SLOVENSKI STANDARD
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Baker in bakrove zlitine - Žica za splošno uporabo

Copper and copper alloys - Wire for general purposes

Kupfer und Kupferlegierungen - Drähte zur allgemeinen Verwendung

Ta slovenski standard je istoveten z: **prEN 12166**

ICS:

77.150.30 Bakreni izdelki Copper products

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Will supersede EN 12166:1998

English Version

Copper and copper alloys - Wire for general purposes

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 133.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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Foreword

This document (prEN 12166:2009) has been prepared by Technical Committee CEN/TC 133 “Copper and copper alloys”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12166:1998.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Pressure Equipment Directive (PED) 97/23/EC.

For relationship with EU Directive 97/23/EC, see informative Annex ZA, which is an integral part of this document.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 4 "Extruded and drawn products, forging 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 rectangular 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 the first edition of EN 12166:1998, the following significant technical changes were made:

— some materials have been removed because they are no longer of economic importance;

— the Tables 7 to 12 of mechanical properties were rationalised to reflect current requirements of economic importance.

1 Scope

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

The sampling procedures, the methods of test for verification of conformity to the requirements of this European Standard, and the delivery conditions 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 10002-1, *Metallic materials — Tensile testing — Part 1: Method of test at ambient temperature*

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

EN ISO 2624, *Copper and copper alloys — Estimation of average grain size*

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

EN ISO 9001, *Quality management systems — Requirements*

ISO 31-0, *Quantities and units — Part 0: General principles*

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

ISO 1811-2, *Copper and copper alloys — Selection and preparation of samples for chemical analysis — Part 2: Sampling of wrought products and castings*

3 Terms and definitions

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

3.1
wire
wound product of uniform cross-section along its whole length, with cross-sections in the shape of circles, squares, regular polygons, rectangles with round or sharp edges or small profiles

3.2
deviation from circular form
difference between the maximum and the minimum diameter measured at any one cross-section of the round product.

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 12);

— 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);

— corner radii for square or rectangular wire (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 2 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 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

6 Requirements

6.1 Composition

The composition shall conform to the requirements for the appropriate material given in Tables 1 to 6.

6.2 Mechanical properties

The tensile properties of R... material condition or the hardness properties of H... material condition shall conform to the appropriate requirements given in Tables 7 to 12. The tests shall be carried out in accordance with 8.2 or 8.3.

6.3 Grain size

The grain size of G... material condition shall conform to the appropriate ranges in Table 13. The tests shall be carried out in accordance with 8.4.

6.4 Dimensions and tolerances

6.4.1 Diameter or width across-flats

The diameter or width across-flats shall conform to the tolerances given in Tables 14 to 16.

NOTE The diameter of round wire is calculated as the mean of one or more pairs of measurements taken at right angles at the same cross-section of the wire.

6.4.2 Shape tolerances for round wire

The deviation from circular form of round wire less than 3,0 mm diameter, shall not exceed half the range of the tolerance on diameter given in Table 14. The deviation from circular form of round wire equal to or greater than 3,0 mm diameter, shall not exceed the range of the tolerance on diameter given in Table 14.

6.4.3 Corner and edge geometry (wire with square and rectangular cross-section only)

The radii of the corners of wires shall conform to the requirements given in Table 17 for sharp or rounded corners.

For wires with the minimum width across-flats less than 3 mm the corners shall be calculated according to Figure 1. For wires with both widths across-flats equal to or greater than 3 mm, except in cases of dispute, the corners shall be measured directly, either by use of a gauge or an optical projector. In cases of dispute the method by optical projector shall be used.

Shaped wire corners and edges shall be smooth and shall not have projecting edges.