

TERASEST KEEVITATUD SURVETORUD. TEHNILISED
TARNETINGIMUSED. OSA 5: RÄBUSTIKAARKEEVITATUD
KÕRGENDATUD TEMPERATUURIL KASUTAMISEKS
SPETSIFITSEERITUD OMADUSTEGA LEGEERIMATA JA
LEGEERITUD TERASEST TORUD

Welded steel tubes for pressure purposes - Technical
delivery conditions - Part 5: Submerged arc welded
non-alloy and alloy steel tubes with specified elevated
temperature properties

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 10217-5:2019 sisaldab Euroopa standardi EN 10217-5:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 10217-5:2019 consists of the English text of the European standard EN 10217-5:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 17.04.2019.	Date of Availability of the European standard is 17.04.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 23.040.10, 77.140.75

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Welded steel tubes for pressure purposes - Technical
delivery conditions - Part 5: Submerged arc welded non-
alloy and alloy steel tubes with specified elevated
temperature properties**

Tubes soudés en acier pour service sous pression -
Conditions techniques de livraison - Partie 5: Tubes
soudés à l'arc immergé en aciers non allié et allié avec
caractéristiques spécifiées à température élevée

Geschweißte Stahlrohre für Druckbeanspruchungen -
Technische Lieferbedingungen - Teil 5:
Unterpulvergeschweißte Rohre aus unlegierten und
legierten Stählen mit festgelegten Eigenschaften bei
erhöhten Temperaturen

This European Standard was approved by CEN on 25 February 2019.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword.....	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 Symbols	7
5 Classification and designation	7
5.1 Classification	7
5.2 Designation.....	7
6 Information to be supplied by the purchaser	8
6.1 Mandatory information.....	8
6.2 Options	8
6.3 Example of an order	9
7 Manufacturing process.....	9
7.1 Steelmaking process	9
7.2 Tube manufacture and delivery conditions	9
7.3 Non Destructive Testing Personnel Requirements.....	10
8 Requirements	10
8.1 General	10
8.2 Chemical composition	11
8.2.1 Cast analysis.....	11
8.2.2 Product analysis	11
8.3 Mechanical properties.....	13
8.4 Appearance and internal soundness.....	15
8.4.1 Weld seam.....	15
8.4.2 Tube surface.....	15
8.4.3 Internal soundness	15
8.5 Straightness.....	16
8.6 Preparation of ends.....	16
8.7 Dimensions, masses and tolerances.....	16
8.7.1 Diameter and wall thickness.....	16
8.7.2 Mass.....	16
8.7.3 Lengths.....	19
8.7.4 Tolerances	19
9 Inspection.....	21
9.1 Type of inspection	21
9.2 Inspection documents	21
9.2.1 Types of inspection documents.....	21
9.2.2 Content of inspection documents.....	21
9.3 Summary of inspection and verification testing.....	22
10 Sampling.....	24
10.1 Frequency of tests	24
10.1.1 Test unit.....	24
10.1.2 Number of sample tubes per test unit	24
10.2 Preparation of samples and test pieces	24
10.2.1 Selection and preparation of samples for product analysis	24
10.2.2 Location, orientation and preparation of samples and test pieces for mechanical tests	25

11	Verification of test methods	26
11.1	Chemical analysis	26
11.2	Tensile test on the tube body	27
11.2.1	At room temperature	27
11.2.2	At elevated temperature	27
11.3	Traverse tensile test on the weld	27
11.4	Weld bend test	27
11.5	Impact test	27
11.6	Hydrostatic leak tightness test	28
11.7	Dimensional inspection	28
11.8	Visual examination	29
11.9	Non-Destructive Testing	29
11.9.1	Non-Destructive Testing of the weld seam	29
11.9.2	Non-Destructive Testing for the detection of laminations for tubes of test category 2	29
11.9.3	Supply of strip end welds in SAWH tubes	30
11.10	Material identification	30
11.11	Retests, sorting and reprocessing	30
12	Marking	30
12.1	Marking to be applied	30
12.2	Additional marking	31
13	Protection	31
Annex A	(normative) Qualification of welding procedure	32
A.1	General	32
A.2	Welding procedure specification	32
A.3	Preparation of sample tube and sample assessment	34
A.4	Inspection and testing of the weld	35
A.5	Weld test pieces	35
A.6	Test methods	35
A.7	Test acceptance levels	36
A.8	Range of use of qualified procedures	38
A.9	Qualification record	39
Annex B	(informative) Technical changes from the previous edition	40
B.1	Introduction	40
B.2	Technical changes	40
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2014/68/EU	42
	Bibliography	43

European foreword

This document (EN 10217-5:2019) has been prepared by Technical Committee CEN/TC 459 “ECISS - European Committee for Iron and Steel Standardization”¹, the secretariat of which is held by AFNOR.

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 October 2019, and conflicting national standards shall be withdrawn at the latest by October 2019.

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

This document supersedes EN 10217-5:2002.

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 2014/68/EU.

For relationship with EU Directive 2014/68/EU (formerly 97/23/EC), see informative Annex ZA, which is an integral part of this document.

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

Part 1: Electric welded and submerged arc welded non-alloy steel tubes with specified room temperature properties

Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties

Part 3: Electric welded and submerged arc welded alloy fine grain steel tubes with specified room, elevated and low temperature properties

Part 4: Electric welded non-alloy steel tubes with specified low temperature properties

Part 5: Submerged arc welded non-alloy and alloy steel tubes with specified elevated temperature properties

Part 6: Submerged arc welded non-alloy steel tubes with specified low temperature properties

Part 7: Stainless steel tubes

Another European Standard series covering tubes for pressure purposes is:

EN 10216, *Seamless steel tubes for pressure purposes*.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

¹ Through its subcommittee SC 10 “Steel tubes, and iron and steel fittings” (secretariat: UNI)

1 Scope

This document specifies technical delivery conditions for two test categories of submerged arc longitudinally (SAWL) or helically (SAWH) welded tubes of circular cross section, with specified elevated temperature properties, made from non-alloy quality steel or alloy special steel.

NOTE 1 These tube grades are intended to support the essential requirements of EU Directive 2014/68/EU in respect of pressure equipment covered under all relevant Categories as set out in Article 13 of that Directive.

NOTE 2 Once this standard is published in the Official Journal of the European Union (OJEU), presumption of conformity to the Essential Safety Requirements (ESR) of Directive 2014/68/EU is limited to the technical data for the materials in this standard and does not presume adequacy of the material for a specific item of pressure 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 are referred to in the text in such a way that some or all of their content constitutes requirements 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 10020, *Definition and classification of grades of steel*

EN 10021:2006, *General technical delivery conditions for steel products*

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

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

EN 10168:2004, *Steel products — Inspection documents — List of information and description*

EN 10204:2004, *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 148-1:2016, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2016)*

EN ISO 377:2017, *Steel and steel products — Location and preparation of samples and test pieces for mechanical testing (ISO 377:2017)*

EN ISO 2566-1:1999, *Steel — Conversion of elongation values — Part 1: Carbon and low alloy steels (ISO 2566-1:1984)*

EN ISO 4885, *Ferrous materials - Heat treatments - Vocabulary (ISO 4885)*

EN ISO 5173:2010, *Destructive tests on welds in metallic materials — Bend tests (ISO 5173:2009)*

EN ISO 6892-1:2016, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2016)*

EN ISO 6892-2:2018, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature (ISO 6892-2:2018)*

EN ISO 10893-6:2011, *Non-destructive testing of steel tubes — Part 6: Radiographic testing of the weld seam of welded steel tubes for the detection of imperfections (ISO 10893-6:2011)*

EN ISO 10893-7:2011, *Non-destructive testing of steel tubes — Part 7: Digital radiographic testing of the weld seam of welded steel tubes for the detection of imperfections (ISO 10893-7:2011)*

EN ISO 10893-8:2011, *Non-destructive testing of steel tubes — Part 8: Automated ultrasonic testing of seamless and welded steel tubes for the detection of laminar imperfections (ISO 10893-8:2011)*

EN ISO 10893-9:2011, *Non-destructive testing of steel tubes — Part 9: Automated ultrasonic testing for the detection of laminar imperfections in strip/plate used for the manufacture of welded steel tubes (ISO 10893-9:2011)*

EN ISO 10893-11:2011, *Non-destructive testing of steel tubes — Part 11: Automated ultrasonic testing of the weld seam of welded steel tubes for the detection of longitudinal and/or transverse imperfections (ISO 10893-11:2011)*

EN ISO 14174:2012, *Welding consumables — Fluxes for submerged arc welding and electroslag welding — Classification (ISO 14174:2012)*

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

EN ISO 17639:2013, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds (ISO 17639:2003)*

ISO 11484:2009, *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 10266, EN ISO 4885 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

test category

classification that indicates the extent and level of inspection and testing

3.2

employer

organisation for which a person works on a regular basis

Note 1 to entry: The employer may be either the tube manufacturer or a third party organization providing services, such as Non-Destructive Testing (NDT).