



**SLOVENSKI STANDARD**  
**SIST EN 1977:1999**  
**01-november-1999**

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**Baker in bakrove zlitine - Polizdelki za bakreno žico**

Copper and copper alloys - Copper drawing stock (wire rod)

Kupfer und Kupferlegierungen - Vordraht aus Kupfer

Cuivre et alliages de cuivre - Fil machine en cuivre

**Ta slovenski standard je istoveten z: EN 1977:1998**

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**ICS:**

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EUROPEAN STANDARD

EN 1977

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 1998

ICS

Descriptors: copper, copper alloys, wire rod, cold drawn products, electric conductions, designation, chemical composition, quality, elongation, electrical properties, dimensional tolerances, sampling, tests, marking

English version

## Copper and copper alloys - Copper drawing stock (wire rod)

Cuivre et alliages de cuivre - Fil machine en cuivre

Kupfer und Kupferlegierungen - Vordraht aus Kupfer

This European Standard was approved by CEN on 28 February 1998.

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.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 1 "Unwrought copper products" to prepare the following standard:

EN 1977 Copper and copper alloys - Copper drawing stock (wire rod)

This is one of a series of European Standards for products manufactured from refined copper grades. Other products are specified as follows:

EN 1976 Copper and copper alloys - Cast unwrought copper products

EN 1978 Copper and copper alloys - Copper cathodes

Wires for conductors will be specified in ----\*) Copper and copper alloys - Drawn round copper wire for the manufacture of electrical conductors (W1: 00133025).

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 September 1998, and conflicting national standards shall be withdrawn at the latest September 1998.

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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.

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\*) In course of preparation

## Introduction

Copper drawing stock (wire rod) is normally manufactured by one of the following process routes:

- a) continuous casting and hot rolling in tandem;
- b) continuous or semi-continuous casting and cold rolling;
- c) rolling of wire bar or billets; or
- d) extrusion.

Annex A (informative) gives information on the relationships between electrical resistivity and conductivity (of copper).

## 1 Scope

This European Standard specifies the composition, mechanical, electrical and physical properties for high conductivity copper drawing stock (wire rod) suitable for fabrication into wire by cold drawing, principally for the manufacture of electrical conductors. The standard covers drawing stock (wire rod), in nine grades of copper and nine silver-bearing copper grades. Normally, the cross-section is approximately circular, in a range of diameters from 6 mm.

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## 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
prEN 12893	Copper and copper alloys - Determination of spiral elongation number
EN ISO 2626	Copper - Hydrogen embrittlement test (ISO 2626: 1973)

IEC 468	Methods of measurement of resistivity of metallic materials
ISO 4746	Oxygen-free copper - Scale adhesion test

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 B.

### 3 Definitions

For the purposes of this standard, the following definition applies:

#### **drawing stock (wire rod)**

Intermediate solid wrought product, of uniform cross-section along its whole length, supplied in coils.

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### 4 Designations

#### 4.1 Material

##### 4.1.1 *General*

The material is designated either by symbol or number (see tables 1 to 4).

##### 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 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 (Copper drawing stock);
- number of this European Standard (EN 1977);
- material designation, either symbol or number (see tables 1 to 4);
- nominal diameter;
- nominal coil mass; **(standards.iteh.ai)**
- surface condition (the following designations shall be used, as appropriate: M for as manufactured, CL for cleaned).

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

## EXAMPLE:

Drawing stock (wire rod) conforming to this standard, in material designated either Cu-ETP or CW004A, nominal diameter 8 mm, in 1 000 kg coils, cleaned surface condition, shall be designated as follows:

	Copper drawing stock	EN 1977 - Cu-ETP - 8 - 1 000 - CL
	or	
	Copper drawing stock	EN 1977 - CW004A - 8 - 1 000 - CL
Denomination		
Number of this European Standard		
Material designation		
Nominal diameter in millimetres		
Nominal coil mass in kilograms		
Surface condition		

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## 5 Ordering information

In order to facilitate the enquiry, order and information 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 (mass or number of coils);
- denomination (Copper drawing stock);
- number of this European Standard (EN 1977);
- material designation (see tables 1 to 4);
- nominal diameter;

- f) nominal coil mass;
- g) surface condition (see 6.8).

NOTE : It is recommended that the product designation as described in 4.2 is used for items b) to g).

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

- h) whether joins are permitted in the coils (see 6.9);
- i) additional tests, if any, which the purchaser requires to be carried out by the manufacturer on the material, selected from the tests appropriate to each copper grade given in table 5;
- 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).

#### EXAMPLE:

Ordering details for 5 000 kg of drawing stock conforming to EN 1977, in material designated either Cu-ETP or CW004A, nominal diameter 8 mm, in 1 000 kg coils, cleaned surface condition:

5 000 kg Copper drawing stock EN 1977 - Cu-ETP - 8 - 1 000 - CL

or  
5 000 kg Copper drawing stock EN 1977 - CW004A - 8 - 1 000 - CL

## 6 Requirements

### 6.1 Composition

The composition shall conform to the requirements for the appropriate grade given in tables 1 to 4.