SLOVENSKI STANDARD
SIST EN 10216-1:2014

01-junij-2014

Nadomešča:
SIST EN 10216-1:2003
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Nevarjene jeklene cevi za tlačne posode - Tehnični dobavni pogoji - 1. del: Nelegirane jeklene cevi s specificiranimi lastnostmi za delo pri sobni temperaturi

Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non -alloy steel tubes with specified room temperature properties

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Nahtlose Stahlrohre für Druckbeanspruchungen - Technische Lieferbedingungen - Teil 1: Rohre aus unlegierten Stählen mit festgelegten Eigenschaften bei Raumtemperature

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Tubes sans soudure en acier pour service sous pression - Conditions techniques de livraison - Partie 1 : Tubes en acier non allié avec caractéristiques spécifiées à température ambiante

Ta slovenski standard je istoveten z: **EN 10216-1:2013**

ICS:

23.020.30	Tlačne posode, plinske jeklenke	Pressure vessels, gas cylinders
77.140.75	Jeklene cevi in cevni profili za posebne namene	Steel pipes and tubes for specific use

SIST EN 10216-1:2014 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 10216-1

December 2013

ICS 23.040.10; 77.140.75

Supersedes EN 10216-1:2002

English Version

Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties

Tubes sans soudure en acier pour service sous pression - Conditions techniques de livraison - Partie 1 : Tubes en acier non allié avec caractéristiques spécifiées à température ambiante

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This European Standard was approved by CEN on 17 August 2013.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 10216-1:2013) has been prepared by Technical Committee ECISS/TC 110 “Steel tubes and fittings for steel tubes”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by June 2014, and conflicting national standards shall be withdrawn at the latest by June 2014.

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 10216-1:2002.

For the list of the most significant technical changes that have been made in this new edition, see Annex A.

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).

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

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This European Standard consists of the following parts, under the general title "*Seamless steel tubes for pressure purposes — Technical delivery conditions*":

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— *Part 1: Non-alloy steel tubes with specified room temperature properties*;

— *Part 2: Non-alloy and alloy steels tubes with specified elevated temperature properties*;

— *Part 3: Alloy fine grain steel tubes*;

— *Part 4: Non-alloy and alloy steel tubes with specified low temperature properties*;

— *Part 5: Stainless steel tubes*.

Another European Standard series covering tubes for pressure purposes is:

— EN 10217, *Welded steel tubes for pressure purposes — Technical delivery conditions*.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This European Standard specifies the technical delivery conditions for two qualities TR1 and TR2 of seamless tubes of circular cross section with specified room temperature properties made of non-alloy quality steel.

NOTE Once this standard is published in the Official Journal of the European Union (OJEU) under Directive 97/23/EC, presumption of conformity to the Essential Safety Requirements (ESR) of Directive 97/23/EC is limited to technical data of materials in this standard 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 the Pressure Equipment Directive are satisfied, needs to be done by the designer or manufacturer of the pressure equipment, taking also into account the subsequent manufacturing processes which may affect properties of the base materials.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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

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

EN 10052, *Vocabulary of heat treatment terms for ferrous products*

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

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

EN 10220, *Seamless and welded steel tubes — Dimensions and masses per unit length*

CEN/TR 10261, *Iron and steel — European standards for the determination of chemical composition*

EN 10266, *Steel tubes, fittings and structural hollow sections — Symbols and definitions of terms for use in product standards*

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

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

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

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

EN ISO 10893-1, *Non-destructive testing of steel tubes — Part 1: Automated electromagnetic testing of seamless and welded (except submerged arc-welded) steel tubes for the verification of hydraulic leaktightness (ISO 10893-1)*

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EN ISO 10893-2, *Non-destructive testing of steel tubes — Part 2: Automated eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of imperfections (ISO 10893-2)*

EN ISO 10893-3, *Non-destructive testing of steel tubes — Part 3: Automated full peripheral flux leakage testing of seamless and welded (except submerged arc-welded) ferromagnetic steel tubes for the detection of longitudinal and/or transverse imperfections (ISO 10893-3)*

EN ISO 10893-10, *Non-destructive testing of steel tubes — Part 10: Automated full peripheral ultrasonic testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of longitudinal and/or transverse imperfections (ISO 10893-10)*

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

ISO 11484, *Steel products — Employer's qualification system for non-destructive testing (NDT) personnel*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10020, EN 10021, EN 10052, EN 10266 and the following apply.

3.1
employer
organization for which a person works on a regular basis

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Note 1 to entry: The employer may be either the tube manufacturer or a third party organization providing non-destructive testing (NDT) services.

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4 Symbols

For the purpose of this Part of EN 10216, the symbols given in EN 10266 apply.

5 Classification and designation

5.1 Classification

According to the classification system in EN 10020, the steels are classified as non-alloy quality steels.

5.2 Designation

5.2.1 For the tubes covered by this Part of EN 10216 the steel designation consists of:

— the number of this Part of EN 10216;

plus either:

— the steel name in accordance with EN 10027-1;

or:

— the steel number allocated in accordance with EN 10027-2.

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5.2.2 The steel name is designated by:

— the capital letter P for pressure purposes;

— the indication of the specified minimum yield strength for thickness ≤ 16 mm, expressed in MPa (see Table 5 and Table 6);

plus either:

— the alphanumeric TR1 for qualities without specified aluminium content, impact properties and specific inspection and testing requirements (see 9.1);

or:

— the alphanumeric TR2 for qualities with specified aluminium content, impact properties and specific inspection and testing requirements.

6 Information to be supplied by the purchaser

6.1 Mandatory information

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

— the quantity (mass or total length or number);

— the term “tube”;

— the dimensions (outside diameter D and wall thickness T) (see Table 7);

— the designation of the steel grade in accordance with this Part of EN 10216 (see 5.2).

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6.2 Options

A number of options are specified in this Part of EN 10216 and these are listed below. In the event that the purchaser does not indicate a wish to implement any of these options at the time of enquiry and order, the tubes shall be supplied in accordance with the basic specification (see 6.1).

1) Delivery condition normalized or normalizing-formed for TR1 (see 7.2.2);

2) restriction on copper and tin contents (see Table 2 and Table 3);

3) product analysis (see 8.2.2);

4) verification of longitudinal impact testing at −10 °C for quality TR2 (see Table 5 and Table 6);

5) selection of method for verification of leak-tightness (see 8.4.2.1);

6) Non-Destructive Testing for quality TR2 (see 8.4.2.2); the test method shall be specified by the purchaser;

7) special end preparation (see 8.6);

8) exact lengths (see 8.7.3);

9) inspection document 3.2 other than the standard document (see 9.2.1);

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10) test unit restriction for tubes with D ≤ 76,1 mm of quality TR2 (see 10.1.1);

11) wall thickness measurement away from the ends (see 11.5);

12) additional marking (see 12.2);

13) protection (see 13).

6.3 Example of an order

100 t of seamless tube with an outside diameter of 168.3 mm, a wall thickness of 4,5 mm, in accordance with EN 10216-1, made of steel grade P235TR2 with a 3.2 inspection certificate in accordance with EN 10204.

EXAMPLE 100 t - Tube – 168,3 × 4,5 - EN 10216-1 - P235TR2 - 3.2.

7 Manufacturing process

7.1 Steelmaking process

The steelmaking process is at the discretion of the manufacturer with the exception that the open hearth (Siemens-Martin) process shall not be employed unless in combination with a secondary steelmaking or ladle refining process.

Steels shall be fully killed.

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NOTE This excludes the use of rimming, balanced or semi-killed steel.

7.2 Tube manufacture and delivery conditions

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7.2.1 All NDT activities shall be carried out by qualified and competent level 1,2 and/or 3 personnel authorized to operate by the employer.

The qualification shall be in accordance with ISO 11484 or, at least, an equivalent to it.

It is recommended that the level 3 personnel be certified in accordance with EN ISO 9712 or, at least, an equivalent to it.

The operating authorization issued by the employer shall be in accordance with a written procedure.

NDT operations shall be authorized by level 3 NDT individual approved by the employer.

NOTE The definition of level 1, 2 and 3 can be found in appropriate standards, e.g. EN ISO 9712 and ISO 11484.

7.2.2 The tubes shall be manufactured by a seamless process. The forming operations and delivery conditions are shown in Table 1.

Table 1 — Forming operations and delivery conditions

Forming operation	Quality	Delivery condition
Hot formed	TR1	As formed or normalized or normalizing-formed [a]
	TR2	Normalized or normalizing-formed
Hot formed + cold finished	TR1 and TR2	Normalized
[a] At the discretion of the manufacturer unless option 1 is specified.		

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Option 1 : *The tube shall be supplied in normalized or normalizing-formed delivery condition.*

8 Requirements

8.1 General

When supplied in a delivery condition indicated in 7.2 and inspected in accordance with Clauses 9, 10 and 11, the tubes shall conform to the requirements of this Part of EN 10216.

In addition, the general technical delivery requirements specified in EN 10021 shall apply.

8.2 Chemical composition

8.2.1 Cast analysis

The cast analysis reported by the steel producer shall apply and conform to the requirements of Table 2 for quality TR2 and in Table 3 for quality TR1.

When welding tubes are produced in accordance with this Part of EN 10216, account should be taken of the fact that the behaviour of the steel during and after welding is dependent not only on the steel, but also on the applied heat treatment and the conditions of preparing for and carrying out the welding.

Table 2 — Chemical composition (cast analysis)[a] in % by mass for quality TR2

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Steel grade		C	Si	Mn	P	S	Cr[b]	Mo[b]	Ni[b]	Al_{tot}[b]	Cu[b c]	Nb[b]	Ti[b]	V[b]	Cr+Cu+Mo+Ni[b]
Steel name	Steel number	max.	max.	max.	max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.
P195TR2	1.0108	0,13	0,35	0,70	0,025	0,015	0,30	0,08	0,30	0,02[d]	0,30	0,010	0,04	0,02	0,70
P235TR2	1.0255	0,16	0,35	1,20	0,025	0,015	0,30	0,08	0,30	0,02[d]	0,30	0,010	0,04	0,02	0,70
P265TR2	1.0259	0,20	0,40	1,40	0,025	0,015	0,30	0,08	0,30	0,02[d]	0,30	0,010	0,04	0,02	0,70

[a] Elements not included in this table shall not be intentionally added to the steel without the agreement of the purchaser, except for elements which may be added for finishing the cast. All appropriate measures shall be taken to prevent the addition of undesirable elements from scrap or other materials used in the steelmaking process.

[b] The content of these elements need not be reported unless intentionally added to the cast.

[c] ***Option 2****:In order to facilitate subsequent forming operation, an agreed maximum copper content lower than indicated and an agreed specified maximum tin content shall apply.*

[d] This requirement is not applicable provided the steel contains a sufficient amount of other nitrogen binding elements which shall be reported.