SLOVENSKI STANDARD
SIST EN 1982:2017

01-november-2017

Nadomešča:
SIST EN 1982:2008

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 1982:2017

ICS:

77.150.30	Bakreni izdelki	Copper products

SIST EN 1982:2017 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1982

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ICS 77.150.30

Supersedes EN 1982:2008

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 9 July 2017.

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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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 1982:2017) 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of an identical text or by endorsement, at the latest by March 2018, and conflicting national standards shall be withdrawn at the latest by March 2018.

This document supersedes EN 1982:2008.

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 Directive(s).

For relationship with EU Directive 2014/68/EU, 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 1982:2008, *Copper and copper alloys — Ingots and castings*

In comparison with EN 1982:2008, the following significant changes were made:

a) introduction of a clear distinction between ingots and castings with regard to pressure equipment applications in the whole standard;

b) addition of information concerning pressure equipment application to the introduction and to the scope;

c) addition of information concerning materials that can be used for products in contact with drinking water in Tables F.1, F.4, G.4, G.8, G.9, H.2, K.2, P.1 and P.2;

d) rearrangements of the tables giving the chemical compositions and mechanical properties of the materials which were moved from Clause 6 to Annex C to Annex P;

e) addition of the following 16 new materials: CB773S and CC773S (new Table F.4), CB757S and CC757S (new Table G.8), CB768S and CC768S (new Table H.2), CB770S and CC770S (new Table G.4), CB771S and CC771S (new Table F.1), CB772S and CC772S (new Table G.9) CB245E and CC245E (new Table P.1) and CB246E and CC246E (new Table P.2);

f) addition of the terms “ingot” and “casting” and their definitions in Clause 3;

g) deletion of item o) in Clause 5 “Ordering information” and renumbering of the subsequent items;

h) subdivision between ingots and castings with regard to pressure equipment applications in 6.2.1 “Ingots” and 6.2.2 “Castings”;

i) revision of Clause 5 i), 6.1, 6.4, 6.5 and 8.2.3;

j) indication that mechanical properties for the “Pressure die cast – GP” castings are mandatory;

k) amendment of Table ZA.1;

l) deletion of B.5;

m) several editorial amendments.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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, 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.

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 CuSi4Zn4MnP-B (CB245E) and CuSi4Zn4MnP-C (CC245E) given in Table P.1 as well as concerning the alloy CuSi4Zn9MnP-B (CB246E) and CuSi4Zn9MnP-C (CC246E) given in Table P.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 CuSi4Zn4MnP-B (CB245E), CuSi4Zn4MnP-C (CC245E), CuSi4Zn9MnP-B (CB246E) and CuSi4Zn9MnP-C (CC246E) information may be obtained from

VIEGA GmbH and Co. KG

Viega Platz 1

D-57439 Attendorn

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 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 European Standard 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 standard are also specified.

This European Standard 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, 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 764-5, *Pressure equipment - Part 5: Inspection documentation of metallic materials and compliance with the material specification*

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)*

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)*

3 Terms and definitions

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

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

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

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

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 P).

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 P);

— for castings, the casting process designation (see 4.2);

— for castings, the pattern, die or drawing number, as appropriate.

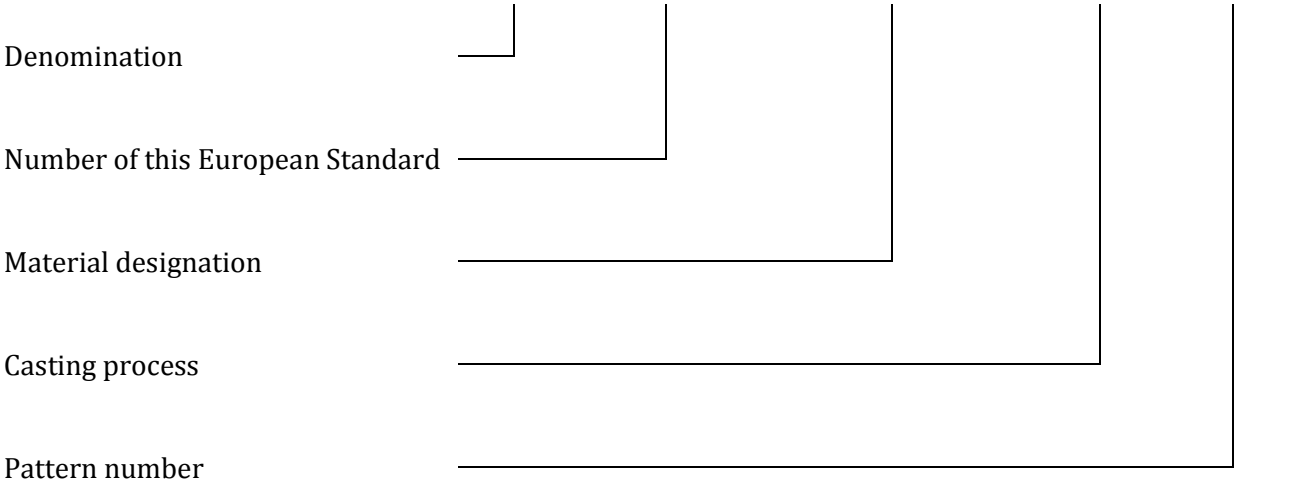
The derivation of a product designation is shown in the following examples.

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

Casting EN 1982 **— CuAl10Fe5Ni5-C** **— GS** **— XXXX**

or

Casting EN 1982 — CC333G — GS — XXXX



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 P);

e) for castings, the casting process to be used (see 4.2 and Annex C to Annex P);

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, M.2, M.3, M.4 and M.5, details of any compositional deviations for special applications (see notes to Tables G.1, G.6, J.2, M.2, M.3, M.4 and M.5);

i) for ingots, whether they are to be supplied grain refined (see 6.4);

j) for castings in alloys in Tables F.1, G.2, G.3, G.4, and G.9, whether Grade A or Grade B dezincification resistance acceptance criterion is required (see 6.5);

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 Tables N.1, O.3, O.4, the compositional requirements to which they are to conform (see notes to Tables N.1, O.3, O.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 P (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

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 P. 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 P, 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 P, 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 may 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 P 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 P. 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.