



**SLOVENSKI STANDARD**  
**SIST EN 1982:2008**

**01-julij-2008**

**BUXca Yý U**  
**SIST EN 1982:1999**

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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 pieces moulées

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**Ta slovenski standard je istoveten z: ~~SIST EN 1982:1999~~ EN 1982:2008**

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**ICS:**

77.150.30      Bakreni izdelki      Copper products

**SIST EN 1982:2008**

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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 21 March 2008.

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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 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

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## Foreword

This document (EN 1982:2008) 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of an identical text or by endorsement, at the latest by October 2008, and conflicting national standards shall be withdrawn at the latest by October 2008.

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

This document supersedes EN 1982:1998.

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, Copper and copper alloys – Ingots and castings

This European Standard 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 97/23/EC.

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

In comparison with the first edition of EN 1982:1998, the following significant technical changes were made:

- option s) in Clause 5 added;
- 8.1 amended;
- 8.6 Surface condition added;
- 9.2.2 amended with regard to pressure equipment applications;
- composition limits for alloy in Tables 2, 5, 8, 13, 14, 20, 25, 33, and 35 revised;
- correction of Table 30;
- Table 23a for the new alloy CuSn5Zn5Pb2-B (CB499K) and CuSn5Zn5Pb2-C (CC499K) added;
- Former Table 23 renumbered to Table 23b.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland 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 standard does not include copper refinery shapes which are intended for working into wrought products and are the subject of EN 1976. Neither 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 to the purchaser's intended 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 rates, where applicable, are specified in Clause 7. For certain applications, more rigorous inspection procedures may be required. Annex B gives a range of supplementary inspection procedures which may be invoked, at the option of the purchaser [see 5 p)].

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## 1 Scope

This European Standard specifies the composition, mechanical properties and other relevant characteristics of the materials. The sampling procedures and test methods for the verification of conformity to the requirements of this standard are also specified.

This standard is applicable to:

- a) copper alloy ingots intended to be remelted for the production of castings; and
- b) copper and copper alloy castings which are intended for use without subsequent working other than machining. The castings may be manufactured by the sand, permanent mould, centrifugal, continuous or pressure die casting process.

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.

## 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 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 (ISO 2624:1990)*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2005)*

EN ISO 6509, *Corrosion of metals and alloys — Determination of dezincification resistance of brass (ISO 6509:1981)*

## 3 Terms and definitions

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

### 3.1

#### 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.

### 3.2

#### 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 Tables 1 to 40).

#### 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 CuSn5Zn5Pb5-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 (for example CuSn5Zn5Pb5-C is CC491K).

### 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.    |

### 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.

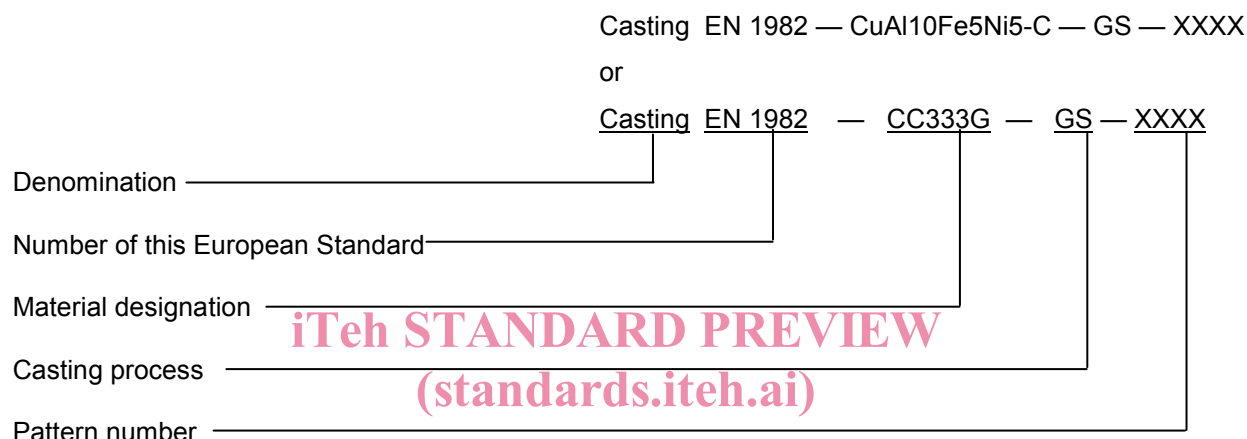
The product designation is no substitute for the full content of the standard.

The product designation for products to this standard shall consist of:

- denomination (Ingot or Casting);
- number of this European Standard (EN 1982);
- material designation, either symbol or number (see Tables 1 to 40);
- 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.

EXAMPLE 1 Castings conforming to this standard, in material designated either CuAl10Fe5Ni5-C or CC333G, sand cast, pattern number XXXX, shall be designated as follows:



EXAMPLE 2 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 his 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 Tables 1 to 40);
- e) for castings, the casting process to be used (see 4.2 and Tables 1 to 40);
- 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);

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- g) for copper castings and for copper-chromium castings (see Tables 1 and 2), whether the electrical conductivity is to be determined, and if so the agreed test details and sampling rate (see note to 8.3) and for copper sand castings, whether Grade A, B or C electrical conductivity is required (see Table 1);
- h) for ingots in the alloy in Table 3, and for ingots and castings in the alloys in Tables 7, 18, 32, 33, 34 and 35, details of any compositional deviations for special applications (see notes to Tables 3, 7, 18, 32, 33, 34 and 35);
- i) for ingots in CuZn35Pb2Al-B (CB752S) and CuZn39Pb1Al-B (CB754S), whether they are to be supplied grain refined (see 6.4 and Tables 5 and 7);
- j) for castings in alloys in Tables 4 and 5, 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 14);
- l) for ingots in the alloys in Tables 36, 39 and 40, the compositional requirements to which they are to conform (see notes to Tables 36, 39 and 40);
- m) for centrifugal castings, whether the samples for mechanical testing are to be taken from the castings, or separately cast (see 8.2.2).

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

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

- n) whether analysis is required, or limits are to be agreed, for elements additional to those listed in the composition Tables 3 to 40 (see notes 1 and 2 of 6.1);
- o) whether mechanical properties, other than those printed in bold typeface in the mechanical properties tables, are to be determined (see note 3 of 6.2 and Tables 1 to 40);
- p) 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;
- q) in the case of castings, whether a declaration of conformity is required (see 9.1);
- r) in the case of castings, whether an inspection document is required, and if so, which type (see 9.2.2);
- s) 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 Tables 1 to 40. The analysis shall be carried out in accordance with 8.1. In the case of ingot casts of more than 2 t, both samples selected in accordance with 7.2.2 b) shall conform to the composition requirements.

NOTE 1 In Tables 3 to 40, elements with known harmful effects are shown separately, below the line, from alloying elements. Maximum limits for these harmful elements are specified.

NOTE 2 Small amounts of residual elements other than those listed in the composition Tables 3 to 40, 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 analytical determination 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 3 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.

### 6.2 Mechanical properties

The mechanical properties of castings shall conform to all the requirements relevant to the material and casting process given in Tables 1 to 40. The test(s) shall be carried out in accordance with 8.2.

NOTE 1 No mechanical properties are specified for ingots.

NOTE 2 The mechanical properties specified in this standard relate to separately cast test bars unless otherwise stated. Separately cast test bars have a valuable function as a check on the quality of the material and also on the foundry technology. It is emphasized that 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.

NOTE 3 All the mechanical properties given for castings in Tables 1 to 40 are mandatory requirements (but see note 4). However, only those mechanical properties printed in bold typeface are normally determined on a routine basis. Determination of the other properties should be specifically requested, if required [see 5 o)].

NOTE 4 Because of the dependence of the properties of pressure die castings on the injection parameters, the mechanical properties given in Tables 4, 5, 7, 8, 10 and 12 are given for information only.