

SVENSK STANDARD

SS-EN 12450:2012



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Koppar och kopparlegeringar – Sömlösa, runda kapillärrör av koppar

Copper and copper alloys – Seamless, round copper capillary tubes



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Europastandarden EN 12450:2012 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 12450:2012.

Denna standard ersätter SS-EN 12450, utgåva 1.

The European Standard EN 12450:2012 has the status of a Swedish Standard. This document contains the official version of EN 12450:2012.

This standard supersedes the Swedish Standard SS-EN 12450, edition 1.

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Denna standard är framtagen av kommittén för Koppar, SIS/TK 132.

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EUROPEAN STANDARD

EN 12450

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2012

ICS 23.040.15; 77.150.30

Supersedes EN 12450:1999

English Version

Copper and copper alloys - Seamless, round copper capillary tubes

Cuivre et alliages de cuivre - Tuyaux circulaires en cuivre, de faible diamètre, sans soudure

Kupfer und Kupferlegierungen - Nahtlose, runde Kapillarrohre aus Kupfer

This European Standard was approved by CEN on 6 October 2012.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 12450:2012) 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 May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.

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 supersedes EN 12450:1999.

In comparison with EN 12450:1999, the following significant technical changes were made:

- a) 6.6 "Surface quality", has been modified;
- b) In 8.5 "Cleanliness test" the text regarding the determination of lubricant residue as described in EN 723 has been added.

This is one of a series of European Standards for copper and copper alloy tubes. Other products are, or will be, 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 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*

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

- EN 12450:1999, *Copper and copper alloys — Seamless, round copper capillary tubes.*

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

SS-EN 12450:2012 (E)**1 Scope**

This European Standard specifies the composition, property requirements and tolerances on dimensions and on form for seamless round copper capillary tubes for use as metering lines for liquids or gases where close controls over the smoothness and dimensions of the bore are required to ensure uniform flow characteristics.

This European Standard applies to capillary tubes in straight lengths, or in coils, in the size range up to and including 6,10 mm outside diameter and from 0,30 mm up to and including 4,45 mm inside diameter which are intended for restrictor applications.

The sampling procedures and the methods of test for verification of conformity to the requirements of this European Standard are also specified.

2 Normative references

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

EN 1057:2006, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 1655, *Copper and copper alloys — Declarations of conformity*

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

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

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1057:2006 and the following apply.

3.1 seamless round tube
hollow semi-finished product, circular in cross-section, having a uniform wall thickness, which at all stages of production has a continuous periphery

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

[SOURCE: EN 1057:2006, 3.5]

3.3 deviation from circular form
difference between the maximum and minimum outside diameters measured at any one cross-section of the tube

[SOURCE: EN 1057:2006, 3.6]

3.4 capillary tube
tube of small inside diameter with an inside surface of high quality and conforming to close diameter tolerances

Note 1 to entry: It is subject to special tests to ensure precision and uniformity of bore, having been specially cleaned.

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.

NOTE Although material symbol designations used in this standard might be the same as those in other standards using the designation system given in ISO 1190-1, the detailed composition requirements are not necessarily the same.

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 standard, the following designations, which are in accordance with the system given in EN 1173, apply for the material condition:

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

H... Material condition designated by the minimum value of hardness requirement for the product with mandatory hardness requirements.

Exact conversion between the material conditions designated R... and H... is not possible.

Material condition is designated by only one of the above designations.

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 standard shall consist of:

- denomination (Tube);
- number of this European Standard (EN 12450);
- material condition designation (see Table 1);
- nominal cross-sectional dimensions (outside diameter × inside diameter).

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

SS-EN 12450:2012 (E)

EXAMPLE Tube conforming to this standard, in material condition R240, nominal outside diameter 4,78 mm, nominal inside diameter 3,30 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:

- a) quantity of product required (length or mass);
- b) denomination (Tube);
- c) number of this European Standard (EN 12450);
- d) material condition designation (see 4.2 and Table 1);
- e) nominal cross-sectional dimensions (outside diameter × inside diameter);
- f) for straight lengths, the length required;
- g) for coils, the coil mass required;

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

In addition, the purchaser shall also state on the enquiry and order any of the following, if required:

- h) whether flow requirements are to be met, and if so, the test details (see 6.5);
- i) whether special internal surface quality is required (see 6.6);
- j) whether a declaration of conformity is required (see 9.1);
- k) whether an inspection document is required, and if so, which type (see 9.2);
- l) whether there are any special requirements for marking, packaging or labelling (see Clause 10).

EXAMPLE Ordering details for 1 000 m of tube conforming to EN 12450, in material condition R240, nominal outside diameter 4,78 mm, nominal inside diameter 3,30 mm, nominal length 3 000 mm.

1 000 m Tube EN 12450 – R240 – 4,78 × 3,30
– nominal length 3 000 mm

6 Requirements

6.1 Composition

The composition shall conform to the following requirements:

Cu + Ag: min. 99,90 %

0,015 % ≤ P ≤ 0,040 %

This copper is designated either Cu-DHP or CW024A.

6.2 Mechanical properties

The properties shall conform to the appropriate requirements given in Table 1. The tests shall be carried out in accordance with either 8.2 (tensile test) or 8.3 (hardness test).

Table 1 — Mechanical properties

Designations			Tensile strength		Elongation	Hardness	
Material		Material condition	R_m N/mm ²		A %	HV	
Symbol	Number		min.	max.	min.	min.	max.
Cu-DHP	CW024A	R240	240	—	15	—	—
		H050	—	—	—	50	90
		R320	320	—	5	—	—
		H095	—	—	—	95	125
		R395	395	515	—	—	—
		H110	—	—	—	110	—
NOTE 1 N/mm ² is equivalent to 1 MPa.							

6.3 Dimensions and tolerances

6.3.1 General

The geometrical properties of the tubes are defined by outside diameter, inside diameter and length.

The dimensional tolerances are applied on the outside diameter, inside diameter and length.

6.3.2 Outside diameter and inside diameter

The diameters of the tubes shall conform to the following tolerances:

- outside diameter;
- inside diameter.

The outside diameter of the tube including deviation from circular form for straight lengths, at any cross-section shall not vary from the specified value by more than ± 0,050 mm.