
Baker in bakrove zlitine - Nevarjene okrogle bakrene cevi za medicinske pline in vakuumske sisteme

Copper and copper alloys - Seamless, round copper tubes for medical gases or vacuum

Kupfer und Kupferlegierungen - Nahtlose Rundrohre aus Kupfer für medizinische Gase oder Vakuum

Cuivre et alliages de cuivre - Tubes ronds sans soudure en cuivre pour gaz médicaux ou le vide

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ICS:

11.040.10	Anestezijska, respiratorna in reanimacijska oprema	Anaesthetic, respiratory and reanimation equipment
77.150.30	Bakreni izdelki	Copper products

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EUROPEAN STANDARD

EN 13348

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2001

ICS 23.040.15

English version

Copper and copper alloys - Seamless, round copper tubes for medical gases or vacuum

Cuivre et alliages de cuivre - Tubes ronds sans soudure en cuivre pour gaz médicaux ou le vide

Kupfer und Kupferlegierungen - Nahtlose Rundrohre aus Kupfer für medizinische Gase oder Vakuum

This European Standard was approved by CEN on 3 May 2001.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 133 "Copper and copper alloys", the secretariat of which is held by DIN.

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 January 2002, and conflicting national standards shall be withdrawn at the latest by January 2002.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 3.1 "Copper tubes" to prepare the following standard:

prEN 13348, *Copper and copper alloys — Seamless, round copper tubes for medical gases or vacuum.*

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of a EU Directive.

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

The annex A is normative.

This is one of a series of European Standards for copper and copper alloy tubes. Other products are specified as follows:

EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications.*

EN 12449, *Copper and copper alloys — Seamless, round tubes for general purposes.*

EN 12450, *Copper and copper alloys — Seamless, round copper capillary tubes.*

EN 12451, *Copper and copper alloys — Seamless, round tubes for heat exchangers.*

EN 12452, *Copper and copper alloys — Rolled, finned, seamless tubes for heat exchangers.*

EN 12735-1, *Copper and copper alloys — Seamless, round copper tubes for air conditioning and refrigeration — Part 1: Tubes for piping systems.*

EN 12735-2, *Copper and copper alloys — Seamless, round copper tubes for air conditioning and refrigeration — Part 2: Tubes for equipment.*

EN 13349, *Copper and copper alloys — Pre-insulated copper tubes with solid covering.*

prEN 13600, *Copper and copper alloys — Seamless copper tubes for electrical 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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

EN 13348:2001 (E)**Introduction**

It is recommended that tubes manufactured to this standard are certified as conforming to the requirements of this standard based on continuing surveillance which should be coupled with an assessment of a supplier's quality management system against EN ISO 9001.

Tubes to this European Standard are suitable for capillary soldering, brazing or assembling by mechanical compression or collared fittings.

NOTE Appropriate precautions should be taken if applying insulating material because it could be detrimental to the copper tube.

1 Scope

This European Standard specifies the requirements, sampling, test methods and conditions of delivery for copper tubes.

It is applicable to seamless round copper tubes having an outside diameter from 8 mm up to and including 54 mm for pipeline systems for distributing the following medical gases intended to be used at operating pressures up to 2 000 kPa and for systems under vacuum:

- oxygen, nitrous oxide, nitrogen, helium, carbon dioxide, xenon;
- air for breathing;
- specific mixtures of these above mentioned gases;
- air for driving surgical tools;
- anaesthetic gases and vapours;
- vacuum.

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2 Normative references

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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 723, *Copper and copper alloys — Combustion method for determination of carbon on the inner surface of copper tubes or fittings.*

EN 1971, *Copper and copper alloys — Eddy current test for tubes.*

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

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

EN 10232, *Metallic materials — Tube (in full section) — Bend test.*

EN 10234, *Metallic materials — Tube — Drift expanding test.*

EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1 : 1997).*

ISO 1553, *Unalloyed copper containing not less than 99,90 % of copper — Determination of copper content — Electrolytic method.*

ISO 4741, *Copper and copper alloys — Determination of phosphorus content — Molybdovanadate spectrometric method.*

NOTE Informative references to documents used in the preparation of this standard, and cited at the appropriate places in the text, are listed in the bibliography.

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1

seamless round copper tube

hollow semi-finished product, circular in cross-section, made of copper, having a uniform wall thickness, which at all stages of production has a continuous periphery, supplied in straight lengths or in coils

3.2

brazing; hard soldering

operation in which metal parts are joined by means of capillary action of a filler metal in the liquid state having a melting (liquidus) temperature higher than 450 °C but lower than that of the parts to be joined and wetting the parent metal(s), which does (do) not participate in the making of the joint

NOTE The definition is based on the definition given in ISO 857.

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3.3

mean diameter

arithmetical mean of any two diameters normal to each other at the same cross-section of the tube

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3.4

deviation from circular form

difference between the maximum and minimum outside diameters measured at any one cross-section of the tube

3.5

deviation from concentricity

half of the difference between the maximum and minimum wall thicknesses at the same cross-section of the tube

3.6

production batch

definite quantity of products of the same form, the same temper and the same cross-sectional dimensions manufactured during the same production sequence under uniform conditions

3.7

durably marked

marked in such a way that the marking will remain readable up to the time of commissioning of the installation

3.8

permanently marked

marked in such a way that the marking will remain readable up to the end of the life of the installation, e.g. by stamping, etching or engraving

EN 13348:2001 (E)

4 Designations

4.1 Material

4.1.1 General

The material is designated either by symbol or number (see 6.1).

4.1.2 Symbol

The material symbol designation is based on the designation system given in ISO 1190-1.

4.1.3 Number

The material number designation is in accordance with the system given in EN 1412.

4.2 Temper

For the purposes of this standard, the following designation, which is in accordance with the system given in EN 1173, applies for the temper (see Table 1):

R... Temper designated by the minimum value of tensile strength requirement for the product with mandatory tensile strength and elongation requirements.

4.3 Product

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The product designation provides a standardized pattern of designation from which a rapid and unequivocal description of a product is conveyed in communication. It provides mutual comprehension at the international level with regard to products which meet the requirements of the relevant European Standard.

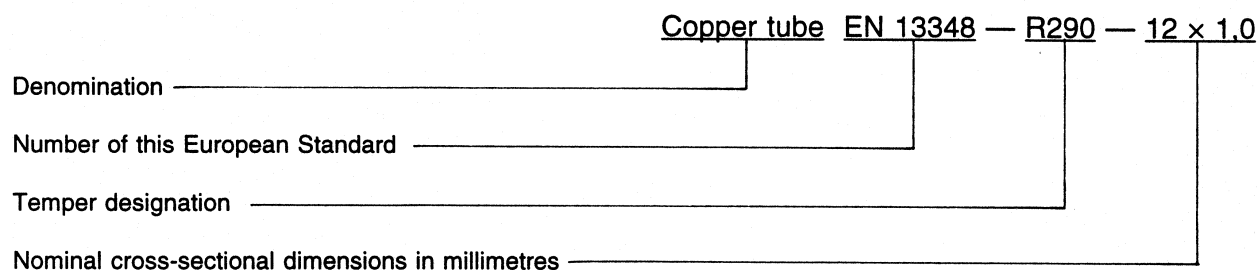
The product designation is no substitute for the full content of the standard.

The product designation for products to this standard shall consist of:

- denomination (Copper tube);
- number of this European Standard (EN 13348);
- temper designation (see Table 1);
- nominal cross-sectional dimensions: outside diameter × wall thickness.

The derivation of a product designation is shown in the following example.

EXAMPLE Copper tube conforming to this standard, in temper R290 (hard), nominal outside diameter 12 mm, nominal wall thickness 1,0 mm, shall be designated as follows:



5 Ordering information

In order to facilitate the enquiry, order and confirmation of order procedures between the purchaser and the supplier, the purchaser shall state on his enquiry and order the following information:

- quantity of product required (in metres);
- denomination (Copper tube);
- number of this European Standard (EN 13348);
- temper designation (see 4.2 and Table 1);
- nominal cross-sectional dimensions: outside diameter x wall thickness (see Table 3);
- whether an inspection document is required (see clause 9);
- nominal length (see 10.2);
- form of delivery (see 10.2).

NOTE It is recommended that the product designation, as described in 4.3, is used for items b) to e).

EXAMPLE Ordering details for 500 m copper tube conforming to EN 13348, in temper R290 (hard), nominal outside diameter 12 mm, nominal wall thickness 1,0 mm, nominal length 5 m, straight lengths:

**500 m Copper tube EN 13348 — R290 — 12 × 1,0
— 5 m straight lengths**

6 Requirements

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6.1 Composition

The composition shall conform to the following requirements:

Cu + Ag: min. 99,90 % <https://standards.iteh.ai/catalog/standards/sist/043fb152-c26d-4d26-a35a-1d4bb89c136f/sist-en-13348-2002>
0,015 % ≤ P ≤ 0,040 %

This copper grade is designated either Cu-DHP or CW024A.

6.2 Mechanical properties

The tensile strength and elongation shall conform to the requirements given in Table 1. The test shall be carried out in accordance with 8.2.

Table 1 — Mechanical properties

Temper		Tensile strength R_m MPa min.	Elongation A % min.	Hardness (indicative) HV 5
designation in accordance with EN 1173	common term			
R220 ^a	annealed ^a	220	40	(40 to 70)
R250	half hard	250	30	(75 to 100)
R290	hard	290	3	(min. 100)

NOTE 1 Hardness figures in parentheses are not requirements of this standard but are given for guidance purposes only.

NOTE 2 1 MPa is equivalent to 1 N/mm².

^a Mechanical properties are applicable only for tubes with wall thickness equal to or greater than 1,0 mm.