SLOVENSKI STANDARD
SIST ISO 1224:2001

01-julij-2001

Kotalni leģaji - Natanļ ni leģaji za instrumente

Rolling bearings -- Instrument precision bearings

Roulements -- Roulements de précision pour instruments

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Ta slovenski standard je istoveten z: **ISO 1224:1984**

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ICS:

21.100.20 Kotalni ležaji Rolling bearings

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International Standard 1224

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Rolling bearings — Instrument precision bearings

Roulements — Roulements de précision pour instruments

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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. Every 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.

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International Standard ISO 1224 was prepared by Technical Committee ISO/TC 4, *Rolling bearings*.

It cancels and replaces ISO Recommendation R 1224-1971, of which it constitutes a technical revision.

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Rolling bearings — Instrument precision bearings

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1 Scope and field of application

This International Standard specifies the characteristics that define instrument precision rolling bearings, their types, boundary dimensions, tolerances and internal clearance, classifications used for selective assembly, torque definitions and test conditions, and limitations of bearing yield rates.

2 References

ISO 15, *Rolling bearings — Radial bearings — Boundary dimensions — General plan.*

ISO 582, *Rolling bearings — Metric series — Chamfer dimension limits.*

ISO 5593, *Rolling bearings — Vocabulary.*

3 Definitions and symbols

For the purpose of this International Standard, the definitions of ISO 5593, and the following, apply.

3.1 variation of bore generatrix inclination with face, S_{d1} (inner ring, reference face): Total variation of the relative position, in a radial direction parallel with the plane tangential to the reference face of the inner ring, of points on the same generatrix of the bore at a distance from the side faces of the ring equal to the largest permissible axial single chamfer dimension.

3.2 assembled bearing outer ring flange back face runout with raceway, S_{ea1} (groove ball bearing): Difference between the largest and the smallest of the axial distances between the outer ring flange back face, in different relative angular positions of this ring, at a radial distance from the outer ring axis equal to half the flange back face mean diameter, and a point in a fixed position relative to the inner ring. The inner and outer ring raceways shall be in contact with all the balls.

3.3 torque quality: The torque quality of an instrument ball bearing is a function of average and maximum torques. Maximum torque is most frequently specified for slow speed (near zero) applications and for limited arcs of travel. Where considerable rotation is involved, average torque may be the criterion.

3.4 maximum torque: The maximum value of torque recorded during any test cycle.

3.5 average torque: The arithmetic mean value of the torque readings obtained during the test cycle.

3.6 test load: A specified axial load coincident with the axis of rotation of the bearing.

A list of symbols is given in table 1.

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Table 1 — Symbols

Symbol	**Term** (see ISO 5593 for definition)
d	nominal bore diameter
Δ_{ds}	deviation of a single bore diameter
Δ_{dmp}	single plane mean bore diameter deviation
V_{dp}	bore diameter variation in a single radial plane
V_{dmp}	mean bore diameter variation
D	nominal outside diameter of the bearing
Δ_{Ds}	deviation of a single outside diameter of the bearing
Δ_{Dmp}	single plane mean outside diameter deviation of the bearing
V_{Dp}	outside diameter variation in a single radial plane of the bearing
V_{Dmp}	mean outside diameter variation of the bearing
D_1	nominal outside diameter of the outer ring flange
Δ_{D1s}	deviation of a single outside diameter of the outer ring flange
B	nominal inner ring width
Δ_{Bs}	deviation of a single inner ring width
V_{Bs}	inner ring width variation
C	nominal outer ring width
Δ_{Cs}	deviation of a single outer ring width
V_{Cs}	outer ring width variation
C_1	nominal outer ring flange width
Δ_{C1s}	deviation of a single outer ring flange width
V_{C1s}	outer ring flange width variation
r	chamfer dimension (except where r_1 is applicable)
r_{smin}	smallest permissible single chamfer dimension (r)
r_{smax}	largest permissible single chamfer dimension (r)
r_1	chamfer dimension of the front face of angular contact ball bearing inner and outer rings
r_{1smin}	smallest permissible single chamfer dimension (r_1)
r_{1smax}	largest permissible single chamfer dimension (r_1)
K_{ia}	radial runout of assembled bearing inner ring
K_{ea}	radial runout of assembled bearing outer ring
S_d	face runout with bore[1]
S_{d1}	variation of bore generatrix inclination with face[1), 2)]
S_D	variation of outside surface generatrix inclination with face[1)]
S_{ia}	assembled bearing inner ring face runout with raceway[1)]
S_{ea}	assembled bearing outer ring face runout with raceway[1)]
S_{ea1}	assembled bearing outer ring flange back face runout with raceway[3)]

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1) For angular contact ball bearings, the back face of a ring is the reference face.

2) See 3.1.

3) See 3.2.

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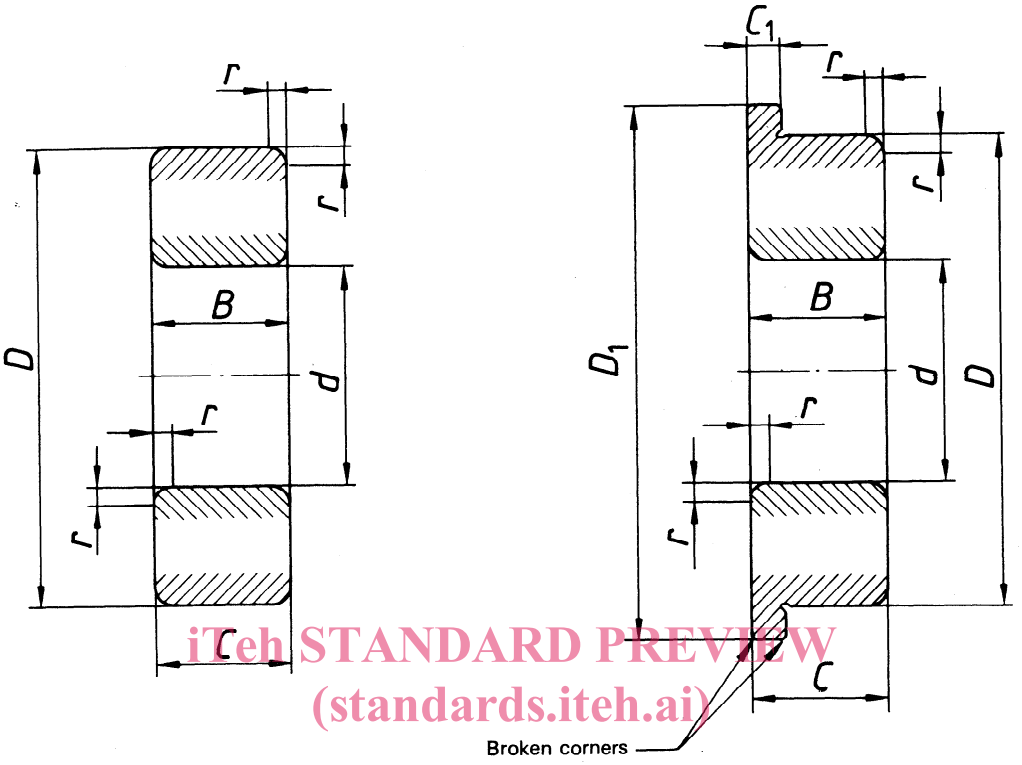

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Figure — Boundary dimension symbols

4 Characteristics

Satisfactory performance of instrument precision bearings necessitates that they be produced to special tolerances, as given in clause 7. In addition, these bearings shall be particularly free from foreign matter and meet one or more specific requirements in the following categories:

a) low torque or uniform torque or both, either at starting or in rotation (this requirement does not apply to bearings with seals);

b) smooth running or vibration limitations;

c) limitations of bearing yield rates.

Due to the many specialized requirements that exist in instrument applications, specification of these categories should be established only after full agreement between manufacturer and user.

5 Bearing types

Single row deep groove ball bearings meet the majority of requirements and may be flanged or unflanged, open or capped. However, for specific applications, angular contact ball bearings, non-separable or with separable inner ring, may be required.

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6 Boundary dimensions

Table 2 — Metric series bearings

Dimensions in millimetres

d	D	B and C	r_{smin}	r_{1smin}	Flanged bearings		Applicable types of bearing	Dimension series[1)]
					D_1	C_1		
0,6	2	0,8	0,05	0,05	—	—	open	17
1	2,5	1	0,05	0,05	—	—	open	17
1	3	1	0,05	0,05	3,8	0,3	open	18
1	3	1,5	0,05	0,05	3,8	0,45	capped	38
1	4	1,6	0,1	0,05	5	0,5	open	19
1	4	2,3	0,1	0,05	5	0,6	capped	39
1,5	3	1	0,05	0,05	—	—	open	17
1,5	4	1,2	0,05	0,05	5	0,4	open	18
1,5	4	2	0,05	0,05	5	0,6	capped	38
1,5	5	2	0,15	0,08	6,5	0,6	open	19
1,5	5	2,6	0,15	0,08	6,5	0,8	capped	39
2	4	1,2	0,05	0,05	—	—	open	17
2	5	1,5	0,08	0,05	6,1	0,5	open	18
2	5	2,3	0,08	0,05	6,1	0,6	capped	38
2	6	2,3	0,15	0,08	7,5	0,6	open, capped	19
2	6	3	0,15	0,08	7,5	0,8	capped	39
2,5	5	1,5	0,08	0,05	—	—	open	17
2,5	6	1,8	0,08	0,05	7,1	0,5	open	18
2,5	6	2,6	0,08	0,05	7,1	0,8	capped	38
2,5	7	2,5	0,15	0,08	8,5	0,7	open, capped	19
2,5	7	3,5	0,15	0,08	8,5	0,9	capped	39
3	6	2	0,08	0,05	—	—	open	17
3	7	2	0,1	0,05	8,1	0,5	open	18
3	7	3	0,1	0,05	8,1	0,8	capped	38
3	8	3	0,15	0,08	9,5	0,7	open, capped	19
3	8	4	0,15	0,08	9,5	0,9	capped	39
3	10	4	0,15	0,08	11,5	1	open, capped	02
4	7	2	0,08	0,05	—	—	open	17
4	9	2,5	0,1	0,05	10,3	0,6	open	18
4	9	4	0,1	0,05	10,3	1	capped	38
4	11	4	0,15	0,08	12,5	1	open, capped	19
4	13	5	0,2	0,1	15	1	open, capped	02
4	16	5	0,3	0,15	—	—	open, capped	03
5	8	2	0,08	0,05	—	—	open	17
5	11	3	0,15	0,08	12,5	0,8	open	18
5	11	5	0,15	0,08	12,5	1	capped	38
5	13	4	0,2	0,1	15	1	open, capped	19
5	16	5	0,3	0,15	18	1	open, capped	02
5	19	6	0,3	0,15	22	1,5	open, capped	03

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Table 2 — Metric series bearings (*concluded*)

Dimensions in millimetres

d	D	B and C	r_{smin}	r_{1smin}	Flanged bearings		Applicable types of bearing	Dimension series[1]
					D_1	C_1		
6	10	2,5	0,1	0,05	—	—	open	17
6	13	3,5	0,15	0,08	15	1	open	18
6	13	5	0,15	0,08	15	1,1	capped	28
6	15	5	0,2	0,1	17	1,2	open, capped	19
6	19	6	0,3	0,15	22	1,5	open, capped	02
7	11	2,5	0,1	0,05	—	—	open	17
7	14	3,5	0,15	0,08	16	1	open	18
7	14	5	0,15	0,08	16	1,1	capped	28
7	17	5	0,3	0,15	19	1,2	open, capped	19
7	19	6	0,3	0,15	22	1,5	open, capped	10
7	22	7	0,3	0,15	—	—	open, capped	02
8	12	2,5	0,1	0,05	—	—	open	17
8	16	4	0,2	0,1	18	1	open	18
8	16	6	0,2	0,1	18	1,3	capped	38
8	19	6	0,3	0,15	22	1,5	open, capped	19
8	22	7	0,3	0,15	—	—	open, capped	10
8	24	8	0,3	0,15	—	—	open	02
9	14	3	0,1	0,05	—	—	open	17
9	17	4	0,2	0,1	19	1	open	18
9	17	6	0,2	0,1	19	1,3	capped	38
9	20	6	0,3	0,15	—	—	open, capped	19
9	24	7	0,3	0,15	—	—	open, capped	10
9	26	8	0,3	0,15	—	—	open, capped	02
10	15	3	0,1	0,05	—	—	open	17
10	19	5	0,3	0,15	21	1	open	18
10	19	7	0,3	0,15	21	1,5	capped	38
10	22	6	0,3	0,15	—	—	open, capped	19
10	26	8	0,3	0,15	—	—	open, capped	10
10	30	9	0,6	0,3	—	—	open, capped	02

1) Dimension series quoted are those given in ISO 15 for unflanged bearings.

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