



SLOVENSKI STANDARD SIST EN 10028-6:2009

01-september-2009

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Flat products made of steels for pressure purposes - Part 6: Weldable fine grain steels, quenched and tempered

Flacherzeugnisse aus Druckbehälterstählen - Teil 6: Schweißgeeignete Feinkornbaustähle, vergütet

Produits plats en acier pour appareils à pression - Partie 6: Aciers soudables à grains fins, trempés et revenus

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Ta slovenski standard je istoveten z: EN 10028-6:2009

ICS:

- 77.140.30 Jekla za uporabo pod tlakom Steels for pressure purposes
- 77.140.50 Ú[[z aeá \ | ^ } á á á ^ \ á á] [| á á ^ \ á Flat steel products and semi-products

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EUROPEAN STANDARD
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Supersedes EN 10028-6:2003

English Version

Flat products made of steels for pressure purposes - Part 6: Weldable fine grain steels, quenched and tempered

Produits plats en acier pour appareils à pression - Partie 6:
Aciers soudables à grains fins, trempés et revenus

Flacherzeugnisse aus Druckbehälterstählen - Teil 6:
Schweißgeeignete Feinkornbaustähle, vergütet

This European Standard was approved by CEN on 14 May 2009.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

page

Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Dimensions and tolerances	4
5 Calculation of mass	4
6 Classification and designation.....	4
6.1 Classification.....	4
6.2 Designation	4
7 Information to be supplied by the purchaser	5
7.1 Mandatory information	5
7.2 Options	5
7.3 Example for ordering.....	5
8 Requirements	5
8.1 Steelmaking process	5
8.2 Delivery condition.....	5
8.3 Chemical composition	6
8.4 Mechanical properties.....	6
8.5 Surface condition.....	6
8.6 Internal soundness.....	6
9 Inspection	6
9.1 Types of inspections and inspections documents	6
9.2 Tests to be carried out	6
9.3 Retests	6
10 Sampling.....	6
11 Test methods.....	7
12 Marking	7
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 97/23/EC	12
Bibliography	13

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Foreword

This document (EN 10028-6:2009) has been prepared by Technical Committee ECISS/TC 22 "Steels for pressure purposes - Qualities", the secretariat of which is held by DIN.

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 December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 10028-6:2003.

This European Standard consists of the following parts, under the general title *Flat products made of steels for pressure purposes*:

- Part 1: General requirements
- Part 2: Non-alloy and alloy steels with specified elevated temperature properties
- Part 3: Weldable fine grain steels, normalized
- Part 4: Nickel alloy steels with specified low temperature properties
- Part 5: Weldable fine grain steels, thermomechanically rolled
- Part 6: Weldable fine grain steels, quenched and tempered
- Part 7: Stainless steels

NOTE The clauses marked by two points (••) contain information relating to agreements that may be made at the time of enquiry and order.

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 97/23/EC.

For relationship with EU Directive 97/23/EC, see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

EN 10028-6:2009 (E)

1 Scope

This European Standard specifies the requirements for flat products for pressure equipments made of quenched and tempered steels as specified in Table 1.

The requirements in EN 10028-1:2007 + A1:2009 also apply.

NOTE Once this European Standard is published in the EU Official Journal (OJEU) under Directive 97/23/EC, presumption of conformity to the Essential Safety Requirements (ESRs) of Directive 97/23/EC is limited to technical data of materials in this European Standard (Part 1 and this Part 6 of the series) and does not presume adequacy of the material to a specific item of equipment. Consequently, the assessment of the technical data stated in this material standard against the design requirements of this specific item of equipment to verify that the ESRs of Directive 97/23/EC are satisfied, needs to be done.

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.

EN 10028-1:2007 + A1:2009, *Flat products made of steels for pressure purposes – Part 1: General requirements*

EN 10204:2004, *Metallic products – Types of inspection documents*

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 10028-1:2007 + A1:2009 apply.

4 Dimensions and tolerances

See EN 10028-1:2007 + A1:2009.

5 Calculation of mass

See EN 10028-1:2007 + A1:2009.

6 Classification and designation

6.1 Classification

6.1.1 This document covers the steel grades given in Table 1 in four qualities:

- a) the basic series (P...Q);
- b) series with elevated temperature properties (P...QH);
- c) series with low temperature properties down to -40 °C (P...QL1);
- d) series with low temperature properties down to -60 °C (P...QL2).

6.1.2 In accordance with EN 10020 all the steels specified in this document are alloy special steels.

6.2 Designation

See EN 10028-1:2007 + A1:2009.

7 Information to be supplied by the purchaser

7.1 Mandatory information

See EN 10028-1:2007 + A1:2009.

7.2 Options

A number of options is specified in this document and listed below. Additionally the relevant options of EN 10028-1:2007 + A1:2009 apply. If the purchaser does not indicate a wish to implement any of these options at the time of enquiry and order, the products shall be supplied in accordance with the basic specification (see also EN 10028-1:2007 + A1:2009).

- 1) providing data on suitable welding conditions (see 8.2.3);
- 2) mid thickness test pieces for the impact test (see Clause 10);
- 3) lower copper content and maximum tin content (see Table 1, footnote c);
- 4) mechanical properties for thicknesses > 150 mm (see Table 3, footnote b);
- 5) specification of a minimum impact energy of 40 J (see Note to 8.4 and Table 4, footnote a);
- 6) applicability of elevated temperature values for QL grades (see Table 5, footnote b).

7.3 Example for ordering

10 plates with nominal dimensions, thickness = 50 mm, width = 2 000 mm, length = 10 000 mm, made of a steel grade with the name P355QL2 and the number 1.8869 as specified in EN 10028-6, inspection certificate 3.1 as specified in EN 10204: <https://standards.iteh.ai/catalog/standards/sist/cab627d1-0a3a-473f-b8b0-bca3f30c226e/sist-en-10028-6-2009>

10 plates – 50 x 2 000 x 10 000 – EN 10028-6 P355QL2 – Inspection certificate 3.1

or

10 plates – 50 x 2 000 x 10 000 – EN 10028-6 1.8869 – Inspection certificate 3.1.

8 Requirements

8.1 Steelmaking process

See EN 10028-1:2007 + A1:2009.

8.2 Delivery condition

8.2.1 The products covered by this European Standard shall be supplied in the quenched and tempered condition.

8.2.2 The steels specified in this European Standard shall be suitable for welding processes in current use (see Notes 1 to 3 to 8.2.3).

8.2.3 •• The manufacturer shall, if requested, provide the purchaser with data on suitable welding conditions determined on the basis of weld procedure tests.

NOTE 1 With increasing product thickness and strength level cold cracking can occur. Cold cracking is caused by the following factors in combination:

- a) the amount of diffusible hydrogen in the weld metal;
- b) brittle structure of the heat affected zone;

EN 10028-6:2009 (E)

c) tensile stress concentrations in the welded joint.

NOTE 2 When using recommendations as laid down, for example in EN 1011-1 and EN 1011-2, the recommended welding conditions and the various welding ranges of the steel grades can be determined depending on the product thickness, the applied welding energy, the design requirements, the electrode efficiency, the welding process and the weld metal properties.

NOTE 3 Excessive post weld heat-treatment (PWHT) conditions can decrease the mechanical properties. It is therefore recommended that the purchaser seeks, at the time of enquiry and order, the advice of the manufacturer and considers, where appropriate, the verification of the mechanical properties on simulated post weld heat treated samples.

8.3 Chemical composition

8.3.1 The requirements of Table 1 apply for the chemical composition according to the cast analysis.

8.3.2 The product analysis may deviate from the specified values of the cast analysis given in Table 1 by the values given in Table 2.

8.4 Mechanical properties

The values given in Tables 3 to 5 apply (see also EN 10028-1:2007 + A1:2009 and Clause 10).

NOTE Optionally, a minimum impact energy value of 40 J may be specified for temperatures where lower minimum values are specified (see Table 4, footnote a).

8.5 Surface condition

See EN 10028-1:2007 + A1:2009.

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8.6 Internal soundness

See EN 10028-1:2007 + A1:2009.

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For possible verification, see also EN 10028-1:2007 + A1:2009.

9 Inspection**9.1 Types of inspections and inspections documents**

See EN 10028-1:2007 + A1:2009.

9.2 Tests to be carried out

See EN 10028-1:2007 + A1:2009.

9.3 Retests

See EN 10028-1:2007 + A1:2009.

10 Sampling

See EN 10028-1:2007 + A1:2009.

For the impact test, deviating from EN 10028-1:2007 + A1:2009, Table 3, footnote f, the preparation of test pieces taken from the mid thickness may be agreed at the time of enquiry and order. In this case, test temperatures and minimum impact energy values shall also be agreed.

11 Test methods

See EN 10028-1:2007 + A1:2009.

12 Marking

See EN 10028-1:2007 + A1:2009.

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