

Specification for

Instrument precision rolling bearings (ball bearings)

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Committees responsible for this British Standard

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- Ball and Roller Bearing Manufacturers' Association
- Engineering Equipment and Materials Users' Association
- Institution of Mechanical Engineers
- Institution of Production Engineers
- Machine Tool Industry Research Association
- Ministry of Defence
- National Coal Board
- North East Coast Institution of Engineers and Shipbuilders
- Society of British Aerospace Companies Limited

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National foreword

This second revision of BS 3469, which has been prepared under the direction of the Machinery and Components Standards Committee, supersedes BS 3469:1970 which is withdrawn. It is identical with ISO 1224:1984, “*Rolling bearings — Instrument precision bearings*” which was prepared by Technical Committee ISO/TC 4 Rolling bearings, of the International Organization for Standardization (ISO) and in the development of which the United Kingdom played an active part.

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker for metric dimensions. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words “International Standard” appear, referring to this standard, they should be read as “British Standard”.

Cross-references

International Standards	Corresponding British Standards
ISO 15:1981	BS 6267:1982 <i>Specification for rolling bearings: boundary dimensions for radial bearings</i> (Identical)
ISO 582:1979	BS 5988:1980 <i>Specification for minimum and maximum chamfer dimensions of metric series rolling bearings</i> (Identical)
ISO 5593:1984	BS 6560:1984 <i>Glossary of terms for rolling bearings</i> (Identical)

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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_{dl} (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

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 ^a
S_{d1}	variation of bore generatrix inclination with face ^{a,b}
S_D	variation of outside surface generatrix inclination with face ^a
S_{ia}	assembled bearing inner ring face runout with raceway ^a
S_{ea}	assembled bearing outer ring face runout with raceway ^a
S_{ea1}	assembled bearing outer ring flange back face runout with raceway ^c

^a For angular contact ball bearings, the back face of a ring is the reference face.
^b See 3.1.
^c See 3.2.