

CONFIRMED
DECEMBER 2007

BS 3SP 89:
1983
ISO 1002:1983
*(Superseding
BS 2SP 89)*

Specification for

Characteristics, boundary dimensions, tolerances and static load ratings of airframe bearings

[ISO title: Rolling bearings — Airframe bearings —
Characteristics, boundary dimensions, tolerances, static load
ratings]

UDC 629.7:621.822

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents

AVA

Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Mechanical Engineering Standards Committee (MEE/-) to Technical Committee MEE/30 upon which the following bodies were represented:

- 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

This British Standard, having been prepared under the direction of the Mechanical Engineering Standards Committee, was published under the authority of the Board of BSI and comes into effect on 30 November 1983

© BSI 01-2000

The following BSI references relate to the work on this standard:
Committee reference MEE/30
Draft for comment 81/80376 DC

ISBN 0 580 13638 8

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	iii
1 Scope and field of application	1
2 References	1
3 Symbols	1
4 Essential characteristics	4
5 Seals and shields	4
6 Protection against corrosion	4
7 Boundary dimensions	5
8 Tolerances	5
9 Basic static radial load ratings	5
10 Dimensions and tolerances — Tables	6
10.1 Index to tables	6
10.2 Dimension tables — Metric series	6
10.3 Tolerance and radial clearance tables — Metric series	9
10.4 Dimensions tables — Inch series	10
10.5 Tolerances and radial clearance tables — Inch series	16
Annex Permissible load	19
Figure 1	1
Figure 2	2
Figure 3	2
Figure 4	2
Figure 5	3
Figure 6	3
Table 1 — Single row rigid ball bearings (Figure 1), sealed or shielded, diameter series 0	6
Table 2 — Single row rigid ball bearings (Figure 1), sealed or shielded, diameter series 2	7
Table 3 — Single row rigid ball bearings (Figure 2), sealed or shielded, diameter series 8 and 9	7
Table 4 — Double row rigid ball bearings (Figure 1), sealed or shielded, diameter series 2	7
Table 5 — Double row self-aligning ball bearings (Figure 1), sealed or shielded, diameter series 2	8
Table 6 — Single row spherical roller bearings (Figure 1), sealed or shielded, diameter series 3	8
Table 7 — Tolerances for ball and roller bearings	9
Table 8 — Radial internal clearance — Rigid ball bearings (dimensions in Table 1 to Table 4)	9
Table 9 — Radial internal clearance — Double row self-aligning ball bearings (dimensions in Table 5)	9
Table 10 — Radial internal clearance — Single row spherical roller bearings (dimensions in Table 6)	10
Table 11 — Single row rigid ball bearings (Figure 1), sealed or shielded	10
Table 12 — Single row rigid ball bearings (Figure 1), sealed	10
Table 13 — Single row rigid ball bearings (Figure 1), torque tube type, extra light, sealed or shielded	11
Table 14 — Single row rigid ball bearings (Figure 1), torque tube type, light, sealed or shielded	12

	Page
Table 15 — Double row rigid angular contact ball bearings (Figure 1), sealed	12
Table 16 — Double row self-aligning ball bearings (Figure 1), sealed or shielded	13
Table 17 — Single row spherical roller bearings (Figure 1), sealed	13
Table 18 — Double row spherical roller bearings (Figure 1), sealed	14
Table 19 — Needle roller bearings (Figure 3), shielded	14
Table 20 — Needle roller bearings, track-roller, yoke type (Figure 4), single row, shielded	15
Table 21 — Needle roller bearings, track roller, yoke type (Figure 4), double row, shielded	15
Table 22 — Tolerances for bearings	16
Table 23 — Radial internal clearance — Single and double row rigid ball bearings (dimensions in Table 11, Table 12 and Table 15)	16
Table 24 — Radial internal clearance — Single row rigid ball bearings, torque tube type (dimensions in Table 13 and Table 14)	17
Table 25 — Radial internal clearance — Double row self-aligning ball bearings (dimensions in Table 16)	17
Table 26 — Radial internal clearance — Single and double row spherical roller bearings (dimensions in Table 17 and Table 18)	17
Table 27 — Radial internal clearance — Needle roller bearings (dimensions in Table 19)	18
Table 28 — Radial internal clearance — Needle roller bearings, track roller, yoke type, single and double row (dimensions in Table 20 and Table 21)	18
Table 29 — Static acceptance load	19
Publications referred to	Inside back cover

National foreword

This British Standard, prepared under the direction of the Mechanical Engineering Standards Committee on behalf of the Aerospace Standards Committee, is supplementary to BS 292 “*Rolling bearings: ball bearings, cylindrical and spherical roller bearings*” and relates to bearings for applications which require features not included in that standard. This second revision of the original 1960 edition is identical with ISO 1002:1983 “*Rolling bearings — Airframe bearings — Characteristics, boundary dimensions, tolerances, static load ratings*”, 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.

The standard is intended to achieve satisfactory and consistent functioning of bearings specifically designed for use in airframes, as distinct from those used in connection with power plants, auxiliary drives and instruments in aircraft. The airframe is defined as the general structure of the aircraft and includes its control surfaces and all flaps, and doors and their respective mechanisms. Airframe bearings are designed to be subjected under load to slow rotations or oscillations only.

As compared with the previous edition of this standard, the ISO coding for airframe bearings, which was given where applicable, is no longer included due to the withdrawal of the former ISO/R 300. Nor is the former Appendix A, which described a salt-mist test for corrosion-resisting bearings, included. If such a test is required, reference should now be made to BS 3G 100 “*Specification for general requirements for equipment in aircraft*”, Subsection 3.8 “*Salt mist*”, which, in turn, refers to BS 2011 “*Basic environmental testing procedures*”, Part 2.1Kb “*Test Kb. Salt mist*”.

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 the 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 76:1978	BS 5645:1978 <i>Specification for rolling bearings — Static load ratings</i> (Identical)
ISO 1132:1980	BS 6107: <i>Rolling bearings: tolerances</i> Part 1:1981 <i>Glossary of terms</i> (Identical)

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 20, 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 characteristics, boundary dimensions, tolerances and static load ratings of rolling bearings, other than tapered roller bearings, used in airframes, as distinct from those used in connection with power plants, auxiliary drives, accessories and instruments in aircraft. For the purposes of this International Standard, an airframe is defined as the general structure of an aircraft and includes its control surfaces, all flaps and doors and their respective mechanisms. Both metric and inch series bearings are included because of established usage in the aircraft industry.

The bearings included in this International Standard are usually full complement bearings (no cage and full complement of rolling elements) with basically cylindrical bore and outside surface and are sealed or shielded. The bearings have an extended inner ring, except for those in Table 3. The bearings are normally supplied adequately charged with suitable grease, and the external surfaces of the bearings may be protected by the same grease.

In view of the design requirements, it is generally not possible to select standard bearings from ISO 15 for airframe applications, but for metric series bearings the boundary dimensions given in ISO 15 have been used where possible.

The fact that a bearing is not included in this International Standard does not exclude the possibility that it may be used to advantage in airframe applications.

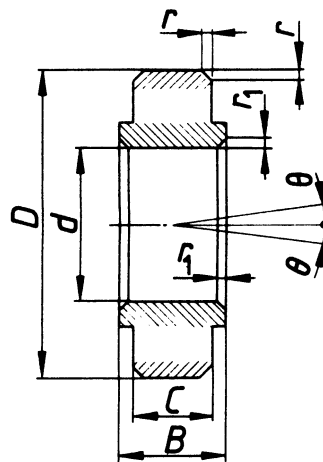
2 References

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

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

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

3 Symbols



(angle θ applies only to self-aligning bearings)

Figure 1

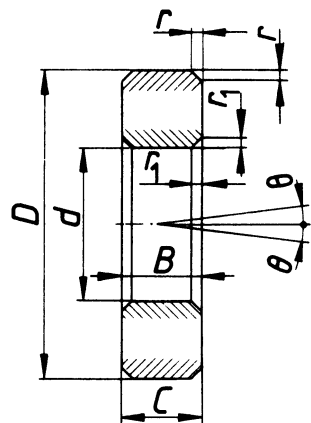


Figure 2

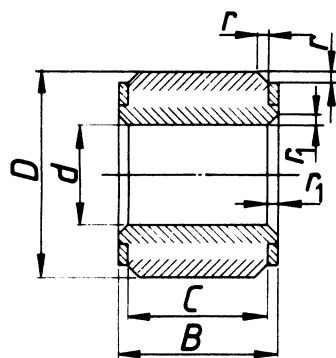


Figure 3

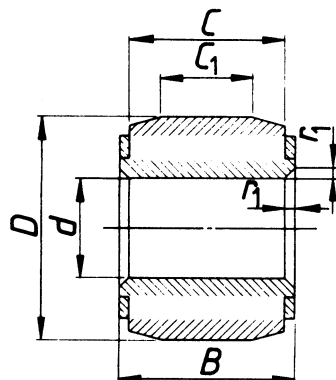


Figure 4

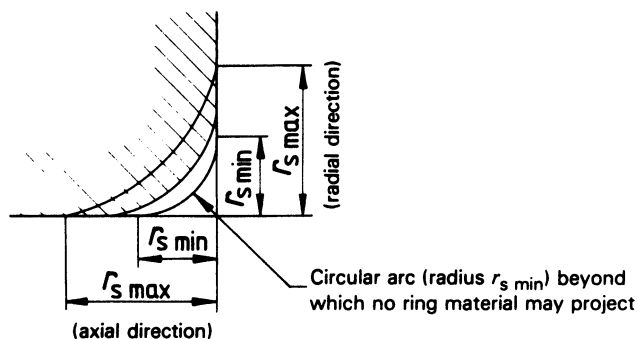


Figure 5

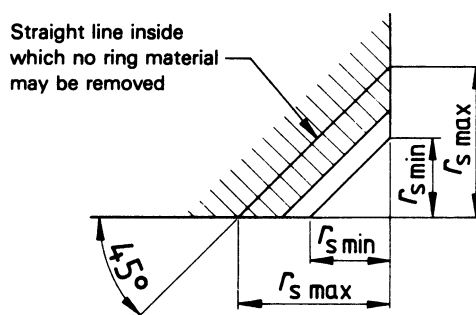


Figure 6

NOTE Figure 5 and Figure 6 apply equally to chamfers denoted as r (shown) and as r_1 .

- d = bearing bore diameter, nominal
- Δ_{dmp} = single plane mean bore diameter deviation
- Δ_{ds} = deviation of a single bore diameter
- V_{dp} = bore diameter variation in a single radial plane
- D = bearing outside diameter, nominal
- Δ_{Dmp} = single plane mean outside diameter deviation
- Δ_{Ds} = deviation of a single outside diameter
- V_{Dp} = outside diameter variation in a single radial plane
- C = outer ring width, nominal
- Δ_{Cs} = deviation of a single width of the outer ring
- V_{Cs} = outer ring width variation
- C_1 = nominal width of track contact (cylindrical)
- C_{1s} = single width of track contact (cylindrical)
- B = inner ring width, nominal
- Δ_{Bs} = deviation of a single width of the inner ring
- V_{Bs} = inner ring width variation