



SLOVENSKI STANDARD SIST EN 12167:2016

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Nadomešča:
SIST EN 12167:2011

Baker in bakrove zlitine - Profili in palice za splošno uporabo

Copper and copper alloys - Profiles and bars for general purposes

Kupfer und Kupferlegierungen - Profile und Rechteckstangen zur allgemeinen Verwendung

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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Copper and copper alloys - Profiles and bars for general purposes

Kupfer und Kupferlegierungen - Profile und Rechteckstangen zur allgemeinen Verwendung

This European Standard was approved by CEN on 9 April 2016.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 12167:2016) 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of an identical text or by endorsement, at the latest by January 2017, and conflicting national standards shall be withdrawn at the latest by January 2017.

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

This document supersedes EN 12167:2011.

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 12167:2011, *Copper and copper alloys — Profiles and bars for general purposes*.

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

— EN 12166, *Copper and copper alloys — Wire for general purposes*;

— EN 12168, *Copper and copper alloys — Hollow rod for free machining purposes*;

— 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 12167:2011, the following significant technical changes were made:

- a) addition of four new materials: CuZn37Pb1 (CW605N), CuZn35Pb1,5AlAs (CW625N), CuZn33Pb1,5AlAs (CW626N) and CuZn33Pb1AlSiAs (CW725R) due to the market requirements on restriction of lead and modification of the chemical composition for CuZn39Pb1 (CW611N);
- b) introduction of an optional procedure how to refer to restrictions to the chemical composition imposed by the 4 MS Common Composition List for materials used for products accepted for contact with drinking water;
- c) requirements and test methods for resistance of dezincification modified;
- d) provisions for surface quality added;

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e) mechanical properties for CuZn21Si3P (CW724R) modified.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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) and CuZn33Pb1AlSiAs (CW725R) 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 ensured the CEN that he is willing to negotiate licenses either free of charge or 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.

— For CuZn21Si3P (CW724R) information may be obtained from:

Wieland-Werke AG
Graf Arco Straße 36
D-89079 Ulm
GERMANY

— For CuZn33Pb1AlSiAs (CW725R) information may be obtained from:

Diehl Metall Messing
Heinrich-Diehl-Straße 9
D-90552 Röthenbach/Pegnitz
GERMANY

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.

CEN and CENELEC maintain online lists of patents relevant to their standards. Users are encouraged to consult the lists for the most up to date information concerning patents (<ftp://ftp.cencenelec.eu/EN/IPR/Patents/IPRdeclaration.pdf>).

Due to developing legislation, the composition of a material may be restricted to the composition specified in this European Standard with respect to individual uses (e.g. for the use in contact with drinking water in some Member States of the European Union). These individual restrictions are not part of this European Standard. Nevertheless, for materials for which traditional and major uses are affected, these restrictions are indicated. The absence of an indication, however, does not imply that the material can be used in any application without any legal restriction.

EN 12167:2016 (E)**1 Scope**

This European Standard specifies the composition, property requirements and dimensional tolerances for copper alloy profiles including L-, T-, U-shaped cross-sections, and bars, finally produced by drawing or extruding.

This European Standard applies to profiles with L-, T- and U-shaped cross-sections which would fit within a circumscribing circle of a maximum 180 mm diameter and to bars with thicknesses from 3 mm up to and including 60 mm and with widths from 6 mm up to and including 120 mm.

The sampling procedures, the methods of test for verification of conformity to the requirements of this European Standard, are also specified.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *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)*

EN ISO 6509-1, *Corrosion of metals and alloys - Determination of dezincification resistance of copper alloys with zinc - Part 1: Test method (ISO 6509-1)*

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

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

ISO 4739, *Wrought copper and copper alloy products — Selection and preparation of specimens and test pieces for mechanical testing*

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 profile

straight product of uniform cross-section along its whole length, in the shape other than rod, hollow rod, bar, tube, sheet or strip

3.2**bar**

straight product of uniform rectangular cross-section along its whole length

4 Designations**4.1 Material****4.1.1 General**

The material is designated either by symbol or by number (see Tables 1 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 strength requirement;
- H... material condition designated by the minimum value of hardness requirement for the product with mandatory hardness requirement;
- S (suffix) material condition for a product which is stress relieved.

Products in the M, R... or H... material 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 Clause 5 list entry i), list entry j) 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 can be 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:

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- denomination (profile or bar);
- number of this European Standard (EN 12167);
- material designation, either symbol or number (see Tables 1 to 7);
- DW for compliance in the chemical composition according to the 4 MS Common Composition List. This information is mandatory in the case in which the product is used for drinking water applications according to the 4 MS Common Composition List and not to be given in other cases;
- material condition designation (see Tables 8 to 14);
- for profiles, the number of the profile or a fully dimensioned and toleranced drawing;
- for profiles with L-, T-, U-shaped cross-sections, the nominal cross-sectional dimensions;
- for bar, the nominal cross-sectional dimensions;
- for bar and profiles with L-, T-, U-shaped cross-sections, the tolerance class (see Table 15 to 17);
- for bar, the corner shape (the following designations shall be used as appropriate: SH for sharp, RD for rounded) (see Table 21).

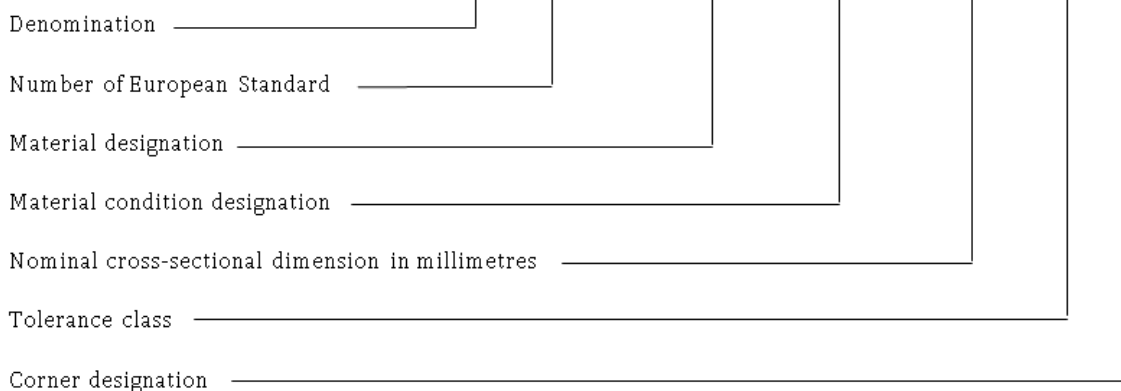
The derivation of a product designation is shown in the following examples.

EXAMPLE 1 Bar conforming to this standard, in material designated either CuZn40Pb2 or CW617N, for standard applications, in material condition H110, nominal cross-sectional dimensions 30 mm × 10 mm, tolerance Class B, with sharp corners, will be designated as follows:

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Bar EN 12167 — CuZn40Pb2 — H110 — 30 × 10 — B — SH

or

Bar EN 12167 — CW617N — H110 — 30 × 10 — B — SH



EXAMPLE 2 Bar conforming to this standard, in material designated either CuZn40Pb2 or CW617N for drinking water applications according to the 4 MS Common Composition List, in material condition H110, nominal cross-sectional dimensions 30 mm × 10 mm, tolerance Class B, with sharp corners, will be designated as follows:

Bar EN 12167 — CuZn40Pb2 — DW — H110 — 30 × 10 — B — SH

or

Bar EN 12167 — CW617N — DW — H110 — 30 × 10 — B — SH

Denomination

Number of European Standard

Material designation

For the use in contact with drinking water
according to 4 MS Common Composition List,
(restriction in chemical composition)

Material condition designation

Nominal cross-sectional dimension in millimetres

Tolerance class

Corner designation

EXAMPLE 3 Profile conforming to this standard, in material designated either CuZn43Pb2Al or CW624N, for standard applications, in material condition M, drawing number S123, will be designated as follows:

Profile EN 12167 — CuZn43Pb2Al — M — S123

or [SIST EN 12167:2016](https://standards.iteh.ai/catalog/standards/sist/d2bd95c2-484b-443c-af2e-2e6b6393a21b/sist-en-12167-2016)

Profile EN 12167 — CW624N — M — S123

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) mass of product required;
- b) denomination (profile or bar);
- c) number of this European Standard (EN 12167);
- d) material designation (see Tables 1 to 7);
- e) for bar, the material condition designation (see 4.2 and Tables 8 to 14), if it is other than M;
- f) DW for compliance in the chemical composition according to the 4 MS Common Composition List. This information is mandatory in the case in which the product is used for drinking water applications according to the 4 MS Common Composition List and not to be given in other cases;
- g) size and shape required:
 - 1) for profiles, by fully dimensioned and toleranced drawing, which shall include any specific requirements for straightness and twist and, if appropriate, for flatness;

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- 2) for profiles with L-, T- and U-shaped cross-sections by dimensions and tolerance class (i.e. Class A, B — see Tables 15 and 16), unless the choices of tolerance class are left to the discretion of the supplier;
- 3) for bar, by dimensions and tolerance class (i.e. Class A, B or C — see Tables 17, 19, 20 and 6.5.3.2), and whether sharp or rounded corners (see Table 21) are required, unless the choices of tolerance class and corner radii are left to the discretion of the supplier;

h) length of product required:

- 1) for profiles, the length and the tolerance on length, unless the lengths supplied are left to the discretion of the supplier;
- 2) for bar, the nominal length (see Table 18).

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

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

- i) whether the products are required to pass a stress corrosion resistance test; if so, which test method shall 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 shall be selected;
- j) whether the products shall be supplied in a thermally stress relieved material condition;
- k) for profiles, whether any additional properties or requirements, not specified within the standard, are required;

Details of any mechanical property requirements for profiles, together with the location in the profile from which the test piece should be machined, should be agreed between the purchaser and the supplier (see 6.2.1).

- l) whether special surface quality is required (see 6.6);
- 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, packaging or labelling (see Clause 10).

EXAMPLE 1 Ordering details for 500 kg bar conforming to EN 12167, in material designated either CuZn40Pb2 or CW617N, for drinking water application according to the 4 MS Common Composition List in material condition H110, nominal cross-sectional dimensions 30 mm 10 mm, tolerance Class B, with sharp corners, nominal length 3 000 mm.

500 kg	Bar	— CuZn40Pb2 — DW — H110 — 30 × 10 — B — SH
EN 12167		— nominal length 3 000 mm
or		
500 kg	Bar	— CW617N — DW — H110 — 30 × 10 — B — SH
EN 12167		— nominal length 3 000 mm

EXAMPLE 2 Ordering details for 1 000 kg profiles conforming to EN 12167, in material designated either CuZn43Pb2Al or CW624N, in material condition M, to drawing number S123, nominal length 3 000 mm.

1 000 kg EN 12167	Profile — CuZn43Pb2Al — M — S123
	— nominal length 3 000 mm
or	
1 000 kg EN 12167	Profile — CW624N — M — S123
	— 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 7.

Due to developing legislation, specific applications (see 4.3) may require restrictions in the chemical composition. In this case the limitations shall be specified in the ordering information [see Clause 5, list entry f)].

6.2 Mechanical properties

6.2.1 Profiles

Mechanical properties of profiles depend on the shape, dimensions and the material. For this reason, mechanical properties of profiles are not specified in this standard but, if needed, are subject to agreement between the purchaser and the supplier [see Clause 5, list entry k)].

6.2.2 Bar

Bar in the R... or H... condition shall conform to the appropriate tensile or hardness requirements given in Tables 8 to 14. The tests shall be carried out in accordance with 8.2 or 8.3.

6.3 Resistance to dezincification

The maximum depth of dezincification, in any direction, of CuZn38As (CW511L), CuZn36Pb2As (CW602N), CuZn32Pb2AsFeSi (CW709R), CuZn21Si3P (CW724R) and CuZn33Pb1AlSiAs (CW725R) products shall be 100 μm . For the alloys CuZn35Pb1,5AlAs (CW625N), CuZn33Pb1,5AlAs (CW626N) the maximum depth of dezincification, in any direction, shall be 200 μm .

The test shall be carried out in accordance with 8.4.

NOTE Shape and distribution of beta phase aggregates can influence the dezincification resistance of products. Special requirements relating to shape and distribution of β phase aggregates are subject to agreement between purchaser and supplier.

Products in alloys other than CuZn21Si3P (CW724R) shall be subjected to heat treatment approximately in the range 500 $^{\circ}\text{C}$ to 550 $^{\circ}\text{C}$. Should the user need to heat the material above 530 $^{\circ}\text{C}$ (i.e. soldering, brazing or welding operations) then advice should be sought from the supplier.