



**SLOVENSKI STANDARD**  
**SIST EN 12450:2000**  
**01-november-2000**

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**Baker in bakrove zlitine - Nevarjene kapilarne cevi z okroglim prerezom**

Copper and copper alloys - Seamless, round copper capillary tubes

Kupfer und Kupferlegierungen - Nahtlose, runde Kapillarrohre aus Kupfer

Cuivre et alliages de cuivre - Tubes capillaires, ronds, sans soudure en cuivre

**Ta slovenski standard je istoveten z: EN 12450:1999**

[SIST EN 12450:2000](https://standards.iteh.ai/catalog/standards/sist/70202c8a-896a-4a9f-a287-59b6437893b0/sist-en-12450-2000)

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**ICS:**

23.040.15	Cevi iz neželeznih kovin	Non-ferrous metal pipes
77.150.30	Bakreni izdelki	Copper products

**SIST EN 12450:2000**

**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 12450**

July 1999

ICS 77.120.30; 77.140.90

English version

## Copper and copper alloys - Seamless, round copper capillary tubes

Cuivre et alliages de cuivre - Tubes capillaires, ronds, sans soudure en cuivre

Kupfer und Kupferlegierungen - Nahtlose, runde Kapillarrohre aus Kupfer

This European Standard was approved by CEN on 14 June 1999.

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 Central Secretariat 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 Central Secretariat 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 2000, and conflicting national standards shall be withdrawn at the latest by January 2000.

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.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 3.2 "Tubes for general purposes" to prepare the following standard:

EN 12450

Copper and copper alloys – Seamless, round copper capillary tubes

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

prEN 12735-1

Copper and copper alloys – Seamless, round copper tubes for air conditioning and refrigeration – Part 1: Tubes for piping systems

prEN 12735-2

Copper and copper alloys – Seamless, round copper tubes for air conditioning and refrigeration – Part 2: Tubes for equipment

prEN 13348

Copper and copper alloys – Seamless, round copper tubes for medical gases

prEN 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 CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

## 1 Scope

This European Standard specifies the composition, property requirements and tolerances on dimensions and 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 standard applies to capillary tubes in straight lengths, or in coils, in the size range up to 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 standard are also specified.

## 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.

EN 1655  
Copper and copper alloys – Declarations of conformity

EN 10002-1  
Metallic materials – Tensile testing – Part 1: Method of test (at ambient temperature)

EN 10204  
Metallic products – Types of inspection documents

EN ISO 6507-1  
Metallic materials – Vickers hardness test – Part 1: Test method (ISO 6507-1:1997)

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

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## 3 Definitions

For the purposes of this standard, the following definitions 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 any two diameters normal to each other at the same cross-section of the tube.

### 3.3 deviation from circular form

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

### 3.4 capillary tube

Tube of small inside diameter with an inside surface of high quality and conforming to close diameter tolerances. 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.

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### 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 x inside diameter).

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

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:

	<b>Tube EN 12450 – R240 – 4,78 × 3,30</b>
Denomination	
Number of this European Standard	
Material condition designation	
Nominal cross-sectional dimensions in millimetres	

## 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 (length or mass);
- denomination (Tube);
- number of this European Standard (EN 12450);
- material condition designation (see 4.2 and table 1);
- nominal cross-sectional dimensions (outside diameter × inside diameter);
- for straight lengths, the length required;
- for coils, the coil mass required;

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

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

- whether flow requirements are to be met, and if so, the test details (see 6.5);
- whether special internal surface quality is required (see 6.6);
- whether a declaration of conformity is required (see 9.1);
- whether an inspection document is required, and if so, which type (see 9.2);
- 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 grade 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		Material condition	Tensile strength $R_m$ N/mm <sup>2</sup>		Elongation A %	Hardness HV	
Material 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	–

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## 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  $\pm 0,050$  mm.

The mean inside diameter shall not vary from the specified value by more than  $\pm 0,025$  mm which shall be determined by the production flow test (see 8.4).

### 6.3.3 Length

Tubes ordered as straight lengths shall conform to the tolerances given in table 2. The length of tube ordered in coiled form shall be agreed between the purchaser and the supplier on the basis of the coil mass.