SLOVENSKI STANDARD
SIST ISO 4382-2:2002

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Drsni ležaji - Bakrove zlitine - 2. del: Kovne bakrove zlitine za masivne drsne ležaje

Plain bearings -- Copper alloys -- Part 2: Wrought copper alloys for solid plain bearings

Paliers lisses -- Alliages de cuivre -- Partie 2: Alliages de cuivre corroyés pour paliers lisses massifs

Ta slovenski standard je istoveten z: **ISO 4382-2:1991**

ICS:

21.100.10	Drsni ležaji	Plain bearings
77.150.30	Bakreni izdelki	Copper products

SIST ISO 4382-2:2002 **en**

INTERNATIONAL STANDARD

ISO 4382-2

Second edition
1991-11-01

Plain bearings — Copper alloys —

Part 2:
Wrought copper alloys for solid plain bearings

Paliers lisses — Alliages de cuivre —

Partie 2: Alliages de cuivre corroyés pour paliers lisses massifs

Reference number
ISO 4382-2:1991(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4382-2 was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Sub-Committee SC 2, *Materials and lubricants, their properties, characteristics, test methods and testing conditions*.

This second edition cancels and replaces the first edition (ISO 4382-2:1982), of which it constitutes a technical revision.

ISO 4382 consists of the following parts, under the general title *Plain bearings — Copper alloys*:

— *Part 1: Cast copper alloys for solid and multilayer thick-walled plain bearings*

— *Part 2: Wrought copper alloys for solid plain bearings*

Annexes A and B of this part of ISO 4382 are for information only.

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Plain bearings — Copper alloys —

Part 2:
Wrought copper alloys for solid plain bearings

1 Scope

This part of ISO 4382 specifies requirements for wrought copper alloys for use in solid plain bearings, particularly for bushes. It gives a limited selection of alloys currently available for general purposes.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 4382. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4382 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4384-2:1982, *Plain bearings — Hardness testing of bearing metals — Part 2: Solid materials.*

3 Requirements

3.1 Chemical composition

The chemical composition shall be within the limits specified in table 1, where single figures denote maximum values.

The chemical analysis is decisive for the acceptance of the bearing metals.

3.2 Material properties

Material properties shall be in accordance with table 1.

The Brinell hardness is regarded as the test and acceptance value. All other indicated values are mean values and are regarded as typical values for the designer. In view of the range of possible alloy compositions, relatively large deviations from the indicated values must be expected in individual cases.

4 Designation

EXAMPLE

Designation of a bearing metal having the symbol CuSn8P and a minimum Brinell hardness of 120:

Bearing metal ISO 4382 - CuSn8P - HB 120

Table 1 — Wrought copper alloys

Chemical elements and properties	Chemical composition, % (*m*/*m*)			
	CuSn8P	CuZn31Si1	CuZn37Mn2Al2Si	CuAl9Fe4Ni4
Cu	Remainder	Remainder	Remainder	Remainder
Sn	7,5 to 9	—	0,5	0,2
Zn	0,3	28,5 to 33,3	32 to 40	0,5
Al	—	—	1 to 2,5	8 to 11
Ni	0,3	0,5	0,25[1]	2,5 to 5
Fe	0,1	0,4	0,6	2,5 to 4,5
Si	—	0,7 to 1,3	0,3 to 1,3	0,1
Mn	—	—	1,5 to 3,5	3
Pb	0,05	0,8	0,8	0,1
P	0,1 to 0,4[2]	—	—	—
Total others	0,2	0,5	0,5	0,5
Material properties of specimen				
Brinell hardness [3] HB 2,5/62,5/10, min.	80 120 140 160 100 135 160		150	160
Tensile strength, R_m N/mm² ≈	400 470 520 580 440 510 560		600	700
Elongation, percent after fracture, A % ≈	55 40 25 10 30 15 10		15	15
0,2 % Proof stress, $R_{p0,2}$ N/mm² ≈	200 300 400 480 250 350 450		300	400
Elastic modulus, E kN/mm² ≈	115	105	100	118
Linear thermal expansion coefficient, α_l 10^{-6}/K ≈	17	18	19	16
Thermal conductivity, λ, at 15 °C W/(m·K) ≈	59	67	65	27
Density, ϱ kg/dm³ ≈	8,8	8,4	8,1	7,6

1) The maximum nickel content may be raised to 2 % by agreement between supplier and purchaser.

2) For as-rolled alloy, < 0,1 % is permissible.

3) For hardness testing, see ISO 4384-2.

Annex A
(informative)

Guide for uses of bearing metals and for the hardness of the mating bearing part (shaft)

Bearing alloys	Characteristics and principal uses	Minimum hardness of the shaft[1)]
CuSn8P	For hardened shafts with any combination of high load, high sliding velocity, impact loading or pounding; when there is adequate lubrication and good alignment. Hardness should be chosen to suit working conditions.	55 HRC
CuZn31Si1	For hardened shafts with any combination of high load, moderate to high sliding velocity, impact loading or pounding; when there is adequate lubrication and good alignment. Hardness should be chosen to suit working conditions.	
CuZn37Mn2Al2Si	High wear resistance; tolerant of poor lubrication; hardened shafts essential.	
CuAl9Fe4Ni4	Very hard alloy for structural components under sliding conditions. Suitable for marine environments. Hardened shafts essential. Relatively poor embeddability.	

1) The shaft hardness should be four times higher than the bearing alloy hardness. The hardness value indicated for the shaft material is a minimum value and is valid for most applications. It may, however, be necessary to have a higher hardness of material due to the working conditions, in particular the lubrication conditions.

Annex B
(informative)

Bibliography

[1] ISO 4379:—[1], *Plain bearings — Copper alloy bushes.*

[2] ISO 6892:1984, *Metallic materials — Tensile testing.*

1) To be published. (Revision of ISO 4379:1978)