
Baker in bakrove zlitine - Nevarjene okrogle bakrene cevi za vodo in plin za sanitarne in ogrevalne namene

Copper and copper alloys - Seamless, round copper tubes for water and gas in sanitary and heating applications

Kupfer und Kupferlegierungen - Nahtlose Rundrohre aus Kupfer für Wasser- und Gasleitungen für Sanitärinstallationen und Heizungsanlagen

Cuivre et alliages de cuivre - Tubes ronds sans soudure en cuivre pour l'eau et le gaz dans les applications sanitaires et de chauffage

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This European Standard was approved by CEN on 23 March 2006 and includes Amendment 1 approved by CEN on 10 January 2010.

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EN 1057:2006+A1:2010 (E)**Foreword**

This document (EN 1057:2006+A1:2010) 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of an identical text or by endorsement, at the latest by August 2010, and conflicting national standards shall be withdrawn at the latest by August 2010.

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

This document includes Amendment 1, approved by CEN on 2010-01-10.

This document supersedes A1 EN 1057:2006 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 3 "Copper tubes (installation and industrial)" to prepare the revision of the following standard:

EN 1057:1996, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

This document has been prepared within the framework of two mandates given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of the EU Construction Products Directive (CPD) 89/106/EEC and the EU Pressure Equipment Directive (PED) 97/23/EC.

For relationship with EU Directives, see informative Annexes ZA and ZB, which are integral parts of this document.

In comparison with the first edition of EN 1057:1996, the following significant technical changes were made:

- harmonization of the standard to the Construction Product Directive (CPD) and to the Pressure Equipment Directive (PED);
- introduction of two new definitions: "permanently marked" and "durably marked";
- updating of the definitions regarding soldering, brazing, fusion welding, braze welding and mean diameter;
- introduction of five new items in Clause 5 "Ordering information" regarding options on tests and documents;
- due to the process of harmonization to the CPD, introduction of three new characteristics in Clause 6 "Material characteristics" inherent to copper material which are not to be tested;
- modification of Table 3 "Standardized dimensions";
- simplification of Table 6 "Quantitative and qualitative specification for carbon residues": Suppression of the residual and potential carbon and application of the thresholds to the total carbon;
- text in Clause 8 "Evaluation of conformity" added due to the process of harmonization to the CPD;
- for permanent and durable markings, specification of their applicability in 12.1 "Marking";
- modification of the table in Annex A, introduction of new diameters and wall thicknesses;
- due to the process of harmonization to the CPD and PED introduction of Annexes ZA and ZB.

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

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

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

EN 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, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EN 1057:2006+A1:2010 (E)**Introduction**

Products in conformity with this European Standard are considered suitable for drinking water applications subject to either

- a) compliance with any national regulations in the country of intended destination; or
- b) compliance in due course with the proposed European Acceptance Scheme (EAS) that will introduce common EU requirements for testing for fitness for contact with drinking water. When the EAS is implemented, this European Standard will have added to it a special Annex (Z/EAS) to incorporate the provisions of the EC mandate M/136 and a) will no longer be applicable.

This European Standard provides the basis for the assessment of a manufacturer's production process for products manufactured in accordance with this European Standard. The assessment could be based on initial and continuing surveillance of the factory production control system which could be concurrent with an assessment of the manufacturer's quality management system against EN ISO 9001.

Regulatory marking and the means by which regulatory marking is applied, is dealt with in Annex ZA.

Tubes having an outside diameter of not more than 108 mm are suitable for soldering, brazing or assembling by mechanical compression, collared, push-fit or press fittings. For tubes having an outside diameter of more than 108 mm, assembly should preferably be performed by welding or braze welding.

Reference can be made to this European Standard for tubes intended for other applications or for the transportation of other fluids. In such cases special requirements (for specifications, conditioning or delivery conditions) can be agreed between the purchaser and the supplier.

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

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1 Scope

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

It is applicable to tubes having an outside diameter from 6 mm up to and including 267 mm for:

- distributing networks for hot water and cold water;
- hot water heating systems, including panel heating systems (under-floor, wall, overhead);
- domestic gas and liquid fuel distribution;
- waste water sanitation.

It is also applicable to seamless round copper tubes intended to be pre-insulated before use for any of the above purposes.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 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 10204:2004, *Metallic products — Types of inspection documents*

EN ISO 8491, *Metallic materials — Tube (in full section) — Bend test (ISO 8491:1998)*

EN ISO 8493, *Metallic materials — Tube — Drift-expanding test (ISO 8493:1998)*

EN ISO 8494, *Metallic materials — Tube — Flanging test (ISO 8494:1998)*

EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1:2005)*

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

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.

EN 1057:2006+A1:2010 (E)**3 Terms and definitions**

For the purposes of this document, 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

3.2**soldering/brazing**

joining process in which, during or after heating, molten filler metal is drawn into or retained in the space between closely adjacent surfaces of the parts to be joined by capillary attraction

3.2.1**soldering**

soft soldering

joining process using filler metal with a liquidus temperature of 450 °C or less

[ISO 857-2:2005]

3.2.2**brazing**

hard soldering

joining process using filler metal with a liquidus temperature above 450 °C

[ISO 857-2:2005]

3.3**fusion welding**

welding without application of outer force in which the facing surface(s) has (have) to be molten; usually, but not necessarily, molten filler metal is added

[ISO 857-1:1998]

3.4**braze welding**

method of welding by using a filler metal that liquefies above 450 °C and below the solid state of the base metals. Unlike brazing, in braze welding, the filler metal is not distributed in the joint by capillary action

3.5**mean diameter**

arithmetical mean of the maximum and minimum outside diameters through the same cross-section of the tube

3.6**deviation from circular form**

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

3.7**deviation from concentricity**

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

3.8**production batch**

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

3.9**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

3.10**durably marked**

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

EXAMPLE ink marking

4 Designations**4.1 Material****4.1.1 General**

The material is designated either by symbol or number (see 7.1).

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 Material condition

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

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

4.3 Product

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 European Standard shall consist of:

- denomination (Copper tube);
- number of this European Standard (EN 1057);
- material condition designation (see Table 1);
- nominal cross-sectional dimensions in millimetres: outside diameter × wall thickness.

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

EXAMPLE Copper tube conforming to this European Standard, material condition R220 (annealed), nominal outside diameter 12 mm, nominal wall thickness 1,0 mm, shall be designated as follows: