.1 General

Mechanical properties are determined as follows:

— tensile testing (yield strength, tensile strength, elongation)

— impact testing (impact strength)

### 5.2.2 Test frequency

The test frequency within one year shall be a minimum of:

— 5000 t of steel grade S235;

— 1000 t per steel grade of all other steel grades.



### 5.2.3 Preparation of samples

**5.2.3.1** The following samples shall be taken from one sample product of each test unit:



— one sample for tensile testing;

— one sample sufficient for one set of six impact test pieces.

**5.2.3.2** The samples shall be taken as specified in prEN 10025-2 to prEN 10025-6.

The location of samples shall be as shown in Annex A.

Additionally for plates, sheet, wide strip and wide flats the samples shall be taken so that the axes of the test pieces are approximately midway between the edge and centre line of the products.

For wide strip and rod the sample shall be taken at an adequate distance from the end of the product.

For narrow strip (< 600 mm wide) the sample shall be taken at an adequate distance from the end of the coil and at one third of the width.

### 5.2.4 Preparation of test pieces

#### 5.2.4.1 General

The requirements of EN ISO 377 shall apply.

#### 5.2.4.2 Tensile test pieces

The requirements of EN ISO 6892-1 shall apply.

Test pieces may be non-proportional but in cases of dispute proportional test pieces having a gauge length $L_o$ = 5,65 $\sqrt{S_0}$ shall be used (see 5.2.5.1).

For flat products with a nominal thickness < 3 mm the test pieces shall always have a gauge length $L_o$ = 80 mm and a width of 20 mm (test piece number 2 EN ISO 6892-1:2009, Annex B).

NOTE For bars round test pieces are commonly used but other forms are not prohibited (see EN ISO 6892-1).

#### 5.2.4.3 Impact test pieces

V-notch test pieces shall be machined and prepared in accordance with EN ISO 148-1. In addition the following requirements apply:

a) Flat products and sections:

— for nominal thicknesses > 12 mm, standard 10 mm x 10 mm test pieces shall be machined in such a way that one side is not further away than 2 mm from a rolled surface, unless otherwise specified in prEN 10025-2 to prEN 10025-6;

— for nominal thicknesses ≤ 12 mm, when test pieces with reduced widths are used, the largest width possible has to be chosen.

b) Bars and rod

— for nominal diameter ≥ 16 mm (round cross section) or nominal thickness ≥ 12 mm (rectangular cross section), standard 10 mm x 10 mm test pieces shall be machined;

— for nominal diameter < 16 mm (round cross section) or nominal thickness < 12 mm (rectangular cross section) no impact tests are required, see 4.3.2.



### 5.2.5 Test methods



#### 5.2.5.1 Tensile tests

The tensile test shall be carried out in accordance with EN ISO 6892-1.

For the specified yield strength the upper yield strength ($R_{eH}$) shall be determined.

If a yield phenomenon is not present, the 0,2 % proof strength ($R_{p0,2}$) shall be determined.

In case of dispute, for products of thickness greater than or equal to 3 mm use proportional test pieces of gauge length $L_0$ = 5,65 $\sqrt{S_0}$ . For normal testing, for reasons of economy, test pieces of a constant measuring length may be used provided the result obtained for elongation after fracture is converted by a recognized formula (see EN ISO 2566-1).

#### 5.2.5.2 Impact tests

The impact test shall be carried out in accordance with EN ISO 148-1 on V-notch specimen using 2 mm striker.

The average value of the three test results shall meet the specified requirement. One individual value may be below the minimum average value specified, provided that it is not less than 70 % of that value.

Three additional test pieces shall be taken from the same sample in accordance with 5.2.3.1 and tested in any one of the following cases:

— if the average of three impact values is lower than the minimum average value specified;

— if the average value meets the specified requirement, but two individual values are lower than the minimum average value specified;

— if anyone value is lower than 70 % of the minimum average value specified.

The average value of the six tests shall be not less than the minimum average value specified. Not more than two of the individual values may be lower than the minimum average value specified and not more than one may be lower than 70 % of this value.

#### 5.2.6 Identification of samples and test pieces

Samples and test pieces shall be marked so that the original products and their location and orientation in the product are known.

### 5.3 Chemical composition (durability, weldability)

Test frequency shall be once per cast.

The selection and preparation of samples shall be in accordance with EN ISO 14284.

Test methods shall be in accordance with EN 10315, EN ISO 15350 or CEN/CR 10320 depending on the elements to be analysed and their content.

Values of elements defined in the relevant tables for ladle analysis of prEN 10025-2 to -6 for each cast as well as elements for determining the carbon equivalent value shall be reported.

## 6 Assessment and verification of constancy of performance

### 6.1 General



The compliance of a hot rolled product of structural steels with the requirements of this standard and with the performance declared by the manufacturer in the DoP shall be demonstrated by:



— determination of the product type;

— factory production control by the manufacturer, including product assessment.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance(s).

### 6.2 Type testing

#### 6.2.1 General

The determination of the product type shall be performed for all characteristics included in the standard for which the manufacturer declares performances:

— at the beginning of the production of a new or modified hot rolled product of structural steels (unless a member of the same product range), or

— at the beginning of a new or modified method of production (where this may affect the stated properties), or it shall be repeated for the appropriate characteristic(s), whenever a change occurs in the hot rolled product of structural steel design, in the raw material, or in the method of production process (subject to the definition of a family), which would affect significantly one or more of the characteristics.

Assessment previously performed in accordance with the provisions of this standard, may be taken into account provided that they were made to the same or a more rigorous test method, under the same AVCP system on the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.