



SLOVENSKI STANDARD

SIST EN 12164:2011

01-oktober-2011

Nadomešča:

SIST EN 12164:1998

SIST EN 12164:1998/A1:2002

Baker in bakrove zlitine - Palice za obdelavo z odrezovanjem 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

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ICS:

77.150.30

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Copper products

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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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 14 April 2011.

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.

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

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EN 12164:2011 (E)

Foreword

This document (EN 12164:2011) 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of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.

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 12164:1998.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 4 "Extruded and drawn products, forgings and scrap" to revise the following standard:

— EN 12164:1998, *Copper and copper alloys — Rod for free machining purposes.*

This is one of a series of European Standards for the copper and copper alloy products rod, wire and profile. 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 bars for general purposes;*
- EN 12168, *Copper and copper alloys — Hollow rod for free machining purposes;*
- EN 13347, *Copper and copper alloys — Rod and wire for welding and braze welding;*
- EN 13601, *Copper and copper alloys — Copper rod, bar and wire for general electrical purposes;*
- EN 13602, *Copper and copper alloys — Drawn round copper wire for the manufacture of electrical conductors;*
- EN 13605, *Copper and copper alloys — Copper profiles and profiled wires for electrical purposes.*

In comparison with EN 12164:1998, the following significant technical changes were made:

- a) Introduction of indicative shaped ends dimensions (Table 1);
- b) Removal of four materials:
 - 1) CuZn38Pb4 (CW609N);
 - 2) CuZn37Pb1Sn1 (CW714R);
 - 3) CuSn4Pb2P (CW455K) and CuSn4Te1P (CW457K);

- c) Addition of five new materials:
- 1) CuZn40 (CW509L), CuZn42 (CW510L) and CuZn38As (CW511L) due to the market requirements on restriction of lead;
 - 2) CuZn21Si3P (CW724R) due to the market requirements on restriction of lead;
 - 3) CuZn32Pb2AsFeSi (CW709R);
- d) Revision of the mechanical properties (Tables 8 to 13) to reflect market needs; in particular the 0,2 % proof strength that was previously informative is now mandatory since it is an important figure for design purposes;
- e) Modification of the sampling rate (Table 20).

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

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Introduction

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning the alloy CuZn21Si3P (CW724R) given in 6.1.

CEN takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the CEN that he is willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with CEN. Information may be obtained from:

Wieland Werke AG
Graf Arco Straße 36
D-89079 Ulm

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. CEN shall not be held responsible for identifying any or all such patent rights.

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1 Scope

This European Standard specifies the composition, property requirements and dimensional tolerances for copper alloy rod, in the shape of circles, squares, hexagons or octagons, finally produced by drawing or extruding, especially intended for free machining purposes.

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 referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1173, *Copper and copper alloys — Material condition designation*

EN 1412, *Copper and copper alloys — European numbering system*

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

EN 10204:2004, *Metallic products — Types of inspection documents*

EN 14977, *Copper and copper alloys — Detection of tensile stress — 5 % ammonia test*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2005)*

EN ISO 6509:1995, *Corrosion of metals and alloys — Determination of dezincification resistance of brass (ISO 6509:1981)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2009)*

ISO 1190-1, *Copper and copper alloys — Code of designation — Part 1: Designation of materials*

ISO 6957, *Copper alloys — Ammonia test for stress corrosion resistance*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

rod

straight product of uniform cross-section along its whole length

[EN 12163:2011]

3.2

deviation from circular form

difference between the maximum and the minimum diameters measured at any one cross-section of a round product

[EN 12163:2011]

EN 12164:2011 (E)**4 Designations****4.1 Material****4.1.1 General**

The material is designated either by symbol or number (see Tables 2 to 7).

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;
H...	Material condition designated by the minimum value of hardness requirement for the product with mandatory hardness requirements;
S (suffix)	Material condition for a product which is stress relieved.

NOTE Products in the M, R... or H... 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 k), 5 l) and 8.5].

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

Except when the suffix S is used, 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.

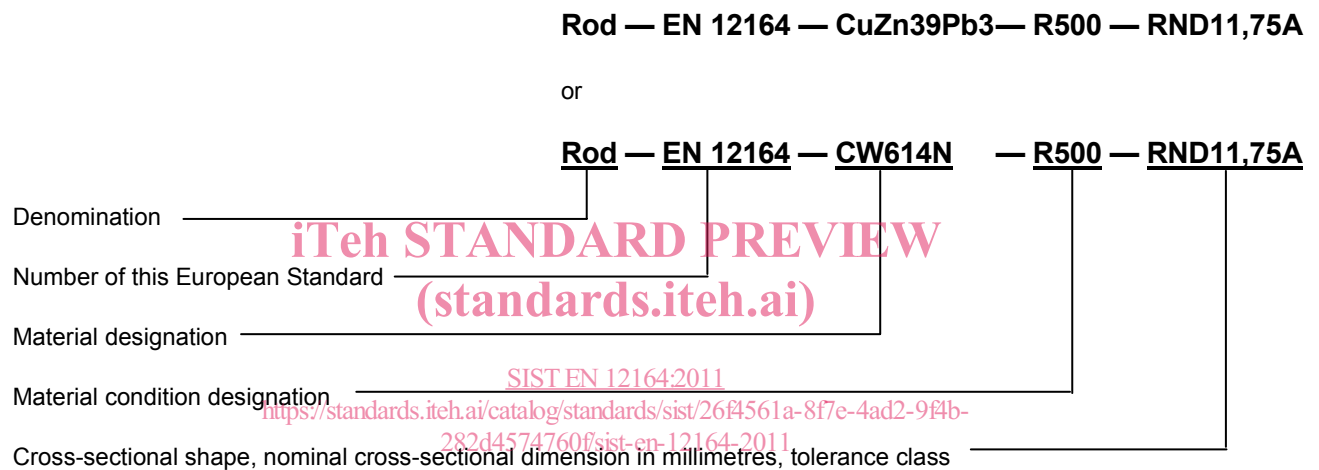
The product designation for products to this standard shall consist of:

- denomination (Rod);
- number of this European Standard (EN 12164);
- material designation, either symbol or number (see Tables 2 to 7);

- material condition designation (see Tables 8 to 13);
- 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 14);
- for square, hexagonal or octagonal rod, the corner shape (the following designations shall be used as appropriate: SH for sharp, RD for rounded) (see Table 18).

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:



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 2 to 7);
- e) material condition designation (see 4.2 and Tables 8 to 13) if it is other than M;
- 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 14);

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- i) for rod with square, hexagonal and octagonal cross-section, 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 18);
- j) length of product required. Normally rod is supplied to "nominal length" tolerances (see Table 17). 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 any of the following, if required:

- k) whether the products are required to pass a stress corrosion resistance test. If so which test method is to be used (see 8.5), 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;
- l) whether the products are to be supplied in a thermally stress relieved material condition;
- m) whether the products are to be supplied with shaped ends which are different from those specified in 6.5.7;
- n) whether a declaration of conformity is required (see 9.1);
- o) whether an inspection document is required, and if so, which type (see 9.2);
- p) whether there are any special requirements for marking, packaging or labelling (see Clause 10).

EXAMPLE Ordering details for 500 kg 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 2 to 7.

6.2 Mechanical properties

The tensile or the hardness properties shall conform to the appropriate requirements given in Tables 8 to 13. The tests shall be carried out in accordance with 8.2 or 8.3.

6.3 Resistance to dezincification

The maximum depth of dezincification of CuZn38As (CW511L), CuZn36Pb2As (CW602N), CuZn32Pb2AsFeSi (CW709R) and CuZn21Si3P (CW724R) products shall be 100 µm for sizes up to 40 mm. For greater sizes the average depth of dezincification shall be less than 100 µm and the maximum measured value shall be less than 200 µm.