



SLOVENSKI STANDARD
SIST EN 12164:1998

01-november-1998

Baker in bakrove zlitine - Palice za obdelavo na avtomatih

Copper and copper alloys - Rod for free machining purposes

Kupfer und Kupferlegierungen - Stangen für die spanende Bearbeitung

Cuivre et alliages de cuivre - Barres pour décolletage

Ta slovenski standard je istoveten z: EN 12164:1998

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EUROPEAN STANDARD

EN 12164

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 1998

ICS 77.150.30

Descriptors: copper, copper alloys, wrought products, metal bars, free cutting, designation, orders : sales documents, chemical composition, mechanical properties, sampling, mechanical tests, dimension, dimensional tolerances, corrosion resistance, conformity tests, marking

English version

Copper and copper alloys - Rod for free machining purposes

Cuivre et alliages de cuivre - Barres pour décolletage

Kupfer und Kupferlegierungen - Stangen für die spanende
Bearbeitung

This European Standard was approved by CEN on 26 December 1997.

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

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 July 1998, and conflicting national standards shall be withdrawn at the latest by July 1998.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 4 "Rod /bar, wire, profiles" to prepare the following standard:

EN 12164 Copper and copper alloys - Rod for free machining purposes

This is one of a series of European Standards for copper and copper alloy products in rod, wire and profile form. Other products are specified as follows:

- EN 12163 Copper and copper alloys - Rod for general purposes
- EN 12165 Copper and copper alloys - Wrought and unwrought forging stock
- EN 12166 Copper and copper alloys - Wire for general purposes
- EN 12167 Copper and copper alloys - Profiles and rectangular bar for general purposes
- EN 12168 Copper and copper alloys - Hollow rod for free machining 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The materials specified in this standard are those which are especially suitable for free machining purposes and the rod is therefore manufactured to tight dimensional tolerances.

Requirements are included in this standard for two alloys, namely CuZn39Pb2Sn (CW613N) and CuZn40Pb2Sn (CW619N), which, because of their higher permitted levels of tin, iron and aluminium, have inferior machinability to CuZn39Pb2 (CW612N) and CuZn40Pb2 (CW617N) respectively. In view of this the alloys CuZn39Pb2Sn (CW613N) and CuZn40Pb2Sn (CW619N) will be deleted from the standard by 1 January 2000.

1 Scope

This European Standard specifies the composition, property requirements and dimensional tolerances for copper alloy rod supplied in straight lengths, specifically intended for free machining purposes.

The sampling procedures, the methods of test for verification of conformity to the requirements of this standard, and the delivery conditions are also specified.

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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
EN ISO 196	Wrought copper and copper alloys - Detection of residual stress - Mercury (I) nitrate test (ISO 196: 1978)
EN ISO 6509: 1995	Corrosion of metals and alloys - Determination of dezincification resistance of brass (ISO 6509: 1981)
ISO 1811-2	Copper and copper alloys - Selection and preparation of samples for chemical analysis -Part 2: Sampling of wrought products and castings

ISO 6957 Copper alloys - Ammonia test for stress corrosion resistance.

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.

3 Definitions

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

3.1 rod

Solid wrought product of uniform cross-section along its whole length, supplied in straight lengths. The cross-sections are in the shape of circles, squares, hexagons or octagons. Products with a polygonal cross-section may have corners rounded along their whole length.

3.2 circularity (round rod)

Difference between the maximum and the minimum diameters measured at any one cross-section of a round rod.

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4 Designations

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4.1 Material

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4.1.1 General

The material is designated either by symbol or number (see tables 1 to 5).

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:

M	Material condition for the product as manufactured, without specified mechanical properties;
R...	Material condition designated by the minimum value of tensile strength requirement for the product with mandatory tensile property requirements;
S (suffix)	Material condition for a product which is stress relieved.

NOTE. Products in the M or R... condition may be specially processed (i.e. mechanically or thermally stress relieved) in order to lower the residual stress level to improve the resistance to stress corrosion and the dimensional stability on machining [see 5 l), 5 m) and 8.4].

Except when the suffix S is used, material condition is designated by only one of the above designations.

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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.

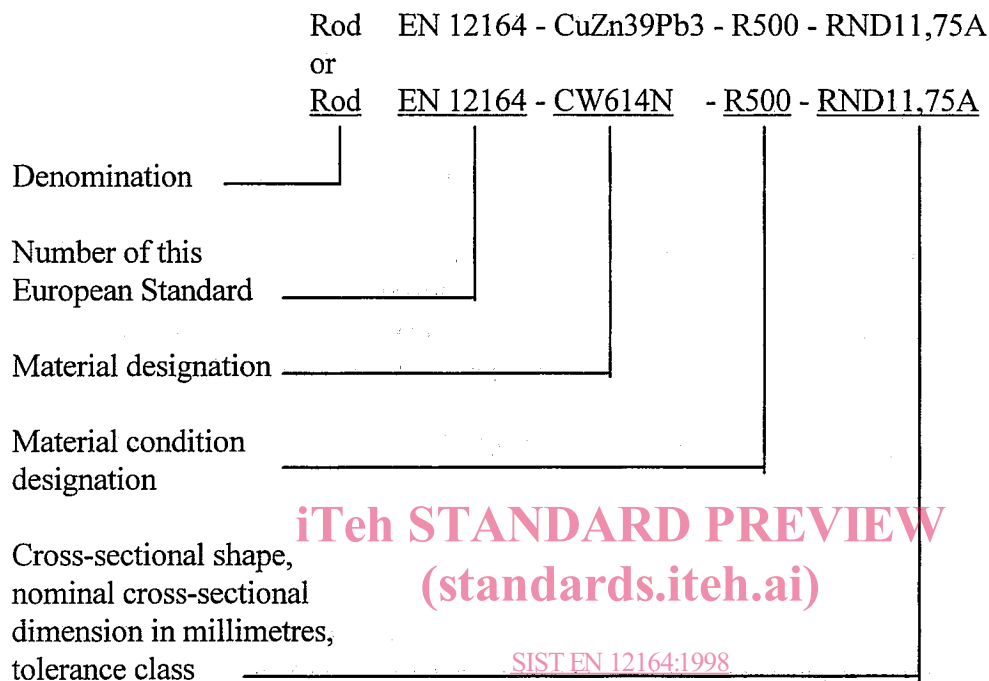
The product designation for products to this standard shall consist of:

- denomination (Rod);
- number of this European Standard (EN 12164);
- material designation, either symbol or number (see tables 1 to 5);
- material condition designation (see tables 6 to 10);
- cross-sectional shape (the following designations shall be used, as appropriate: RND for round, SQR for square, HEX for hexagonal, OCT for octagonal);
- nominal cross-sectional dimension (diameter or width across-flats);
- for round rod, the tolerance class (see table 11);
- for square, hexagonal or octagonal rod, the corner type (the following designations shall be used as appropriate: SH for sharp, RD for rounded) (see table 15).

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

EXAMPLE:

Rod for free machining purposes conforming to this standard, in material designated either CuZn39Pb3 or CW614N, in material condition R500, round cross-section, nominal diameter 11,75 mm, tolerance class A, shall be designated as follows:



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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 (Rod);
- c) number of this European Standard (EN 12164);
- d) material designation (see tables 1 to 5);
- e) material condition designation (see 4.2 and tables 6 to 10) if it is other than M. The purchaser may request, and it shall then be subject to agreement between the supplier and the purchaser, that the informative values of 0,2 % proof strength become mandatory, in which case the specified tensile strength values become informative;
- f) cross-sectional shape;

- g) nominal cross-sectional dimension (diameter or width across-flats);
- h) for round rod up to and including 30 mm diameter, whether class A or class B tolerances are required, unless the tolerance class is to be left to the discretion of the supplier (see table 11);
- i) for square, hexagonal and octagonal rod, whether 'sharp' or 'rounded' corners are required unless the corner radii of the rod are to be left to the discretion of the supplier (see 6.5.5 and table 15);
- j) length of product required. Normally rod is supplied to "nominal length" tolerances (see table 14). If "fixed lengths" are required, the length and tolerance shall be stated (see 6.5.4).

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

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

- k) for products in alloy CuZn36Pb2As (CW602N), whether the dezincification resistance acceptance criterion required is other than grade A (see 6.3);
- l) whether the products are required to pass a stress corrosion resistance test. If so which test method is to be used (see 8.4), if the choice is not to be left to the discretion of the supplier. If the purchaser chooses ISO 6957, the pH value for the test solution is to be selected;
- m) whether the products are to be supplied in a thermally stress relieved condition;
- n) whether the products are to be supplied with shaped ends which are different from those specified in 6.5.7;
- o) whether a declaration of conformity is required (see 9.1);
- p) whether an inspection document is required, and if so, which type (see 9.2);
- q) whether there are any special requirements for marking, labelling or packaging (see clause 10).

EXAMPLE:

Ordering details for 500 kg of rod for free machining purposes conforming to EN 12164, in material designated either CuZn39Pb3 or CW614N, in material condition R500, round cross-section, nominal diameter 11,75 mm, tolerance class A, nominal length 3 000 mm, shaped ends (type A and type B according to standard):

500 kg Rod EN 12164 - CuZn39Pb3 - R500 - RND11,75A
- nominal length 3 000 mm

or

500 kg Rod EN 12164 - CW614N - R500 - RND11,75A
- nominal length 3 000 mm

6 Requirements

6.1 Composition

The composition shall conform to the requirements for the appropriate material given in tables 1 to 5.

6.2 Tensile properties

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The tensile properties shall conform to the appropriate requirements given in tables 6 to 10. The tests shall be carried out in accordance with 8.2.

6.3 Resistance to dezincification

The depth of dezincification of CuZn36Pb2As (CW602N) products shall be:

- for grade A: maximum 200 µm;
- for grade B: mean not to exceed 200 µm and maximum 400 µm [see 5 k)].

The test shall be carried out in accordance with 8.3.

NOTE: Products in this alloy may be subjected to heat treatment in the range 450 °C to 550 °C during manufacture. If the user needs to heat the material above 530 °C during subsequent processing then advice should be sought from the supplier.