
International Standard



7938

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Aircraft — Ball bearings for control cable pulleys — Dimensions and loads

Aéronefs — Roulements à billes pour poulies de câbles de commande — Dimensions et charges

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Descriptors : aircraft, aircraft equipment, control devices, cable controls, pulleys, ball bearings, specifications, dimensions, loads (forces), designation, marking.

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.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7938 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Aircraft — Ball bearings for control cable pulleys — Dimensions and loads

1 Scope and field of application

This International Standard specifies the requirements for sealed or shielded ball bearings for use in aircraft control cable pulleys conforming to ISO 7939 within the temperature range from – 55 to + 120 °C.

2 References

ISO 76, *Rolling bearings — Static load ratings.*

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

ISO 3768, *Metallic coatings — Neutral salt spray test (NSS test).*

ISO 5593, *Rolling bearings — Vocabulary.*

ISO 7939, *Aircraft — Non-metallic pulleys with ball bearings for control cables — Dimensions and loads.*¹⁾

ISO 7940, *Aircraft — Non-metallic pulleys with ball bearings for control cables — Technical specification.*¹⁾

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

ISO 8628, *Aerospace material — Martensitic stainless steel 17Cr 0,5Mo 1C — Bars — Spherodized annealed (AISI 440C).*¹⁾

ISO 8629, *Aerospace material — Martensitic stainless steel 17Cr 0,5Mo 1C — Forgings — Spherodized annealed (AISI 440C).*¹⁾

3 Materials

3.1 General

ISO 7938:1986 — Shields: corrosion-resisting steel

Seals: polytetrafluoroethylene (PTFE), or glass-fibre reinforced polytetrafluoroethylene (PTFE), or material at the manufacturer's discretion

— Seal retainers: corrosion-resisting steel

— Cage: optional, at the manufacturer's discretion

3.2 Low alloy steel bearings (Code letter F)

— Inner ring }
 — Outer ring } low alloy steel (see ISO 683/17, type 1, quenched and tempered)
 — Balls }

3.3 Corrosion-resisting steel bearings (Code letter S)

— Inner ring }
 — Outer ring } corrosion-resisting steel (see ISO 8628 or ISO 8629)
 — Balls }

1) At present at the stage of draft.

4 Surface treatment

All elements manufactured from corrosion-resisting steel shall normally be passivated in accordance with ISO 8075. All elements manufactured from low alloy steel shall have those surfaces which are exposed in the assembled bearing finished with a metallic coating for corrosion protection. External surfaces of corrosion-resisting steel elements may be coated in this way if necessary. The assembled and lubricated bearing shall be capable of withstanding a neutral salt spray test, carried out in accordance with ISO 3768, without corrosion damage.

5 Lubrication ¹⁾

Ester-type extreme pressure grease having the following main properties shall be used:

- Nature: synthetic, with gelling agents and extreme pressure additives

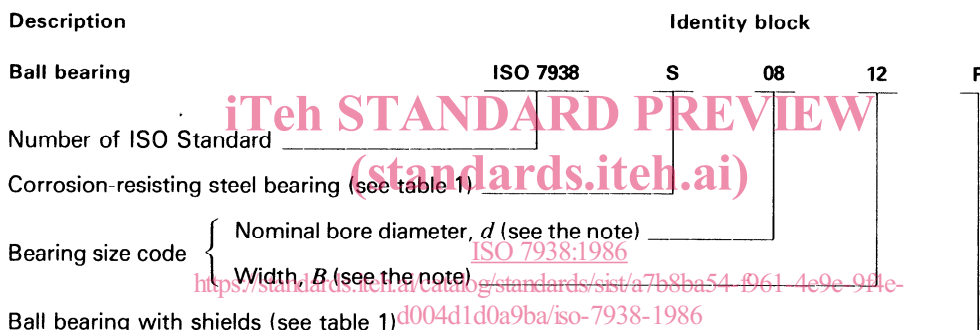
- Dropping point: not lower than 163 °C
- Worked penetration: 270 to 310
- Operating temperature limits²⁾: from – 55 to + 120 °C

6 Requirements

The configuration of the bearings shall be as shown in the figure, either a) or b), as specified in table 2. Dimensions and other requirements shall conform to the values given in table 2. The bearings shall be assembled with either seals or shields. Bearings supplied to this International Standard shall comply with the relevant requirements of ISO 7940.

7 Designation

Each ball bearing complying with this International Standard shall be designated as shown in the following example:



NOTE — The number of characters is constant. If the nominal bore diameter *d* or width *B* is less than 10, a zero shall be inserted to the left of the relevant designation number.

Table 1 — Identification symbols

Description of ball bearing		Code letter
Material	Corrosion-resisting steel	S
	Low alloy steel	F
Fitted with	Seals	E
	Shields	P

1) Date of lubrication, see 8.2.

2) The grease shall be capable of withstanding the operating temperature limits specified without losing its effectiveness.

8 Marking

8.1 Marking of bearings

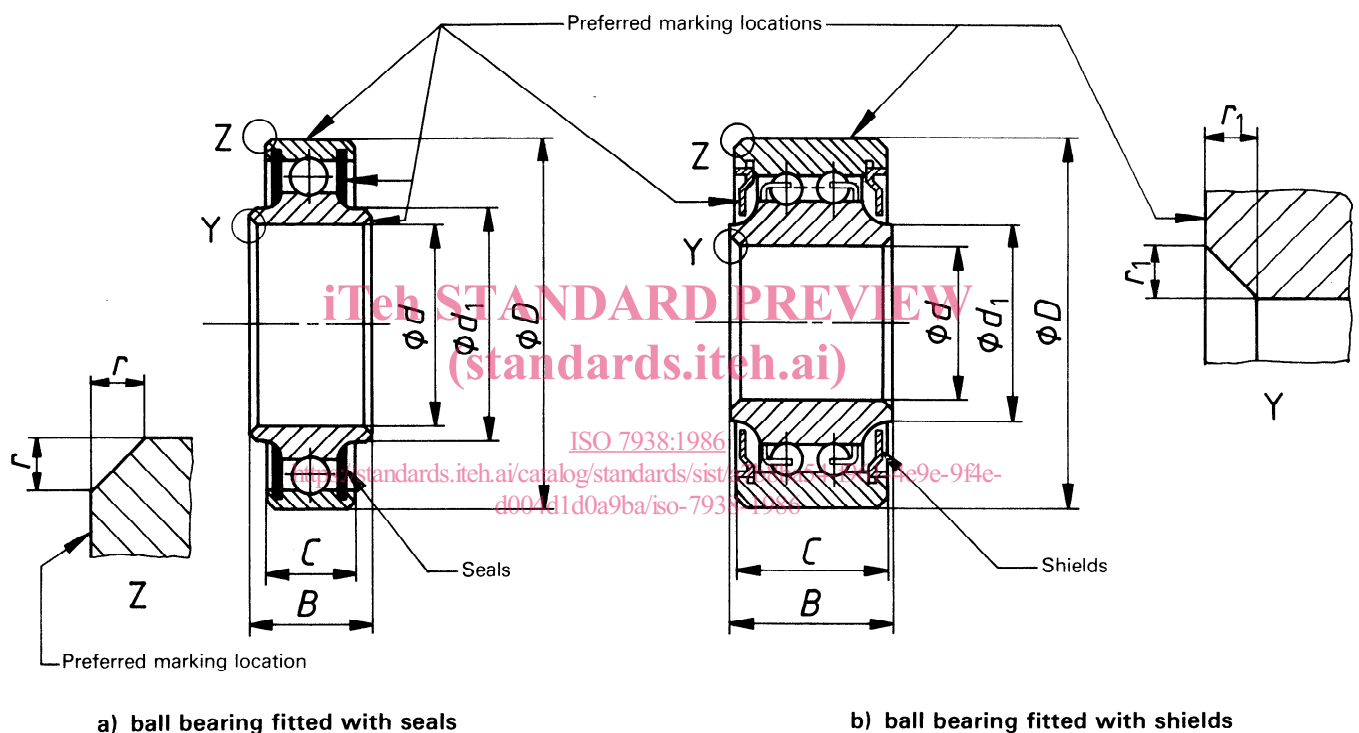
Each ball bearing shall be marked with the manufacturer's identification. In addition, each ball bearing shall be indelibly marked using the identity block specified in clause 7 (see the figure). This marking may be on seal retainers, shields, inner ring, outer ring or the outside diameter of the bearing but, where such marking on small items is impracticable, the marking

shall appear on the package or on a durable label securely attached to the bearing.

The marking of bearings is optional provided that the bearing and the pulley are made by the same manufacturer.

8.2 Date of lubrication

The date (month and year) of lubrication shall be stated on the package or label.



NOTE — Details left unspecified are to be chosen as appropriate.

Figure — Ball bearing configuration

Table 2 Dimensions and mechanical requirements

Bearing size code	Nominal bore diameter d mm	B mm	D mm	C mm	d_1 mm	Single plane mean bore diameter deviation ¹⁾²⁾ mm	Single plane mean outside diameter deviation ¹⁾²⁾ mm	Deviation of a single bore diameter ¹⁾²⁾ Δd_s tol.	Deviation of a single outside diameter ¹⁾²⁾ ΔD_s tol.	Radial internal clearance ³⁾ mm	Permissible static radial load of the bearing ⁴⁾ C_s kN	Maximum starting torque ³⁾ Code		Mass g	Type
												P	E		
0507	5	7	16	5	7,1	0 -0,008	0 -0,008	tol.	tol.	mm	6,1	1,0	1,6	4	Single row of balls without cage
												mN·m			
0608	6	8	19	6	8,8	0 -0,008	0 -0,009	tol.	tol.	mm	4,5	0,6	1,0	9	Single row of balls with cage
												mN·m			
0812	8	12	22	10	10,6	0 -0,008	0 -0,009	tol.	tol.	mm	9,7	1,2	1,9	20	Double row of balls with cage
												mN·m			
1014	10	14	26	12	13,2	0 -0,008	0 -0,009	tol.	tol.	mm	13,8	2,4	3,7	30	Double row of balls with cage
												mN·m			
1216	12	16	28	14	15,5	0 -0,008	0 -0,009	tol.	tol.	mm	19,4	3,0	4,6	40	Double row of balls with cage
												mN·m			
1217	12	17	32	15	16,0	0 -0,008	0 -0,009	tol.	tol.	mm	25,2	3,5	5,2	55	Double row of balls with cage
												mN·m			
1518	15	18	32	16	17,7	0 -0,011	0 -0,011	tol.	tol.	mm	42,3	5,0	8,5	65	Double row of balls without cage
												mN·m			

1) For definitions, see ISO 5593.

2) After plating, where applicable.

3) Measured on bearing before assembly to pulley.

4) $C_s = 5,6 C_{or}$; for C_{or} — see ISO 76.

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