



SLOVENSKI STANDARD

SIST EN 10217-3:2003

01-april-2003

Varjene jeklene cevi za tlačne posode - Tehnični dobavni pogoji - 3. del: Legirane jeklene cevi z drobnozrnato mikrostrukturo

Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes

Geschweißte Stahlrohre für Druckbeanspruchungen - Technische Lieferbedingungen - Teil 3: Rohre aus legierten Feinkornbaustählen

Tubes soudés en acier pour service sous pression - Conditions techniques de livraison - Partie 3: Tubes en aciers alliés à grain fin

<https://standards.iteh.ai/catalog/standards/sist/68dfad5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003>

Ta slovenski standard je istoveten z: EN 10217-3:2002

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 10217-3:2003

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 10217-3:2003](https://standards.iteh.ai/catalog/standards/sist/68dfadf5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003)

<https://standards.iteh.ai/catalog/standards/sist/68dfadf5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 10217-3

May 2002

ICS 23.040.10; 77.140.75

English version

Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes

Tubes soudés en acier pour service sous pression -
Conditions techniques de livraison - Partie 3: Tubes en
aciers alliés à grain fin

Geschweißte Stahlrohre für Druckbeanspruchungen -
Technische Lieferbedingungen - Teil 3: Rohre aus legierten
Feinkornbaustählen

This European Standard was approved by CEN on 25 April 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 10217-3:2003](https://standards.iteh.ai/catalog/standards/sist/68dfadf5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003)

<https://standards.iteh.ai/catalog/standards/sist/68dfadf5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword.....	4
1 Scope	5
2 Normative References.....	5
3 Terms and definitions	7
4 Symbols	7
5 Classification and designation.....	7
5.1 Classification.....	7
5.2 Designation	8
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 Deoxidation process.....	9
7.3 Tube manufacture and delivery conditions	9
8 Requirements.....	11
8.1 General.....	11
8.2 Chemical composition	12
8.3 Mechanical properties.....	12
8.4 Appearance and internal soundness.....	16
8.5 Straightness	17
8.6 Preparation of ends.....	17
8.7 Dimensions, masses and tolerances.....	18
9 Inspection	24
9.1 Types of inspection	24
9.2 Inspection documents.....	24
9.3 Summary of inspection and testing.....	24
10 Sampling.....	26
10.1 Frequency of tests.....	26
10.2 Preparation of samples and test pieces	26
11 Test methods	28
11.1 Chemical analysis.....	28
11.2 Tensile test	28
11.3 Flattening test	29
11.4 Ring tensile test	29
11.5 Drift expanding test	29
11.6 Ring expanding test	30
11.7 Weld bend test for SAW tubes	30
11.8 Impact test.....	30
11.9 Leak tightness test	31
11.10 Dimensional inspection	32
11.11 Visual examination	32
11.12 Non-Destructive Testing	32
11.13 Material identification.....	33
11.14 Retests, sorting and reprocessing	33
12 Marking	33

12.1	Marking to be applied	33
13	Protection	34
	Annex A (normative).....	35
	Annex B (Normative)	43
	Annex ZA (informative)	44
	Bibliography	45

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 10217-3:2003](https://standards.iteh.ai/catalog/standards/sist/68dfadf5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003)

<https://standards.iteh.ai/catalog/standards/sist/68dfadf5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003>

EN 10217-3:2002 (E)**Foreword**

This document (EN 10217-3:2002) has been prepared by Technical Committee ECISS/TC 29, "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 November 2002, and conflicting national standards shall be withdrawn at the latest by November 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 EU Directive(s).

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

Other parts of EN 10217 are:

- Part 1: 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 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 organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This Part of EN 10217 specifies the technical delivery condition in two test categories for welded tubes of circular cross section, made of weldable alloy fine grain steel.

2 Normative References

This European Standard incorporates by date or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For date references, subsequent amendments to or revisions of, any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

The requirements of this European Standard rule when they differ from those in the standards and documents referred to below:

EN 760, *Welding consumables - Fluxes for submerged arc welding – Classification*

EN 895, *Destructive tests on welds in metallic materials - Transverse tensile test.*

EN 910, *Destructive tests on weld in metallic materials -Bend test.*

EN 1321, *Destructive tests on welds in metallic materials - Macroscopic and microscopic examination of welds*

EN 10002-1, *Metallic materials - Tensile testing - Part 1 : Method of test at ambient temperature.*

EN 10002-5, *Metallic materials - Tensile testing - Part 5 : Method of testing at elevated temperature.*

EN 10020, *Definitions and classification of grades of steel.*

EN 10021, *General technical delivery requirements for steel and iron products.*

EN 10027-1, *Designation systems for steels - Part 1 : Steel names, principle symbols.*

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

EN 10045-1, *Metallic materials - Charpy impact test - Part 1 : Test method.*

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

EN 10204, *Metallic products - Types of inspection documents.*

ENV 10220, *Seamless and welded steel tubes - Dimensions and masses per unit length.*

EN 10233, *Metallic materials - Tubes - Flattening test.*

EN 10234, *Metallic materials - Tubes - Drift expanding test.*

EN 10236, *Metallic materials - Tubes - Ring expanding test.*

EN 10237, *Metallic materials - Tubes - Ring tensile test.*

EN 10246-1, *Non-Destructive Testing of steel tubes Part 1 : Automatic electromagnetic testing of seamless and welded (except submerged arc welded) ferromagnetic steel tubes for verification of hydraulic leak-tightness.*

EN 10246-3, *Non-Destructive Testing of steel tubes - Part 3 :Automatic eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of imperfections.*

EN 10217-3:2002 (E)

EN 10246-5, *Non-Destructive Testing of steel tubes – Part 5: Automatic full peripheral magnetic transducer/flux leakage testing of seamless and welded (except submerged arc-welded) ferromagnetic steel tubes for the detection of longitudinal imperfections.*

EN 10246-6, *Non-Destructive Testing of steel tubes - Part 6 : Automatic full peripheral ultrasonic testing of seamless steel tubes for the detection of transverse imperfections*

EN 10246-7, *Non-Destructive Testing of steel tubes - Part 7 : Automatic full peripheral ultrasonic testing of seamless and welded (except submerged arc welded) steel tubes for the detection of longitudinal imperfections.*

EN 10246-8, *Non-Destructive Testing of steel tubes – Part 8: Automatic ultrasonic testing of the weld seam of electric welded tubes for the detection of longitudinal imperfections.*

EN 10246-9, *Non-Destructive Testing of steel tubes – Part 9: Automatic ultrasonic testing of the weld seam of submerged arc-welded steel tubes for the detection of longitudinal and/or transverse imperfections.*

EN 10246-10, *Non-Destructive Testing of steel tubes – Part.10: Radiographic testing of the weld seam of automatic fusion arc-welded steel tubes for the detection of imperfections.*

EN 10246-14, *Non-Destructive Testing of steel tubes - Part 14:Automatic ultrasonic testing of seamless and welded (except submerged arc welded) steel tubes for the detection of laminar imperfections.*

EN 10246-15, *Non-Destructive Testing of steel tubes - Part 15: Automatic ultrasonic testing of strip/ plate used in the manufacture of welded steel tubes for the detection of laminar imperfections.*

EN 10246-16, *Non-Destructive Testing of steel tubes - Part 16: Automatic ultrasonic testing of the area adjacent to the weld seam of welded steel tubes for the detection of laminar imperfections.*

EN 10246-17, *Non-Destructive Testing of steel tubes - Part 17: Ultrasonic testing of tube ends of seamless and welded steel tubes for the detection of laminar imperfections.*

EN 10256, *Non-Destructive Testing of steel tubes - Qualification and competence of level 1 and level 2 NDT personnel.*

prEN 10266¹⁾, *Steel tubes, fittings and structural hollow sections - Symbols and definition of terms for use in product standards*

EN ISO 377, *Steel and steel products - Location and preparation of samples and test pieces for mechanical testing (ISO 377:1997)*

prEN 10168¹⁾, *Iron and steel products - Inspection documents - List of information and description*

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

ISO 14284, *Steel and iron - Sampling and preparation of samples for the determination of chemical composition*

EURONORM 103²⁾, *Microscopic determination of ferritic grain size of steel.*

CR 10260, *Designation systems for steel - Additional symbols*

CR 10261, *ECISS Information Circular IC 11 - Iron and steel - Review of available methods of chemical analysis.*

1) In preparation; until this document is published as a European standard, a corresponding national standard should be agreed at the time of enquiry and order.

2) Until this EURONORM is transformed into an a European Standard, it can be implemented or the corresponding national standard should be agreed at the time of enquiry and order.

3 Terms and definitions

For the purposes of this Part of EN 10217 the terms and definitions given in EN 10020, EN 10021, EN 10052, prEN 10266 and the following apply:

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 The employer may be either the tube manufacturer or supplier or a third party organisation providing Non-Destructive Testing (NDT) services.

3.3

fine grain steel

steel having a ferritic grain size equal to or finer than 6 in accordance with EURONORM 103.

3.4

qualification of welding procedure

testing and inspection of the welding procedure for Submerged arc welded (SAW) tubes by the manufacturer in accordance with annex A.

3.5

approval of welding procedure

testing and inspection of the welding procedure for SAW tubes witnessed and approved in accordance with annex A by an authorised body.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 10217-3:2003

<https://standards.iteh.ai/catalog/standards/sist/68dfadf5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003>

4 Symbols

For the purposes of this Part of EN 10217. The symbols given in prEN 10266 and the following apply:

- C1, C2 category conformity indicators (see 7.3.1 and 7.3.3.)
- TC test category.

5 Classification and designation

5.1 Classification

5.1.1 This Part of EN 10217 covers steel grades in four qualities (see Tables 2 and 4):

- the basic quality (P ... N);
- the elevated temperature quality (P ... NH);
- the low temperature quality (P ... NL1);
- the special low temperature quality (P ... NL2).

5.1.2 In accordance with the classification system in EN 10020, the steel grades P275NL1, P355N, P355NH and P355NL1 are classified as alloy quality steels and the other steel grades are classified as alloy special steels.

EN 10217-3:2002 (E)**5.2 Designation**

5.2.1 For the tubes covered by this Part of EN 10217 the steel designation consists of:

— the number of this Part of EN 10217;

plus either:

— the steel name in accordance with EN 10027-1 and CR 10260;

or:

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

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 the lowest applicable wall thickness T group expressed in MPa (see Table 4);

— one of the additional symbols N, NH, NL1 or NL2 (see 5.1.1, Tables 2 and 4).

iTeh STANDARD PREVIEW
(standards.iteh.ai)

6 Information to be supplied by the purchaser**6.1 Mandatory information**

SIST EN 10217-3:2003

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

- a) the quantity (mass or total length or number);
- b) the term "tube";
- c) the dimensions (outside diameter D, wall thickness T) (see Table 8 and 9);
- d) the designation of the steel grade in accordance with this Part of EN 10217 (see 5.2);
- e) the test category (see 9.3).

6.2 Options

A number of options are specified in this Part of EN 10217 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) Tube manufacturing route (see 7.3.2).
- 2) Restriction on copper and tin content (see Table 2).
- 3) Product analysis (see 8.2.2).
- 4) Verification of elevated temperature properties of NH-grades (see 8.3).
- 5) Verification of elevated temperature properties of NL-grades (see 8.3).
- 6) Selection for leak-tightness test method (see 8.4.3.1).

- 7) Non-Destructive Testing for test category 2 HFW tubes for detection of transverse imperfections (see 8.4.3.2).
- 8) Non-Destructive Testing for test category 2 tubes for detection of laminar imperfections (see 8.4.3.2).
- 9) Special end preparation (see 8.6).
- 10) Exact lengths (see 8.7.3).
- 11) Type of inspection document other than the standard document (see 9.2.1).
- 12) Transverse weld tensile test for SAW tubes (see Table 15).
- 13) Additional impact test at test temperature different from standard test temperature (see Table 15).
- 14) Transverse weld tensile test for HFW tubes (see Table 15).
- 15) Test pressure for hydrostatic leak-tightness test (see 11.9.1).
- 16) Wall thickness measurement away from the ends (see 11.10).
- 17) Non-Destructive Testing method for the inspection of the weld seam of HFW tubes (see 11.12.1.1)
- 18) Non-Destructive Testing method for the inspection of the weld seam of SAW tubes (see 11.12.2.1).
- 19) Image quality class R1 of EN 10246-10 for the non-destructive radiographic inspection of the weld seam (see 11.12.2.1).
- 20) Additional marking (see 12.2).
- 21) Protection (see 13).

iTech STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 10217-3:2003
<https://standards.iteh.ai/catalog/standards/sist/68dfadf5-bf89-4957-a44a-82a5774bb534/sist-en-10217-3-2003>

6.3 Example of an order

500 m of welded tube with an outside diameter of 168,3 mm, a wall thickness of 4,5 mm in accordance with EN 10217-3, made of steel grade P355N, test category 1, with a 3.1.C inspection certificate in accordance with EN 10204:

500 m - Tube - 168,3 x 4,5 - EN 10217-3 - P355N -TC 1 - Option 11: 3.1.C

7 MANUFACTURING PROCESS

7.1 Steelmaking process

The steelmaking process is at the discretion of the manufacturer.

7.2 Deoxidation process

Steels shall be fully killed and be made to fine grain practice (see 3.3).

7.3 Tube manufacture and delivery conditions

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

The qualification shall be in accordance with EN 10256 or, at least, an equivalent to it.

EN 10217-3:2002 (E)

It is recommended that the level 3 personnel be certified in accordance with EN 473 or, at least, an equivalent to it.

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

NDT operations shall be authorised by a 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 473 and EN 10256.

For pressure equipment in categories III and IV (of Directive 97/23-EC) the personnel shall be approved by a recognised third-party organisation. Tubes not conforming to this requirement shall be marked "C 2", unless a requirement to mark "C1" (see 7.3.3) applies.

7.3.2 The tubes shall be manufactured by the manufacturing processes and routes as specified in Table 1.

Unless Option 1 is specified the manufacturing process and route is at the discretion of the manufacturer.

Option 1: *The manufacturing process and/or route is specified by the purchaser.*

The submerged arc weld of SAW tubes shall be made using at least one weld run on the inside and one weld run on the outside of the tube.

The strip used for the manufacture of the helically submerged arc welded (SAWH) tubes shall have a width of not less than 0.8 times or more than 3.0 times the outside diameter of the tube.

The finished tubes shall not include welds used for joining together lengths of the hot or cold rolled strip or plate prior to forming except that for helically welded.

For helically welded submerged arc welded (SAWH) tubes, when the weld joining lengths of strip are part of the delivered tube, they shall have the welding procedure qualified in accordance with annex A and the weld shall be subjected to the same inspection and testing as the helical weld.

7.3.3 Welding shall be carried out by suitably qualified personnel in accordance with suitable operating procedures.

For pressure equipment in categories II, III, and IV, (of Directive 97/23 EC) the operating procedures and the personnel shall be approved by a competent third-party. Tubes not conforming to this requirement shall be marked "C 1".

7.3.4 The welding procedure for SAW tubes shall be qualified in accordance with Annex A.

7.3.5 The delivery conditions of tubes covered by this Part of EN 10217 are shown in Table 1.

7.3.6 In case of steel grade P355 and P355NH normalising may be replaced by normalising forming.

7.3.7 For steel grade P460 delayed cooling or additional tempering may be necessary to apply after normalising.

Table 1 — Tube manufacturing processes, route and delivery condition

Route N°	Manufacturing process		Manufacturing route		Delivery	Applicable for ^a
	Process	Symbols	Starting material	Forming operation	Condition	
1a	High frequency welded	HFW ^e	Normalising rolled strip	Cold formed (+ welded)	Normalised weld zone	B
1b					Normalised ^b (entire tube)	A
2a			As (hot) rolled or Normalising rolled strip	Cold formed (+ welded) + hot stretch reduced	Normalised ^b (entire tube)	A
2b					Normalised ^b (entire tube)	A
2c					Cold formed (+ welded) + hot stretch reduced at a controlled temperature to give a normalised condition	Normalised rolled
3	Submerged arc welded	SAW	As (hot) rolled plate or strip	Cold formed (+ welded)	Normalised ^b (entire tube)	A
4a	-longitudinal seam	-SAWH	Normalising rolled plate or strip	Cold formed (+ welded)	Without subsequent heat treatment ^c	B
4b	-helical seam	-SAWL	Normalising plate or strip			A
5			As (hot) rolled plate or strip- Normalising or Normalising rolled plate or strip	Normalising formed ^d (+ welded)	Without subsequent heat treatment ^c	A

^a A = all steel grades; B= for grades P355N and P355NH only.

^b see 7.3.7.

^c Stress relieving treatment on the weld is permissible

^d Only applicable to SAWL tubes

^e A minimum frequency of 100 kHz

8 Requirements

8.1 General

When supplied in a delivery condition indicated in clause 7.3 and inspected in accordance with clauses 9, 10 and 11, the tubes shall conform to the requirements of this Part of EN 10217.

Tubes shall be suitable for hot and cold bending provided the bending is carried out in an appropriate manner.

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