

International Standard



4383

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Plain bearings — Metallic multilayer materials for thin-walled plain bearings

Paliers lisses — Matériaux métalliques multicouches pour paliers lisses minces

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4383 was developed by Technical Committee ISO/TC 123, *Plain bearings*, and was circulated to the member bodies in September 1978.

It has been approved by the member bodies of the following countries:

Australia	Italy	South Africa, Rep. of
Chile	Korea, Rep. of	Spain
Czechoslovakia	Libyan Arab Jamahiriya	Sweden
France	Mexico	United Kingdom
Germany, F.R.	Netherlands	USA
India	New Zealand	USSR
Ireland	Poland	Yugoslavia

No member body expressed disapproval of the document.

Plain bearings — Metallic multilayer materials for thin-walled plain bearings

1 Scope and field of application

This International Standard specifies requirements for metallic multilayer materials for the manufacture of thin-walled plain bearings (half bearings, bushes, thrust washers). The multilayer material consists of a steel backing, the bearing metal layer (cast, sintered, roll bonded) and possibly an electrodeposited overlay.

2 References

ISO 3548, *Plain bearings — Thin-walled half bearings Dimensions, tolerances and methods of checking.*

ISO 4381, *Plain bearings — Lead and tin casting alloys for multilayer plain bearings.*

ISO 4382/1, *Plain bearings — Copper alloys — Part 1: Cast copper alloys for solid and multilayer plain bearings.*

ISO 4384/1, *Plain bearings — Hardness testing on bearing metals — Part 1: Compound materials.*¹⁾

ISO 6864, *Plain bearings — Thin-walled flanged half bearings — Dimensions, tolerances and methods of checking.*¹⁾

3 Requirements

3.1 Chemical composition

The chemical composition shall be within the limits specified in tables 1, 2, 3 and 4, where single figures denote maximum values.

3.2 Steel backings

The chemical composition of the steel for backings shall be the

subject of agreement between manufacturer and purchaser. In general, low carbon steel will be used.

3.3 Bearing metal layers

Bearing metals based on lead and tin shall be according to table 1.

Bearing metals based on copper shall be according to table 2.

Bearing metals based on aluminium shall be according to table 3.

3.4 Overlays

Overlays according to table 4 may be used only for bearing metal layers according to tables 2 and 3. The thickness of the overlay and any additional layers between the bearing metal layer and the overlay shall be the subject of agreement between manufacturer and purchaser.

3.5 Guide to bearing metal properties and selection

A guide to bearing metal hardness in strip form and uses of bearing metals is given in tables 5 and 6.

4 Designation

Example : Designation of a multilayer material consisting of a steel backing, the bearing metal CuPb24Sn as cast (G) and the overlay PbSn10Cu2 :

Bearing metal ISO 4383 — G — CuPb24Sn — PbSn10Cu2.

1) At present at the stage of draft.

Table 1 — Lead and tin alloys

Chemical elements	Chemical composition, % (m/m)			
	PbSb10Sn6	PbSb15SnAs	PbSb15Sn10	SnSb8Cu4
Pb	Remainder	Remainder	Remainder	0,35
Sb	9,0 to 11,0	13,5 to 15,5	14,0 to 16,0	7,0 to 8,0
Sn	5,0 to 7,0	0,9 to 1,7	9,0 to 11,0	Remainder
Cu	0,70	0,70	0,70	3,0 to 4,0
As	0,25	0,8 to 1,2	0,60	0,10
Bi	0,10	0,10	0,10	0,08
Zn	0,005	0,005	0,005	0,005
Al	0,005	0,005	0,005	0,005
Cd	0,05	0,02	0,05	—
Fe	0,10	0,10	0,10	0,10
Total others	0,20	0,20	0,20	0,20

Table 2 — Copper alloys

Chemical elements	Chemical composition, % (m/m)				
	CuPb10Sn10 ¹⁾ G - cast P - sintered	CuPb17Sn5 G - cast	CuPb24Sn4 G - cast P - sintered	CuPb24Sn G - cast P - sintered	CuPb30 P - sintered
Cu	Remainder	Remainder	Remainder	Remainder	Remainder
Pb	9,0 to 11,0	14,0 to 20,0	19,0 to 27,0	19,0 to 27,0	26,0 to 33,0
Sn	9,0 to 11,0	4,0 to 6,0	3,0 to 4,5	0,6 to 2,0	0,5
Zn	0,5	0,5	0,5	0,5	0,5
P	0,1	0,1	0,1	0,1	0,1
Fe	0,7	0,7	0,7	0,7	0,7
Ni	0,5	0,5	0,5	0,5	0,5
Sb	0,2	0,2	0,2	0,2	0,2
Total others	0,5	0,5	0,5	0,5	0,5

1) The chemical composition of this alloy differs from that of solid plain bearings (see ISO 4382/1).

Table 3 — Aluminium alloys

Chemical elements	Chemical composition, % (m/m)				
	AlSn20Cu	AlSn6Cu	AlSi4Cd	AlCd3CuNi	AlSi11Cu
Al	Remainder	Remainder	Remainder	Remainder	Remainder
Cu	0,7 to 1,3	0,7 to 1,3	0,05 to 0,15	0,7 to 1,3	0,7 to 1,3
Sn	17,5 to 22,5	5,5 to 7,0	—	—	0,2
Ni	0,1	1,3	—	0,7 to 1,3	0,1
Cd	—	—	0,8 to 1,4	2,7 to 3,5	—
Si	0,7 ¹⁾	0,7 ¹⁾	3,5 to 4,5	0,7 ¹⁾	10,0 to 12,0
Fe	0,7 ¹⁾	0,7 ¹⁾	0,35	0,7 ¹⁾	0,3
Mn	0,7 ¹⁾	0,7 ¹⁾	0,2	0,7 ¹⁾	0,1
Ti	0,2	0,2	0,2	0,1	0,1
Total others	0,5	0,5	0,25	0,15	0,3

1) Total Si + Fe + Mn not exceeding 1,0 %.

Table 4 — Overlays

Chemical elements	Chemical composition, % (m/m)		
	PbSn10Cu2	PbSn10	PbIn7
Pb	Remainder	Remainder	Remainder
Sn	8,0 to 12,0	8,0 to 12,0	—
Cu	1,0 to 3,0	—	—
In	—	—	5,0 to 10,0
Total others	0,5	0,5	0,5

Table 5 — Guide to bearing metal hardness in strip form

(Hardness values may be increased by skin-rolling; tests carried out according to ISO 4384/1.)

Bearing alloys	As cast	Sintered	Rolled and annealed	Special treatments
PbSb10Sn6	19 to 23HV	—	—	15 to 19HV
PbSb15SnAs	16 to 20HV	—	—	—
PbSb15Sn10	18 to 23HV	—	—	—
SnSb8Cu4	17 to 24HV	—	—	—
CuPb10Sn10	70 to 130HB	60 to 90HB	—	—
CuPb17Sn5	60 to 95HB	—	—	—
CuPb24Sn4	60 to 90HB	45 to 70HB	—	—
CuPb24Sn	55 to 80HB	40 to 60HB	—	—
CuPb30	—	30 to 45HB	—	—
AlSn20Cu	—	—	30 to 40HB	—
AlSn6Cu	—	—	35 to 45HB	—
AlSi4Cd	—	—	30 to 40HB	50 to 70HB
AlCd3CuNi	—	—	35 to 55HB	—
AlSi11Cu	—	—	45 to 60HB	—