
Plain bearings — Copper alloy bushes

Paliers lisses — Bagues en alliages de cuivre

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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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 3, *Dimensions, tolerances and construction details*.

This third edition cancels and replaces the second edition (ISO 4379:1993), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

- In Clause 2, all dated references have been changed to undated ones.
- A new Clause 3 *Terms and definitions* has been added.

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 alloy bushes

1 Scope

This document specifies dimensions and tolerances for cylindrical and flanged bushes with internal diameter, d_1 , in the range 6 mm to 200 mm.

It applies to solid mono-metal copper alloy bushes to be used as plain bearings with and without oil holes and oil grooves.

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 1302, *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

ISO 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 4382-1, *Plain bearings — Copper alloys — Part 1: Cast copper alloys for solid and multilayer thick-walled plain bearings*

ISO 4382-2, *Plain bearings — Copper alloys — Part 2: Wrought copper alloys for solid plain bearings*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Dimensions and tolerances

Dimensions shall be as shown and given in [Figure 1](#) and in [Table 1](#) and [Table 2](#).

Tolerances shall be as given in [Table 3](#).

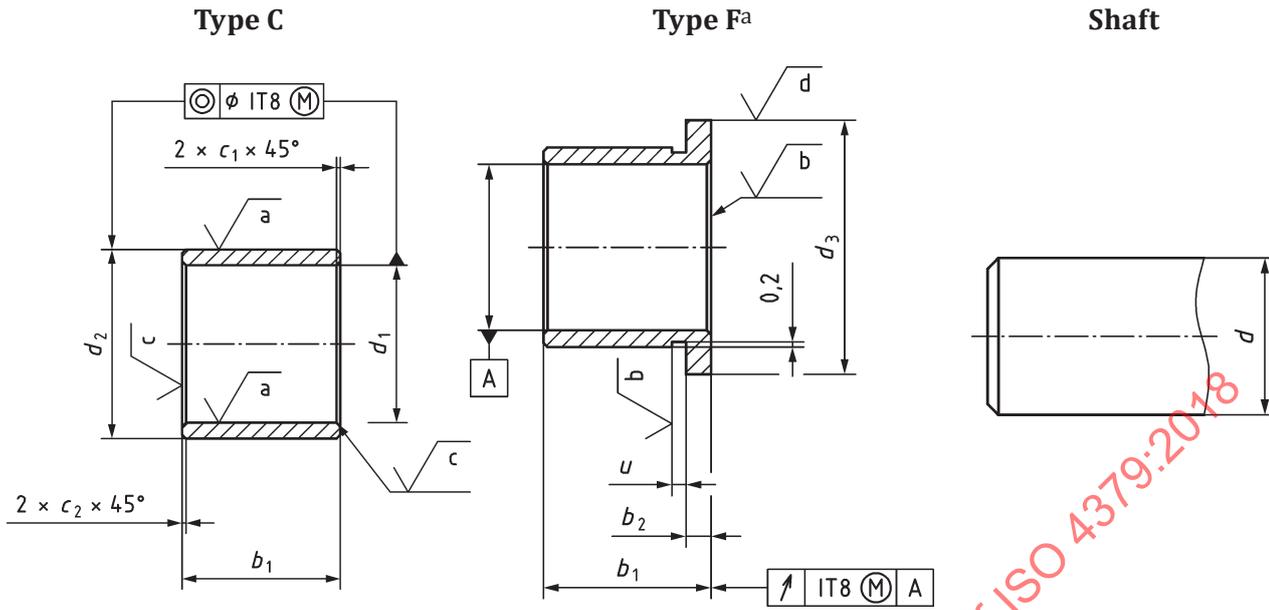
Tolerance classes which deviate from those given in this document shall in each case be added in the designation to the nominal size.

The dimensions of d_2 shall be used to determine the IT value in the case of the coaxial tolerance.

The dimensions of d_3 shall be used to determine the IT value in the case of the axial runout.

Details which have not been specified shall be chosen appropriately.

All dimensions are given in millimetres.



a Other dimensions and details than type C.

Figure 1 — Dimensions and tolerances for bush type C, F and shafts

Table 1 — Type C

d_1	d_2			b_1			Chamfers	
							45° c_1, c_2 max.	15° c_2 max.
6	8	10	12	6	10	—	0,3	1
8	10	12	14	6	10	—	0,3	1
10	12	14	16	6	10	—	0,3	1
12	14	16	18	10	15	20	0,5	2
14	16	18	20	10	15	20	0,5	2
15	17	19	21	10	15	20	0,5	2
16	18	20	22	12	15	20	0,5	2
18	20	22	24	12	20	30	0,5	2
20	23	24	26	15	20	30	0,5	2
22	25	26	28	15	20	30	0,5	2
(24)	27	28	30	15	20	30	0,5	2
25	28	30	32	20	30	40	0,5	2
(27)	30	32	34	20	30	40	0,5	2
28	32	34	36	20	30	40	0,5	2
30	34	36	38	20	30	40	0,5	2
32	36	38	40	20	30	40	0,8	3
(33)	37	40	42	20	30	40	0,8	3
35	39	41	45	30	40	50	0,8	3

Values in parentheses are for special applications only. They shall be avoided as far as possible.

Table 1 (continued)

d_1	d_2			b_1			Chamfers	
							45° c_1, c_2 max.	15° c_2 max.
(36)	40	42	46	30	40	50	0,8	3
38	42	45	48	30	40	50	0,8	3
40	44	48	50	30	40	60	0,8	3
42	46	50	52	30	40	60	0,8	3
45	50	53	55	30	40	60	0,8	3
48	53	56	58	40	50	60	0,8	3
50	55	58	60	40	50	60	0,8	3
55	60	63	65	40	50	70	0,8	3
60	65	70	75	40	60	80	0,8	3
65	70	75	80	50	60	80	1	4
70	75	80	85	50	70	90	1	4
75	80	85	90	50	70	90	1	4
80	85	90	95	60	80	100	1	4
85	90	95	100	60	80	100	1	4
90	100	105	110	60	80	120	1	4
95	105	110	115	60	100	120	1	4
100	110	115	120	80	100	120	1	4
105	115	120	125	80	100	120	1	4
110	120	125	130	80	100	120	1	4
120	130	135	140	100	120	150	1	4
130	140	145	150	100	120	150	2	5
140	150	155	160	100	150	180	2	5
150	160	165	170	120	150	180	2	5
160	170	180	185	120	150	180	2	5
170	180	190	195	120	180	200	2	5
180	190	200	210	150	180	250	2	5
190	200	210	220	150	180	250	2	5
200	210	220	230	180	200	250	2	5

Values in parentheses are for special applications only. They shall be avoided as far as possible.

Table 2 — Type F

d_1	d_2	d_3	b_2	d_2	d_3	b_2				Chamfers		u
										45° c_1, c_2 max.	15° c_2 max.	
Series 1			Series 2			b_1						
6	8	10	1	12	14	3	—	10	—	0,3	1	1
8	10	12	1	14	18	3	—	10	—	0,3	1	1
10	12	14	1	16	20	3	—	10	—	0,3	1	1
12	14	16	1	18	22	3	10	15	20	0,5	2	1
14	16	18	1	20	25	3	10	15	20	0,5	2	1
15	17	19	1	21	27	3	10	15	20	0,5	2	1
16	18	20	1	22	28	3	12	15	20	0,5	2	1,5
18	20	22	1	24	30	3	12	20	30	0,5	2	1,5
20	23	26	1,5	26	32	3	15	20	30	0,5	2	1,5
22	25	28	1,5	28	34	3	15	20	30	0,5	2	1,5
(24)	27	30	1,5	30	36	3	15	20	30	0,5	2	1,5
25	28	31	1,5	32	38	4	20	30	40	0,5	2	1,5
(27)	30	33	1,5	34	40	4	20	30	40	0,5	2	1,5
28	32	36	2	36	42	4	20	30	40	0,5	2	1,5
30	34	38	2	38	44	4	20	30	40	0,5	2	2
32	36	40	2	40	46	4	20	30	40	0,8	3	2
(33)	37	41	2	42	48	5	20	30	40	0,8	3	2
35	39	43	2	45	50	5	30	40	50	0,8	3	2
(36)	40	44	2	46	52	5	30	40	50	0,8	3	2
38	42	46	2	48	54	5	30	40	50	0,8	3	2
40	44	48	2	50	58	5	30	40	60	0,8	3	2
42	46	50	2	52	60	5	30	40	60	0,8	3	2
45	50	55	2,5	55	63	5	30	40	60	0,8	3	2
48	53	58	2,5	58	66	5	40	50	60	0,8	3	2
50	55	60	2,5	60	68	5	40	50	60	0,8	3	2
55	60	65	2,5	65	73	5	40	50	70	0,8	3	2
60	65	70	2,5	75	83	7,5	40	60	80	0,8	3	2
65	70	75	2,5	80	88	7,5	50	60	80	1	4	2
70	75	80	2,5	85	95	7,5	50	70	90	1	4	2
75	80	85	2,5	90	100	7,5	50	70	90	1	4	3
80	85	90	2,5	95	105	7,5	60	80	100	1	4	3
85	90	95	2,5	100	110	7,5	60	80	100	1	4	3
90	100	110	5	110	120	10	60	80	120	1	4	3
95	105	115	5	115	125	10	60	100	120	1	4	3
100	110	120	5	120	130	10	80	100	120	1	4	3
105	115	125	5	125	135	10	80	100	120	1	4	3
110	120	130	5	130	140	10	80	100	120	1	4	3
120	130	140	5	140	150	10	100	120	150	1	4	3
130	140	150	5	150	160	10	100	120	150	2	5	4
140	150	160	5	160	170	10	100	150	180	2	5	4

Values in parentheses are for special applications only. They shall be avoided as far as possible.

Table 2 (continued)

d_1	d_2	d_3	b_2	d_2	d_3	b_2	b_1			Chamfers		u
										45° c_1, c_2 max.	15° c_2 max.	
Series 1			Series 2									
150	160	170	5	170	180	10	120	150	180	2	5	4
160	170	180	5	185	200	12,5	120	150	180	2	5	4
170	180	190	5	195	210	12,5	120	180	200	2	5	4
180	190	200	5	210	220	15	150	180	250	2	5	4
190	200	210	5	220	230	15	150	180	250	2	5	4
200	210	220	5	230	240	15	180	200	250	2	5	4

Values in parentheses are for special applications only. They shall be avoided as far as possible.

Table 3 — Tolerances

d_1	d_2		d_3	b_1	Housing bore	Shaft diameter d
E6 ^a	120	s6	d11	h13	H7	e7 or g7 ^b
	>120	r6				

^a After pressing, this usually gives a tolerance position H and tolerance grade approximately IT8.
^b Recommended tolerance, depending on application.
 When the bushes are to be used in conjunction with ready-made precision ground shafts of tolerance position h, the tolerance on the inside diameter d_1 shall be D6, so that the probable tolerance after fitting is F8.
 If the bearing bore is to be machined after fitting, the size and tolerance of the inside diameter d_1 shall be agreed upon between the manufacturer and customer.

5 Material

Cast copper alloys shall be in accordance with ISO 4382-1.

Wrought copper alloys shall be in accordance with ISO 4382-2.

6 Surface finish

Surface roughness shall be indicated in accordance with ISO 1302 (see Figure 1) and be as follows:

$$\sqrt{a} = \sqrt{Ra \leq 1,6 \mu m}$$

$$\sqrt{b} = \sqrt{Ra \leq 3,2 \mu m}$$

$$\sqrt{c} = \sqrt{Ra \leq 6,3 \mu m}$$

$$\sqrt{d} = \sqrt{Ra \leq 25 \mu m}$$

Edges shall be free of burrs.

Slight indentations shall only be accepted on the outside surfaces and provided they are considered not to have an effect on fitting and function.