
Plain bearings — Copper alloys —

Part 1:

**Cast copper alloys for solid and
multilayer thick-walled plain bearings**

Paliers lisses — Alliages de cuivre —

*Partie 1: Alliages de cuivre moulés pour paliers lisses à paroi épaisse,
massifs et multicouches*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 2, *Materials and lubricants, their properties, characteristics, test methods and testing conditions*.

This third edition cancels and replaces the second edition (ISO 4382-1:1991), which has been technically revised.

The main changes compared to the previous edition are as follows:

- [Clause 2](#) "Normative references" has been updated;
- [Clause 3](#) "Terms and definitions" has been implemented;
- [Table 1](#) and [Table 2](#) have been updated.

A list of all parts in the ISO 4382 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Plain bearings — Copper alloys —

Part 1:

Cast copper alloys for solid and multilayer thick-walled plain bearings

1 Scope

This document specifies requirements for cast copper alloys for use in solid and multilayer thick-walled plain bearings. It gives a limited selection of alloys currently available for general purposes.

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.

ISO 4384-1, *Plain bearings — Hardness testing of bearing metals — Part 1: Multilayer bearings materials*

ISO 4384-2, *Plain bearings — Hardness testing of bearing metals — Part 2: Solid materials*

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

3 Terms and definitions

No terms and definitions are listed in this document.

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/>

4 Requirements

4.1 General

If the purchaser's requirements necessitate limits for any element not specified, or limits different from those already specified, these should be agreed upon between supplier and purchaser.

WARNING — Lead's (Pb) toxicity has been recognized, and its use has since been phased out of many applications. However, many countries still allow the sale of products that expose humans to lead. Lead is a neurotoxin (see [Figure 1](#)).



GHS 07



GHS 08



GHS 09

Figure 1 — Reach compliance symbols

4.2 Chemical composition

The chemical composition shall be within the limits specified in [Table 1](#) and [Table 2](#), where single figures denote maximum values.

4.3 Analysis

Methods of analysis for alloying elements or impurities shall either be as specified in relevant International Standards or as mutually agreed between supplier, purchaser and any mutually acceptable arbitrator.

5 Material properties

5.1 General

The minimum tensile strength and elongation values quoted in [Table 1](#) and [Table 2](#) are included as properties which may assist designers. Brinell hardness is the mandatory quality control check. If tensile strength and elongation tests are required, this should be stated by the purchaser at the time of ordering.

For finished bearings, Brinell hardness will normally be checked.

Table 1 — Copper/lead/tin and copper/aluminium casting alloys for solid and multilayer thick-walled plain bearings

Chemical elements and properties	Chemical composition				
	mass fraction %				
	CuPb9Sn5	CuPb10Sn10 ^a	CuPb15Sn8	CuPb20Sn5	CuAl10Fe5Ni5
Cu	Remainder	Remainder	Remainder	Remainder	Remainder
Sn	4 to 6	9 to 11	7 to 9	4 to 6	0,2
Pb	8 to 10	8 to 11	13 to 17	18 to 23	0,1
Zn	2	2	2	2	0,5
Fe	0,25	0,25	0,25	0,25	3,5 to 5,5
Ni	2	2	2	2,5	3,5 to 6,5
Sb	0,5	0,5	0,5	0,75	—
P	0,1 ^b	0,05 ^b	0,1 ^b	0,1 ^b	—
Al	0,01	0,01	0,01	0,01	8 to 11
Mn	0,2	0,2	0,2	0,2	3
Si	0,01	0,01	0,01	0,01	0,1
S	0,1	0,1	0,1	0,1	—