SLOVENSKI STANDARD
SIST EN 12166:2011

01-oktober-2011

Nadomešča:
SIST EN 12166:1999
SIST EN 12166:1999/AC:2004

Baker in bakrove zlitine - Žica za splošno uporabo

Copper and copper alloys - Wire for general purposes

Kupfer und Kupferlegierungen - Drähte zur allgemeinen Verwendung

Cuivre et alliages de cuivre - Fils pour usages généraux

Ta slovenski standard je istoveten z: **EN 12166:2011**

ICS:

77.150.30 Bakreni izdelki Copper products

SIST EN 12166:2011 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12166

June 2011

ICS 77.150.30

Supersedes EN 12166:1998

English Version

Copper and copper alloys - Wire for general purposes

Cuivre et alliages de cuivre - Fils pour usages généraux

Kupfer und Kupferlegierungen - Drähte zur allgemeinen Verwendung

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.

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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Figures

Tables

Foreword

This document (EN 12166:2011) 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of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.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 12166:1998.

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 12166, *Copper and copper alloys — Wire for general 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 12164, *Copper and copper alloys — Rod for free machining purposes*;

— EN 12165, *Copper and copper alloys — Wrought and unwrought forging stock*;

— 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 wire for electrical purposes*.

In comparison with EN 12166:1998, the following significant technical changes were made:

a) Removal of eight materials:

   1) Cu-DHP (CW024A);

   2) CuNi2Be (CW110C), CuSi1 (CW115C) and CuSi3Mn1 (CW116C);

   3) CuSn5 (CW451K);

   4) CuZn38Pb4 (CW609N);

5) CuZn19Sn (CW701R) and CuZn37Pb1Sn1 (CW714R);

b) Addition of five new materials:

1) CuFe2P (CW107C) due to its importance for the connector industry;

2) CuSP (CW114C) as an alternative to CuTeP (CW118C);

3) CuZn40 (CW509L), CuZn42 (CW510L) due to market requirements on restriction of lead;

4) CuZn21Si3P (CW724R) due to market requirements on restriction of lead;

c) Revision of the mechanical properties (Tables 7 to 12) to reflect market needs. In particular the 0,2 % proof strength and the elongation that were previously informative are now mandatory, since these are important figures for design purposes;

d) Modification of the sampling rate (Table 18).

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.

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.

1 Scope

This European Standard specifies the composition, property requirements and dimensional tolerances for copper alloy wire, finally produced by drawing, rolling or extruding, intended for general purposes, spring and fastener manufacturing applications.

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 ISO 2624, *Copper and copper alloys — Estimation of average grain size (ISO 2624:1990)*

EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1:2005)*

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*

3 Terms and definitions

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

3.1
wire
wound product of uniform cross-section along its whole length

NOTE Rectangles may have round or sharp corners.

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]

4 Designation

4.1 Material

4.1.1 General

The material is designated either by symbol or number (see Tables 1 to 6).

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 Vickers hardness requirement for the product with mandatory hardness requirements;

S (suffix) Material condition for a product which is stress relieved.

G... Material condition designated by the mid-range value of grain size requirement for the product with mandatory grain size requirements (Table 13).

NOTE The G... material condition is normally applicable only to round wires in the soft material condition made from alloys given in Tables 3, 4 and non-leaded alloys given in Table 2.

Exact conversion between material conditions designated R..., H... and G... 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 (Wire);

— number of this European Standard (EN 12166);

— material designation, either symbol or number (see Tables 1 to 6);

— material condition designation (see 4.2 and Tables 7 to 13);

— cross-sectional shape (the following designations shall be used as appropriate: RND for round, SQR for square, RCT for rectangular, HEX for hexagonal, OCT for octagonal, PFL for profile);

— nominal cross-sectional dimension(s) (or the number of the profile or a fully dimensioned and toleranced drawing);

— tolerance class for round, square or polygonal wire, (see Tables 14 and 15);

— for square, rectangular or polygonal wire, the corner shape (the following designations shall be used as appropriate: SH for sharp, RD for rounded), (see Table 17).

The derivation of a product designation is shown in EXAMPLE 1 and another typical product designation is shown in EXAMPLE 2.

EXAMPLE 1 Wire conforming to this standard, in material designated either CuZn39Pb3 or CW614N, in material condition H115, rectangular, nominal cross-sectional dimensions 6,0 mm × 5,0 mm, with sharp corners, shall be designated as follows:

Wire EN 12166 — CuZn39Pb3 — H115 — RCT6,0 × 5,0 — SH

or

Wire EN 12166 — CW614N — H115 — RCT6,0 × 5,0 — SH

Denomination

Number of this European Standard

Material designation

Material condition designation

Cross-sectional shape and nominal dimensions in millimetres

Corner designation

EXAMPLE 2 Wire conforming to this standard, in material designated either CuZn39Pb3 or CW614N, in material condition R430, round, nominal diameter 6,0 mm, tolerance class B, shall be designated as follows:

Wire EN 12166 — CuZn39Pb3 — R430 — RND6,0B

or

Wire EN 12166 — CW614N — R430 — RND6,0B

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 (Wire);

c) number of this European Standard (EN 12166);

d) material designation (see Tables 1 to 6);

e) material condition designation (see 4.2 and Tables 7 to 13) if other than M;

f) cross-sectional shape;

g) nominal cross-sectional dimension(s) (diameter or width across-flats);

h) for round, square and regular polygonal wire, the tolerance class required, unless the tolerance class is to be left to the discretion of the supplier (see Tables 14 and 15); for profiles, the tolerances required (or a drawing with dimensions and tolerances);

i) for square or rectangular wire, whether 'sharp' or 'rounded' corners are required, unless the corner radii are to be left to the discretion of the supplier (see Table 17);

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:

j) for profiles, if the shape is such that the position of the cross-section within the coil, reel, spool or drum is of importance to the purchaser, this should be stated on the drawing (see Annex A for illustration);

k) for profiles, whether mechanical properties are required; if so, the method of test and the level of properties shall be agreed between the purchaser and the supplier;

l) whether the products are to be supplied in a thermally stress relieved material condition;

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

n) whether an inspection document is required, and if so, which type (see 9.2);

o) whether there are any special requirements for marking, labelling or packaging including, if necessary, any limitation on dimensions or mass of coils, spools, reels or drums (see Clause 10).

EXAMPLE 1 Ordering details for 1 000 kg wire for general purposes conforming to EN 12166, in material designated either CuZn39Pb3 or CW614N, in material condition H115, rectangular, nominal cross-sectional dimensions 6,0 mm × 5,0 mm, with sharp corners, in 25 kg coils:

1 000 kg Wire EN 12166 — CuZn39Pb3 — H115 — RCT 6,0 × 5,0 — SH
— 25 kg coils

or

1 000 kg Wire EN 12166 — CW614N — H115 — RCT 6,0 × 5,0 — SH
— 25 kg coils

EXAMPLE 2 Ordering details for 5 000 kg wire for general purposes conforming to EN 12166, in material designated either CuZn39Pb3 or CW614N, in material condition R420, round, nominal diameter 6,0 mm, tolerance class B, on 1 000 kg spools:

5 000 kg Wire EN 12166 — CuZn39Pb3 — R430 — RND6,0B
— 1 000 kg spools

or

5 000 kg Wire EN 12166 — CW614N — R430 — RND6,0B
— 1 000 kg spools