
Varjene jeklene cevi za tlačne posode - Tehnični dobavni pogoji - 4. del: Električno varjene nelegirane jeklene cevi s specificiranimi lastnostmi za delo pri nizkih temperaturah

Welded steel tubes for pressure purposes - Technical delivery conditions - Part 4: Electric welded non-alloy steel tubes with specified low temperature properties

Geschweißte Stahlrohre für Druckbeanspruchungen - Technische Lieferbedingungen - Teil 4: Elektrisch geschweißte Rohre aus unlegierten Stählen mit festgelegten Eigenschaften bei tiefen Temperaturen
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Tubes soudés en acier pour service sous pression - Conditions techniques de livraison - Partie 4: Tubes soudés électriquement en acier non allié avec caractéristiques spécifiées a basse température

Ta slovenski standard je istoveten z: EN 10217-4:2002

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Welded steel tubes for pressure purposes - Technical delivery conditions - Part 4: Electric welded non-alloy steel tubes with specified low temperature properties

Tubes soudés en acier pour service sous pression -
Conditions techniques de livraison - Partie 4: Tubes soudés
électriquement en acier non allié avec caractéristiques
spécifiées à basse température

Geschweißte Stahlrohre für Druckbeanspruchungen -
Technische Lieferbedingungen - Teil 4: Elektrisch
geschweißte Rohre aus unlegierten Stählen mit
festgelegten Eigenschaften bei tiefen Temperaturen

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

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword.....	3
1 SCOPE	4
2 NORMATIVE REFERENCES.....	4
3 Definitions	5
4 Symbols	5
5 CLASSIFICATION AND DESIGNATION.....	6
5.1 Classification.....	6
5.2 Designation	6
6 Information to be supplied by the purchaser	6
6.1 Mandatory information.....	6
6.2 Options	6
6.3 Example of an order	7
7 Manufacturing process	7
7.1 Steelmaking process.....	7
7.2 Deoxidation process	7
7.3 Tube manufacture and delivery conditions	7
8 REQUIREMENTS.....	8
8.1 General.....	8
8.2 Chemical composition	9
8.3 Mechanical properties.....	9
8.4 Appearance and internal soundness.....	12
8.5 Straightness	13
8.6 Preparation of ends.....	13
8.7 Dimensions, masses and tolerances.....	13
9 Inspection.....	18
9.1 Types of inspection.....	18
9.2 Inspection documents.....	18
9.3 Summary of inspection and testing.....	18
10 Sampling.....	20
10.1 Frequency of tests.....	20
10.2 Preparation of samples and test pieces.....	20
11 Test methods	22
11.1 Chemical analysis.....	22
11.2 Tensile test on the base material	22
11.3 Transverse tensile test on the weld.....	22
11.4 Flattening test	22
11.5 Ring tensile test	22
11.6 Drift expanding test	23
11.7 Ring expanding test	23
11.8 Impact test.....	23
11.9 Leak tightness test	24
11.10 Dimensional inspection	24
11.11 Visual examination	25
11.12 Non-Destructive Testing	25
11.13 Retests, sorting and reprocessing	25
12 Marking	25
12.1 Marking to be applied.....	25
12.2 Additional marking	26
13 protection	26
Annex ZA (informative)	27
Bibliography.....	28

Foreword

This document (EN 10217-4:2002) 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 3: Alloy fine grain steel tubes.
- 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.

EN 10217-4:2002 (E)**1 Scope**

This Part of EN 10217 specifies the technical delivery conditions in two test categories of electric welded tubes of circular cross section, with specified low temperature properties, made of non-alloy 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 10002-1, *Metallic materials - Tensile testing - Part 1: Method of test (at ambient 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*

prEN 10168 ¹⁾, *Iron and steel products - Inspection documents - List of information and description*

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 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 10246-14, *Non-Destructive Testing of steel tubes - Part 7 : Automatic ultrasonic testing of seamless and welded (except submerged arc 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*

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.*

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

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*

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3 Terms and definitions

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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 followings 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.

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.

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.

EN 10217-4:2002 (E)**5 Classification and designation****5.1 Classification**

In accordance with the classification system in EN 10020, the steel grade given in Tables 2 and 4 are classified as non-alloy quality steels.

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 expressed in MPa, given in Table 4;

— the symbol of the delivery condition for the steel grade concerned (see Table 1);

— the symbol L for low temperature.

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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:

- a) the quantity (mass or total length or number);
- b) the term "tube";
- c) the dimensions (outside diameter D and wall thickness T) (see Table 6);
- 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) Specification of leak-tightness test method (see 8.4.3.1).
- 5) Non-Destructive Testing for test category 2 tubes for the detection of transverse imperfections (see 8.4.3.2).
- 6) Non-Destructive Testing for test category 2 tubes for the detection of laminar imperfections (see 8.4.3.2)
- 7) Special end preparation (see 8.6).
- 8) Exact lengths (see 8.7.3).
- 9) The type of inspection document other than the standard document (see 9.2.1).
- 10) Transverse weld tensile test (see Table 9).
- 11) Test pressure for hydrostatic leak-tightness test (see 11.9.1).
- 12) Wall thickness measurement away from the ends (see 11.10).
- 13) Non-Destructive Testing method for the inspection of the weld seam (see 11.12.1).
- 14) Non-Destructive Testing method for the inspection of the tube body (see 11.12.2)
- 15) Additional marking (see 12.2).
- 16) Protection (see 13).

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6.3 Example of an order

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500 m of electric welded tube with an outside diameter of 168,3 mm, a wall thickness of 4,5 mm in accordance with EN 10217-4, made of steel grade P265NL, test category 1, with a 3.1.C inspection certificate in accordance with EN 10204:

500 m - Tube - 168,3 x 4,5 - EN 10217-4 - P265NL - TC 1 - Option 9: 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.

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.

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

EN 10217-4:2002 (E)

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 high frequency welding (HFW), minimum frequency 100 kHz, by the manufacturing process and routes as specified in Table 1.

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

Option 1: *The manufacturing route is specified by the purchaser.*

The finished tubes shall not include welds used for joining together lengths of the strip prior to forming.

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

Table 1 — Tube manufacturing route and delivery condition

Route N°	Routes		Delivery condition
	Starting material	Forming operation	
1	Normalising rolled or Normalised strip	Cold formed (+welded)	Normalising weld zone or Normalising (entire tube)
2a	As (hot) rolled or normalising rolled strip	Cold formed (+welded)	Normalising (entire tube)
2b		Cold formed (+welded) + hot stretch reduced	Normalising (entire tube)
2c		Cold formed (+ welded) + hot stretch reduced at a controlled temperature to give a normalised condition	Normalised rolled

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.

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.

NOTE When welding tubes produced in accordance with this Part of EN 10217, 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.

8.2.2 Product analysis

Option 3: *Product analysis for the tube shall be supplied.*

Table 3 specifies the permissible deviations of the product analysis from the specified limits on cast analysis given in Table 2.

8.3 Mechanical properties

The mechanical properties of the tubes shall conform to the requirements in Tables 4 and 5 and in clauses 11.4, 11.5, 11.6 and 11.7.

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Table 2 — Chemical composition (cast analysis) ^a, in % by mass

Steel grade		C max	Si max	Mn		P max	S max	Cr max	Mo max	Ni max	Al _{total} ^b	Cu ^c max	Nb max	Ti max	V max
Steel name	Steel number			Min	max										
P215NL	1.0451	0,15	0,35	0,40	1,20	0,025	0,020	0,30	0,08	0,30	0,020	0,30	0,010	0,03	0,02
P265NL	1.0453	0,20	0,40	0,60	1,40	0,025	0,020	0,30	0,08	0,30	0,020	0,30	0,010	0,03	0,02

^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 steel making process.

^b Al/N ≥ 2, if nitrogen is fixed by niobium, titanium or vanadium the requirement for Al_{tot} and Al/N do not apply.

^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.

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