

**SLOVENSKI STANDARD**  
**oSIST prEN 10025-2:2014**  
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**Vroče valjani izdelki iz konstrukcijskih jekel - 2. del: Tehnični dobavni pogoji za nelegirana konstrukcijska jekla**

Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels

Warmgewalzte Erzeugnisse aus Baustählen - Teil 2: Technische Lieferbedingungen für unlegierte Baustähle

Produits laminés à chaud en aciers de construction - Partie 2 : Conditions techniques de livraison pour les aciers de construction non alliés

**Ta slovenski standard je istoveten z: prEN 10025-2**

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**ICS:**

77.140.10	Jekla za toplotno obdelavo	Heat-treatable steels
77.140.45	Nelegirana jekla	Non-alloyed steels
77.140.50	Ploščati jekleni izdelki in polizdelki	Flat steel products and semi-products

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

Produits laminés à chaud en aciers de construction - Partie  
2 : Conditions techniques de livraison pour les aciers de  
construction non alliés

Warmgewalzte Erzeugnisse aus Baustählen - Teil 2:  
Technische Lieferbedingungen für unlegierte Baustähle

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.

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

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## Foreword

This document (prEN 10025-2:2014) has been prepared by Technical Committee ECISS/TC 103 “Structural steels other than reinforcements”, the secretariat of which is held by DIN.

This document is currently submitted to the COCOR Vote.

This document will supersede EN 10025-2:2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

The titles of the other Parts of this European Standard are:

*Part 1: General;*

*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.*

SIST EN 10025-2:2019

<https://standards.iteh.ai/catalog/standards/sist/bc1b1cb5-113a-4eb6-8062-c4a4219d3c04/sist-en-10025-2-2019>

## 1 Scope

Part 2 of this document, in addition to Part 1, specifies the technical delivery conditions for flat and long products and semi-finished products which are meant for further processing to flat and long products of hot rolled non-alloy quality steels in the grades and qualities given in Tables 1 to 5 (chemical composition) and Tables 6 to 8 (mechanical properties) in the delivery conditions as given in 6.3. Three engineering steels are also specified in this document (see Tables 2 and 4) (chemical composition) and Table 7 (mechanical properties). This document does not apply to structural hollow sections and tubes (see EN 10210-1 and EN 10219-1).

The technical delivery conditions apply to:

- thicknesses  $\geq 3$  mm and  $\leq 150$  mm for long products of steel grade S460JR, J0, J2, K2 and S500J0;
- thicknesses  $\leq 400$  mm for flat products of qualities JR, J0, J2 and K2;
- thicknesses  $\leq 250$  mm for flat and long products of all other grades and qualities.

Products made of steel grades S185, E295, E335 and E360 cannot be CE marked.

The steels specified in this Part 2 are not intended to be heat treated except products delivered in delivery condition +N. Stress relief annealing is permitted. Products delivered in +N condition can be hot formed and/or normalized after delivery (see Clause 3).

NOTE 1 Semi-finished products which are to be converted to rolled finished products conforming to this document should be the subject of special agreement at the time of the order. The chemical composition can also be agreed at the time of the order, however the values should be within the limits of Tables 1 and 2.

NOTE 2 For certain grades and product forms suitability for particular applications may be specified at the time of the order (see 7.4.2, 7.4.3 and Table 9).

[SIST EN 10025-2:2019](https://standards.iteh.ai/catalog/standards/sist/bc1b1cb5-113a-4eb6-8062-c4a4219d3c04/sist-en-10025-2-2019)

<https://standards.iteh.ai/catalog/standards/sist/bc1b1cb5-113a-4eb6-8062-c4a4219d3c04/sist-en-10025-2-2019>

## 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 1011-2, *Welding – Recommendations for welding of metallic materials - Part 2: Arc welding of ferritic steels*.

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

EN 10021, *General technical delivery conditions for steel products*

prEN 10025-1:2014, *Hot rolled products of structural steels - Part 1: General*

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*

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*

EN 10163-3, *Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections – Part 3: Sections*

EN 10164, *Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions*

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

EN 10204, *Metallic products – Types of inspection documents*

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

EN ISO 14713-2:2009, *Guidelines and recommendations for the protection against corrosion of iron and steel structures – Zinc coating – Part 2: Hot dip galvanizing (ISO 14713-2:2009)*

CEN/TR 10347, *Guidance for forming of structural steels in processing*

## **2.2 Standards on dimensions and tolerances (see 7.7.1)**

EN 10017, *Non-alloy 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*

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## 2.3 Standards on testing

EN 10160, *Ultrasonic testing of steel flat product of thickness equal to or greater than 6 mm (reflection method)*

EN 10306, *Iron and steel - Ultrasonic testing of H beams with parallel flanges and IPE beams*

EN 10308, *Non-destructive testing - Ultrasonic testing of steel bars*

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

EN ISO 643, *Steels – Micrographic determination of the apparent grain size (ISO 643:2003)*

EN ISO 6892-1, *Metallic materials – Tensile testing – Part 1: Method of test 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)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 10025-1:2014 and the following apply.

### 3.1 normalized rolled

rolling process in which the final deformation is carried out in a certain temperature 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

Note 1 to entry The abbreviated form of this delivery condition is +N

Note 2 to entry In international publications for both the normalizing rolling, as well as the thermomechanical rolling, the expression "controlled rolling" may be found. However in view of the different applicability of the products a distinction of the terms is necessary.

### 3.2 as-rolled

conventional hot rolling without any normalized rolling or thermomechanical rolling and/or heat treatment like normalizing or quenching

Note 1 to entry The abbreviated form of this delivery condition is +AR

### 3.3 thermomechanical rolling

rolling process in which the final deformation is carried out in a certain temperature range leading to a material condition with certain properties which cannot be achieved or repeated by heat treatment alone

Note 1 to entry The abbreviated form of this delivery condition is +M.

Note 2 to entry Thermomechanical rolling leading to the delivery condition +M can include processes with an increasing cooling rate with or without tempering including self-tempering but excluding direct quenching and quenching and tempering.

Note 3 to entry In some publications the word TMCP (Thermomechanical Control Process) is also used.



**3.4****normalizing**

heat treatment consisting of austenitizing followed by air cooling

Note 1 to entry The abbreviated form of this delivery condition is +N.

**4 Classification and designation****4.1 Classification****4.1.1 Main quality classes**

The steel grades specified in this document shall be classified as non-alloy quality steels according to EN 10020.

**4.1.2 Grades and qualities**

This document specifies nine steel grades S185, S235, S275, S355, S460, S500, E295, E335 and E360. They differ in their mechanical properties.

The steel grades S235 and S275 may be supplied in qualities JR, J0 and J2. The steel grades S355 and S460 may be supplied in qualities JR, J0, J2 and K2. The steel grade S500 may be supplied in quality J0.

The qualities differ in specified impact energy requirements.

For steel grades S185, E295 to E360 no requirements for impact energy are specified.

**4.2 Designation**

**4.2.1** The designation shall be in accordance with prEN 10025-1.

**4.2.2** The designation shall consist of:

- number of this document (prEN 10025-2);
- steel name or the steel number; the steel name consisting of:
  - symbol S (for structural steel) or E (for engineering steel);
  - indication of the minimum specified yield strength for thickness  $\leq 16$  mm expressed in MPa<sup>1)</sup>;
  - if applicable, the quality designation (see 4.1.2) in respect of specified impact energy values;
  - if applicable, the additional symbol C for the suitability for the particular application (see Tables 9, 10, 11 and 12).
- indication "+N, +AR or +M", when the products are ordered and delivered in the condition +N, +AR or +M (see 3.1, 3.2, 3.3, 3.4 and 6.3). The indication "+N, +AR or +M" shall also be added to the steel number.

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<sup>1)</sup> 1 MPa = 1 N/mm<sup>2</sup>.

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EXAMPLE Structural steel (S) with a specified minimum yield strength at room temperature of 355 MPa<sup>1)</sup>, with a minimum impact energy value of 27 J at 0 °C (J0) and suitable for cold flanging (C), delivery condition +N:

Steel prEN 10025-2 - S355J0C+N

or

Steel prEN 10025-2 - 1.0554+N

**5 Information to be supplied by the purchaser****5.1 Mandatory information**

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

- a) quantity to be delivered;
- b) product form;
- c) number of the relevant part of this document;
- d) steel name or the steel number (see 4.2.2);
- e) nominal dimensions and tolerances on dimensions and shape (see 7.7.1);
- f) additional requirements of inspection and testing as specified in prEN 10025-2;
- g) type of inspection document according to EN 10204 (see 8.2);
- h) all required options (see 5.2);

**5.2 Options**

A number of options are specified in Clause 13. 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 (see 5.1 a) to g)).

**6 Manufacturing process****6.1 Steel making process**

The steel making process is at the discretion of the manufacturer with the exclusion of the open hearth (Siemens-Martin) process.

See option 1.

**6.2 Deoxidation**

**6.2.1** The method of deoxidation shall be as given in Tables 1 and 2.

**6.2.2** The deoxidation methods are designated as follows:

- a) Optional - Method at the manufacturer's discretion;

- b) FN - Rimming steel not permitted;
- c) FF - Fully killed steel containing nitrogen binding elements in amounts sufficient to bind the available nitrogen (for example min. 0,020 % total aluminium). The usual guideline is a minimum aluminium to nitrogen ratio of 2:1, when no other nitrogen binding elements are present. Such other elements shall be reported in the inspection document.

### 6.3 Delivery conditions

Unless otherwise agreed the delivery condition of long products and hot rolled strip can be +AR, +N or +M at the manufacturer's discretion.

The delivery condition for quarto plates can only be +AR or +N at the manufacturer's discretion.

For long products and hot rolled strip, the delivery condition +AR, +N or +M can be ordered. For quarto plates, the delivery condition +AR or +N can be ordered.

See option 19a.

If an inspection document is required (see 8.2) the delivery condition shall be indicated in it with its specific symbol (+N, +AR or +M). In case the products are ordered in the delivery condition +N, +AR or +M the specific symbol (+N, +AR or +M) shall be added to the designation (see 4.2.2).

NOTE The requirements on the mechanical properties of the steel grades according to this standard are not depending on the delivery condition.

## 7 Requirements

### 7.1 General

The following requirements apply when sampling, preparation of test pieces and testing specified in Clauses 8, 9 and 10 are carried out.

### 7.2 Chemical composition

**7.2.1** The chemical composition determined by ladle analysis shall comply with the specified values of Tables 1 and 2.

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.

**7.2.2** The upper limits applicable for the product analysis are given in Tables 3 and 4.

The product analysis shall be carried out when specified at the time of the order.

See option 2.

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

**7.2.3** The maximum carbon equivalent values for the grades S235, S275, S355, S460 and S500 based on the ladle analysis, given in Table 5 shall apply. For the carbon equivalent value formula see 4.4 of prEN 10025-1:2014.

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**7.2.4** For all S235, S275 and S355 qualities the following additional chemical requirement can be agreed at the time of the order:

- Copper-content between 0,25 % and 0,40 % on ladle analysis and between 0,20 % and 0,45 % on product analysis. In this case the maximum carbon equivalent value of Table 5 shall be increased by 0,02 %.

See option 20.

**7.2.5** When products of grade S275 and S355 are supplied with a control on Si e.g. for hot-dip zinc-coating so that there could be a need to increase the content of other elements like C and Mn to achieve the required tensile properties, the maximum carbon equivalent values of Table 5 shall be increased as follows:

- for  $Si \leq 0,04$  %, increase the value of the CEV by 0,02;
- for  $Si \leq 0,25$  %, increase the value of the CEV by 0,01.

**7.2.6** The chemical composition of steel grades for cold formability (see 7.4.2.2) shall be in conformance with the corresponding grades in Tables 1 to 5.

### **7.3 Mechanical properties**

#### **7.3.1 General**

**7.3.1.1** Under the inspection and testing conditions as specified in Clauses 8, 9 and 10 and in the delivery condition as specified in 6.3 the mechanical properties shall comply with the values given in Tables 6, 7 and 8.

**NOTE** Stress relieving at more than 580 °C or for over 1 h may lead to a deterioration of the mechanical properties of the steel grades as defined in prEN 10025-2. For normalized and normalized rolled flat products the maximum stress relief temperature should be 560 °C. If the purchaser intends to stress relief the products at higher temperatures or for longer times than mentioned above the minimum values of the mechanical properties after such a treatment should be agreed at the time of the order.

**7.3.1.2** For flat and bar products ordered and supplied in the normalized or normalized rolled condition (delivery condition +N) the mechanical properties shall comply with the relevant tables for mechanical properties of prEN 10025-2 in the normalized or normalized rolled condition or after normalizing by heat treatment after delivery or after hot forming if the provisions of CEN/TR 10347 are satisfied.

**NOTE** Products can be susceptible to a deterioration in mechanical strength if they are subjected to incorrect heat treatment processes at higher temperature such as flame straightening, rerolling, etc. Products in the +N delivery condition are less sensitive than other delivery conditions, but it is recommended that guidance is sought from the manufacturer if any higher temperature processing is required.

**7.3.1.3** For flat products the nominal thickness applies. For long products of irregular section the nominal thickness of that part from which the samples are taken applies (see Annex A of prEN 10025-1:2014).

**7.3.1.4** The mechanical properties of steel grades for cold formability (see 7.4.2.2) shall be in conformance with the corresponding grades in Tables 6 to 8.

#### **7.3.2 Impact properties**

**7.3.2.1** The verification of the impact energy value shall be carried out in accordance with prEN 10025-1.

The impact properties of products of certain qualities specified in prEN 10025-2 shall be verified by test at the temperature given in Table 8 unless otherwise agreed at the time of the order.

See option 3.