SLOVENSKI STANDARD
SIST EN 1982:2024

01-december-2024

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: **EN 1982:2024**

ICS:

77.150.30 Bakreni izdelki Copper products

SIST EN 1982:2024 **en,fr,de**

EUROPEAN STANDARD

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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 European Standard was approved by CEN on 19 August 2024.

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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.

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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

Ref. No. EN 1982:2024 E

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European foreword

This document (EN 1982:2024) 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of an identical text or by endorsement, at the latest by April 2025, and conflicting national standards shall be withdrawn at the latest by April 2025.

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 1982:2017.

In comparison with the previous edition, the following technical modifications have been made:

— correction of Pb-content for castings in CuZn39Pb1AL-C (CC757S);

— addition of the following new materials: CB472K and CC472K (new Table J.6), CB486K and CC486K (new Table J.8), CB485K and CC485K (new Table J.7), CB470K and CC470K (new Table L.1), CB471K and CC471K (new Table L.2), CB247E and CC247E (new Table Q.3);

— deletion of the material CB490K and CC490K (Table K.1);

— revision of subclause 8.2.2 for continuous cast profiles with one or more outside dimension greater than 300 mm for tensile test piece.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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. Its purpose is to assist in providing full information to ensure that the castings are in accordance to the specified requirements. It is recommended that full consultation takes place 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, 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.

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.

NOTE Brittle fracture prevention: copper, having a face-centred cubic crystal structure, does not suffer a transition from ductile to brittle failure like some other materials.

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 CuSi3Zn12FeMnP-B (CB247E) and CuSi3Zn12FeMnP-C (CC247E) given in Table Q.3 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 assured CEN that he/she is willing to negotiate licences 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 CuSi4Zn4MnP-B (CB245E), CuSi4Zn4MnP-C (CC245E), CuSi4Zn9MnP-B (CB246E) and CuSi4Zn9MnP-C (CC246E) information may be obtained from:

Viega Technology GmbH & Co. KG

Viega Platz 1

D-57439 Attendorn

GERMANY

— For CuSn4Zn2PS-B (CB470K) and CuSn4Zn2PS-C (CC470K) information may be obtained from:

Gebr. Kemper GmbH + Co. KG

Harkortstrasse 5

D-57462 Olpe

GERMANY

— For CuSn12S-B (CB472K), CuSn12S-C (CC472K), CuSn7Zn3Ni2PS-B (CB471K) and CuSn7Zn3Ni2PS-C (CC471K) information may be obtained from:

KS Gleitlager GmbH

Am Bahnhof 14

68789 St. Leon-Rot

GERMANY

— For CuSi3Zn12FeMnP-B (CB247E) and CuSi3Zn12FeMnP-C (CC247E) information may be obtained from:

IBP Atcosa SL

Polígono Industrial Quintos-Aeropuerto

14005 Córdoba

SPAIN

and

Conex IPR Limited

Global House

95 Vantage Point

The Pensnett Estate

Kingswinford

West Midlands

DY6 7FT

UNITED KINGDOM

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 (see https://www.cencenelec.eu/european-standardization/ipr-and-patents/patents/.

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 1412:2016, *Copper and copper alloys — European numbering system*

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

EN ISO 2624:1995, *Copper and copper alloys — Estimation of average grain size (ISO 2624:1990)*

EN ISO 6506-1:2014, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2014)*

EN ISO 6509-1:2014, *Corrosion of metals and alloys — Determination of dezincification resistance of copper alloys with zinc — Part 1: Test method (ISO 6509-1:2014)*

EN ISO 6892-1:2019, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2019)*

EN ISO 80000-1:2022, *Quantities and units — Part 1: General (ISO 80000-1:2022)*

ISO 1190-1:1982, *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.

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, modified by adding Note 1 to entry]

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, Tables C.1, D.1, E.1, F.1 to F.4, G.1 to G.9, H.1 to H.2, I.1 to I.4, J.1 to J.8, K.1 to K.5, L.1 to L.2, M.1 to M.4, N.1 to N.5, O.1, P.1 to P.4, Q.1 to Q.3).

4.1.2 Symbol

The material symbol designation is based on the designation system given in ISO 1190-1:1982. 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 document might be the same as those in other standards using the designation system given in ISO 1190-1:1982, 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 1412:2016.

4.2 Casting process

The designations used to indicate the casting processes referred to in this document are based on those given in ISO 1190-1:1982, 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 document 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 document, in material designated either CuAl10Fe5Ni5-C or CC333G, sand cast, pattern number XXXX, shall be designated as follows:

Casting EN 1982 — CuAl10Fe5Ni5-C — GS — XXXX

or

Casting EN 1982 — CC333G — GS — XXXX

Denomination

Number of this European Standard

Material designation

Casting process

Pattern number

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

EXAMPLE 1 Ingot EN 1982 — CuAl10Fe5Ni5-B

or

EXAMPLE 2 Ingot EN 1982 — CB333G

5 Ordering information

In order to facilitate the enquiry, order and confirmation of order procedures the following information shall be stated at the time of placing the order:

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;

g) for copper castings and for copper-chromium castings (see Table C.1 and Table D.1), whether the electrical conductivity shall 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 shall 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);