



**SLOVENSKI STANDARD**  
**SIST EN 1978:1999**

**01-november-1999**

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**Baker in bakrove zlitine - Bakrove katode**

Copper and copper alloys - Copper cathodes

Kupfer und Kupferlegierungen - Kupfer-Kathoden

Cuivre et alliages de cuivre - Cathodes en cuivre

**Ta slovenski standard je istoveten z: EN 1978:1998**

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**ICS:**

77.150.30      Bakreni izdelki                      Copper products

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 1978

March 1998

ICS

Descriptors: copper, copper alloys, cathodes, designation, chemical composition, dimensions, electrical properties, sampling, tests marking

English version

## Copper and copper alloys - Copper cathodes

Cuivre et alliages de cuivre - Cathodes en cuivre

Kupfer und Kupferlegierungen - Kupfer-Kathoden

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels



## 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 1978 Copper and copper alloys - Copper cathodes

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

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 by September 1998.

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.

## Introduction

This standard was prepared to combine the various requirements and methods of test for copper cathodes, previously dealt with in a range of separate national standards.

Copper cathodes are intended for melting. Cu-CATH-1 (CR001A) is primarily intended for the production of high conductivity copper, such as for drawing stock. Cu-CATH-2 (CR002A) is intended for the production of other wrought products for electrical and general purposes.

## 1 Scope

This European Standard specifies the composition and property requirements for cathodes of two copper grades, designated Cu-CATH-1 (CR001A) and Cu-CATH-2 (CR002A).

Annex A (normative) describes methods for sampling cathodes for use in cases of dispute between the purchaser and the supplier. Annex B (informative) gives information on the relationships between electrical resistivity and conductivity of copper.

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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.

EN 1655	Copper and copper alloys - Declarations of conformity
EN 10204	Metallic products - Types of inspection documents
IEC 468	Method of measurement of resistivity of metallic materials
ISO 1553	Unalloyed copper containing not less than 99,90 % of copper - Determination of copper content - Electrolytic 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 a bibliography, see annex C.

### 3 Definitions

For the purposes of this standard, the following definitions apply:

#### 3.1 cathode

Flat, unwrought product made by electrolytic deposition.

#### 3.2 lot (copper cathodes)

Quantity of copper cathodes weighing over 25 t and up to and including 200 t, consisting of one consignment, or part of one consignment, produced by one refinery.

#### 3.3 bundle

Total amount of a certain number of cathodes, typically 20 to 60, stacked together and secured, generally by steel bands.

#### 3.4 sample cathodes

Number of cathodes randomly selected from the lot, and considered in total to be representative of the lot.

#### 3.5 cathode sample

Portion of one of the sample cathodes (see 3.4) obtained by systematic cutting of vertical strips.

#### 3.6 bulk sample

Sample produced by melting and casting into a suitable mould (or moulds) the cathode samples (see 3.5) obtained from all the sample cathodes and considered to be representative of the lot.

#### 3.7 analysis sample

Representative fractions of swarf taken from the swarf arising from drilling, milling or sawing the bulk sample castings (see 3.6).

### 4 Designations

#### 4.1 Material

##### 4.1.1 General

The material is designated either by symbol or number (see table 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 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:

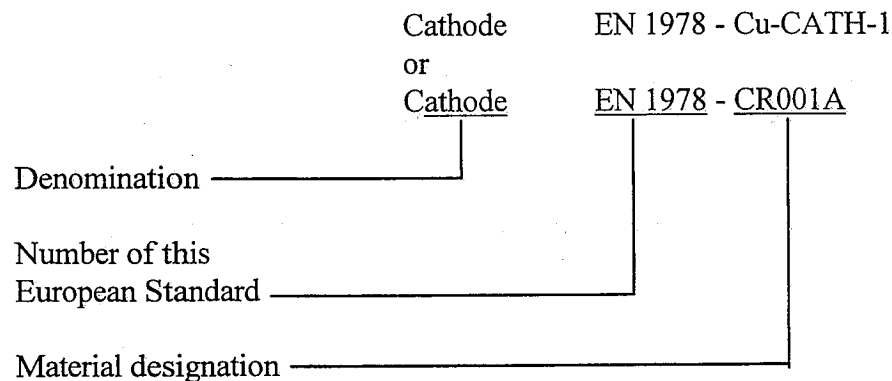
- denomination (Cathode);
- number of this European Standard (EN 1978);
- material designation, either symbol or number (see table 1).

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

EXAMPLE:

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Cathode conforming to this standard, in material designated either Cu-CATH-1 or CR001A, 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 (mass);
- b) denomination (Cathode);



- c) number of this European Standard (EN 1978);
- d) material designation (see table 1).

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

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

- e) the dimensions and tolerances required, if the cathodes are to be supplied cut to size (see 6.3);
- f) whether a declaration of conformity is required (see 9.1);
- g) whether an inspection document is required, and if so, which type (see 9.2).

EXAMPLE:

Ordering details for 100 t of cathode conforming to EN 1978, in material designated either Cu-CATH-1 or CR001A:

100 t Cathode EN 1978 - Cu-CATH-1

or

<https://standards.iteh.ai/catalog/standards/sist/ba7770a0-193d-42dd-bb43-1bc4e48/sist-en-1978-1999>

100 t Cathode EN 1978 - CR001A

## 6 Requirements

### 6.1 Composition

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

### 6.2 Electrical properties

The electrical properties shall conform to the requirements for the appropriate grade given in table 2. The tests shall be carried out in accordance with 8.2.

NOTE: Mass resistivity is the mandatory electrical property requirement in this standard. The relationship between mass resistivity and the corresponding volume resistivity and conductivity is given in annex B.

### 6.3 Dimensions and tolerances

The cathodes shall be either whole, or cut to sizes as agreed between the purchaser and the supplier and stated in the purchaser's order [see 5 e)].

### 6.4 Surface condition

Cathodes shall withstand ordinary handling without breakage. They shall be reasonably free from nodules, outgrowth edges and from all extraneous materials such as electrolyte residues, dirt, grease and oil.

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Table 1 : Composition of Cu-CATH-1 (CR001A) and Cu-CATH-2 (CR002A)

Material designation		Element	Composition in % (m/m)														Sum of elements listed in this table other than copper									
			Cu	Ag	As	Bi	Cd	Co	Cr	Fe	Mn	Ni	P	Pb	S	Sb		Se	Si	Sn	Te	Zn				
Cu-CATH-1	Number																									
	CR001A	min.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cu-CATH-2	Number																									
	CR002A	min.	99,90 <sup>3)</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	max.	-	0,0025	0,0005 <sup>1)</sup>	0,00020 <sup>2)</sup>	-	-	-	-	-	-	-	0,0010 <sup>3)</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
	max.	-	-	-	0,0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1) (As + Cd + Cr + Mn + P + Sb) maximum 0,0015 %  
2) (Bi + Se + Te) maximum 0,000 3 %, of which (Se + Te) maximum 0,000 30 %  
3) (Co + Fe + Ni + Si + Sn + Zn) maximum 0,0020 %  
4) The sulfur content shall be determined on a cast sample.  
5) Including silver up to a maximum of 0,015 %

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