



**SLOVENSKI STANDARD**  
**oSIST prEN 1982:2023**

**01-marec-2023**

**Nadomešča:**  
**SIST EN 1982:2017**

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**Baker in bakrove zlitine - Bloki za pretaljevanje in ulitki**

Copper and copper alloys - Ingots and castings

Kupfer und Kupferlegierungen - Blockmetalle und Gussstücke

Cuivre et alliages de cuivre - Lingots et pièces moulées

**Ta slovenski standard je istoveten z: prEN 1982**

**ICS:**

77.150.30      Bakreni izdelki      Copper products

**oSIST prEN 1982:2023**      **en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 1982**

January 2023

ICS 77.150.30

Will supersede EN 1982:2017

English Version

## Copper and copper alloys - Ingots and castings

Cuivre et alliages de cuivre - Lingots et pièces moulées

Kupfer und Kupferlegierungen - Blockmetalle und Gussstücke

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.

This draft European Standard was established by CEN 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.

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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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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[oSIST prEN 1982:2023](https://standards.iteh.ai/catalog/standards/sist/b3e66ca4-9de1-432b-b151-ac5adfl42358/osist-pren-1982-2023)

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## European foreword

This document (prEN 1982:2023) 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 1982:2017.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), 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 7 “Ingots and castings” to prepare the revision of the following standard:

EN 1982:2017, *Copper and copper alloys — Ingots and castings*

prEN 1982:2023 includes the following significant technical changes with respect to EN 1982:2017:

- a) addition of information in the Introduction on permissible alloys in drinking water installations given in relevant tables in the Annexes;
- b) addition of note concerning European Regulations and Directives that need to be taken into account given in relevant tables in the Annexes. Addition of the Bibliography. See [14] to [17];
- c) correction of Pb-content for castings in CUZn39Pb1AL-C (CC757S);
- d) addition of the following new materials: CB7xxS and CC7xxS (new Table G.10), CB472K and CC472K (new Table J.6), CB48xK and CC 48xK (new Table J.7), CB49xK and CC49xK (new Table K.6), CB470K and CC470K (new Table L.1), CB471K and CC471K (new Table L.2);
- e) deletion of the material CB490K and CC490K (Table K.1);
- f) revision of subclause 8.2.2 for continuous cast profiles with one or more outside dimension greater than 300 mm for tensile test piece.

## Introduction

This European Standard for copper alloy ingots, and copper and copper alloy castings is based on previous national standards and harmonizes the compositions and mechanical properties required.

This European Standard does not include copper refinery shapes which are intended for working into wrought products and are the subject of EN 1976. Nor does it include master alloys intended for the manufacture of copper alloys which are the subject of EN 1981.

The essential information relevant to correct ordering, given in Clause 5 of the standard, is supplemented by Annex A, which is based upon the recommended practice for the ordering and supply of castings given in EN 1559-1. Its purpose is to assist the purchaser in providing full information to the supplier to ensure that he supplies castings according to the purchaser's requirements. It is recommended that full consultation takes place between the purchaser and the supplier at the stages of enquiry and ordering.

Sampling and testing frequency, where applicable, are specified in Clause 7. For certain applications, more rigorous inspection procedures may be required. Annex B gives supplementary inspection procedures which may be invoked, at the option of the purchaser [see Clause 5 o)].

Some copper and copper alloys can be used in castings for pressure equipment. Ingots are not suitable for pressure equipment.

The permitted material grades of copper and copper alloys for pressure applications and the conditions for their use are given in specific product or application standards.

Information on permissible alloys in drinking water installations is given in the relevant tables in the appendix in accordance with the applicable European requirements at the time the standard was published.

For the design of pressure equipment, specific design rules apply.

Annex ZA gives information relating to the conformance of permitted material grades of copper and copper alloys used in castings to the New Approach Pressure Equipment Directive 2014/68/EU.

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-B (CB768S) and CuZn21Si3P-C (CC768S) given in Table H.2 as well as concerning the alloy CuSn12S-B (CB472K) and CuSn12S-C (CC472K) given in Table J.6 as well as concerning the alloy CuSi4Zn4MnP-B (CB245E) and CuSi4Zn4MnP-C (CC245E) given in Table Q.1 as well as concerning the alloy CuSi4Zn9MnP-B (CB246E) and CuSi4Zn9MnP-C (CC246E) given in Table Q.2 as well as concerning the alloy CuSn4Zn2PS B (CB470K) and CuSn4Zn2PS C (CC470K) given in Table L.1 as well as concerning the alloy CuSn7Zn3Ni2PS-B (CB471K) and CuSn7Zn3Ni2PS-C (CC471K) given in Table L.2.

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-B (CB768S) and CuZn21Si3P-C (CC768S) information may be obtained from:

Wieland-Werke AG

Graf Arco Straße 36

D-89079 Ulm

GERMANY



- For CuSi<sub>4</sub>Zn<sub>4</sub>MnP-B (CB245E), CuSi<sub>4</sub>Zn<sub>4</sub>MnP-C (CC245E), CuSi<sub>4</sub>Zn<sub>9</sub>MnP-B (CB246E) and CuSi<sub>4</sub>Zn<sub>9</sub>MnP-C (CC246E) information may be obtained from:

VIEGA GmbH and Co. KG

Viega Platz 1

D-57439 Attendorn

GERMANY

- For CuSn<sub>4</sub>Zn<sub>2</sub>PS B (CB470K) and CuSn<sub>4</sub>Zn<sub>2</sub>PS C (CC470K) information may be obtained from:

Gebr. Kemper GmbH + Co. KG

Harkortstrasse 5

D-57462 Olpe-Biggeseesee

GERMANY

- For CuSn<sub>12</sub>S-B (CB472K), CuSn<sub>12</sub>S-C (CC472K), CuSn<sub>7</sub>Zn<sub>3</sub>Ni<sub>2</sub>PS-B (CB471K) and CuSn<sub>7</sub>Zn<sub>3</sub>Ni<sub>2</sub>PS-C (CC471K) information may be obtained from:

KS Gleitlager GmbH

Am Bahnhof 14

68789 St. Leon-Rot

GERMANY

<https://standards.iteh.ai/catalog/standards/sist/b3e66ca4-9de1-432b-b151-ac5adfl42358/osist-pren-1982-2023>

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 specified in this European Standard may be restricted to the composition 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.

## 1 Scope

This document specifies the composition, mechanical properties and other relevant characteristics of copper and copper alloys. The sampling procedures and test methods for the verification of conformity to the requirements of this document are also specified.

This document is applicable to:

- a) copper alloy ingots intended to be remelted for later processing (e.g. castings); and
- b) copper and copper alloy castings which are intended for use without subsequent working other than machining.

Recommended practice for the ordering and supply of castings is included in Annex A. Optional supplementary inspection procedures for ingots and castings are included in Annex B.

NOTE Ingots are not suitable for pressure equipment applications.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 764-5:2014, *Pressure equipment — Part 5: Inspection documentation of metallic materials and compliance with the material specification*

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

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

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)*

EN ISO/IEC 17050-1:2010, *Conformity assessment — Supplier's declaration of conformity — Part 1: General requirements (ISO/IEC 17050-1:2004, corrected version 2007-06-15)*

EN ISO/IEC 17050-2:2004, *Conformity assessment — Supplier's declaration of conformity — Part 2: Supporting documentation (ISO/IEC 17050-2:2004)*

## 3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

**3.1****ingot**

metal cast into a form suitable for remelting

**3.2****casting**

workpiece that has been shaped by solidification of liquid metal or alloy in a mould

Note 1 to entry: Castings are manufactured by the sand, permanent mould, centrifugal, continuous or pressure die casting process.

[SOURCE: EN 1559-1:2011, 3.3]

**3.3****cast**

any of the following:

- a) product of one furnace melt; or
- b) product of one crucible melt; or
- c) product of a number of furnace or crucible melts where these are aggregated and mixed prior to sampling; or
- d) production corresponding to the intervals between additions to a holding furnace of new furnace or crucible melts (for example in permanent mould casting or pressure die casting); or
- e) product from a number of consecutive melts of the same alloy through a die, in the case of continuous casting

**3.4****batch**

any of the following:

- a) number of ingots taken from a single cast; or
- b) number of castings of the same design produced from a single cast; or
- c) portion of the output of a continuous caster during a cast

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

The material is designated either by symbol or number (see Annex C to Annex Q).

**prEN 1982:2023 (E)****4.1.2 Symbol**

The material symbol designation is based on the designation system given in ISO 1190-1. A suffix -B is added to the designation to identify material in the form of ingots and a suffix -C is added to the designation to identify material in the form of castings (for example CuSn5Zn5Pb2-C). These suffixes also serve to avoid confusion with wrought products of a similar alloy.

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 Casting process**

The designations used to indicate the casting processes referred to in this standard are based on those given in ISO 1190-1, as follows:

GS sand casting;

GM permanent mould casting;

GZ centrifugal casting;

GC continuous casting;

GP pressure die casting.

NOTE Pressure die castings are produced by the injection and solidification of molten metal under substantial pressure, typically above 70 bars, into a metal die. The terms “die casting”, “pressure die casting” or “high pressure die casting” are often used for this concept.

**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.

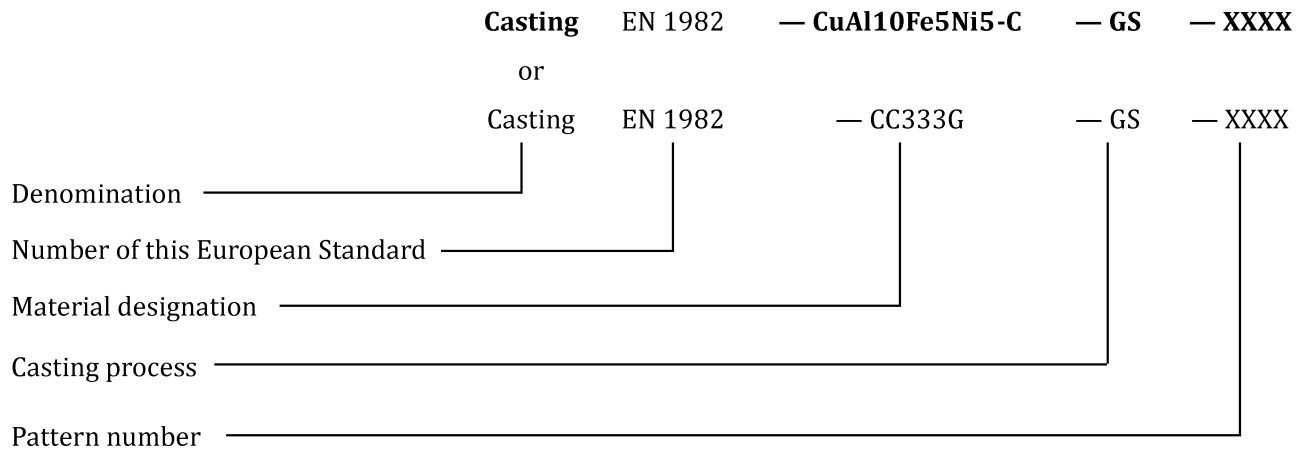
The product designation is no substitute for the full content of the standard.

The product designation for products specified in this standard shall consist of:

- denomination (ingot or casting);
- number of this European Standard (EN 1982);
- material designation, either symbol or number (see Annex C to Annex Q);
- for castings, the casting process designation (see 4.2);
- for castings, the pattern, die or drawing number, as appropriate.

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

Castings conforming to this standard, in material designated either CuAl10Fe5Ni5-C or CC333G, sand cast, pattern number XXXX, shall be designated as follows:



Ingots conforming to this standard, in material designated either CuAl10Fe5Ni5-B or CB333G, shall be designated as follows:

Ingot EN 1982 — CuAl10Fe5Ni5-B

or

Ingot EN 1982 — CB333G

## 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 the enquiry and order the following information:

- a) quantity of product required (mass or number of castings);
- b) denomination (ingot or casting);
- c) number of this European Standard (EN 1982);
- d) material designation (see Annex C to Annex Q);
- e) for castings, the casting process to be used (see 4.2 and Annex C to Annex Q);
- f) for castings, full details of the casting(s), i.e. a fully dimensioned drawing, or identification of the casting by, for instance, reference to a pattern, die or drawing number (see Annex A);
- g) for copper castings and for copper-chromium castings (see Table C.1 and Table D.1), whether the electrical conductivity is to be determined, and if so the test details and sampling rate (see 8.3) and for copper sand castings, whether Grade A, B or C electrical conductivity is required (see Table C.1);
- h) for ingots in the alloy given in Table G.1, and for ingots and castings in the alloys given in Tables G.1, G.6, J.2, N.2, N.3, N.4 and N.5, details of any compositional deviations for special applications (see notes to Tables G.1, G.6, J.2, N.2, N.3, N.4 and N.5);
- i) for ingots, whether they are to be supplied grain refined (see 6.4);
- j) for castings in alloys in Table F.1, Table G.2, Table G.3, Table G.4, and Table G.9, whether Grade A or Grade B dezincification resistance acceptance criterion is required (see 6.5);

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- k) for castings in CuZn35Mn2Al1Fe1-C (CC765S), whether a minimum alpha-phase content of 15 % is required (see 6.4 and Table I.4);
- l) for ingots in the alloys in Table O.1, Table P.3, Table P.4, the compositional requirements to which they are to conform (see notes to Table O.1, Table P.3, Table P.4);
- m) for centrifugal castings, whether the samples for mechanical testing are to be taken from the castings, or separately cast (see 8.2.2).

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

- n) whether analysis is required, or limits are to be agreed, for elements additional to those listed in the composition Tables in Annex E to Annex Q (see 6.1);
- o) whether any of the optional supplementary inspection procedures given in Annex B are required, and if so, the full details of the agreed test parameters and acceptance criteria for each inspection option invoked;
- p) in the case of castings, whether a declaration of conformity is required (see 9.1);
- q) in the case of castings, whether an inspection document is required, and if so, which type (see 9.2.2);
- r) whether a special inner or outer surface condition is required (see 8.6).

EXAMPLE 1 Ordering details for 1 500 kg of castings conforming to EN 1982, in material designated either CuAl10Fe5Ni5-C or CC333G, sand cast, pattern number XXXX, without any additional requirements:

1 500 kg Casting EN 1982 — CuAl10Fe5Ni5-C – GS – XXXX

<https://standards.iteh.ai/catalog/standards/sist/3e66ca4-9de1-432b-b151-ac5adff42358/osist-pr-en-1982-2023> or

1 500 kg Casting EN 1982 — CC333G – GS – XXXX

EXAMPLE 2 Ordering details for 500 castings conforming to EN 1982, in material designated either CuAl10Fe5Ni5-C or CC333G, sand cast, pattern number XXXX, without any additional requirements:

500 pieces Casting EN 1982 — CuAl10Fe5Ni5-C – GS – XXXX

or

500 pieces Casting EN 1982 — CC333G – GS – XXXX

## 6 Requirements

### 6.1 Composition

The composition of ingots and castings shall conform to the requirements for the appropriate material given in Annex C to Annex Q. The analysis shall be carried out in accordance with 8.1. In the case of ingots of more than 2 t, both samples selected in accordance with 7.2.2 b) shall conform to the composition requirements.

In Annex E to Annex Q, elements with harmful effects are shown separately from alloying elements. Maximum limits for these harmful elements are specified.

Small amounts of residual elements other than those listed in the tables given in Annex E to Annex Q, for example As, Bi, Cd, Co, Cr, Mg, Ti, may be present in amounts which generally have no deleterious

effects. If requested at the time of placing the order, the determination of the content of any of these elements, or of any other residual element not included in the composition tables, together with limiting values, should be agreed between the purchaser and the supplier. Usually such elements (excluding oxygen) will not exceed 0,05 % individually in ingots or 0,06 % in castings, and the total of such elements will not usually exceed 0,20 % in ingots or 0,25 % in castings.

NOTE 1 In all tables of composition the "Remainder" is the balance between the sum of the elements determined and 100 %. It is not determined by analysis.

NOTE 2 For drinking water applications [12], restrictions to the chemical composition of some materials listed in some tables might apply according to national regulations/laws.

## 6.2 Mechanical properties

### 6.2.1 Ingots

The mechanical properties of ingots are not specified in this standard. If applicable, mechanical properties shall be agreed between the manufacturer and the purchaser. Ingots are not suitable for pressure equipment.

### 6.2.2 Castings

The mechanical properties specified in Annex C to Annex Q are related to castings and are not valid for ingots. The mechanical properties of castings shall conform to all the requirements relevant to the material and casting processes given in Annex C to Annex Q. The test(s) shall be carried out in accordance with 8.2.

The mechanical properties specified in this standard relate to separately cast test bars unless otherwise stated. Mechanical properties are wall thickness dependant. If applicable, the manufacturer and the purchaser shall agree on the minimum values to be obtained and the type and size of the cast sample.

The mechanical properties obtained when testing a casting may differ from those obtained from a separately cast test bar(s) because of possible differences in structure between the test bars and the castings, arising mainly from variations in section thickness.

## 6.3 Electrical properties

The electrical conductivity of Cu-C (CC040A) castings shall conform to the requirements given in Table C.1. The electrical conductivity of CuCr1-C (CC140C) castings shall conform to the requirements given in Table D.1. The test shall be carried out in accordance with 8.3.

NOTE 0,58 MS/m is equivalent to 1 % IACS.

## 6.4 Microstructure and grain size

For marine and other applications requiring high resistance to corrosion, the microstructure of CuZn35Mn2Al1Fe1-C (CC765S) castings shall reveal a minimum of 15 % alpha-phase when tested and examined as described in 8.4.1 [see Clause 5 k)].

Ingots in certain alloys shall have maximum average grain size, e.g.:

- 0,150 mm for material CuZn35Pb2Al-B (CB752S) (see Table G.3), CuZn36Pb-B (CB770S) (see Table G.4) and CuZn39Pb1Al-B (CB754S) (see Table G.6), when specifically ordered in the grain refined condition [see Clause 5 i)];
- 0,100 mm for material CuZn39Pb1AlB-B (CB755S) (see Table G.7) and CuZn39Pb1Al-B (CB757S) (see Table G.8);
- 0,300 mm for material CuZn37Pb2Ni1AlFe-B (CB753S) (see Table G.5).