INTERNATIONAL STANDARD

ISO 10792-1

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Aerospace — Airframe spherical plain bearings in corrosion-resisting steel with self-lubricating liner —

Part 1:
Metric series

Aéronautique — Rotules en acier résistant à la corrosion, à garniture autolubrifiante, utilisées dans la structure des aéronefs

Partie 1: Séries métriques

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 10792-1 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 15, *Airframe bearings.*

ISO 10792 consists of the following parts, under the general title *Aerospace — Airframe spherical plain bearings in corrosion-resisting steel with self-lubricating liner* :

— *Part 1: Metric series*

— *Part 2: Inch series*

— *Part 3: Technical specification*

Aerospace — Airframe spherical plain bearings in corrosion-resisting steel with self-lubricating liner —

Part 1:

Metric series

1 Scope

This part of ISO 10792 specifies the characteristics of spherical plain bearings in corrosion-resisting steel with self-lubricating liner, narrow and wide series, for elevated loads at ambient temperature, for use in fixed or moving parts of the aircraft structure and control mechanisms at temperatures of −55 °C to +163 °C.

It is applicable to self-lubricating spherical plain bearings (without rolling elements) consisting of an outer ring having a concave sphered sliding contact surface with self-lubricating liner and inner ring having a matched convex sphered sliding contact surface.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 10792. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 10792 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 683-16:1976, *Heat-treated steels, alloy steels and free-cutting steels — Part 16: Precipitation hardening stainless steels.*

ISO 683-17:1976, *Heat-treated steels, alloy steels and free-cutting steels — Part 17: Ball and roller bearing steels.*

ISO 1132:1980, *Rolling bearings — Tolerances — Definitions.*

ISO 6811:1983, *Spherical plain bearings — Vocabulary.*

ISO 8075:1985, *Aerospace — Surface treatment of hardenable stainless steel parts.*

ISO 10792-3:1995, *Aerospace — Airframe spherical plain bearings in corrosion-resisting steel with self-lubricating liner — Part 3: Technical specification*

3 Definitions

For the purposes of this part of ISO 10792, the definitions given in ISO 6811 and the following definitions apply. In addition, definitions of the concepts related to the tolerances specified in this part of ISO 10792 are given in ISO 1132.

3.1 surface liner: Material which is affixed to the outer ring intended to reduce the coefficient of friction.

3.2 permissible static radial load: Unidirectional static load which when applied radially can result in permanent bearing deformation but will not cause fracture or structural failure of the bearing components.

3.3 permissible static axial load: Unidirectional static load which when applied axially can result in permanent bearing deformation but will not cause fracture or structural failure of the bearing components.

3.4 permissible dynamic radial load: Unidirectional load which when applied radially while oscillating the bearing will result in a bearing life of 25 000 cycles as determined by bearing wear.

4 Symbols

For the purposes of this part of ISO 10792, the symbols given in ISO 1132 and the following symbols apply.

α Angle of tilt of the outer ring with respect to the inner ring

> NOTE — Its maximum value is determined with the spherical surface of the outer ring completely in contact with the inner ring. See also footnote 1) to tables 1 and 2.

β (Inside) angle of face groove

C_a Permissible static axial limit load

C_s Permissible static radial limit load

C_{25} Permissible dynamic radial limit load

d_1 Diameter of shoulder of inner ring

D_1 Face groove pitch diameter

K Spherical diameter of inner ring (reference)

5 Characteristics

5.1 Dimensions and tolerances

The dimensions and tolerances for narrow-series spherical plain bearings shall conform to table 1; those for wide-series spherical plain bearings shall conform to table 2.

The configuration of spherical plain bearings shall conform to either figure 1 for those without face grooves or to figure 2 for those with face grooves.

5.2 Mass

The mass of spherical plain bearings shall conform to the values given in tables 1 and 2.

5.3 Loads and starting torques

Loads and starting torques shall conform to the values given in table 3 for narrow-series bearings and to those given in table 4 for wide-series bearings.

5.4 Materials

Inner ring   Bearing steel, type 21, in accordance with ISO 683-17, quenched and tempered, except for hardnesses 55 HRC to 62 HRC.

Outer ring   Bearing steel, type 1, in accordance with ISO 683-16, except with maximum molybdenum content of 0,5 %, heat treatment R 093, hardnesses 28 HRC to 37 HRC, before swaging.

Liner   Self-lubricating wear-resisting material with a low coefficient of friction.
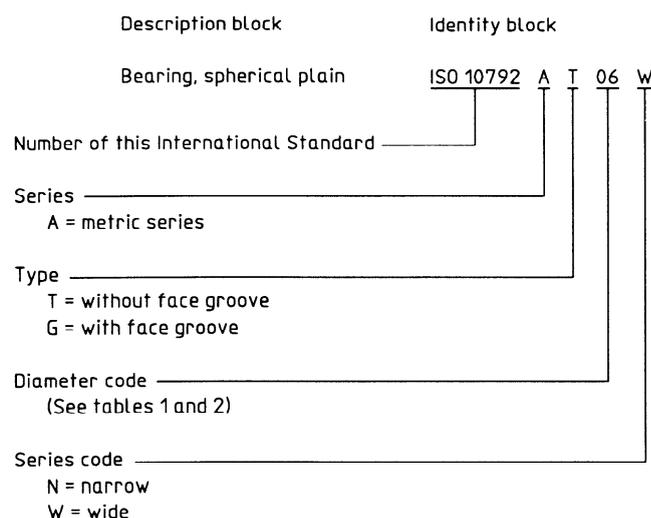
5.5 Surface treatment

A surface treatment shall be applied to the inner ring material in accordance with ISO 8075. The application of this same surface treatment to the outer ring material is optional.

6 Technical specification

Spherical plain bearings supplied in accordance with this part of ISO 10792 shall conform with the requirements of ISO 10792-3.

7 Designation

Each spherical plain bearing in accordance with this part of ISO 10792 shall be designated as in the following example.

	Description block	Identity block
	Bearing, spherical plain	ISO 10792 A T 06 W

Number of this International Standard ⎯⎯⎯

Series ⎯⎯⎯
   A = metric series

Type ⎯⎯⎯
   T = without face groove
   G = with face groove

Diameter code ⎯⎯⎯
   (See tables 1 and 2)

Series code ⎯⎯⎯
   N = narrow
   W = wide

8 Marking

In addition to the manufacturer's identification, each spherical plain bearing shall be marked using the identity block as defined in clause 7. Marking position and method are at the manufacturer's option but shall not adversely affect the working of the spherical plain bearing.

Dimensions in millimetres
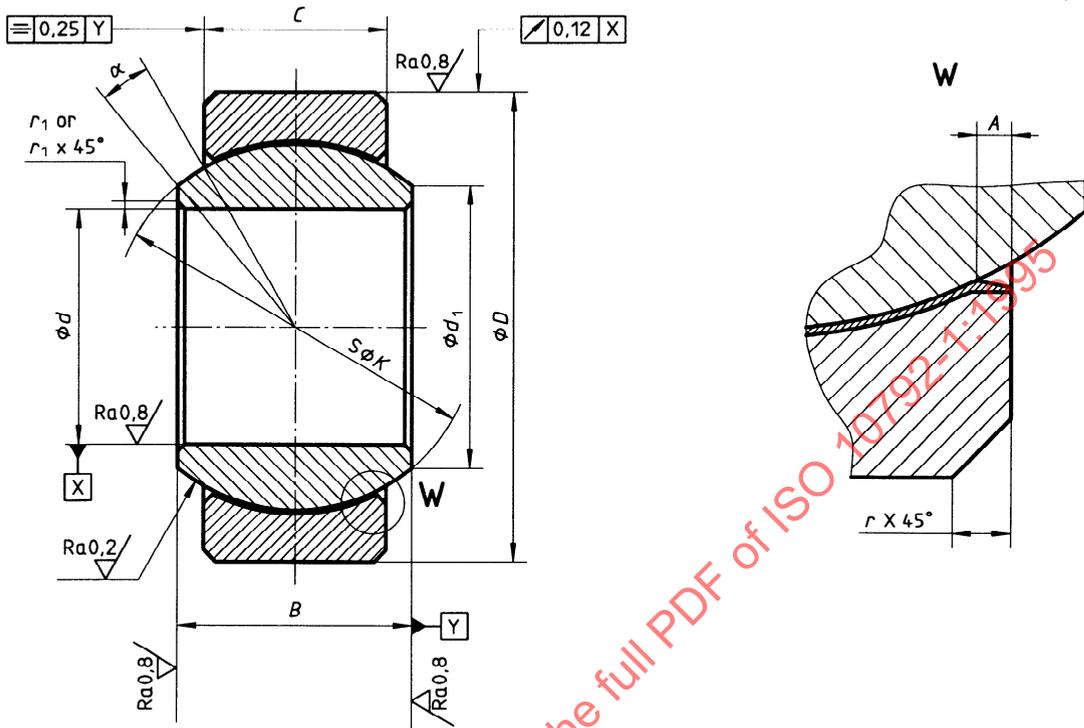Surface roughness values in micrometres

Figure 1 — Spherical plain bearing with self-lubricating liner without face groove

Dimensions in millimetres
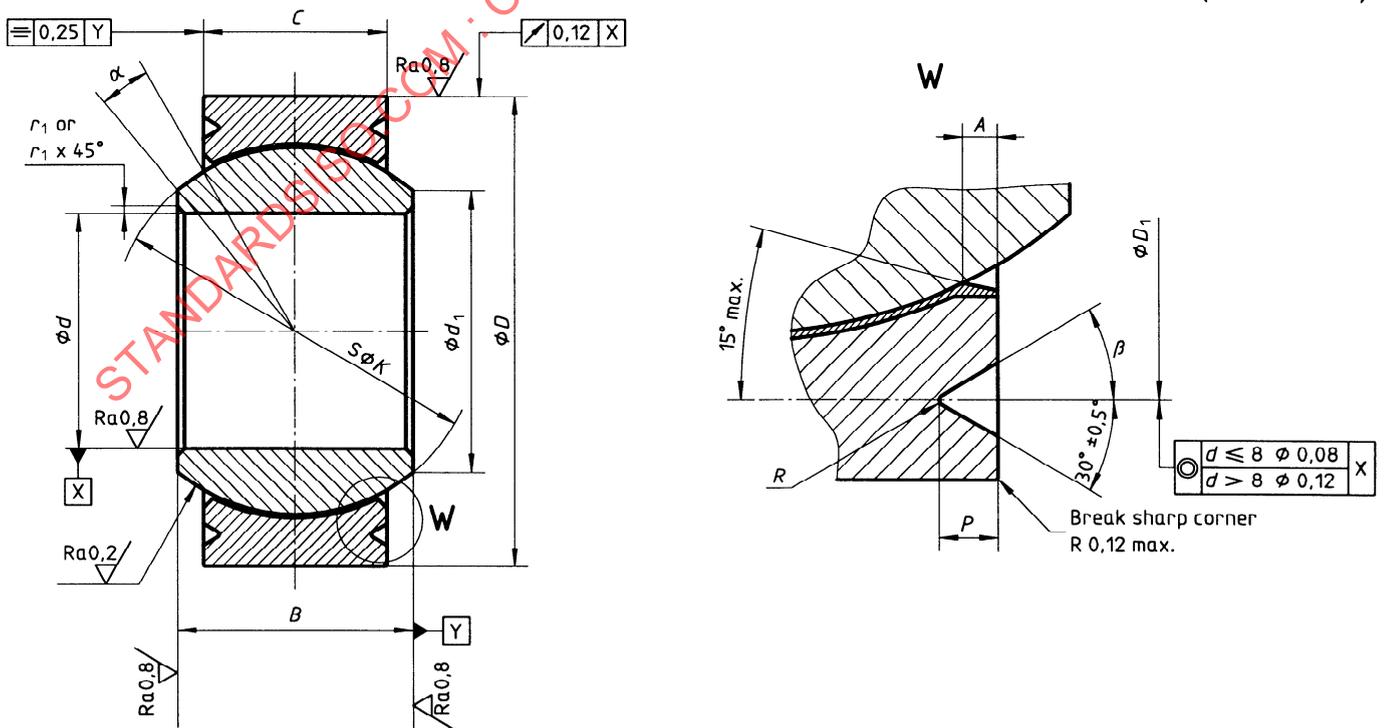Surface roughness values in micrometres

Figure 2 — Spherical plain bearing with self-lubricating liner with face groove

3

Table 1 — Narrow series — Dimensions, tolerances and masses

Dimensions in millimetres
Tolerances in micrometres

Diameter code	d	D	C +100 −100	B 0 −60	Δ_{dmp}	Δ_{ds}	Δ_{Dmp}	Δ_{Ds}	d_1 min.	K ref.	r	r_1	D_1 +100 0	P 0 −200	R +100 0	A max.	β ± 0,5°	$\alpha^{1)}$ min.	Mass ≈ g
05	5	14	5,5	7			0 −8	+5 −13	8,6	11,1			12,2	0,7	0,2	0,8	20°	9°	7
06	6	16	6,5	9		+2 −10			9	12,8			14,2					14°	9
08	8	18	7	10					10,2	14,3			16,2					15°	12
10	10	21	8	10,5	0 −8				11,9	15,9	0,5 to 0,8		18,4					11°	20
12	12	25	10	13			0 −9	+6 −15	15	19,8			22,4	0,9		0,9		10°	32
15	15	29	12	15		+3 −11			20,5	25,4			26,4					8°	50
17	17	31	13,5	16					21,7	27		0,1 to 0,4	28,4			1		7°	59
22	22	40	18	22			0 −11	+8 −19	27,1	34,9			36,8					8°	126
25	25	45	20	25	0 −10	+3 −13			29,6	38,8	0,6 to 1		41,8		0,3	1,2	30°	8°	185
30	30	51	24	28					35,5	45,2			47,8	1,4				6°	300
35	35	57	26	31			0 −13	+10 −23	41,7	52			53,8					7°	340
40	40	64	29	34	0 −12	+3 −15			47	56	0,8 to 1,2		60,8			1,5		6°	460
45	45	72	32	37					52,2	64			68,8					5°	630
50	50	80	34	41			0 −15	+13 −28	59,2	72			76,8					7°	870

1) In use, this value is the permissible maximum.

Table 2 — Wide series — Dimensions, tolerances and masses

Dimensions in millimetres
Tolerances in micrometres

Diameter code	d	D	C +100 −100	B 0 −60	Δ_{dmp}	Δ_{ds}	Δ_{Dmp}	Δ_{Ds}	d_1 min.	K ref.	r	r_1	D_1 +100 0	P 0 −200	R +100 0	A max.	β ± 0,5°	$\alpha^{1)}$ min.	Mass ≈ g
05	5						0 −8	+5 −13									20°		
06	6	16	8,5	11		+2 −10			7,7	13,5			14,2	0,7	0,2	0,8		15°	16
08	8	18	8						10,3	15,1			16,2					14°	17
10	10	21	10	12,5	0 −8				12,2	17,5	0,5 to 0,8		18,4					10°	27
12	12	26	13	16			0 −9	+6 −15	15,5	22,3			23,4	0,9		0,9		10°	49
15	15	29	13,5	17		+3 −11			18,9	25,5			26,4						62
17	17	30	14,5	18					20,1	27,5		0,1 to 0,4	27,4			1		9°	69
20	20	35	16	20			0 −11	+8 −19	23,5	31,8			31,8					8°	104
25	25	54	26	32	0 −10	+3 −13			35,3	47,7	0,6 to 1		50,8		0,3	1,2	30°	9°	445
30	30	60	28	34					40,9	53,2			56,8						480
35	35	65	29	36			0 −13	+10 −23	45,5	58,1			61,8	1,4					565
40	40	68	31	38					47	60,5			64,8					8°	600
45	45	76	33	41	0 −12	+3 −15			54,1	67,9	0,8 to 1,2		72,8			1,5			800
50	50	82	35	44			0 −15	+13 −28	60,3	74,7			78,8						970
55	55	96	40	52					63,4	82			92,8	1,5				10°	1 580

1) In use, this value is the permissible maximum.