



SLOVENSKI STANDARD SIST EN 12165:2011

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Nadomešča:

SIST EN 12165:1998/prA1:2007

SIST EN 12165:1999

Baker in bakrove zlitine - Palice (lite in izstiskane) za izkovke

Copper and copper alloys - Wrought and unwrought forging stock

Kupfer und Kupferlegierungen - Vormaterial für Schmiedestücke

Cuivre et alliages de cuivre - Barres corroyées et brutes pour matriçage

[SIST EN 12165:2011](#)

Ta slovenski standard je istoveten z: EN 12165:2011

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77.150.30

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Copper products

SIST EN 12165:2011

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EUROPEAN STANDARD

EN 12165

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 77.150.30

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Copper and copper alloys - Wrought and unwrought forging stockCuivre et alliages de cuivre - Barres corroyées et brutes
pour matriçageKupfer und Kupferlegierungen - Vormaterial für
Schmiedestücke

This European Standard was approved by CEN on 14 April 2011.

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

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EN 12165:2011 (E)

Foreword

This document (EN 12165:2011) 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of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.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 12165:1998.

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 12165:1998, *Copper and copper alloys — Wrought and unwrought forging stock.*

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

— EN 12163, *Copper and copper alloys — Rod for general purposes;*

— EN 12164, *Copper and copper alloys — Rod for free machining purposes;*

— 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 12420, *Copper and copper alloys — Forgings;*

— 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 12165:1998, the following significant technical changes were made:

a) Removal of thirteen materials:

- 1) CuCr1 (CW105C), CuNi2Be (CW110C) and CuNi3Si1 (CW112C);
- 2) CuAl6Si2Fe (CW301G), CuAl7Si2 (CW302G) and CuAl9Ni3Fe2 (CW304G);
- 3) CuNi10Zn42Pb2 (CW402J);
- 4) CuZn39Pb3Sn (CW615N) and CuZn40Pb2Sn (CW619N);

- 5) CuZn25Al5Fe2Mn2Pb (CW705R), CuZn37Pb1Sn1 (CW714R), CuZn39Mn1AlPbSi (CW718R) and CuZn40Mn2Fe1 (CW723R);
- b) Addition of four materials:
- 1) CuZn38Pb1 (CW607N) due to the use for hot stamping applications;
 - 2) CuZn42 (CW510L) and CuZn38As (CW511L) due to the market requirements on restriction of lead;
 - 3) CuZn21Si3P (CW724R) due to the market requirements on restriction of lead;
- c) Revision of the mechanical properties (Tables 9 to 16) to reflect market needs; in particular the tensile strength, the 0,2 % proof strength and the elongation that were previously informative have been deleted;
- d) Modification of the sampling rate (Table 19).

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 forging stock of copper and copper alloys.

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 1976, *Copper and copper alloys — Cast unwrought copper products*

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

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)*

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

3 Terms and definitions

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

3.1

forging

three-dimensional shaped product produced by a plastic forming process such as hammering or pressing between open or closed dies, including hammering between flat surfaces, normally when hot

NOTE Forging processes include, drop forging, hot stamping and hot pressing.

3.2

forging stock

extruded, rolled or drawn product such as rod, hollow rod, bar or profile or cast product, intended for the production of forgings

3.3

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 12165:2011 (E)**4 Designations****4.1 Material****4.1.1 General**

The material is designated either by symbol or number (see Tables 1 to 8).

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; |
| H... | Material condition designated by the minimum value of hardness requirement for the product with mandatory hardness requirements. |

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.

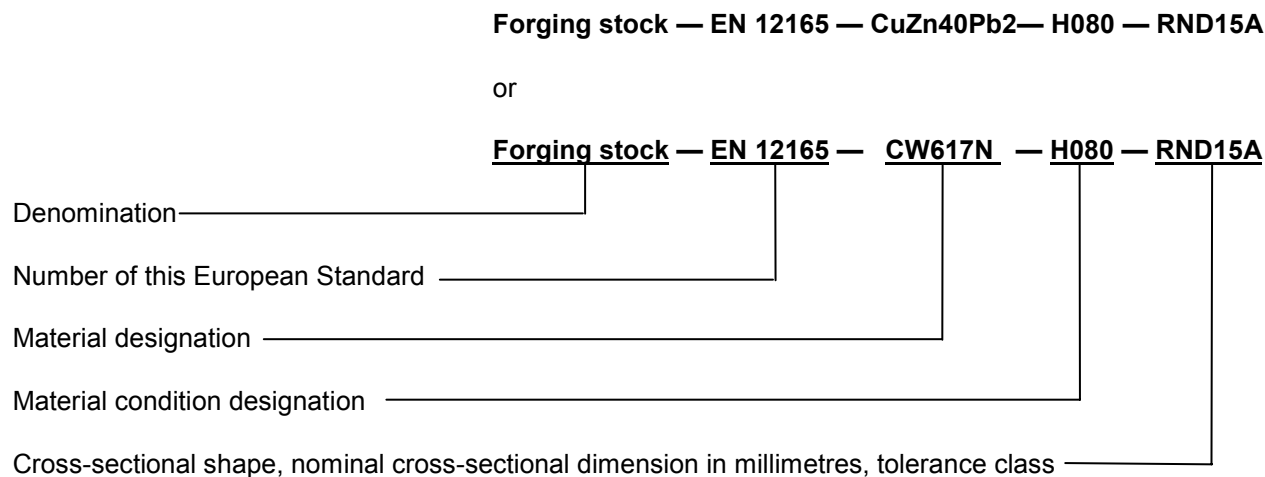
The product designation for products to this standard shall consist of:

- denomination (Forging stock);
- number of this European Standard (EN 12165);
- material designation, either symbol or number (see Tables 1 to 8);
- material condition designation (see Tables 9 to 16);
- cross-sectional shape (the following designations shall be used as appropriate: RND for round, SQR for square, HEX for hexagonal, OCT for octagonal, RCT for rectangular (bar), PFL for profile);
- for rod with round or regular polygonal cross-section, hollow rod or bar, the nominal cross-sectional dimension(s) (diameter, width across-flats, external dimension × internal dimension, width × thickness, as appropriate);
- for profiles, the number of the profile, or a fully dimensioned and toleranced drawing;

— for round rod, the tolerance class (see Table 17).

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

EXAMPLE Forging stock conforming to this standard, in material designated either CuZn40Pb2 or CW617N, in material condition H080, round, nominal diameter 15 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); [SIST EN 12165:2011](https://standards.iteh.ai/catalog/standards/sist/af066153-4a6e-42a0-a4e1-bb290c7efc96/sist-en-12165-2011)
- b) denomination (Forging stock); <https://standards.iteh.ai/catalog/standards/sist/af066153-4a6e-42a0-a4e1-bb290c7efc96/sist-en-12165-2011>
- c) number of this European Standard (EN 12165);
- d) material designation (see Tables 1 to 8);
- e) material condition designation (see 4.2 and Tables 9 to 16), if it is other than M;
- f) cross-sectional shape;
- g) size required:
 - 1) for round rod, diameter and whether class A or class B tolerance is required, unless the tolerance class is to be left to the discretion of the supplier (see Table 17);
 - 2) for rod with regular polygonal cross-section or hollow rod or bar, nominal dimension(s) and tolerance(s) required unless they are to be left to the discretion of the supplier;
 - 3) for profiles, a fully dimensioned and toleranced drawing;
- h) the length of product required, if not left to the discretion of the supplier;

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

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

- i) whether a declaration of conformity is required (see 9.1);

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- j) whether an inspection document is required, and if so, which type (see 9.2);
- k) whether there are any special requirements for marking, packaging or labelling (see Clause 10).

EXAMPLE Ordering details for 500 kg of forging stock conforming to EN 12165, in material designated either CuZn40Pb2 or CW617N, in material condition H080, round, nominal diameter 15 mm, tolerance class A, length 2 500 mm:

**500 kg Forging stock EN 12165 — CuZn40Pb2 — H080 — RND15A
— length 2 500 mm**

or

**500 kg Forging stock EN 12165 — CW617N — H080 — RND15A
— length 2 500 mm**

6 Requirements**6.1 Composition**

The composition shall conform to the requirements for the appropriate material given in Tables 1 to 8.

6.2 Mechanical properties

Products whose shapes are other than round may be delivered in M material condition in accordance with an agreement between supplier and customer.

The hardness properties of H... material condition shall conform to the Brinell hardness requirements given for forging stock with round cross-section in Tables 9 to 16. The test shall be carried out in accordance with 8.2.

NOTE In case tensile properties are required for forging stock, rods in accordance with EN 12163 or EN 12164 should be used.

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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.

The test shall be carried out in accordance with 8.3.

Products in CuZn21Si3P (CW724R) that have passed the test shall be marked with “Si”.

NOTE The as-supplied forging stock may not necessarily meet this requirement unless suitably heat treated as described in 8.3. The test is intended to demonstrate that forgings produced from the stock are capable of being processed so as to pass the test requirement.

6.4 Dimensions and tolerances**6.4.1 Diameter**

The diameter shall conform to the tolerances given in Table 17 for class A or class B, as appropriate to the order [see 5 g)]. The diameter is calculated as the mean of one or more pairs of measurements taken at right angles at the same cross-section of the rod.