BS ISO 464:2015

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Rolling bearings — Radial bearings with locating snap ring — Dimensions, geometrical product specifications (GPS) and tolerance values

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National foreword

This British Standard is the UK implementation of ISO 464:2015. It supersedes BS ISO 464:1995 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/7, Rolling bearings.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Third edition
2015-11-01

Rolling bearings — Radial bearings with locating snap ring — Dimensions, geometrical product specifications (GPS) and tolerance values

Roulements — Roulements radiaux à segment d'arrêt — Dimensions, spécification géométrique des produits (GPS) et valeurs de tolérance

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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. 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 4, *Rolling bearings*, Subcommittee SC 4, *Tolerances, tolerance definitions and symbols (including GPS)*.

This third edition cancels and replaces the second edition (ISO 464:1995), of which it constitutes a technical revision with the following changes:

— implementation of Geometrical Product Specifications (GPS);

— different presentation of the tables.

Introduction

This International Standard is a machine element geometry standard as defined in the geometrical product specification (GPS) system as presented in the matrix model of ISO 14638[7].

The fundamental rules of ISO/GPS given in ISO 8015[3] apply to this International Standard and the default decision rules given in ISO 14253-1[5] apply to the specifications made in accordance with this International Standard, unless otherwise indicated.

The connection between functional requirements, measuring technique and measuring uncertainty is always intended to be considered. The traditionally used measuring technique is described in ISO 1132-2[2]. For measurement uncertainty it is intended that ISO 14253-2[6] should be considered.

For small radial bearings, when D < 30 mm, manufacturing a snap ring groove might distort the raceways. As such, it is recommended to use bearings with a flanged outer ring instead. Information about snap ring grooves and snap rings for these small bearings can be found in Annexes A and B.

Annexes C and D contain informative information on snap ring material and an example of correct application.

Annex E contains an example of a real drawing indication of a snap ring groove.

INTERNATIONAL STANDARD ISO 464:2015(E)

Rolling bearings — Radial bearings with locating snap ring — Dimensions, geometrical product specifications (GPS) and tolerance values

1 Scope

This International Standard specifies the snap ring groove dimensions and tolerance values, chamfer dimensions on the snap ring groove side of the outer ring, and the snap ring dimensions and tolerance values for radial bearings in the dimension series 18 and 19 and the diameter series 0, 2, 3, and 4 (except dimension series 00, 82, and 83), as specified in ISO 15[1].

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 582, *Rolling bearings — Chamfer dimensions — Maximum values*

ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 5593, *Rolling bearings — Vocabulary*

ISO 14405-1, *Geometrical product specifications (GPS) — Dimensional tolerancing — Part 1: Linear sizes*

ISO 15241, *Rolling bearings — Symbols for physical quantities*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1101, ISO 5593 and ISO 14405-1 apply.

4 Symbols

See Figures 1 to 3 and Table 1.

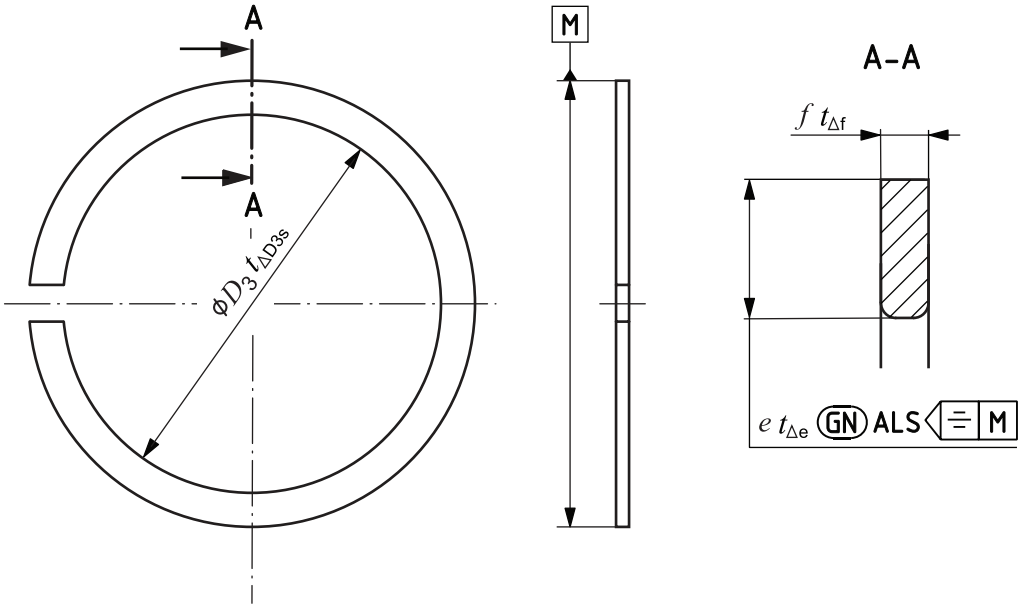


Figure 1 — Snap ring

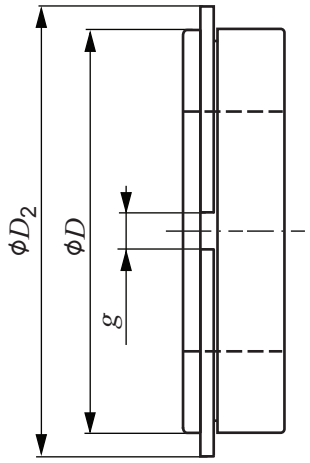
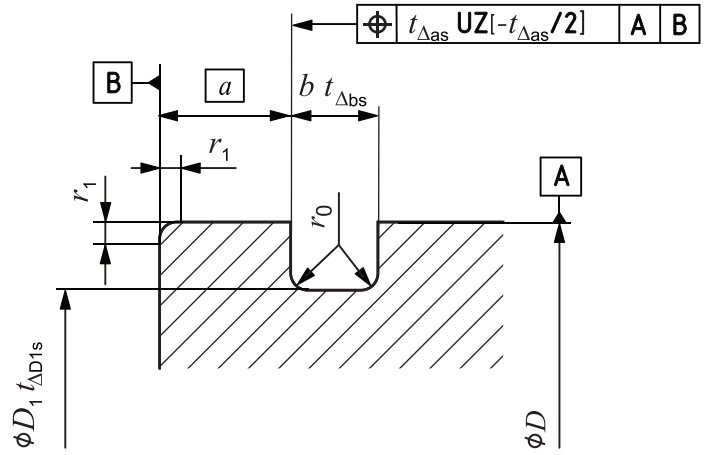


Figure 2 — Mounted snap ring



NOTE Regarding UZ, refer to ISO 1101:2012, 10.2.

Figure 3 — Snap ring groove and chamfer

To express that the geometrical product specification (GPS) system is applied, the dimensional and geometrical characteristics shall be included in the technical product documentation (for example, on the drawing). The dimensional and geometrical specifications associated to them are described in Table 1.

A tolerance value associated to a characteristic is symbolized by t followed by the symbol of characteristic, for example $t_{\Delta as}$.

In this International Standard, the ISO default specification operator for size is in accordance with ISO 14405-1, i.e. the two-point size is valid.

In Tables 2 to 5, A.1, A.2, B.1, and B.2, the symbols U and L are used as follows:

— U = upper limit deviation

— L = lower limit deviation

An example of a real drawing indication is given in Annex E.

Table 1 — Symbols for nominal dimensions, characteristics, and specification modifiers

Symbol for nominal dimension (size and distance)[a]	Symbol for characteristic[a]	GPS symbol and specification modifier[b, c]	Description[d]
a			nominal snap ring groove location distance
	Δas		position of snap ring groove face at distance "a" with respect to secondary datum B which is constraint by primary datum A
b			nominal snap ring groove width
	Δbs		deviation of a two-point size of snap ring groove width from its nominal size
D			nominal bearing outside diameter
D_1			nominal snap ring groove diameter
	ΔD1s		deviation of a two-point size of snap ring groove diameter from its nominal size
D_2			nominal outside diameter of snap ring, when mounted
D_3			nominal inside diameter of snap ring, before mounting
	ΔD3s		deviation of a two-point size of inside diameter of snap ring, before mounting, from its nominal size
e			nominal snap ring section height
	Δe		deviation of a minimum circumscribed size of snap ring section height, between two opposite lines, in any longitudinal section, which includes the snap ring outside surface axis, from its nominal size

[a] Symbols given in ISO 15241 except for the used format.

[b] Symbols given in ISO 1101 and ISO 14405-1.

[c] Specification modifier (LP) shall not be indicated on a drawing, because two-point size is the default specification modifier for size.

[d] Description based on ISO 1101 and ISO 14405-1.

NOTE The full set of GPS indications can be seen in Figure 3.

Table 1 *(continued)*

Symbol for nominal dimension (size and distance)[a]	Symbol for characteristic[a]	GPS symbol and specification modifier[b, c]	Description[d]
f			nominal snap ring thickness
	Δf	(LP)	deviation of a two-point size of snap ring thickness from its nominal size
g			nominal snap ring gap when mounted
r_0			nominal fillet radius at the bottom of snap ring groove
$r_{0s\ max}$			maximum single fillet radius at the bottom of snap ring groove
r_1			nominal chamfer dimension of outer ring on snap ring groove side
$r_{1s\ min}$			smallest single chamfer dimension of outer ring on snap ring groove side

[a] Symbols given in ISO 15241 except for the used format.

[b] Symbols given in ISO 1101 and ISO 14405-1.

[c] Specification modifier (LP) shall not be indicated on a drawing, because two-point size is the default specification modifier for size.

[d] Description based on ISO 1101 and ISO 14405-1.

NOTE The full set of GPS indications can be seen in Figure 3.

5 Snap ring groove and chamfer dimensions and tolerance values

Snap ring groove and chamfer dimensions and tolerance values for radial bearings in the dimension series 18 and 19 are given in Table 2 and for radial bearings in the diameter series 0, 2, 3, and 4 are given in Table 3.

Chamfer dimension, "r_1", applies at the corners indicated in Figure 3 and is specified with "$r_{1s\ min}$" in Tables 2 and 3.

Table 2 — Snap ring groove and chamfer dimensions and tolerance values for radial bearings in the dimension series 18 and 19

Dimensions and tolerance values in millimetres

D	D_1			Dimension series				b			$r_{0s\ max}$	Dimension series	
				18		19						18	19
		$t_{\Delta D1s}$		a	$t_{\Delta as}$	a	$t_{\Delta as}$		$t_{\Delta bs}$			$r_{1s\ min}$ [a]	
		U	L						U	L			
30	28,7	0	−0,3	-	-	1,3	0,15	0,95	+0,25	0	0,25	-	0,3
32	30,7	0	−0,3	1,3	0,15	-	-	0,95	+0,25	0	0,25	0,3	-
34	32,7	0	−0,3	1,3	0,15	-	-	0,95	+0,25	0	0,25	0,3	-
37	35,7	0	−0,3	1,3	0,15	1,7	0,15	0,95	+0,25	0	0,25	0,3	0,3
39	37,7	0	−0,3	-	-	1,7	0,15	0,95	+0,25	0	0,25	-	0,3
40	38,7	0	−0,3	1,3	0,15	-	-	0,95	+0,25	0	0,25	0,3	-

[a] The corresponding maximum chamfer dimensions are given in ISO 582.

Table 2 *(continued)*

D	D_1			Dimension series				b			$r_{0s\,max}$	Dimension series	
				18		19						18	19
		$t_{\Delta D1s}$		a	$t_{\Delta as}$	a	$t_{\Delta as}$		$t_{\Delta bs}$			$r_{1s\,min}$ [a]	
		U	L						U	L			
42	40,7	0	−0,3	1,3	0,15	1,7	0,15	0,95	+0,25	0	0,25	0,3	0,3
44	42,7	0	−0,3	1,3	0,15	-	-	0,95	+0,25	0	0,25	0,3	-
45	43,7	0	−0,3	-	-	1,7	0,15	0,95	+0,25	0	0,25	-	0,3
47	45,7	0	−0,3	1,3	0,15	1,7	0,15	0,95	+0,25	0	0,25	0,3	0,3
52	50,7	0	−0,3	1,3	0,15	1,7	0,15	0,95	+0,25	0	0,25	0,3	0,5
55	53,7	0	−0,3	-	-	1,7	0,15	0,95	+0,25	0	0,25	-	0,5
58	56,7	0	−0,3	1,3	0,15	-	-	0,95	+0,25	0	0,25	0,3	-
62	60,7	0	−0,4	-	-	1,7	0,15	0,95	+0,25	0	0,25	-	0,5
65	63,7	0	−0,4	1,3	0,15	-	-	0,95	+0,25	0	0,25	0,3	-
68	66,7	0	−0,4	-	-	1,7	0,15	0,95	+0,25	0	0,25	-	0,5
72	70,7	0	−0,4	1,7	0,15	1,7	0,15	0,95	+0,25	0	0,25	0,3	0,5
78	76,2	0	−0,4	1,7	0,15	-	-	1,3	+0,3	0	0,4	0,3	-
80	77,9	0	−0,4	-	-	2,1	0,2	1,3	+0,3	0	0,4	-	0,5
85	82,9	0	−0,4	1,7	0,15	2,1	0,2	1,3	+0,3	0	0,4	0,5	0,5
90	87,9	0	−0,4	1,7	0,15	2,1	0,2	1,3	+0,3	0	0,4	0,5	0,5
95	92,9	0	−0,4	1,7	0,15	-	-	1,3	+0,3	0	0,4	0,5	-
100	97,9	0	−0,4	1,7	0,15	2,5	0,2	1,3	+0,3	0	0,4	0,5	0,5
105	102,6	0	−0,5	-	-	2,5	0,2	1,3	+0,3	0	0,4	-	0,5
110	107,6	0	−0,5	2,1	0,2	2,5	0,2	1,3	+0,3	0	0,4	0,5	0,5
115	112,6	0	−0,5	2,1	0,2	-	-	1,3	+0,3	0	0,4	0,5	-
120	117,6	0	−0,5	2,1	0,2	3,3	0,2	1,3	+0,3	0	0,4	0,5	0,5
125	122,6	0	−0,5	2,1	0,2	3,3	0,2	1,3	+0,3	0	0,4	0,5	0,5
130	127,6	0	−0,5	2,1	0,2	3,3	0,2	1,3	+0,3	0	0,4	0,5	0,5
140	137,6	0	−0,5	2,5	0,2	3,3	0,2	1,9	+0,3	0	0,6	0,5	0,5
145	142,6	0	−0,5	-	-	3,3	0,2	1,9	+0,3	0	0,6	-	0,5
150	147,6	0	−0,5	2,5	0,2	3,3	0,2	1,9	+0,3	0	0,6	0,5	0,5
165	161,8	0	−0,5	3,3	0,2	3,7	0,2	1,9	+0,3	0	0,6	0,5	0,5
175	171,8	0	−0,5	3,3	0,2	-	-	1,9	+0,3	0	0,6	0,5	-
180	176,8	0	−0,5	-	-	3,7	0,2	1,9	+0,3	0	0,6	-	0,5
190	186,8	0	−0,5	3,3	0,2	3,7	0,2	1,9	+0,3	0	0,6	0,5	0,5
200	196,8	0	−0,5	3,3	0,2	-	-	1,9	+0,3	0	0,6	0,5	-

[a] The corresponding maximum chamfer dimensions are given in ISO 582.

Table 3 — Snap ring groove and chamfer dimensions and tolerance values for radial bearings in the diameter series 0, 2, 3, and 4

Dimensions and tolerance values in millimetres

D	D_1			Diameter series				b			$r_{0s\,max}$	Diameter series			
				0		2, 3, and 4						0	2	3	4
		$t_{\Delta D1s}$		a	$t_{\Delta as}$	a	$t_{\Delta as}$		$t_{\Delta bs}$			$r_{1s\,min}$ [a]			
		U	L						U	L					
30	28,17	0	−0,26	-	-	2,06	0,16	1,35	+0,3	0	0,4	-	0,5	0,5	0,5
32	30,15	0	−0,25	2,06	0,16	2,06	0,16	1,35	+0,3	0	0,4	0,3	0,5	-	0,5
35	33,17	0	−0,25	2,06	0,16	2,06	0,16	1,35	+0,3	0	0,4	0,3	0,5	0,5	-
37	34,77	0	−0,25	-	-	2,06	0,16	1,35	+0,3	0	0,4	-	-	0,5	0,5
40	38,1	0	−0,25	-	-	2,06	0,16	1,35	+0,3	0	0,4	-	0,5	-	-
42	39,75	0	−0,25	2,06	0,16	2,06	0,16	1,35	+0,3	0	0,4	0,5	-	0,5	0,5
44	41,75	0	−0,25	2,06	0,16	-	-	1,35	+0,3	0	0,4	0,5	-	-	-
47	44,6	0	−0,25	2,06	0,16	2,46	0,15	1,35	+0,3	0	0,4	0,5	0,5	0,5	-
50	47,6	0	−0,25	-	-	2,46	0,15	1,35	+0,3	0	0,4	-	0,5	-	-
52	49,73	0	−0,25	2,06	0,16	2,46	0,15	1,35	+0,3	0	0,4	0,5	0,5	0,5	0,5
55	52,6	0	−0,25	2,08	0,2	-	-	1,35	+0,3	0	0,4	0,5	-	-	-
56	53,6	0	−0,25	-	-	2,46	0,15	1,35	+0,3	0	0,4	-	-	0,5	-
58	55,6	0	−0,25	2,08	0,2	2,46	0,15	1,35	+0,3	0	0,4	0,5	0,5	-	-
62	59,61	0	−0,5	2,08	0,2	3,28	0,21	1,9	+0,3	0	0,6	0,5	0,5	0,5	0,5
65	62,6	0	−0,5	-	-	3,28	0,21	1,9	+0,3	0	0,6	-	0,5	-	-
68	64,82	0	−0,51	2,49	0,2	3,28	0,21	1,9	+0,3	0	0,6	0,5	-	0,5	-
72	68,81	0	−0,51	-	-	3,28	0,21	1,9	+0,3	0	0,6	-	0,5	0,5	0,5
75	71,83	0	−0,51	2,49	0,2	3,28	0,21	1,9	+0,3	0	0,6	0,5	-	0,5	-
80	76,81	0	−0,51	2,49	0,2	3,28	0,21	1,9	+0,3	0	0,6	0,5	0,5	0,5	0,5
85	81,81	0	−0,5	-	-	3,28	0,21	1,9	+0,3	0	0,6	-	0,5	-	-
90	86,79	0	−0,51	2,87	0,2	3,28	0,21	2,7	+0,3	0	0,6	0,5	0,5	0,5	0,5
95	91,82	0	−0,51	2,87	0,2	-	-	2,7	+0,3	0	0,6	0,5	-	-	-
100	96,8	0	−0,51	2,87	0,2	3,28	0,21	2,7	+0,3	0	0,6	0,5	0,5	0,5,	0,5
110	106,81	0	−0,51	2,87	0,2	3,28	0,21	2,7	+0,3	0	0,6	0,5	0,5	0,5	0,5
115	111,81	0	−0,51	2,87	0,2	-	-	2,7	+0,3	0	0,6	0,5	-	-	-
120	115,21	0	−0,5	-	-	4,06	0,2	3,1	+0,3	0	0,6	-	0,5	0,5	0,5
125	120,22	0	−0,51	2,87	0,2	4,06	0,2	3,1	+0,3	0	0,6	0,5	0,5	-	-
130	125,22	0	−0,51	2,87	0,2	4,06	0,2	3,1	+0,3	0	0,6	0,5	0,5	0,5	0,5
140	135,23	0	−0,51	3,71	0,26	4,9	0,25	3,1	+0,3	0	0,6	0,5	0,5	0,5	0,5
145	140,23	0	−0,5	3,71	0,26	-	-	3,1	+0,3	0	0,6	0,5	-	-	-
150	145,24	0	−0,51	3,71	0,26	4,9	0,25	3,1	+0,3	0	0,6	0,5	0,5	0,5	0,5
160	155,22	0	−0,51	3,71	0,26	4,9	0,25	3,1	+0,3	0	0,6	0,5	0,5	0,5	0,5
170	163,65	0	−0,51	3,71	0,26	5,69	0,25	3,5	+0,3	0	0,6	0,5	0,5	0,5	-
180	173,66	0	−0,51	3,71	0,26	5,69	0,25	3,5	+0,3	0	0,6	0,5	0,5	0,5	0,5
190	183,64	0	−0,51	-	-	5,69	0,25	3,5	+0,3	0	0,6	-	0,5	0,5	0,5

[a] The corresponding maximum chamfer dimensions are given in ISO 582.

Table 3 *(continued)*

D	D_1			Diameter series 0		Diameter series 2, 3, and 4		b			$r_{0s\ max}$	Diameter series 0	2	3	4
		$t_{\Delta D1s}$		a	$t_{\Delta as}$	a	$t_{\Delta as}$		$t_{\Delta bs}$			$r_{1s\ min}$ [a]			
		U	L						U	L					
200	193,65	0	−0,51	5,69	0,25	5,69	0,25	3,5	+0,3	0	0,6	0,5	0,5	0,5	0,5
210	203,6	0	−0,5	5,69	0,25	5,69	0,25	3,5	+0,3	0	1	0,5	-	-	0,5
215	208,6	0	−0,5	-	-	5,69	0,25	3,5	+0,3	0	1	-	0,5	0,5	-
225	217	0	−0,5	6,5	0,3	6,5	0,3	4,5	+0,4	0	1	0,5	-	0,5	0,5
230	222	0	−0,5	-	-	6,5	0,3	4,5	+0,4	0	1	-	0,5	-	-
240	232	0	−0,5	6,5	0,3	6,5	0,3	4,5	+0,4	0	1	0,5	-	0,5	0,5
250	242	0	−0,5	-	-	6,5	0,3	4,5	+0,4	0	1	-	0,5	-	0,5

[a] The corresponding maximum chamfer dimensions are given in ISO 582.

6 Snap ring dimensions and tolerance values

Snap ring dimensions and tolerance values for radial bearings in the dimension series 18 and 19 are given in Table 4 and for radial bearings in the diameter series 0, 2, 3, and 4 are given in Table 5.

Table 4 — Snap ring dimensions and tolerance values for radial bearings in the dimension series 18 and 19

Dimensions and tolerance values in millimetres

D	D_2[a]	D_3	$t_{\Delta D3s}$		e	$t_{\Delta e}$		f	$t_{\Delta f}$		g[a]
	max		U	L		U	L		U	L	≈
30	32,8	28,3	0	−0,3	2,05	0	−0,15	0,85	0	−0,1	3
32	34,8	30,3	0	−0,3	2,05	0	−0,15	0,85	0	−0,1	3
34	36,8	32,3	0	−0,3	2,05	0	−0,15	0,85	0	−0,1	3
37	39,8	35,3	0	−0,3	2,05	0	−0,15	0,85	0	−0,1	3
39	41,8	37,3	0	−0,3	2,05	0	−0,15	0,85	0	−0,1	3
40	42,8	38,3	0	−0,3	2,05	0	−0,15	0,85	0	−0,1	3
42	44,8	40,3	0	−0,4	2,05	0	−0,15	0,85	0	−0,1	3
44	46,8	42,3	0	−0,4	2,05	0	−0,15	0,85	0	−0,1	4
45	47,8	43,3	0	−0,4	2,05	0	−0,15	0,85	0	−0,1	4
47	49,8	45,3	0	−0,4	2,05	0	−0,15	0,85	0	−0,1	4
52	54,8	50,3	0	−0,4	2,05	0	−0,15	0,85	0	−0,1	4
55	57,8	53,3	0	−0,4	2,05	0	−0,15	0,85	0	−0,1	4
58	60,8	56,3	0	−0,6	2,05	0	−0,15	0,85	0	−0,1	4
62	64,8	60,2	0	−0,6	2,05	0	−0,15	0,85	0	−0,1	4
65	67,8	63,2	0	−0,6	2,05	0	−0,15	0,85	0	−0,1	4
68	70,8	66,2	0	−0,6	2,05	0	−0,15	0,85	0	−0,1	5
72	74,8	70,2	0	−0,6	2,05	0	−0,15	0,85	0	−0,1	5
78	82,7	75,7	0	−0,6	3,25	0	−0,15	1,12	0	−0,1	5

[a] The dimensions given for D_2 and g apply to mounted snap rings. The rings should fit in the grooves without radial slackness and are, therefore, somewhat expanded in the mounted condition.

Table 4 *(continued)*

D	D_2[a]	D_3	$t_{\Delta D3s}$		e	$t_{\Delta e}$		f	$t_{\Delta f}$		g[a]
	max		U	L		U	L		U	L	≈
80	84,4	77,4	0	−0,6	3,25	0	−0,15	1,12	0	−0,1	5
85	89,4	82,4	0	−0,6	3,25	0	−0,15	1,12	0	−0,1	5
90	94,4	87,4	0	−0,6	3,25	0	−0,15	1,12	0	−0,1	5
95	99,4	92,4	0	−0,6	3,25	0	−0,15	1,12	0	−0,1	5
100	104,4	97,4	0	−0,6	3,25	0	−0,15	1,12	0	−0,1	5
105	110,7	101,9	0	−0,8	4,04	0	−0,15	1,12	0	−0,1	5
110	115,7	106,9	0	−0,8	4,04	0	−0,15	1,12	0	−0,1	5
115	120,7	111,9	0	−0,8	4,04	0	−0,15	1,12	0	−0,1	5
120	125,7	116,9	0	−0,8	4,04	0	−0,15	1,12	0	−0,1	7
125	130,7	121,8	0	−0,8	4,04	0	−0,15	1,12	0	−0,1	7
130	135,7	126,8	0	−0,8	4,04	0	−0,15	1,12	0	−0,1	7
140	145,7	136,8	0	−1	4,04	0	−0,15	1,7	0	−0,1	7
145	150,7	141,8	0	−1	4,04	0	−0,15	1,7	0	−0,1	7
150	155,7	146,8	0	−1,2	4,04	0	−0,15	1,7	0	−0,1	7
165	171,5	161	0	−1,2	4,85	0	−0,15	1,7	0	−0,1	7
175	181,5	171	0	−1,2	4,85	0	−0,15	1,7	0	−0,1	10
180	186,5	176	0	−1,2	4,85	0	−0,15	1,7	0	−0,1	10
190	196,5	186	0	−1,4	4,85	0	−0,15	1,7	0	−0,1	10
200	206,5	196	0	−1,4	4,85	0	−0,15	1,7	0	−0,1	10

[a] The dimensions given for D_2 and g apply to mounted snap rings. The rings should fit in the grooves without radial slackness and are, therefore, somewhat expanded in the mounted condition.

Table 5 — Snap ring dimensions and tolerance values for radial bearings in the diameter series 0, 2, 3, and 4

Dimensions and tolerance values in millimetres

D	D_2[a]	D_3	$t_{\Delta D3s}$		e	$t_{\Delta e}$		f	$t_{\Delta f}$		g[a]
	max		U	L		U	L		U	L	≈
30	34,7	27,9	0	−0,4	3,25	0	−0,15	1,12	0	−0,1	3
32	36,7	29,9	0	−0,4	3,25	0	−0,15	1,12	0	−0,1	3
35	39,7	32,9	0	−0,4	3,25	0	−0,15	1,12	0	−0,1	3
37	41,3	34,5	0	−0,4	3,25	0	−0,15	1,12	0	−0,1	3
40	44,6	37,8	0	−0,4	3,25	0	−0,15	1,12	0	−0,1	3
42	46,3	39,5	0	−0,5	3,25	0	−0,15	1,12	0	−0,1	3
44	48,3	41,5	0	−0,5	3,25	0	−0,15	1,12	0	−0,1	3
47	52,7	44,3	0	−0,5	4,04	0	−0,15	1,12	0	−0,1	4
50	55,7	47,3	0	−0,5	4,04	0	−0,15	1,12	0	−0,1	4
52	57,9	49,4	0	−0,5	4,04	0	−0,15	1,12	0	−0,1	4
55	60,7	52,3	0	−0,5	4,04	0	−0,15	1,12	0	−0,1	4
56	61,7	53,2	0	−0,6	4,04	0	−0,15	1,12	0	−0,1	4

[a] The dimensions given for D_2 and g apply to mounted snap rings. The rings should fit in the grooves without radial slackness and are, therefore, somewhat expanded in the mounted condition.

Table 5 *(continued)*

D	D_2[a]	D_3	$t_{\Delta D3s}$		e	$t_{\Delta e}$		f	$t_{\Delta f}$		g[a]
	max		U	L		U	L		U	L	≈
58	63,7	55,2	0	−0,6	4,04	0	−0,15	1,12	0	−0,1	4
62	67,7	59	0	−0,6	4,04	0	−0,15	1,7	0	−0,1	4
65	70,7	62	0	−0,6	4,04	0	−0,15	1,7	0	−0,1	4
68	74,6	64,2	0	−0,6	4,85	0	−0,15	1,7	0	−0,1	5
72	78,6	68,2	0	−0,6	4,85	0	−0,15	1,7	0	−0,1	5
75	81,6	71,2	0	−0,6	4,85	0	−0,15	1,7	0	−0,1	5
80	86,6	76,2	0	−0,6	4,85	0	−0,15	1,7	0	−0,1	5
85	91,6	81,2	0	−0,6	4,85	0	−0,15	1,7	0	−0,1	5
90	96,5	86,2	0	−0,6	4,85	0	−0,15	2,46	0	−0,1	5
95	101,6	91,2	0	−0,6	4,85	0	−0,15	2,46	0	−0,1	5
100	106,5	96,2	0	−0,8	4,85	0	−0,15	2,46	0	−0,1	5
110	116,6	106,2	0	−0,8	4,85	0	−0,15	2,46	0	−0,1	5
115	121,6	111,2	0	−0,8	4,85	0	−0,15	2,46	0	−0,1	5
120	129,7	114,6	0	−0,8	7,21	0	−0,15	2,82	0	−0,1	7
125	134,7	119,6	0	−0,8	7,21	0	−0,15	2,82	0	−0,1	7
130	139,7	124,6	0	−0,8	7,21	0	−0,15	2,82	0	−0,1	7
140	149,7	134,6	0	−1,2	7,21	0	−0,15	2,82	0	−0,1	7
145	154,7	139,6	0	−1,2	7,21	0	−0,15	2,82	0	−0,1	7
150	159,7	144,5	0	−1,2	7,21	0	−0,15	2,82	0	−0,1	7
160	169,7	154,5	0	−1,2	7,21	0	−0,15	2,82	0	−0,1	7
170	182,9	162,9	0	−1,2	9,6	0	−0,15	3,1	0	−0,1	10
180	192,9	172,8	0	−1,2	9,6	0	−0,15	3,1	0	−0,1	10
190	202,9	182,8	0	−1,4	9,6	0	−0,15	3,1	0	−0,1	10
200	212,9	192,8	0	−1,4	9,6	0	−0,15	3,1	0	−0,1	10
210	222,8	202,7	0	−1,4	9,6	0	−0,15	3,1	0	−0,1	10
215	227,8	207,7	0	−1,4	9,6	0	−0,15	3,1	0	−0,1	10
225	237	216,1	0	−1,4	10	0	−0,15	3,5	0	−0,1	10
230	242	221	0	−1,4	10	0	−0,15	3,5	0	−0,1	10
240	252	231	0	−1,4	10	0	−0,15	3,5	0	−0,1	10
250	262	241	0	−1,4	10	0	−0,15	3,5	0	−0,1	10

[a] The dimensions given for D_2 and g apply to mounted snap rings. The rings should fit in the grooves without radial slackness and are, therefore, somewhat expanded in the mounted condition.

Annex A
(informative)

Snap ring groove and chamfer dimensions and tolerance values for radial bearings, *D* < 30 mm

For small radial bearings, when *D* < 30 mm, manufacturing a snap ring groove might distort the raceways. As such, it is recommended to use a bearing with a flanged outer ring instead. See ISO 8443[2] for dimensions.

Information about snap ring groove and chamfer dimensions and tolerance values for radial bearings in the dimension series 19, *D* < 30 mm, are given in Table A.1 and for radial bearings in the diameter series 0, 2, and 3, *D* < 30 mm, are given in Table A.2.

Table A.1 — Snap ring groove and chamfer dimensions and tolerance values for radial bearings in the dimension series 19, *D* < 30 mm

Dimensions and tolerance values in millimetres

D	D_1	$t_{\Delta D1s}$		a	$t_{\Delta as}$	b	$t_{\Delta bs}$		$r_{0s\ max}$	$r_{1s\ min}$ [a]
		U	L				U	L		
22	20,8	0	−0,3	1,05	0,15	0,8	+0,25	0	0,2	0,2
24	22,8	0	−0,3	1,05	0,15	0,8	+0,25	0	0,2	0,2
28	26,7	0	−0,3	1,3	0,15	0,95	+0,25	0	0,25	0,3

[a] The corresponding maximum chamfer dimensions are given in ISO 582.

Table A.2 — Snap ring groove and chamfer dimensions and tolerance values for radial bearings in the diameter series 0, 2, and 3, *D* < 30 mm

Dimensions and tolerance values in millimetres

D	D_1			Diameter series 0		Diameter series 2 and 3		b			$r_{0s\ max}$	Diameter series $r_{1s\ min}$[a]		
		$t_{\Delta D1s}$		a	$t_{\Delta as}$	a	$t_{\Delta as}$		$t_{\Delta bs}$			0	2	3
		U	L						U	L				
13	12,04	0	−0,13	-	-	1,1	0,15	0,80	+0,25	0	0,2	-	0,2	0,2
16	15,16	0	−0,12	-	-	1,2	0,15	0,80	+0,25	0	0,2	-	0,2	0,2
19	18,25	0	−0,15	1,73	0,18	1,73	0,18	0,80	+0,25	0	0,2	0,3	0,3	0,3
22	21,11	0	−0,16	1,73	0,18	1,73	0,18	0,80	+0,25	0	0,2	0,3	0,3	0,3
24	23,00	0	−0,15	1,73	0,18	1,73	0,18	0,80	+0,25	0	0,2	0,3	0,3	0,3
26	25,15	0	−0,15	1,73	0,18	1,73	0,18	0,80	+0,25	0	0,2	0,3	0,3	0,3
28	26,7	0	−0,3	1,73	0,18	1,73	0,18	0,95	+0,25	0	0,25	0,3	-	0,3

[a] The corresponding maximum chamfer dimensions are given in ISO 582.

Annex B
(informative)

Snap rings for radial bearings, *D* < 30 mm

Snap ring dimensions and tolerance values for radial bearings in the dimension series 19, *D* < 30 mm, are given in Table B.1 and for radial bearings in the diameter series 0, 2, and 3, *D* < 30 mm, are given in Table B.2.

Table B.1 — Snap ring dimensions and tolerance values for radial bearings in the dimension series 19, *D* < 30 mm

Dimensions and tolerance values in millimetres

D	D_2[a]	D_3	$t_{\Delta D3s}$		e	$t_{\Delta e}$		f	$t_{\Delta f}$		g[a]
	max		U	L		U	L		U	L	≈
22	24,8	20,5	0	−0,3	2	0	−0,15	0,7	0	−0,1	2
24	26,8	22,5	0	−0,3	2	0	−0,15	0,7	0	−0,1	2
28	30,8	26,4	0	−0,3	2,05	0	−0,15	0,85	0	−0,1	3

[a] The dimensions given for D_2 and g apply to mounted snap rings. The rings should fit in the grooves without radial slackness and are, therefore, somewhat expanded in the mounted condition.

Table B.2 — Snap ring dimensions and tolerance values for radial bearings in the diameter series 0, 2, and 3, *D* < 30 mm

Dimensions and tolerance values in millimetres

D	D_2[a]	D_3	$t_{\Delta D3s}$		e	$t_{\Delta e}$		f	$t_{\Delta f}$		g[a]
	max		U	L		U	L		U	L	≈
13	14,3	11,9	0	−0,3	1,15	0	−0,15	0,7	0	−0,1	3
16	18,5	15	0	−0,3	1,65	0	−0,15	0,7	0	−0,1	3
19	21,5	18	0	−0,3	1,65	0	−0,15	0,7	0	−0,1	3
22	25,1	20,8	0	−0,4	2	0	−0,15	0,7	0	−0,1	3
24	27	22,7	0	−0,4	2	0	−0,15	0,7	0	−0,1	3
26	29,2	24,9	0	−0,4	2	0	−0,15	0,7	0	−0,1	3
28	30,8	26,4	0	−0,4	2,05	0	−0,15	0,85	0	−0,1	3

[a] The dimensions given for D_2 and g apply to mounted snap rings. The rings should fit in the grooves without radial slackness and are, therefore, somewhat expanded in the mounted condition.

Annex C
(informative)

Material of snap ring

Snap rings are recommended to be made of spring steel with a hardness of 450 HV to 520 HV.

Annex D
(informative)

Application example

Principal design recommendations can be found in Figure D.1.

When radially split housings need to be assembled and the snap ring is contacting the housing and the bearing in axial direction, it is recommended to have a clearance between the housing parts. A gap should also be kept between the snap ring outside diameter and the housing bore in radial direction.

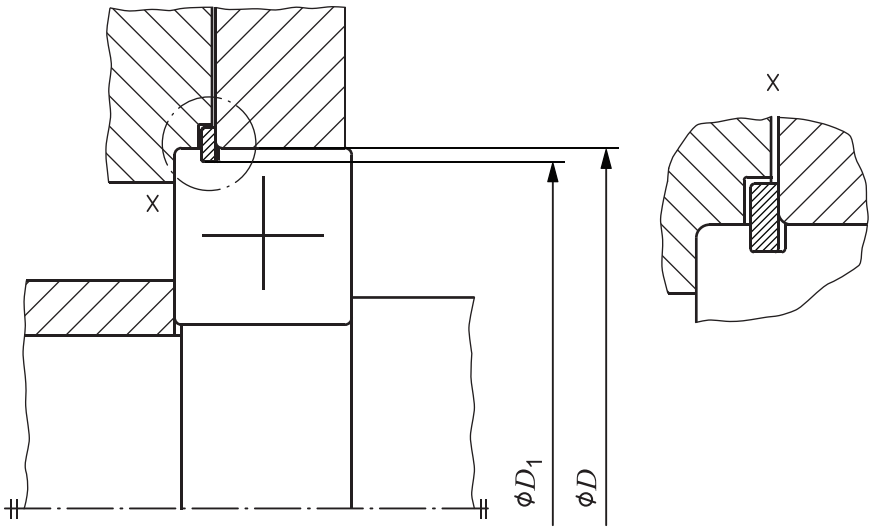
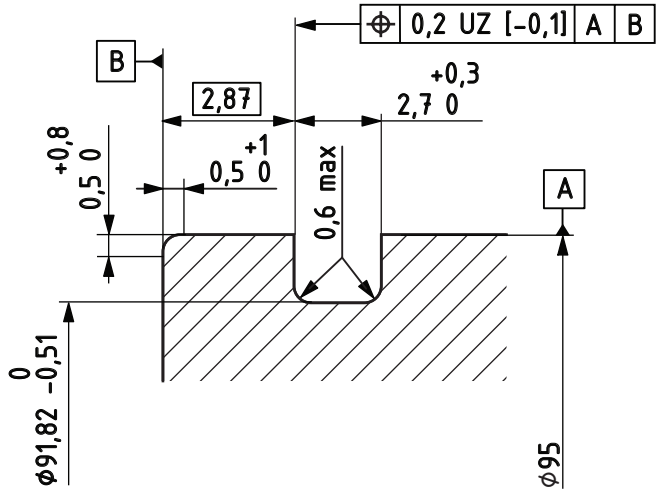


Figure D.1 — Application example of a bearing with a mounted locating snap ring

Annex E
(informative)

Example of drawing indications of characteristics with specification for a snap ring groove

Figure E.1 gives an example of drawing indications of the characteristics given in this International Standard.



NOTE The dimensions (not to scale) and tolerance values correspond to a radial ball bearing according to dimension series 10, bore diameter 60 mm, and outside diameter 95 mm.

Figure E.1 — Example of drawing

Bibliography

[1] ISO 15, *Rolling bearings — Radial bearings — Boundary dimensions, general plan*

[2] ISO 1132-2, *Rolling bearings — Tolerances — Part 2: Measuring and gauging principles and methods*

[3] ISO 8015, *Geometrical product specifications (GPS) — Fundamentals — Concepts, principles and rules*

[4] ISO 8443, *Rolling bearings — Radial ball bearings with flanged outer ring — Flange dimensions*

[5] ISO 14253-1, *Geometrical product specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformity or nonconformity with specifications*

[6] ISO 14253-2, *Geometrical product specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 2: Guidance for the estimation of uncertainty in GPS measurement, in calibration of measuring equipment and in product verification*

[7] ISO 14638, *Geometrical product specifications (GPS) — Matrix model*

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