SLOVENSKI STANDARD
oSIST prEN 10025-3:2012

01-julij-2014

Vroče valjani izdelki iz konstrukcijskih jekel - 3. del: Tehnični dobavni pogoji za normalizirana/normalizirana valjana variva drobnozrnata konstrukcijska jekla

Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized rolled weldable fine grain structural steels

Warmgewalzte Erzeugnisse aus Baustählen - Teil 3: Technische Lieferbedingungen für normalgeglühte/normalisierend gewalzte schweißgeeignete Feinkornbaustähle

Produits laminés à chaud en aciers de construction - Partie 3 : Conditions techniques de livraison pour les aciers de construction soudable à grains fins à l'état normalisé/laminage normalisé

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Ta slovenski standard je istoveten z: prEN 10025-3

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

NORME EUROPÉENNE

EUROPÄISCHE NORM

WHITE DRAFT
prEN 10025-3

May 2014

ICS 77.140.10; 77.140.50

Will supersede EN 10025-3:2004

English Version

Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized rolled weldable fine grain structural steels

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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.

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

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oSIST prEN 10025-3:2012

Contents

Page

Foreword 3

1 Scope 4

2 Normative references 4
2.1 General standards 4
2.2 Standards on dimensions and tolerances (see 7.7.1) 5
2.3 Standards on testing 5

3 Terms and definitions 6

4 Classification and designation 6
4.1 Classification 6
4.2 Designation 6

5 Information to be supplied by the purchaser 7
5.1 Mandatory information 7
5.2 Options 7

6 Manufacturing process 7
6.1 Steel making process 7
6.2 Grain structure 8
6.3 Delivery conditions 8

7 Requirements 8
7.1 General 8
7.2 Chemical composition 8
7.3 Mechanical properties 9
7.4 Technological properties 9
7.5 Surface properties 11
7.6 Internal soundness 11
7.7 Dimensions, tolerances on dimensions and shape, mass 12

8 Inspection 12
8.1 General 12
8.2 The type of inspection and inspection document 12
8.3 Frequency of testing 12
8.4 Tests to be carried out 13

9 Preparation of samples and test pieces 13
9.1 Selection and preparation of samples for chemical analysis 13
9.2 Location and orientation of samples and test pieces for mechanical tests 14
9.3 Identification of samples and test pieces 14

10 Test methods 14
10.1 Chemical analysis 14
10.2 Mechanical tests 14
10.3 Ultrasonic testing 14
10.4 Retests 14

11 Marking, labelling, packaging 15

12 Complaints 15

13 Options (see 5.2) 15

Bibliography 22

iTeh Standards
(https://standards.iteh.ai)
Document Preview
SIST EN 10025-3:2019
https://standards.iteh.ai/catalog/standards/sist/9ae0f8f0-6f2f-4ab3-a8b8-6fa8a576dfa4/sist-en-10025-3-2019

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Foreword

This document (prEN 10025-3:2014) 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 10025-3:2004.

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 document are:

Part 1: General;

Part 2: Technical delivery conditions for non-alloy 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.

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1 Scope

Part 3 of this document, in addition to Part 1, specifies technical delivery conditions for flat and long products of hot rolled weldable fine grain structural steels in the normalized/normalized rolled delivery condition in the grades and qualities given in Tables 1 to 3 (chemical composition) and Tables 4 to 6 (mechanical properties) in thickness ≤ 250 mm.

In addition to prEN 10025-1:2014 the steels specified in this document are especially intended for use in heavily loaded parts of welded structures such as, bridges, flood gates, storages tanks, water supply tanks, etc., for service at ambient and low temperatures.

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*

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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 10204, *Metallic products – Types of inspection documents*

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

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.*

oSIST prEN 10025-3:2012

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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Document Preview
SIST EN 10025-3:2012
https://standards.iteh.ai/catalog/standards/sist/9ae1d41b-e125-44b3-a8b8-6fa8a576dfa4/sist-en-10025-3-2019

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)*

oSIST prEN 10025-3:2012

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 rolling
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 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
normalizing
heat treatment consisting of austenitizing followed by air cooling

3.3
fine grained steels
steels with fine grain structure with an equivalent index of ferritic grain size ≥ 6.

Note 1 to entry For the determination of grain sizes see EN ISO 643.

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4 Classification and designation

4.1 Classification

4.1.1 Main quality classes

The steel grade S275 specified in this document shall be classified as non-alloy quality steel and steel grade S355 shall be classified as alloy quality steel and the steel grades S420 and S460 specified in this document shall be classified as alloy special steels according to EN 10020.

4.1.2 Grades and qualities

This document specifies four steel grades S275, S355, S420 and S460.

All the steel grades may be supplied in the following qualities as specified at the time of the order:

- with specified minimum values of impact energy at temperatures not lower than -20 °C, designated as N;
- with specified minimum values of impact energy at temperatures not lower than -50 °C, designated as NL.

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 10025-3);
- steel name or the steel number; the steel name consisting of:
  - symbol S (for structural steel);

oSIST prEN 10025-3:2012

– indication of the minimum specified yield strength for thickness ≤ 16 mm expressed in MPa[1)];

– delivery condition N;

– capital letter L for the quality with specified minimum values of impact energy at temperatures not lower than -50 °C.

EXAMPLE Normalized structural steel (S) with a specified minimum yield strength at room temperature of 355 MPa[1)], and with a specified minimum value of impact energy at -50 ºC:

Steel prEN 10025-3 - S355NL

or

Steel prEN 10025-3 - 1.0546

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 10025-3;

g) type of inspection document according to EN 10204 (see 8.2);

h) all required options (see 5.2);

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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.

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1) 1 MPa = 1 N/mm^2.

oSIST prEN 10025-3:2012

6.2 Grain structure

The steels shall have a fine grain structure containing sufficient amounts of nitrogen binding elements (see Table 1).

6.3 Delivery conditions

The products shall be supplied normalized or in an equivalent condition obtained by normalizing rolling as defined in Clause 3.

For steels with a minimum yield strength ≥ 460 MPa, delayed cooling or additional tempering may be carried out after normalizing for small product thicknesses and in special cases. If such a treatment is performed, this shall be noted in the inspection document.

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 Table 1. On special request of the purchaser the manufacturer shall inform the purchaser at the time of the order which of the alloying elements appropriate to the steel grade required will be deliberately added to the material to be delivered.

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See option 29.

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.

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https://standards.iteh.ai/catalog/standards/sist/9ae1d41b-c125-44b3-a8b8-6fa8a576dfa4/sist-en-10025-3-2019

7.2.2 The limits applicable for the product analysis are given in Table 2. 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 based on the ladle analysis, given in Table 3 shall apply. For the carbon equivalent value formula see 4.4 of prEN 10025-1:2014.

7.2.4 When products 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 3 shall be increased as follows:

— for Si ≤ 0,04 %, increase the value of the CEV by 0,02;

— for Si ≤ 0,25 %, increase the value of the CEV by 0,01.