Welded stainless steel tubes for the conveyance of aqueous liquids including water for human consumption

Technical delivery conditions
English version of DIN EN 10312

DIN
EN 10312

ICS 23.040.10

Supersedes parts of DIN 17455, February 1999 edition.

Geschweißte Rohre aus nichtrostenden Stählen für den Transport wässriger Flüssigkeiten einschließlich Trinkwasser – Technische Lieferbedingungen

European Standard EN 10312 : 2002 has the status of a DIN Standard.

A comma is used as the decimal marker.

National foreword

This standard has been prepared by ECISS/TC 29.

The responsible German body involved in the preparation of this standard was the *Normenausschuss Eisen und Stahl* (Steel and Iron Standards Committee), Technical Committee *Nichtrostende Stahlrohre*.

Amendments

Parts of DIN 17455, February 1999 edition, have been superseded by the specifications of EN 10312.

Previous editions

DIN 17455: 1985-07, 1999-02.

EN comprises 25 pages.

Ref. No. DIN EN 10312 : 2003-04
English price group 13 *Sales No. 1113*
07.03

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 10312

December 2002

ICS 23.040.10

English version

Welded stainless steel tubes for the conveyance of aqueous liquids including water for human consumption

Technical delivery conditions

Tubes soudés en acier inoxydable pour le transport des liquides aqueux, y compris l'eau destinée à la consommation humaine – Conditions techniques de livraison

Geschweißte Rohre aus nichtrostenden Stählen für den Transport wässriger Flüssigkeiten einschließlich Trinkwasser – Technische Lieferbedingungen

This European Standard was approved by CEN on 2002-10-16.

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.

The European Standards exist 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, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

Ref. No. EN 10312 : 2002 E

Contents

Page

Foreword 4

Introduction 4

1 Scope 5

2 Normative references 5

3 Terms and definitions 6

4 Symbols 6

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 7
6.3 Example of an order 7

7 Manufacturing process 7
7.1 Grades of steel for feedstock material 7
7.2 Tube manufacture and delivery conditions 7

8 Requirements 8
8.1 General 8
8.2 Chemical analysis 8
8.3 Mechanical properties 8
8.4 Corrosion resistance 8
8.5 Appearance and soundness 8
8.6 Straightness 9
8.7 Preparation of ends 9
8.8 Dimensions, masses and tolerances 9
8.9 Reaction to fire 12

9 Inspection 12
9.1 Type of inspection 12
9.2 Inspection documents 12
9.3 Content of inspection document 12
9.4 Summary of inspection and testing 13

10 Sampling 14
10.1 Frequency of tests 14
10.2 Preparation of samples and test pieces 14

11 Test methods 14
11.1 Tensile test 14
11.2 Drift expanding test 14
11.3 Flattening test 14
11.4 Leak-tightness test 15
11.5 Non-destructive test of weld seam 15
11.6 Visual examination 15
11.7 Dimensional inspection 15
11.8 Intergranular corrosion test 16
11.9 Material identification 16

12 **Retests, sorting and reprocessing** 16

13 **Marking** 16

14 **Packaging** 16

Annex A (informative) **Preferred steel grades** 17

Annex B (informative) **Recommended use of tubes** 18

Annex ZA (informative) **Clauses of this European Standard addressing the provisions of the EU Construction Products Directive** 19

Bibliography 25

Foreword

This document EN 10312:2002 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 June 2003, and conflicting national standards shall be withdrawn at the latest by September 2004.

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.

Another European Standard covering tubes for the conveyance of aqueous liquids including water for human consumption is:

EN 10224, *Non-alloy steel tubes and fittings for the conveyance of aqueous liquids including water for human consumption — Technical delivery conditions.*

Annexes A and B are informative.

This document includes a Bibliography.

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.

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this standard:

a) this standard provides no information as to whether the product may be used without restriction in any of the member states of the EU or EFTA;

b) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

The European Committee for Standardisation (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning steel grade 1.4362 given in Table A1.

CEN takes no position concerning the evidence, validity and scope of this patent right.

The holder of this permit has assured CEN that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with CEN. Information may be obtained from

AB Sandvik Steel

20-SLS, FoU Centrum

SE-811 81 SANDVIKEN

Sweden

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those indicated above. CEN is not responsible for identifying any such patent rights.

1 Scope

This European Standard specifies the technical delivery conditions for light gauge welded stainless steel tubes, primarily for water application, including water intended for human consumption, supplied in straight lengths and suitable for use with compression fittings or press fittings or for adhesive bonding, silver brazing or inert gas welding of capillary fittings. The standard is applicable to the size range from 6 mm to 267 mm outside diameter made of stainless (except martensitic and precipitation hardening) steel grades taken from EN 10088-2.

2 Normative references

This European Standard incorporates by dated 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 dated 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).

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

EN 10020:2000, *Definition and classification of grades of steel.*

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

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

EN 10088-1, *Stainless steels — Part 1: List of stainless steels.*

EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip for general purposes.*

prEN 10168[1)], *Iron and steel products — Inspection documents — List of information and description.*

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

EN 10233, *Metallic materials — Tube — Flattening test.*

EN 10234, *Metallic materials — Tube — Drift expanding 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 10246-2, *Non-destructive testing of steel tubes - Part 2: Automatic eddy current testing of seamless and welded (except submerged arc-welded) austenitic and austenitic-ferritic 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 10246-8, *Non-destructive testing of steel tubes — Part 8: Automatic ultrasonic testing of the weld seam of electric welded steel tubes for the detection of longitudinal imperfections.*

---

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.

prEN 10266, *Steel tubes, fittings and structural hollow sections - Definitions and symbols 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).*

EN ISO 2566-2, *Steel - Conversion of elongation values - Part 2: Austenitic steels (ISO 2566-2:1984).*

EN ISO 3651-1, *Determination of resistance to intergranular corrosion of stainless steels - Part 1: Austenitic and ferritic-austenitic (duplex) stainless steels - Corrosion test in nitric acid medium by measurement of loss in mass (Huey test) (ISO 3651-1:1998).*

EN ISO 3651-2, *Determination of resistance to intergranular corrosion of stainless steels - Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels - Corrosion test in media containing sulfuric acid (ISO 3651-2:1998).*

3 Terms and definitions

For the purposes of this European Standard the terms and definitions given in EN 10020:2000, EN 10021, EN 10052, and prEN 10266 apply.

4 Symbols

See prEN 10266.

5 Classification and designation

5.1 Classification

The classification of the steels contained in this European Standard is given in EN 10088-1.

5.2 Designation

For tubes covered by this European Standard, the steel designation consists of the number of this European Standard (EN 10312) and either the steel name in accordance with EN 10027-1 and CR 10260 or the steel number in accordance with EN 10027-2.

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 (total length or number);

b) the term tube;

c) the tube series and the dimensions (outside diameter, wall thickness) (see Tables 1 and 2 and annex B);

d) the steel designation according to this European Standard (see 5.2);

e) the length (5 m or 6 m) (see 8.8.3).

6.2 Options

A number of options are specified in this European Standard 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.

1) annealed or solution annealed condition depending on grade (see 7.2);

2) intergranular corrosion test (see 8.4);

3) for use with capillary, compression or press fittings (see 8.5.1 and annex B);

4) lengths other than 5 m and 6 m (see 8.8.3);

5) removal of the internal weld bead (see 8.8.6);

6) specific inspection (see 9.1);

7) selection of leak tightness test method (see 11.4.1);

8) marking on a label (see clause 13);

9) end protection of the tubes or bundles of tubes (see clause 14).

6.3 Example of an order

EXAMPLE 1000 m of welded steel tube in accordance with EN 10312 series 1 with an external diameter of 76,1 mm, a wall thickness of 1,5 mm, in standard lengths of 6 m made of steel grade X5CrNi 18-10 and with marking on a label would have the following description:

1000 m tube — series1 76,1 × 1,5 — EN 10312 X5CrNi18-10 —6— option 8

7 Manufacturing process

7.1 Grades of steel for feedstock material

The grades of steel required shall be specified from EN 10088-2.

A list of preferred grades is given in annex A.

7.2 Tube manufacture and delivery conditions

Tube shall be manufactured from steel strip and longitudinally welded without the addition of filler material. Tubes shall not include welds used for joining lengths of strip.

Tube shall be supplied in the as-welded condition unless option 1 is specified.

Option 1: The tubes shall be supplied in the solution-annealed condition (austenitic or austenitic-ferritic steels) or the annealed condition (ferritic steels).

When tubes in the annealed condition are specified (see option 1), they shall meet a hardness requirement The hardness test method, test load and values to be achieved shall be agreed at the time of enquiry and order.

8 Requirements

8.1 General

The tubes, when supplied in a delivery condition given in 7.2 and inspected in accordance with clause 9 shall conform to the requirements of this European Standard.

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

8.2 Chemical analysis

Chemical analysis shall be in accordance with EN 10088-2. The cast analysis reported by the steelmaker shall apply.

8.3 Mechanical properties

Mechanical properties shall be in accordance with EN 10088-2.

8.4 Corrosion resistance

In accordance with EN 10088-2 some steels have resistance to intergranular corrosion. When option 2 is specified, tubes shall be tested in accordance with 11.8.

Option 2: The tubes shall be subjected to an intergranular corrosion test (see 11.8).

8.5 Appearance and soundness

8.5.1 Appearance

The tubes shall be smooth and have a bright surface, free from all external and internal surface defects that can be detected by visual examination.

NOTE The welding conditions should be controlled so that the heat discoloration in the welded area is kept to a minimum, to ensure corrosion resistance is not reduced.

Surface imperfections, which encroach on the specified minimum wall thickness, shall be considered defects and tubes containing these shall be deemed not to conform to this European Standard.

The tubes are intended for general use unless option 3 is specified, then the outside surface including the weld area and tube ends shall be suitable for the type of fitting specified.

Option 3: Tubes shall be suitable for use for capillary, compression or press fittings, purchaser to specify which type at the time of enquiry and order.

NOTE A surface roughness value can be agreed at the time of enquiry and order.

8.5.2 Soundness

The tubes shall pass a leak tightness test in accordance with 11.4.2, 11.4.3 or 11.4.4. The full length of the weld seam shall be subjected to a non-destructive test in accordance with 11.5 for the detection of imperfections.

8.6 Straightness

The deviation from straightness of any tube length L shall not exceed 0,0015 L. Deviations from straightness over any 1 m length shall not exceed 3 mm for series 1 tubes. For series 2 tubes deviations from straightness shall not exceed:

— 2 mm for 12 mm < D < 128 mm.

and

— 2,5 mm for $D \geq 128$ mm

8.7 Preparation of ends

The tubes shall be delivered with square cut ends, free from harmful burrs.

8.8 Dimensions, masses and tolerances

8.8.1 General

This European Standard covers two series of outside diameters and related wall thicknesses as given in Tables 1 and 2.

NOTE For recommended uses see annex B.

8.8.2 Mass

For the mass per unit length the values given in EN 10088-2 shall be used as a basis for the density of the steel grade concerned.

NOTE Information on the calculation of mass per unit length can be found in EN 10220 and EN ISO 1127.

Table 1 — Dimensions of light gauge stainless steel tubes — Series 1

Dimensions in millimetres

Specified outside diameter *D*	Outside diameter		Specified wall thickness *T*
	maximum	minimum	
6	6,04	5,94	0,6
8	8,04	7,94	0,6
10	10,04	9,94	0,6
12	12,04	11,94	0,6
15	15,04	14,94	0,6
18	18,04	17,94	0,7
22	22,05	21,95	0,7
28	28,05	27,95	0,8
35	35,07	34,97	1,0
42	42,07	41,97	1,1
54	54,07	53,84	1,2
66,7	66,75	66,08	1,2
76,1	76,30	75,54	1,5
(103)	103,8	102,2	1,5
108	108,3	107,2	1,5
(128)	129,0	127,0	1,5
133	133,5	132,2	1,5
(153)	154,5	151,5	1,5
159	159,5	157,9	2,0

NOTE Non-preferred sizes of tube are shown in parentheses

Table 2 — Dimensions of light gauge stainless steel tubes — Series 2

Dimensions in millimetres

Specified outside diameter *D*	Tolerance on *D*	Specified wall thickness *T*	Tolerance on *T*
12,0	± 0,10	1,0	± 0,10
15,0	± 0,10	1,0	± 0,10
18,0	± 0,10	1,0	± 0,10
22,0	± 0,11	1,2	± 0,10
28,0	± 0,14	1,2	± 0,10
35,0	± 0,18	1,5	± 0,10
42,0	± 0,21	1,5	± 0,10
54,0	± 0,27	1,5	± 0,10
64,0	± 0,32	2,0	± 0,15
76,1	± 0,38	2,0	± 0,15
88,9	± 0,44	2,0	± 0,15
108,0	± 0,54	2,0	± 0,15
133,0	± 1,00	3,0	± 0,30
159,0	± 1,00	3,0	± 0,30
219,0	± 1,50	3,0	± 0,30
267,0	± 1,50	3,0	± 0,30

8.8.3 Length

The tube shall be supplied in standard lengths of 5 m or 6 m, the length to be specified at the time of enquiry and order, unless option 4 is specified.

Option 4: The tubes shall be supplied in lengths other than 5 m and 6 m, the length shall be agreed at the time of enquiry and order.

8.8.4 Tolerance on outside diameter

The tolerance on outside diameter shall be within the limits given in Tables 1 and 2. Out of roundness is included in the tolerance.

8.8.5 Tolerance on wall thickness

The tolerance on wall thickness shall be:

— ± 10 % for series 1 tubes;

— as given in Table 2 for series 2 tubes.

8.8.6 Height of the weld seam

The external weld seam shall be removed. The internal weld seam need not be removed unless option 5 is specified.

Option 5: The internal weld seam shall be removed.

8.8.7 Tolerance on length

The tolerance on standard lengths is ± 20 mm. For lengths other than standard lengths, tolerances shall be agreed at the time of enquiry and order.

8.9 Reaction to fire

The tube material is class A1[2)] .

9 Inspection

9.1 Type of inspection

Conformity to the requirements of the order shall be checked by non-specific inspection unless option 6 is specified.

Option 6: The tubes shall be subjected to specific inspection.

9.2 Inspection documents

For tubes supplied with non-specific inspection, a test report 2.2 in accordance with EN 10204 shall be issued. For tubes supplied with specific inspection, an inspection certificate 3.1.B in accordance with EN 10204 shall be issued.

9.3 Content of inspection document

The content of the inspection document shall be in accordance with prEN 10168 as given below.

The test report or the inspection certificate shall contain the following codes and information:

A	Commercial transactions and parties involved.
B	Description of products to which the inspection document applies.
C02	Directions of the test pieces for D = 267,0 mm.

---

2) In accordance with Commission Decision 96/603/EEC of 4 October 1996 the material is class A1 and therefore does not require to be tested for reaction to fire.

C10-C13	Tensile tests if applicable.
C30-C39	Hardness test if applicable.
C60-C69	Other tests.
C71-C92	Chemical composition.
D01	Marking and identification, the surface appearance, the shape and dimensional properties.
D02-D99	Leak Tightness Test, NDT of the weld.
Z	Validation.

9.4 Summary of inspection and testing

Inspection and testing shall be carried out in accordance with Table 3.

Table 3 — Summary of inspection and testing

Test/Inspection		Frequency of testing		Clause reference
		Non-specific inspection and testing	Specific inspection and testing	
Mandatory	Cast analysis	Steel manufacturers cast analysis	Steel manufacturers cast analysis	8.2
	Hardness test [a]	By agreement		7.2
	Tensile test [b]	Manufacturer's procedure	1/test unit	11.1
	Drift expanding test for $D \leq 150$ mm	Manufacturer's procedure	1/test unit	11.2
	Flattening test	Manufacturer's procedure	1/test unit	11.3
	Leak tightness test	Individual	Individual	11.4
	Weld NDT	Individual	Individual	11.5
	Visual examination	See 11.6		
	Dimensional inspection	See 11.7		
Optional	Material identification	Individual	Individual	11.9
	Intergranular corrosion test	Not applicable	By agreement	11.8

[a] Only for ferritic steel tubes supplied annealed when option 1 is specified.

[b] Only for tubes supplied in accordance with Table 2.

10 Sampling

10.1 Frequency of tests

10.1.1 Test unit

A test unit shall consist of not more than 400 tubes per steel grade and specified dimension.

10.1.2 Number of sample tubes

One sample tube shall be taken from each test unit.

10.2 Preparation of samples and test pieces

Samples and test pieces shall be taken at the tube ends in accordance with the requirements of EN ISO 377.

The test piece for the tensile test shall be prepared in accordance with EN 10002-1 and shall either be a full tube section or a strip section taken from opposite the weld in the direction longitudinal to the axis of the tube.

The test pieces for the drift expanding test and the flattening test shall consist of a full tube section and shall be in accordance with EN 10233 for the flattening test and EN 10234 for the drift expanding test.

Test pieces for the intergranular corrosion test shall be in accordance with EN ISO 3651-1 or EN ISO 3651-2 (see 11.8).

11 Test methods

11.1 Tensile test

The test shall be carried out in accordance with EN 10002-1 and the following determined:

— the tensile strength (R_m);

— the 0,2 % proof strength ($R_{p\ 0,2}$) and 1,0 % proof strength ($R_{p\ 1,0}$);

— the percentage elongation after fracture with a reference to a gauge length L_o of 5,65 $\sqrt{S_o}$. If a non-proportional test piece is used, the percentage elongation value shall be converted to the value for a gauge length $L_o = 5,65\sqrt{S_o}$ using the tables in EN ISO 2566-2.

11.2 Drift expanding test

The test shall be carried out in accordance with EN 10234.

For austenitic and austenitic-ferritic steels the tube section shall be expanded at one end using a conical tool having an included angle, β (see EN 10234) of 60° until the maximum outside diameter of the expanded end exceeds the original outside diameter by 25 %. For ferritic steels the test criteria shall be agreed at the time of enquiry and order.

11.3 Flattening test

The test shall be carried out in accordance with EN 10233.

For austenitic and austenitic-ferritic steels, the tube section shall be flattened at room temperature between the platens until the distance between the platens is 5*T*. The weld shall be placed at 90° to the direction of flattening. For ferritic steels the test criteria shall be agreed at the time of enquiry and order.

11.4 Leak-tightness test

11.4.1 General

The choice of the test method is at the discretion of the manufacturer, unless option 7 is specified.

Option 7: The test method for verification of leak tightness in accordance with 11.4.2 or 11.4.3 or 11.4.4 is specified by the purchaser.

11.4.2 Eddy current test

Depending on the type of steel, the test shall be carried out in accordance with one of the following standards:

— EN 10246-1 for ferromagnetic steels;

— EN 10246-2 for austenitic steels and ferritic-austenitic steels.

11.4.3 Hydrostatic test

The hydrostatic test shall be carried out at a minimum gauge pressure of 50 bar[3)] for tubes up to and including 76,1 mm outside diameter, and of 30 bar [3)] for tubes greater than 76,1 mm outside diameter.

The tube shall withstand the test pressure without leakage or visible deformation.

NOTE The hydrostatic test is not a strength test.

11.4.4 Pneumatic test

The tube shall be tested with air under water at a minimum pressure of 6 bar[3)]. No air bubbling shall occur.

11.5 Non-destructive test of weld seam

Non-destructive testing of the weld seam shall be carried out in accordance with one of the standards given below for the detection of imperfections.

— EN 10246-3 to acceptance level E4(H);

— EN 10246-8 to acceptance level U4 (minimum notch depth shall be agreed at the time of enquiry and order).

11.6 Visual examination

Tubes shall be visually examined and shall conform to 8.5.1.

11.7 Dimensional inspection

The specified dimensions shall be verified.

---

3) 1 bar = 10^5 N/m^2 = 10^5Pa.

Wall thickness shall be measured at the tube end.

The tube diameter shall be measured at a distance of not less than 10 mm or more than 3*D* from the end of the tube.

11.8 Intergranular corrosion test

The test shall be carried out in accordance with EN ISO 3651-1 or EN ISO 3651-2, details to be agreed at the time of enquiry and order.

11.9 Material identification

Each tube shall be tested to assure that the correct grade is being supplied.

12 Retests, sorting and reprocessing

Retests, sorting and reprocessing shall be in accordance with EN 10021.

13 Marking

Unless option 8 is specified, the information shall be marked indelibly on each tube at intervals of not more than 1 m.

Option 8: Marking shall be applied on a label attached to the bundle or the box of the tubes.

The marking shall include the following information:

- the manufacturer's name or trade mark;
- the number of this European Standard;
- the steel name or number;
- the dimensions;
- in case of specific inspection;
  - an identification number (e.g. order or item number) which permits the correlation of the product or delivery unit to the related document;
  - the mark of the inspection representative.

14 Packaging

Carbon steel strapping shall not come into contact with the tubes. Tube ends need not be protected unless option 9 is specified for tubes to be used for water for human consumption.

Option 9: Tubes or bundles of tubes shall be supplied with protection at the ends.

Annex A
(informative)

Preferred steel grades

Table A.1 lists preferred grades of steel, which can be used. The steels conform to EN 10088-2.

Table A.1 — Steel grades

Type of steel	Steel Grade	
	Steel Name	**Steel Number**
Ferritic	X3CrTi17	1.4510
	X3CrNb17	1.4511
	X2CrMoTi18-2	1.4521
Austenitic	X2CrNi18-9	1.4307
	X2CrNi19-11	1.4306
	X5CrNi18-10	1.4301
	X6CrNiTi18-10	1.4541
	X2CrNiMo17-12-2	1.4404
	X5CrNiMo17-12-2	1.4401
	X6CrNiMoTi17-12-2	1.4571
	X2CrNiMo17-12-3	1.4432
	X3CrNiMo17-13-3	1.4436
	X2CrNiMo18-14-3	1.4435
	X2CrNiMoN17-13-5	1.4439
	X1NiCrMoCu25-20-5	1.4539
	X1CrNiMoCuN20-18-7	1.4547
	X1NiCrMoCuN20-20-7	1.4529
Austenitic – ferritic	X2CrNiN23-4	1.4362 [a]
	X2CrNiMoN22-5-3	1.4462

[a] Patented grade.

Annex B
(informative)

Recommended use of tubes

The recommended use of tubes, manufactured in accordance with this European Standard, with fittings, is given in Table B.1.

Table B.1 — Recommended use of tubes with fittings

Fitting	Series 1	Series 2
Capillary	Yes [a]	No
Compression	Yes [b]	Yes
Press	Yes [b]	Yes
NOTE Diameters and wall thickness should be in accordance with Tables 1 and 2.		
[a] Tubes for use with capillary fittings supplied with outside diameter *D* in accordance with series 1 may have their wall thickness in accordance with series 2. [b] Care needs to be taken to avoid damaging the tube.		

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of the EU Construction Products Directive

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under a Mandate M131 (Pipes, Tanks and Ancillaries not in contact with water intended for human consumption) given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard shown in this annex meet the requirements of the mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the construction products covered by this annex for the intended uses indicated herein; reference shall be made to the information accompanying the CE marking.

WARNING: Other requirements and other EU Directives, not affecting the fitness for intended use may be applicable to a construction product falling within the scope of this standard.

Note: In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply. Note: an informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (CREATE, accessed through http://europa.eu.int).

This annex establishes the conditions for the CE marking of the tubes intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable:

The scope of this annex is defined by Table ZA.1

Table ZA.1 - Relevant clauses for product and intended use

Product:	Steel Tube
Intended use:	In installations for the transport/disposal/storage of water not intended for human consumption.

The tubes may be used for water intended for human consumption, in accordance with national regulations. Certification for contact with water intended for human consumption remains the competence of each Member State until the acceptance of a European Acceptance Scheme.

Essential characteristic	Requirement clauses in this European Standard	Levels and/or classes	Notes
Reaction to fire	8.9	Class A1	-
Proof strength	8.3	-	MPa
Dimensional tolerances [a]	8.8 except for 8.8.3 and 8.8.6	-	mm or %
Tightness: Liquid	11.4	-	Pass/fail
Durability	11.8		For EN ISO 3651-1, mm/year or g/m^2/h, or for EN ISO 3651-2, immerse in test solution of Sulphuric and copper sulphate, followed by bend test and assessment

[a] When required, for the calculation of crushing strength, internal and external pressure strength, longitudinal bending strength, or the maximum load for admissible deformation, the weld bead is assumed to be flush with the surface of the tube.

The requirement on a certain characteristic is not applicable in those Member States (MSs) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these MSs are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option "No performance determined" (NPD) in the information accompanying the CE marking (see ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

ZA.2 Procedure for the attestation of conformity of tubes

ZA.2.1 General

Tubes for the intended use given in ZA.1 shall follow, the system of attestation of conformity in Table ZA.2, which is in accordance with the Decision of the Commission (1999/472/EC) of 1 July 1999. This requires

initial type testing by the manufacturer (see ZA 2.2) and compliance with the requirements for a factory production control system (see ZA 2.3).

Table ZA.2 - Attestation of conformity systems

Product	Intended use	Level(s) or class(es)	Attestation of conformity system(s)
Steel Tube	In installations for the transport/disposal/storage of water not intended for human consumption.	-	4
System 4: See Directive 89/106/EEC (CPD) Annex III.2. (ii), Third possibility.			

The attestation of conformity of the tubes in Table ZA.1 shall be based on the evaluation of conformity procedures indicated in Table ZA.3 resulting from application of the clauses of this European Standard indicated therein.

ZA.2.2 Initial type testing

ZA.2.2.1 General

The manufacturer shall declare the conformity of the initial type testing of all the applicable characteristics given in Table ZA.1. The following principles apply -.

1. Initial type testing shall be performed on first application of this standard in accordance with ZA 2.2.2.

2. Where products have previously been tested in accordance with the relevant requirements of this European Standard (same product, same essential characteristics, same test methods and same sampling regime), such tests may be taken into account for initial type testing purposes.

3. In addition, initial type testing shall be performed at the beginning of the production of a new product type or at the beginning of a new method of production (where this may affect the essential characteristics).

ZA.2.2.2 Programme of tests

Testing of the characteristics shown in Table ZA.1 of this European Standard shall be carried out on the largest and thickest and the smallest and thinnest product produced. If the difference in size between these two sizes is less than 10% of the outside diameter of the largest size only one test needs to be carried out. For the purposes of type testing this shall constitute the range.

Further type testing is required when the dimensions to be supplied are more than 10% outside the range previously tested.

ZA.2.2.3 Documentation

The results of the initial type-testing programme shall be recorded and such records shall be maintained and be made available for inspection for a period of at least 10 years after the date when the last product to which the test programme refers to were delivered.

ZA.2.3 Factory production control

The manufacturer shall establish, document and maintain a factory production control system to ensure that the products placed on the market conform to the technical specifications.

A factory production control system which complies with EN ISO 9001 [4] and which covers steel tubes is deemed to comply with the above and with the requirements for factory production control in ZA 2.1.

Table ZA.3 - Assignment of evaluation of conformity tasks for tubes under system 4

Tasks		Content of task	Evaluation of conformity clauses to apply
Tasks for the manufacturer	Factory production control	Parameters related to all relevant characteristics of Table ZA 1	ZA 2.3
	Initial type testing	All relevant characteristics of Table ZA 1	ZA 2.2

ZA.3 CE Marking

The CE marking shall be shown on the accompanying documents and contain the following information:

- the CE symbol given in directive 93/68/EC;
- the name or identifying mark and registered address of the producer
- the last two digits of the year in which the marking is affixed;
- the number of this European Standard;
- the product name and description - i.e. "tube + description of area of use";
- specified proof strength;
- reaction to fire - i.e. Euroclass A1;
- durability (where relevant) - i.e. information on resistance to intergranular corrosion;
- series number.

---

[4] For a transition period up to 16 December 2003, having a quality system that conforms to the requirements of EN ISO 9001/2:1994 is also deemed to satisfy the requirements.

In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation. Note: European legislation without national derogation's need not be mentioned.

Examples of typical CE marking are shown in Figures ZA.1 and ZA.2.

CE

AnyCo Ltd, P.O. Box 21, B - 1050

00

EN 10312

Tubes for use in installations for the transport/disposal/storage of water not intended for human consumption. Certification for contact with water intended for human consumption remains the competence of each Member State.

Reaction to fire : Euroclass A1

Minimum specified

proof strength : 230 MPa (From EN 10088-2)

Durability : Intergranular corrosion resistant

Series 1

Figure ZA.1 - Example 1 CE marking information - tubes series 1

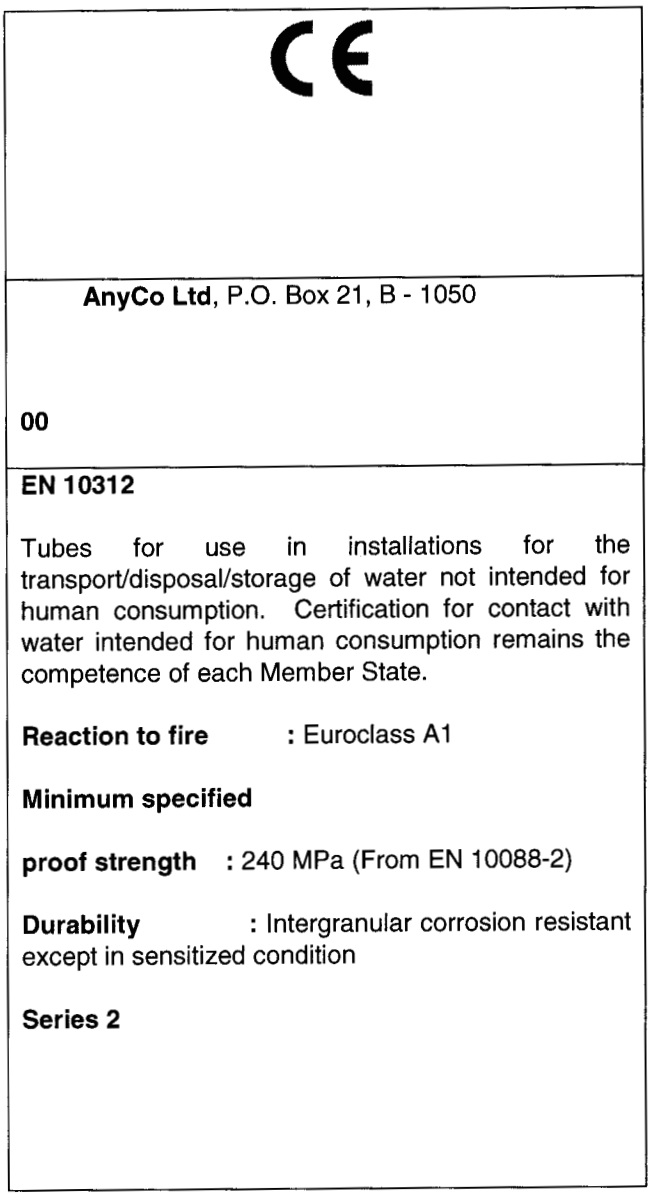

Figure ZA.2 - Example 2 CE marking information - tubes series 2

ZA.4 Declaration of conformity

The manufacturer or his authorised representative established in the EEA, shall prepare and retain a declaration of conformity, which entitles the manufacturer or his authorised representative to affix the CE marking. This declaration shall include:

- name and address of the manufacturer, or his authorised representative established in the EEA, and the place of production;
- description of the product (type, identification, use, etc.), and a copy of the information accompanying the CE marking;
- provisions to which the product conforms (e.g. annex ZA of this European Standard);
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);
- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

The above mentioned declaration shall be presented in the official language or langauges of the Member State in which the product is to be used.

Bibliography

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

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

EN 10220, *Seamless and welded steel tubes - General tables of dimensions and masses per unit length.*

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

EN ISO 1127, *Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length.*

EN ISO 9001, *Quality management systems - Requirements (ISO 9001:2000).*