INTERNATIONAL STANDARD

ISO 13412

First edition
1997-12-15

Aerospace — Airframe needle track roller, yoke type, single-row, sealed — Inch series

Aéronautique et espace — Galets de came à aiguilles pour étrier, à une rangée, avec joints, pour cellule d'aéronef — Série «inch»

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 13412 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 15, *Airframe bearings*.

Annex A forms an integral part of this International Standard. Annex B is for information only.

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Introduction

At the time this International Standard was developed, the imperial units sizes of airframe needle roller bearings were dominant in world application. The basis for this International Standard is the imperial units provided in annex B.

1 Scope

This International Standard specifies the characteristics, boundary dimensions, tolerances, internal clearances and permissible static radial loads of inch series, single-row, yoke type, needle track rollers used in airframe applications.

The airframe needle track rollers covered by this International Standard are designed to operate in the temperature range –54 °C to +121 °C.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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 683-17:—[1], *Heat-treated steels, alloy steels and free-cutting steels — Part 17: Ball and roller bearing steels.*

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

ISO 2082:1986, *Metallic coatings — Electroplated coatings of cadmium on iron or steel.*

ISO 2859-1:—[2], *Sampling procedures for inspection by attributes — Part 1: Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection.*

ISO 4520:1981, *Chromate conversion coatings on electroplated zinc and cadmium coatings.*

ISO 5593:1997, *Rolling bearings — Vocabulary.*

ISO 6158:1984, *Metallic coatings — Electroplated coatings of chromium for engineering purposes.*

ISO 13411:1997, *Aerospace — Airframe needle roller, cylindrical roller and track roller bearings — Technical specification.*

AMS 2417E:1993, *Plating, zinc-nickel alloy.*[3]

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[1] To be published. (Revision of ISO 683-17:1976)
[2] To be published. (Revision of ISO 2859-1:1989)
[3] Available from: SAE International
400 Commonwealth Drive
Warrendale, PA 15096-0001
USA

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5593 apply.

4 Symbols

4.1 For the purposes of this International Standard, the symbols given in ISO 1132 apply. The symbols (except those for tolerances) shown in the figures and the values given in the tables denote nominal dimensions unless specified otherwise.

4.2 The following additional symbols for bearings covered by this International Standard also apply.

B overall width (over faces of end washers)

C_s permissible static radial load

d_a clamping face diameter

R crown radius of outer ring

5 Required characteristics

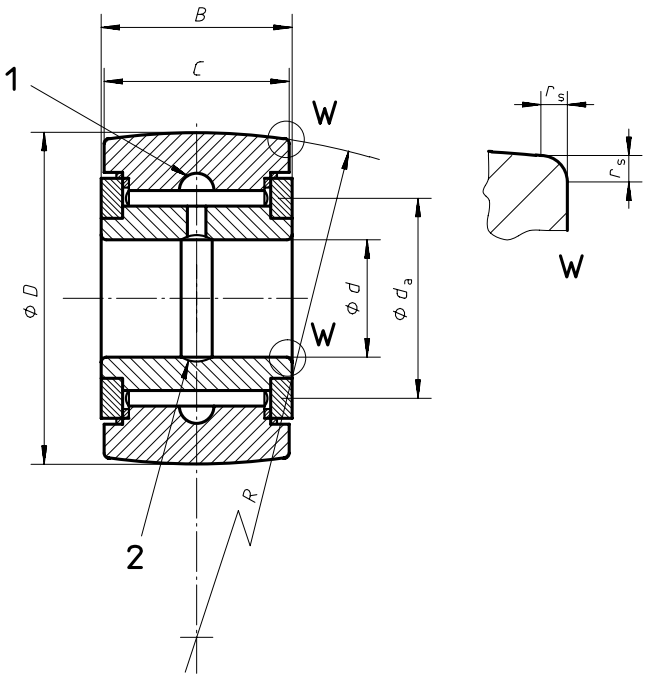
5.1 Dimensions — Tolerances — Internal clearances — Loads

For values, see table 1. For configuration, see figure 1.

Table 1

Dimensions in millimetres, tolerance and clearance values in micrometres

Diameter code	d	D	B 0 / − 254	C 0 / − 381	Tolerance values Δ_{dmp}	Tolerance values K_{ia} max.	Tolerance values Δ_{Dmp}	Tolerance values K_{ea} max.	R min.	r_s min.	d_a min.	Internal clearance Radial, G_r max.	Internal clearance Axial, G_a max.	C_s kN	Mass kg ≈
03	4,826	19,05	7,93	7,12							11,2			5,34	0,01
04	6,35	22,225	9,53	8,77					254	0,55	13,2			8,49	0,02
06	9,525	26,988	12,7	11,56							17,1			16	0,05
08	12,7	33,338	15,88	14,74					318		21,5			25,7	0,08
10	15,875	38,1	19,05	17,91					444		24,3			37,8	0,13
14	22,225	50,8	28,58	27,31	0 / − 18	25	+ 25 / − 25	41	698		31		635	85,8	0,34
20	31,75	63,5	31,75	30,48					762		41,3			112,5	0,53
24	38,1	76,2								0,81	50,8			168,5	1,07
28	44,45	87,312									58			196,1	1,23
32	50,8	98,425	38,1	36,58					1524		65,1			217,5	1,55
36	57,15	109,538									72,7			244,6	1,92
40	63,5	120,65									79	51		266,4	2,33
44	69,85	127									85			288,2	2,49



Key

1 Lubrication groove
2 Lubrication groove and holes

Figure 1

5.2 Surface roughness

Rollers: R_a = 0,2 µm max.

Inner ring raceway: R_a = 0,4 µm max.

Outer ring raceway: R_a = 1,0 µm max.

End washers: R_a = 1,6 µm max. at roller contact area

6 Materials

Rings: bearing steel - ISO 683-17, type 1, raceway hardness 58 HRC to 66 HRC (670 HV to 860 HV).

Rollers: bearing steel - ISO 683-17, type 1, heat treated to 58 HRC to 66 HRC (670 HV to 860 HV).

End washers: steel heat treated to 51 HRC to 60 HRC (528 HV to 697 HV) at roller contact area.

Seals: acetal resin, nylon or equivalent.

7 Surface treatment

7.1 Bearings made of conventional rolling bearing steel, shall have the external surfaces of the outer ring chromium plated, and all other external surfaces, except the inner ring bore surface, shall be cadmium or zinc-nickel plated. Black oxide coating is a permissible alternate on all inner ring external surfaces (see annex A).

7.2 Where cadmium plating is specified (code letters D and M), it shall be in accordance with ISO 2082. The thickness of the plating shall not be less than 7 µm and not more than 15 µm. The bearing shall be embrittlement-relieved within

4 h of plating by heat treatment at (140 ± 10) °C for a minimum of 8 h followed by chromate treatment in accordance with ISO 4520 (code letter D only).

7.3 Where chromium plating is specified (code letters D, M and Z), it shall be in accordance with ISO 6158. The thickness of the plating shall be not less than 12 µm, 8 µm on faces and ring chamfers, and not more than 25 µm.

7.4 Where zinc-nickel plating is specified (code letter Z) it shall be in accordance with AMS 2417E, type 2. The thickness of the plating shall not be less than 7 µm and not more than 15 µm.

8 Lubrication

The bearing shall be prelubricated with either grease A or B, as specified by the customer.

NOTE — Descriptions of grease A and grease B are given in ISO 13411:1997, annex I.

9 Designation

Bearings covered by this International Standard shall be designated only in the manner shown in the following example:

where the following codes are applied:

— greases:

A = ester type grease;

B = synthetic hydrocarbon type grease;

— materials/surface treatments:

D = material: low alloy bearing steel;

surface treatment: outer ring - chromium plated;

washer - cadmium plated with chromate conversion coating;

inner ring - cadmium plated with chromate conversion coating, or black oxide coated;

M = material: low alloy bearing steel;

surface treatment: outer ring - chromium plated;

washer - cadmium plate without chromate conversion coating;

inner ring - cadmium plated without chromate conversion coating, or black oxide coated;

Z = material: low alloy bearing steel;

surface treatment: outer ring- chromium plated;

washer - zinc-nickel plated;

inner ring - zinc-nickel plated, or black oxide coated.

10 Identification marking

In addition to the manufacturer's name or trademark, each bearing shall be permanently and legibly marked, using the identity block as defined in clause 9. Marking position and method shall be at the manufacturer's option.

11 Technical specification

Airframe needle track rollers supplied to this International Standard shall conform to the requirements of ISO 13411.