
**Rolling bearings — Radial bearings
— Geometrical product specifications
(GPS) and tolerance values**

*Roulements — Roulements radiaux — 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 document 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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 4, *Rolling bearings*, Subcommittee SC 4, *Rolling bearings - Vocabulary, boundary dimensions and geometrical product specifications*.

This sixth edition cancels and replaces the fifth edition (ISO 492:2014), which has been technically revised.

The main changes are as follows:

- symbols have been revised and the symbol list amended;
- some revisions have been made to the geometrical product specifications (GPS) system, such as the indication of K_{ia} and K_{ea} ;
- revisions have been made to the symbol for width of asymmetric rings and assembled bearing;
- an extension of deviation limits and tolerance values towards larger bore diameter and outside bearing diameters in [Tables 4](#) to [26](#) has been made;
- the tables for the radial bearings and the tapered roller bearings, such as the headings, notes of tables and some other values, have been aligned;
- Annexes A, B, C and D (in ISO 492:2014) have been deleted;
- the stiffness series of tapered roller bearings and background information regarding affected tolerance values have been added in new [Annexes A](#) and [B](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

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

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

The connection between functional requirements, measuring technique, and measuring uncertainty should always be considered. For measurement uncertainty, ISO 14253-2^[6] should be considered.

This document uses most of the existing symbols associated with rolling bearings because they are well established in the market. In some cases, new terms are derived from the full GPS definition. The definitions of the established terms and symbols are necessarily changed according to the GPS rules. These changes of terms, definitions and symbols for geometrical product specifications (GPS) to define characteristics and tolerances of rolling bearing components and assemblies are given in ISO 22872 and incorporated in this document.

The representation of symbols, tolerance values, limits of size, deviation limits and limit values derived from GPS indications according to, for example, ISO 1101 and ISO 14405-1, including indications in tables and graphical descriptions, have been revised and implemented in accordance with the principles of ISO 22872.

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Rolling bearings — Radial bearings — Geometrical product specifications (GPS) and tolerance values

1 Scope

This document specifies dimensional and geometrical characteristics, deviation limits from nominal sizes, and tolerance values to define the interface (except chamfers) of radial rolling bearings. Nominal boundary dimensions are defined in ISO 15, ISO 355^[2] and ISO 8443^[4].

This document does not apply to certain radial bearings of particular types (e.g. needle roller bearings) or for particular fields of application (e.g. airframe bearings). Tolerances for such bearings are given in the relevant International Standards.

Chamfer dimension limits are given in ISO 582^[3].

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirement of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15:2017, *Rolling bearings — Radial bearings — Boundary dimensions, general plan*

ISO 1101:2017, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 5593, *Rolling bearings — Vocabulary*

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

ISO 14405-1:2016, *Geometrical product specifications (GPS) — Dimensional tolerancing — Part 1: Linear sizes*

ISO/TS 17863:2013, *Geometrical product specification (GPS) — Tolerancing of moveable assemblies*

ISO 22872, *Rolling bearings — Geometrical product specifications (GPS) — Vocabulary and representation of symbols*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15, ISO 1101, ISO 5593, ISO 14405-1, ISO/TS 17863 and ISO 22872 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Symbols

4.1 Symbols for physical quantities

Symbols in [Table 1](#) represent physical quantities in the GPS environment and may sometimes be applied to more than one physical quantity.

In this document, the symbols for tolerance values, deviation limits and limit values are preceded by letter “*t*” in figures and tables.

EXAMPLE 1 $t_{\Delta Bs}$, t_{Vdmp} .

In this document, the symbols for nominal dimensions and values of upper/lower limit of size are not preceded by the letter “*t*” because those values are usually interpreted as nominal dimensions.

EXAMPLE 2 C , D .

Table 1 — Symbols for dimensions and tolerance values

Symbol	Description	Figure
a	Distance from face to define the restricted area for S_D or S_{D1}	3 , 8 , 13
B	Nominal inner ring width	1 , 2 , 7 , 12
C	Nominal outer ring width	1 , 2 , 7 , 12
C_1	Nominal outer ring flange width	12
D	Nominal outside diameter	1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10 , 11 , 12 , 13 , 14 , 15 , 16
D_1	Nominal outside diameter of outer ring flange	12
d	Nominal bore diameter <cylindrical bore>	1 , 2 , 3 , 4 , 5 , 6 , 12 , 13 , 14 , 15 , 16
d	Nominal bore diameter <tapered bore>	7
d_1	Nominal bore diameter at the theoretical large end of a tapered bore	7
S_L	Nominal tapered slope	7
T	Nominal assembled bearing width <tapered roller bearing>	17
T_1	Nominal effective width of inner subunit assembled with a master outer ring <tapered roller bearing>	17
T_2	Nominal effective width of outer ring assembled with a master inner subunit	17
T_F	Nominal width of an assembled flanged bearing	17
T_{F2}	Nominal effective width between an outer ring flange with a master inner subunit	17
t_{Kea}	Tolerance value for range of section height at outer ring of assembled bearing	4 , 5 , 6 , 9 , 10 , 11 , 14 , 15 , 16
t_{Kia}	Tolerance value for range of section height at inner ring of assembled bearing	4 , 5 , 6 , 9 , 10 , 11 , 14 , 15 , 16
t_{SD}	Tolerance value for perpendicularity of outer ring outside surface to the face	3 , 8
t_{SD1}	Tolerance value for perpendicularity of outer ring outside surface to the flange back face	13
t_{Sd}	Tolerance value for run-out of inner ring face to the bore	3 , 8 , 13
t_{Sea}	Tolerance value for axial run-out of outer ring of assembled bearing	5 , 6 , 10 , 11
t_{Sea1}	Tolerance value for axial run-out of outer ring flange back face of assembled bearing	15 , 16
t_{Sia}	Tolerance value for axial run-out of inner ring of assembled bearing	5 , 6 , 10 , 11 , 15 , 16

Table 1 (continued)

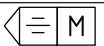
Symbol	Description	Figure
t_{VBgp}	Tolerance value for range of inner ring width with faces offset or narrow	2 , 7
t_{VBs}	Tolerance value for range of inner ring width with faces directly opposite	1 , 12
t_{VCgp}	Tolerance value for range of outer ring width with faces offset or narrow	2 , 12
t_{VCs}	Tolerance value for range outer ring width with faces directly opposite	1 , 7
t_{VC1s}	Tolerance value for range of outer ring flange width	12
t_{VDmp}	Tolerance value for range of mid-range outside diameter	1 , 2 , 7 , 12
t_{VDsp}	Tolerance value for range of outside diameter	1 , 2 , 7 , 12
t_{Vdmp}	Tolerance value for range of mid-range bore diameter	1 , 2 , 12
t_{Vdsp}	Tolerance value for range of bore diameter	1 , 2 , 7 , 12
$t_{\Delta Bgp}$	Upper deviation limit of inner ring width with faces offset or narrow	2 , 7
$t_{\Delta Bs}$	Upper and lower deviation limits of inner ring width with faces directly opposite	1 , 12
$t_{\Delta Bs}$	Lower deviation limit of inner ring width with faces offset or narrow	2 , 7
$t_{\Delta Cgp}$	Upper deviation limit of outer ring width with faces offset or narrow	2 , 12
$t_{\Delta Cs}$	Upper and lower deviation limits of outer ring width with faces directly opposite	1 , 7
$t_{\Delta Cs}$	Lower deviation limit of outer ring width with faces offset or narrow	2 , 12
$t_{\Delta C1s}$	Upper and lower deviation limits of outer ring flange width	12
$t_{\Delta Dmp}$	Upper and lower deviation limits of mid-range outside diameter	1 , 2 , 7 , 12
$t_{\Delta Ds}$	Upper and lower deviation limits of outside diameter	1 , 2 , 7 , 12
$t_{\Delta D1s}$	Upper and lower deviation limits of outside diameter of outer ring flange	12
$t_{\Delta dmp}$	Upper and lower deviation limits of mid-range bore diameter <cylindrical bore>	1 , 2 , 12
$t_{\Delta dmp}$	Upper and lower deviation limits of mid-range bore diameter <tapered bore>	7
$t_{\Delta d1mp}$	Upper and lower deviation limits of a mid-range bore diameter at the theoretical large end of an inner ring <tapered bore>	7
$t_{\Delta ds}$	Upper and lower deviation limits of bore diameter	1 , 2 , 12
$t_{\Delta SL}$	Upper and lower deviation limits of tapered slope	7
$t_{\Delta Tg}$	Upper and lower deviation limits of the actual bearing width <tapered roller bearing>	17
$t_{\Delta T1g}$	Upper and lower deviation limits of the actual effective width of inner subunit <tapered roller bearing>	17
$t_{\Delta T2g}$	Upper and lower deviation limits of the actual effective width of outer ring	17
$t_{\Delta TFg}$	Upper and lower deviation limits of the actual bearing width of flanged bearing	17
$t_{\Delta TF2g}$	Upper and lower deviation limits of the actual effective width of flanged outer ring	17
α	Angle of tapered inner ring bore	7 , 8 , 9 , 10 , 11

4.2 Additional symbols

Symbols defined in standards other than ISO 22872 and used in this document are presented in [Table 2](#) for information.

These includes symbols for specification modifiers, complementary specification modifiers and geometrical characteristics.

Table 2 — Additional symbols defined in other standards

Symbol	Description	Figure	Reference
ACS	Any cross-section	1 , 2 , 4 , 5 , 6 , 7 , 9 , 10 , 11 , 12 , 14 , 15 , 16	ISO 14405-1:2016, 7.4
ALS	Any longitudinal section	2 , 7 , 12	ISO 14405-1:2016, 7.4
(GN)	Minimum circumscribed size	2 , 7 , 12 , 17	ISO 14405-1:2016, 3.7.1.3
(LP)	Two-point size	2 , 7 , 12	ISO 14405-1:2016, 3.6.1
(SD)	Mid-range size	1 , 2 , 7 , 12	ISO 14405-1:2016, 3.7.2.2.5
(SR)	Range of sizes	1 , 2 , 4 , 5 , 6 , 7 , 9 , 10 , 11 , 12 , 14 , 15 , 16	ISO 14405-1:2016, 3.7.2.2.6
//	Parallelism	2 , 7 , 12	ISO 1101:2017, 17.10
⊥	Perpendicularity	3 , 4 , 5 , 6 , 8 , 9 , 10 , 11 , 13 , 14 , 15 , 16	ISO 1101:2017, 17.11
≡	Symmetry	2 , 7 , 12	ISO 1101:2017, 17.15
↗	Circular run-out	3 , 5 , 6 , 8 , 10 , 11 , 13 , 15 , 16	ISO 1101:2017, 17.16
 ^a	Intersection plane indicator	2 , 4 , 5 , 6 , 7 , 9 , 10 , 11 , 12 , 14 , 15 , 16	ISO 1101:2017, 13
 ^a	Direction feature indicator	2 , 7 , 12	ISO 1101:2017, 15
FP	Fixed part	4 , 5 , 6 , 9 , 10 , 11 , 14 , 15 , 16	ISO/TS 17863:2013, 6.10.1.1
MP	Moveable part	4 , 5 , 6 , 9 , 10 , 11 , 14 , 15 , 16	ISO/TS 17863:2013, 6.10.1.1
	Gravity	4 , 5 , 6 , 9 , 10 , 11 , 14 , 15 , 16 , 17	ISO/TS 17863:2013, 6.3
 ^a	Flag	4 , 5 , 6 , 9 , 10 , 11 , 14 , 15 , 16 , 17	ISO/TS 17863:2013, 6.8 and 6.9
^a Letters and characteristic symbols are examples.			

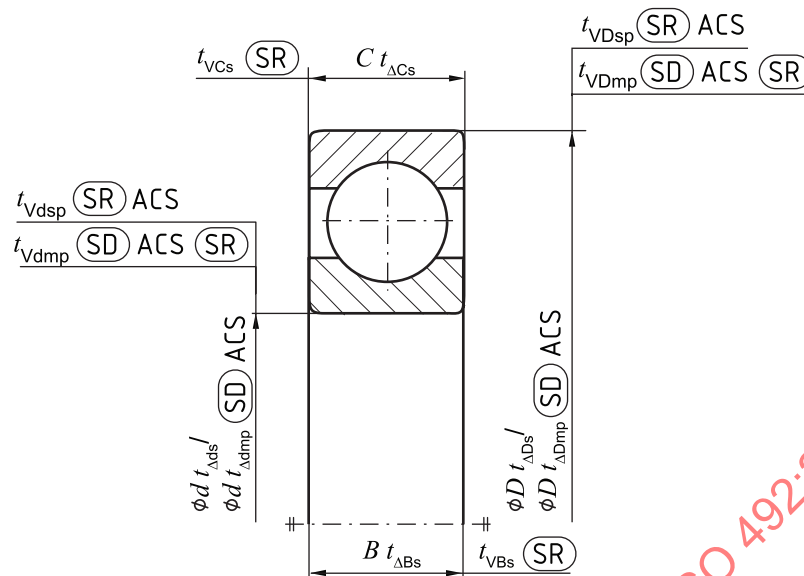
5 Graphical description

To express that the ISO GPS system in ISO 8015 is applied, the dimensional and geometrical characteristics shall be included in the technical product documentation (e.g. on the drawing). The dimensional and geometrical specifications associated to these characteristics are described in [Figures 1](#) to [17](#).

According to ISO 8015, specifications shall be completed with specification operators, e.g. filtration. These may be agreed between manufacturer and customer case by case.

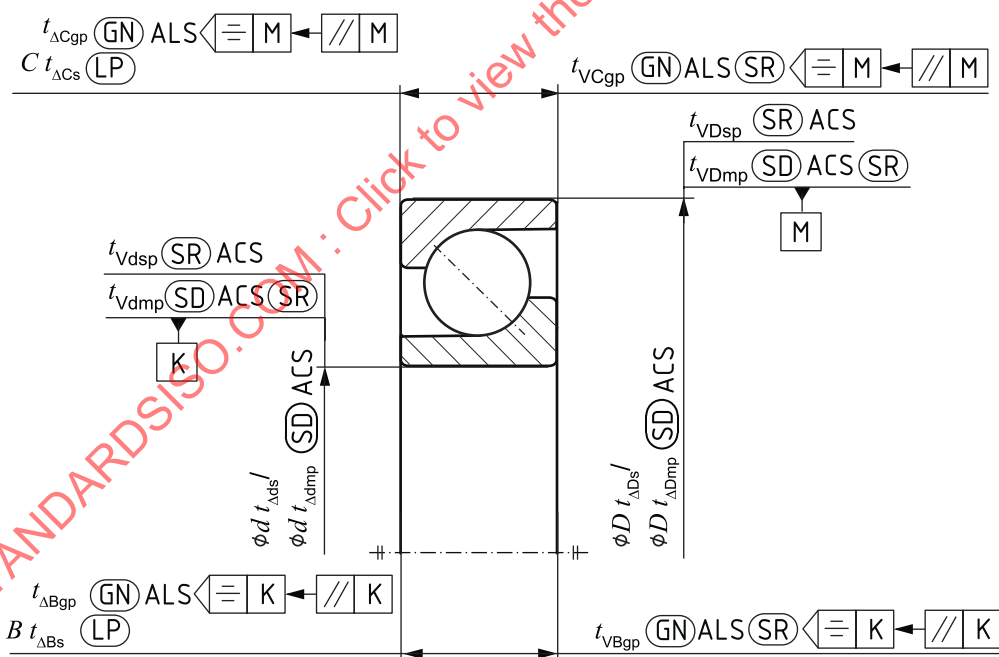
The indications in [Figures 1](#) to [17](#) illustrate the correlation of interface dimensions and corresponding dimensional and geometrical tolerance symbols. The specifications for single components are illustrated in [Figures 1](#), [2](#), [3](#), [7](#), [8](#), [12](#) and [13](#). The specifications for assembled bearings are illustrated in [Figures 4](#), [5](#), [6](#), [9](#), [10](#), [11](#), [14](#), [15](#), [16](#) and [17](#). The examples are not intended to cover all possible assemblies.

NOTE [Figures 1](#) to [17](#) are drawn schematically and do not necessarily show all design details.



NOTE The symbol “/” (forward slash) shows alternative specification indications depending on tolerance class and diameter series.

Figure 1 — Size specification for single components of bearing with cylindrical bore and symmetrical rings



NOTE The symbol “/” (forward slash) shows alternative specification indications depending on tolerance class and diameter series.

Figure 2 — Size specification for single components of bearing with cylindrical bore and asymmetrical rings

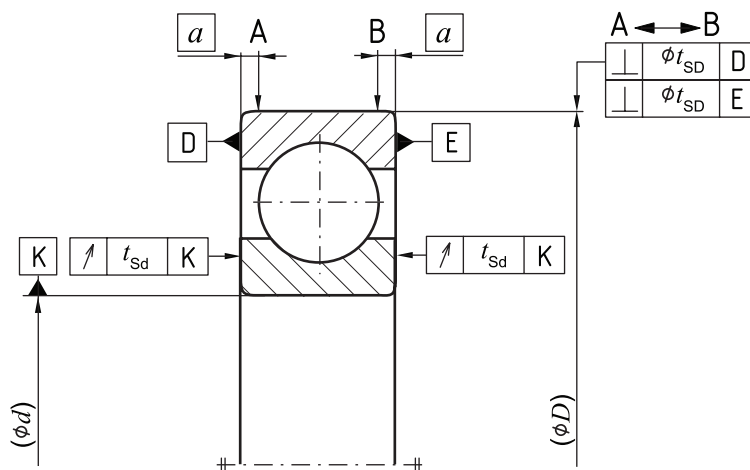
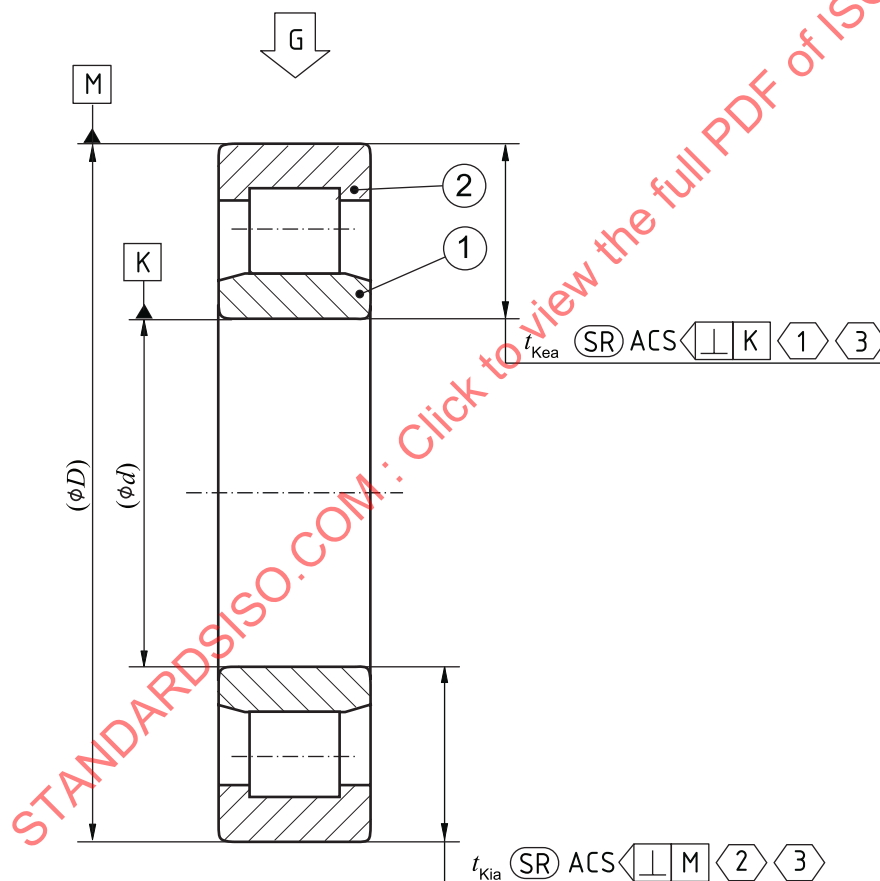


Figure 3 — Geometrical tolerances for single components of bearing with cylindrical bore



Key

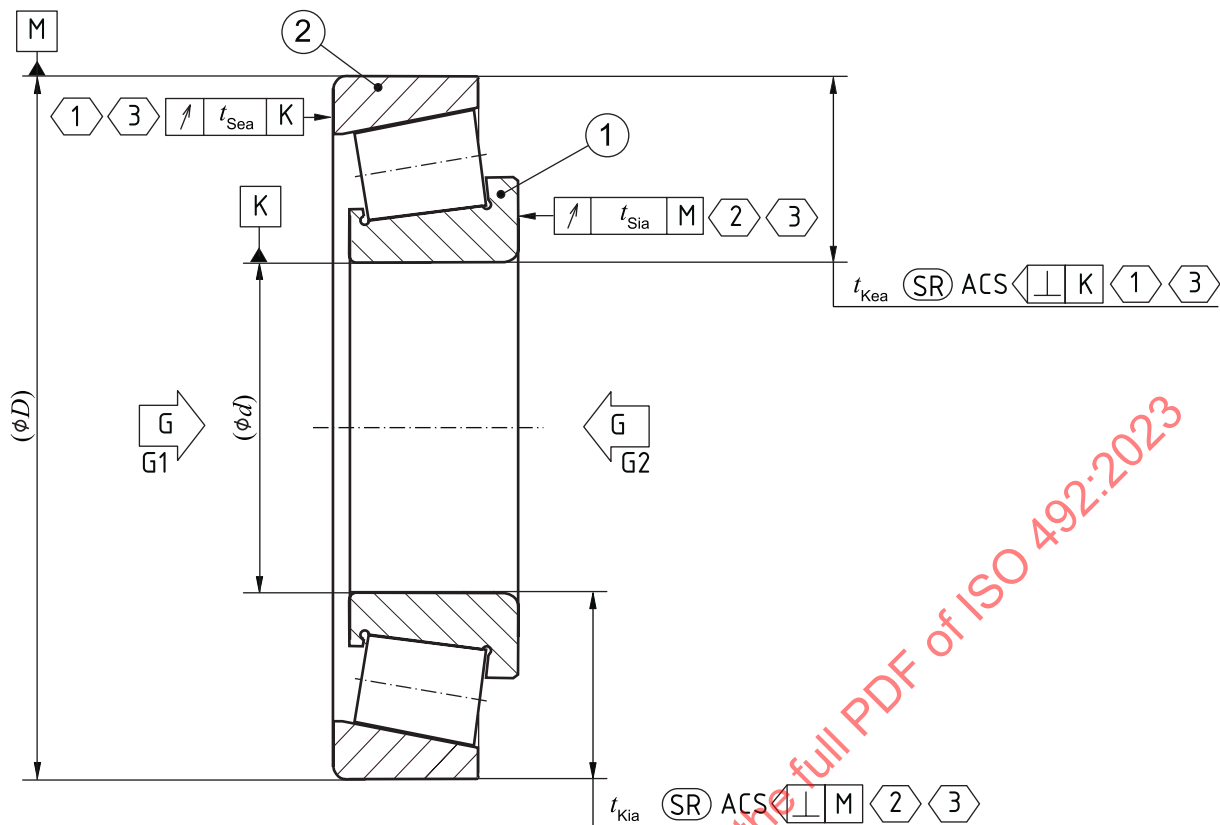
- ① = FP ① - MP ②, G
- ② = FP ② - MP ①, G
- ③ = the rolling elements shall be in correct functional contact with both the inner and outer rings

Figure 4 — Geometrical tolerances for assembled bearing with cylindrical bore — Cylindrical roller bearing, spherical roller bearing, toroidal roller bearing and self-aligning ball bearing

$$\text{Hexagon } 1 = \text{FP } 1 - \text{MP } 2, \text{ G2}$$
$$\text{Hexagon}(2) = \text{FP}(\text{Circle}(2)) - \text{MP}(\text{Circle}(1)), \text{G2}$$
$$\text{Hexagon } 3 = \text{FP } 1 - \text{MP } 2, \text{ G1}$$
$$\text{Hexagon}(4) = \text{FP}(\text{Circle}(2)) - \text{MP}(\text{Circle}(1)), G1$$

5 = the rolling elements shall be in correct functional contact with both the inner and outer rings

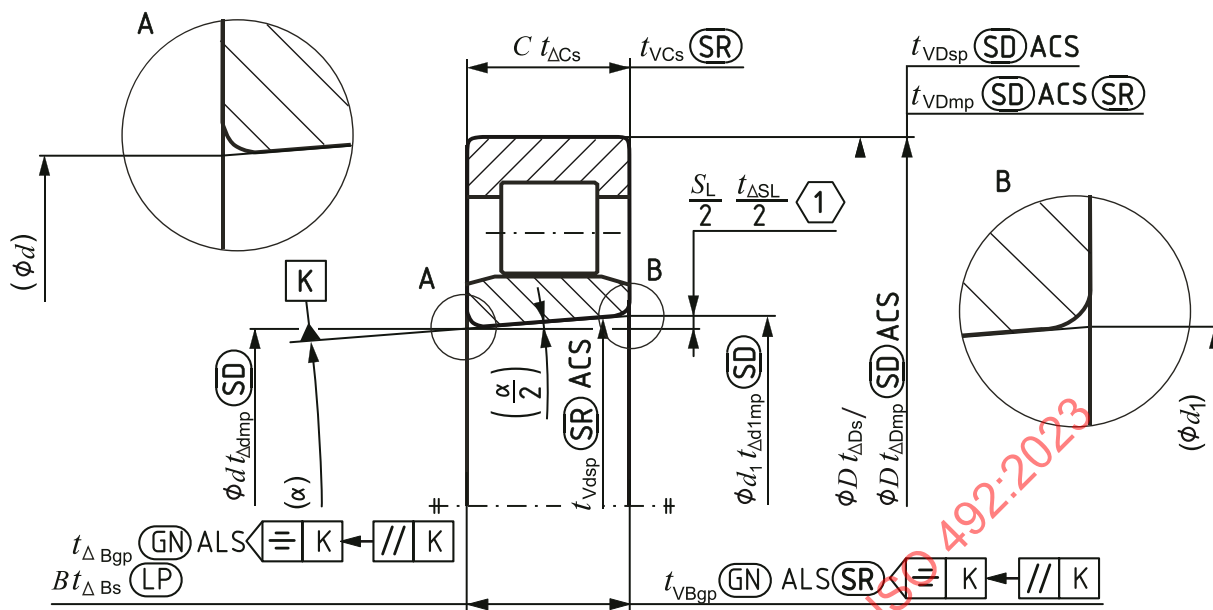
Figure 5 — Geometrical tolerances for assembled bearing with cylindrical bore — Deep groove ball bearing, double-row deep groove ball bearing, double-row angular contact ball bearing and four-point-contact ball bearing



Key

- ① = FP ① - MP ②, G1
- ② = FP ② - MP ①, G2
- ③ = the rolling elements shall be in correct functional contact with both the inner and outer rings

Figure 6 — Geometrical tolerances for assembled bearing with cylindrical bore — Single-row angular contact ball bearing and tapered roller bearing



Key

- $\boxed{1} = S_L$ is a calculated nominal size according to Formula (1)
 $t_{\Delta SL}$ is a calculated characteristic according to Formula (2)
 $S_L = (d_1 - d) = 2B \tan(\alpha/2)$ (1)
 $t_{\Delta SL} = t_{\Delta d1mp} - t_{\Delta dmp}$ (2)

NOTE 1 See Figure 2 for indications on asymmetrical outer ring.

NOTE 2 The symbol "/" (forward slash) shows alternative specification indications depending on tolerance class and diameter series.

Figure 7 — Size specification for single components of bearing with tapered bore

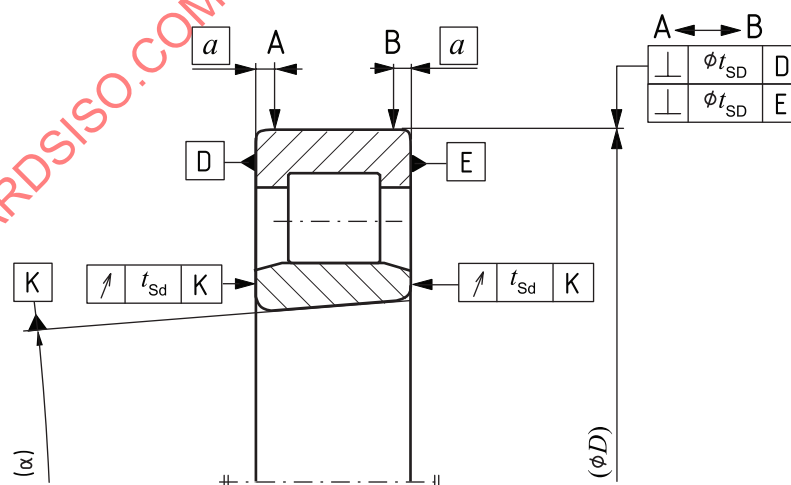
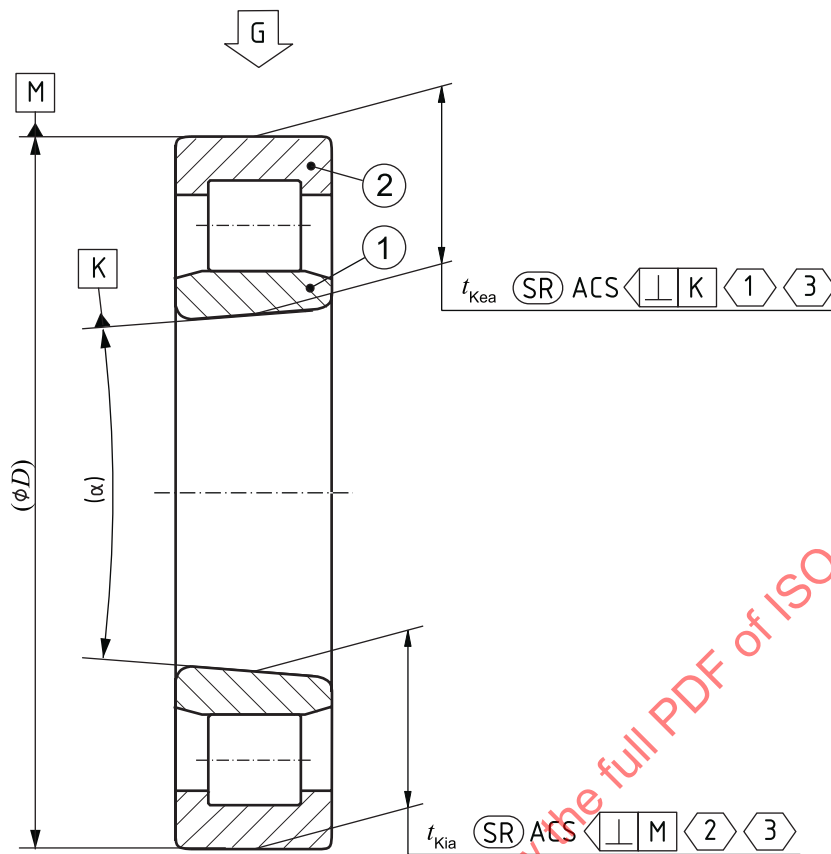


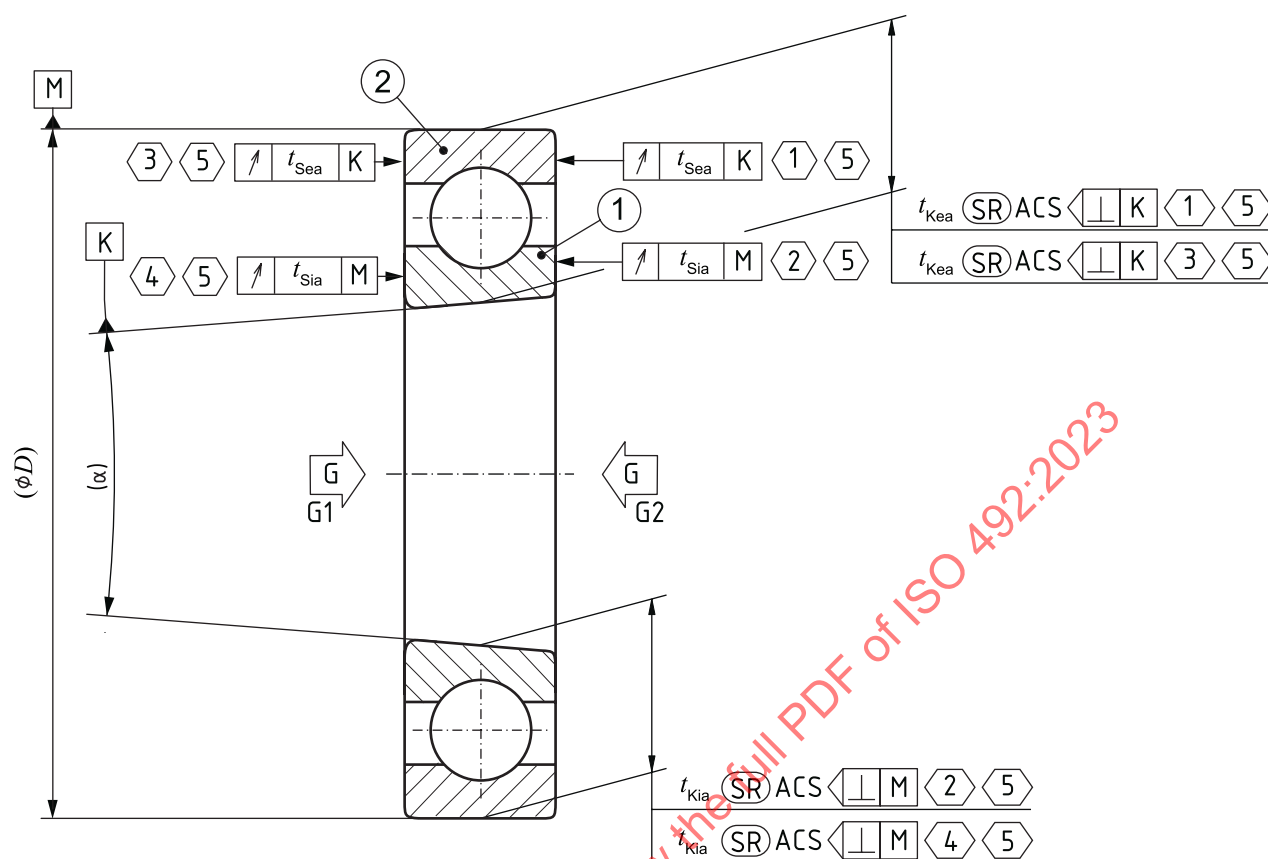
Figure 8 — Geometrical tolerances for single components of bearing with tapered bore



Key

- ① = FP ① - MP ②, G
- ② = FP ② - MP ①, G
- ③ = the rolling elements shall be in correct functional contact with both the inner and outer rings

Figure 9 — Geometrical tolerances for assembled bearing with tapered bore — Cylindrical roller bearing, spherical roller bearing, toroidal roller bearing and self-aligning ball bearing



Key

- ① = FP ① - MP ②, G2
 ② = FP ② - MP ①, G2
 ③ = FP ① - MP ②, G1
 ④ = FP ② - MP ①, G1
 ⑤ = the rolling elements shall be in correct functional contact with both the inner and outer rings

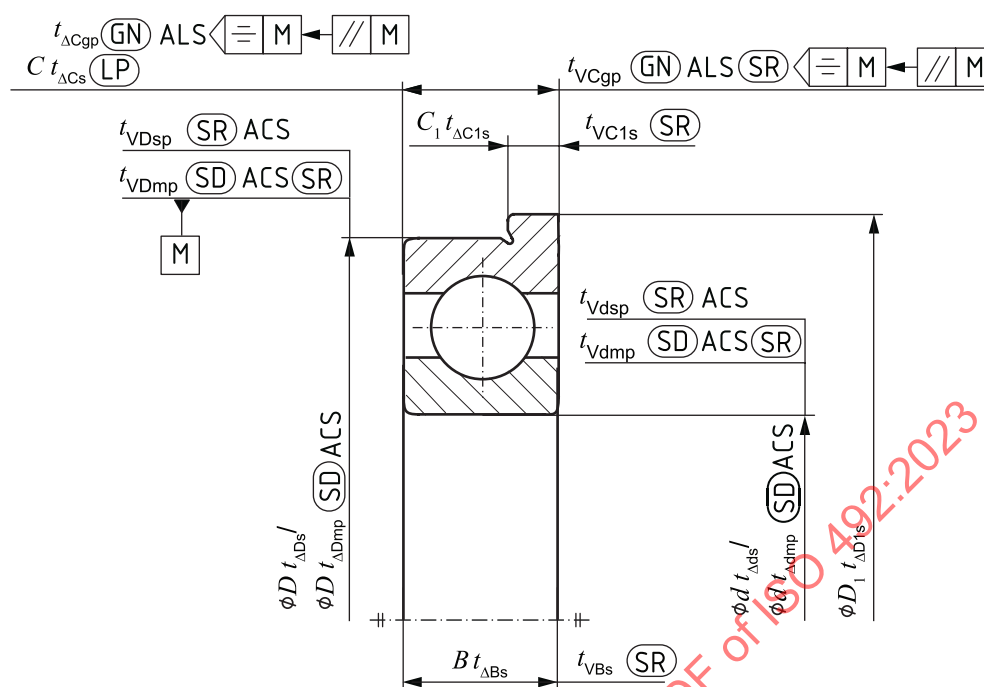
Figure 10 — Geometrical tolerances for assembled bearing with tapered bore — Deep groove ball bearing, double-row deep groove ball bearing, double-row angular contact ball bearing and four-point-contact ball bearing

(1) - MP (2), G1

(2) - MP (1), G2

rolling elements shall be in correct functional contact with both the inner and outer rings

Geometrical tolerances for assembled bearing with tapered bore — Single- angular contact ball bearing and tapered roller bearing



NOTE 1 See Figure 2 for indications on asymmetrical inner ring.

NOTE 2 The symbol "/" (forward slash) shows alternative specification indications depending on tolerance class and diameter series.

Figure 12 — Size specification for single components of bearing with flanged outer ring

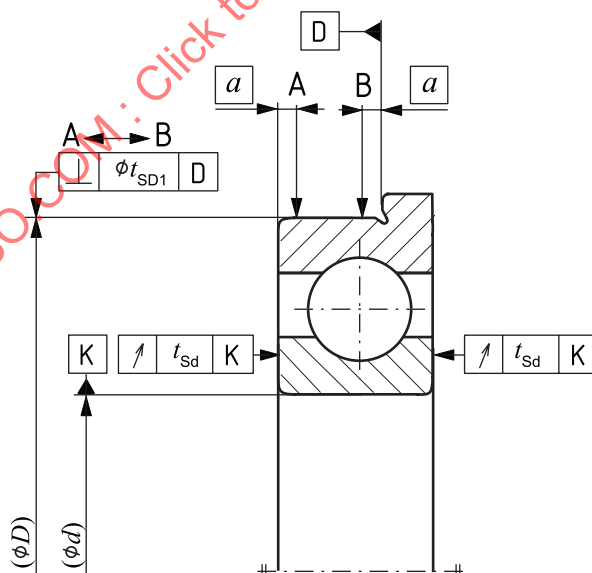


Figure 13 — Geometrical tolerances for single components of bearing with flanged outer ring



- Figure 14 — Geometrical tolerances for assembled bearing with flanged outer ring —
Cylindrical roller bearing, spherical roller bearing, toroidal roller bearing and self-aligning ball
bearing**

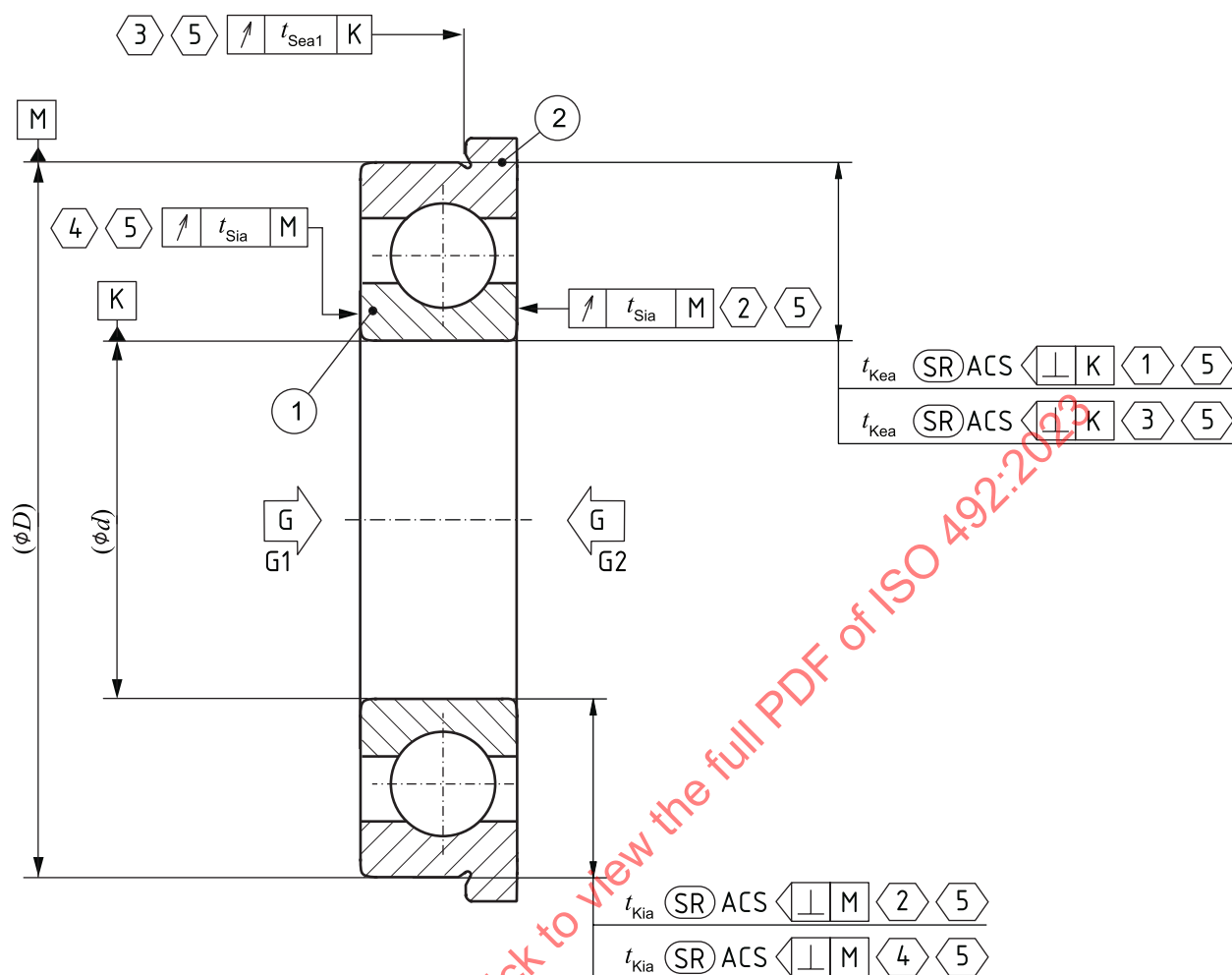
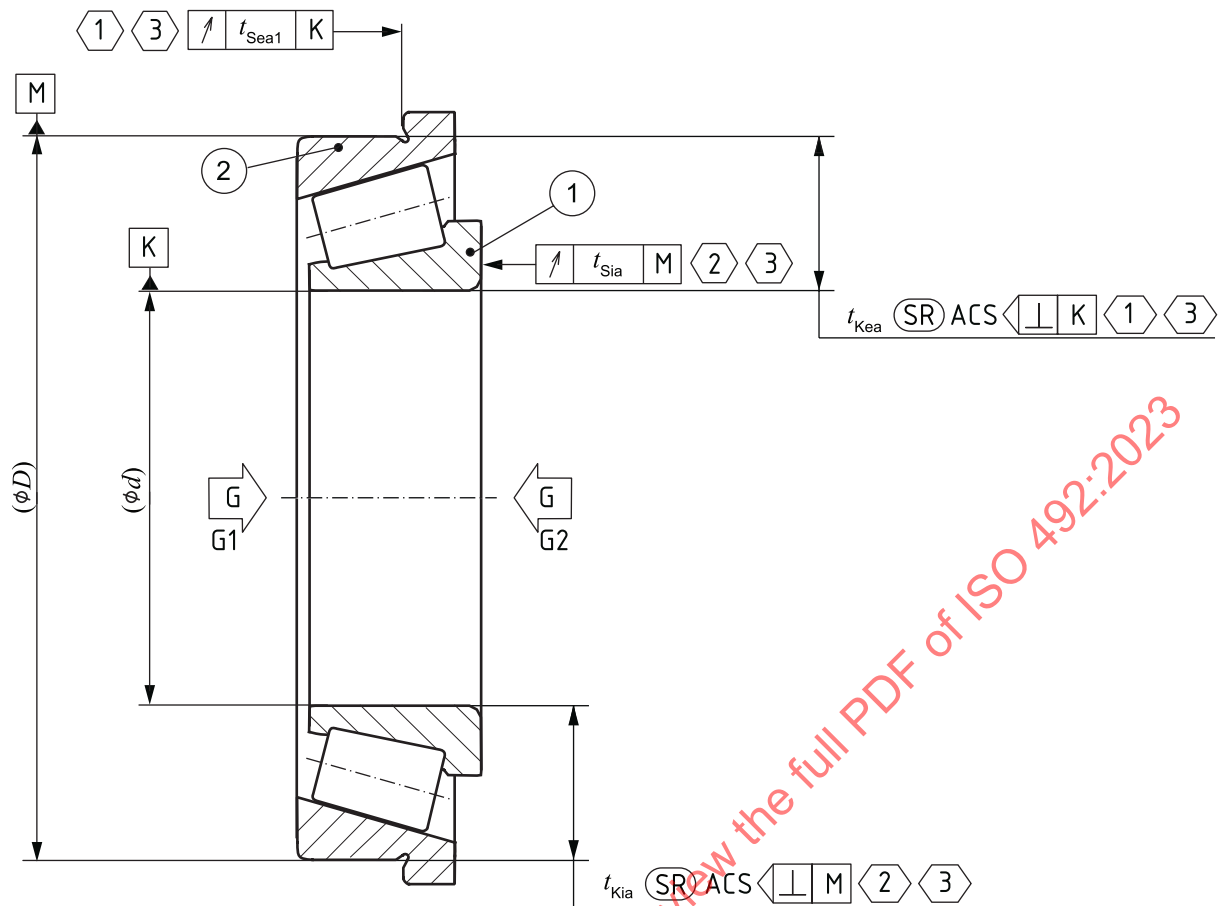


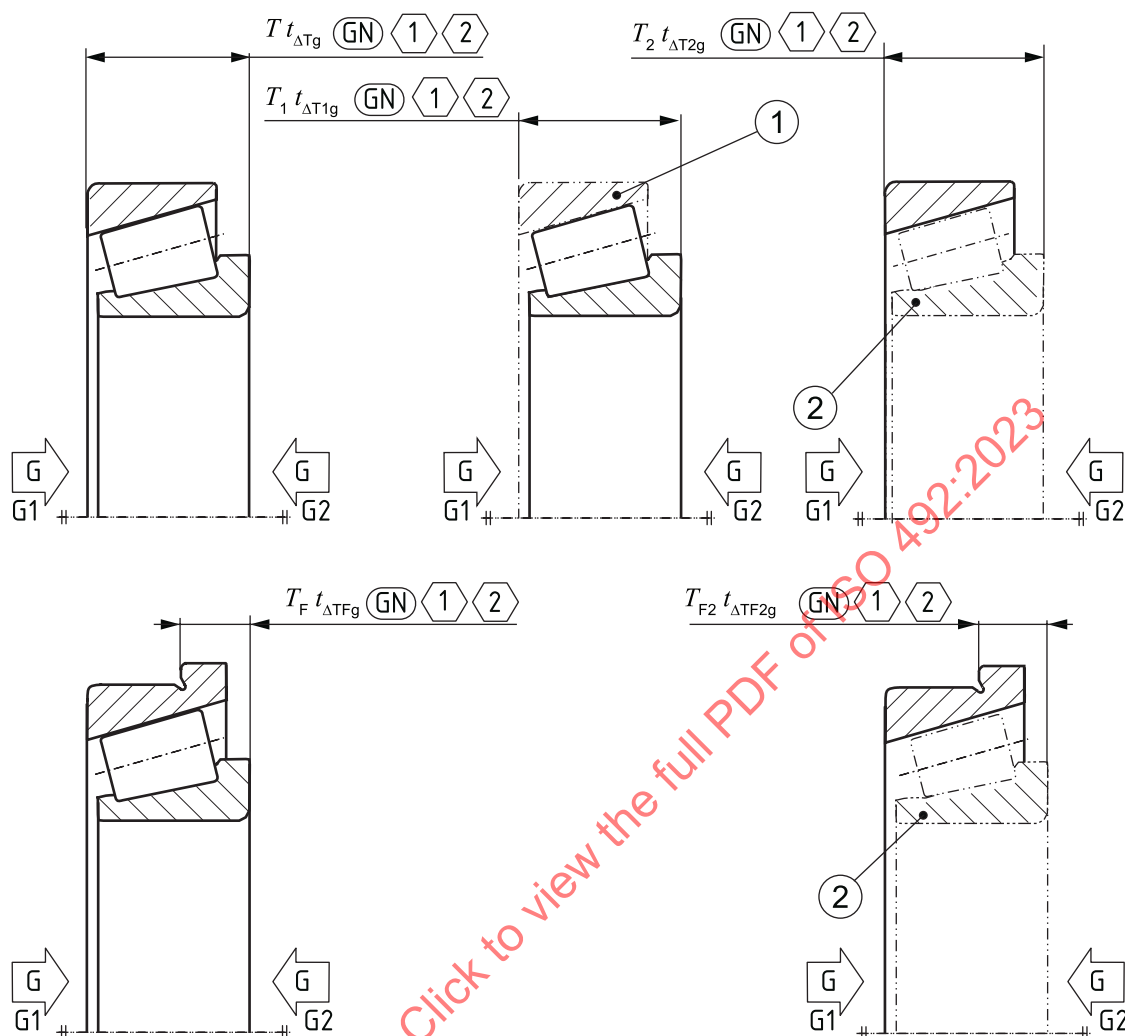
Figure 15 — Geometrical tolerances for assembled bearing with flanged outer ring — Deep groove ball bearing, double-row deep groove ball bearing, double-row angular contact ball bearing and four-point-contact ball bearing



Key

- ① = FP ① - MP ②, G1
- ② = FP ② - MP ①, G2
- ③ = the rolling elements shall be in correct functional contact with both the inner and outer rings

Figure 16 — Geometrical tolerances for assembled bearing with flanged outer ring — Single-row angular contact ball bearing and tapered roller bearing

**Key**

- 1 = G1 or G2
 2 = the rolling elements shall be in correct functional contact with both the inner and outer rings
 1 master outer ring
 2 master inner subunit

Figure 17 — Additional symbols for assembled tapered roller bearings

6 Deviation limits and tolerance values

6.1 General

The deviation limits and tolerance values for cylindrical bores are given in 6.2 and 6.3 and for flanges in 6.4. The deviation limits and tolerance values for tapered bore are given in 6.5.

The diameter series referred to in Tables 4 to 13 are those defined in ISO 15. In Tables 4 to 29, the symbols U and L are used as follows:

- U = upper deviation limit;
- L = lower deviation limit.

The symbol "—" in [Tables 4](#) to [29](#) is used when no values have been established.

The stiffness series referred to in [Tables 14](#), [15](#), [18](#), [19](#), [21](#) and [22](#) are categorized according to [Table 3](#).

Stiffness equivalent factor f_S is calculated from [Formula \(3\)](#):

$$f_S = (D-d)/d^{0,9} \quad (3)$$

NOTE 1 [Formula \(3\)](#) is similar in concept to ISO 15:2017, A.3.

NOTE 2 [Annex A](#) provides background information on t_{VDsp} and t_{Vdsp} for radial tapered roller bearings.

Table 3 — Tapered roller bearings — Stiffness series

f_S		Stiffness series	Abbreviation for stiffness series
>	≤		
—	0,535	extra light	A
0,535	0,73	light	B
0,73	1,3	medium	C
1,3	—	standard	S

EXAMPLE 1

Tapered roller bearing 3EC 080 according to ISO 355^[2] with the boundary dimensions:

$$d = 80 \text{ mm}$$

$$D = 140 \text{ mm}$$

$$f_S = (140-80)/80^{0,9} = 1,16$$

⇒ Values for V_{dsp} and V_{Dsp} according to stiffness series C “medium”

EXAMPLE 2

Tapered roller bearing 3EC 260 according to ISO 355^[2] with the boundary dimensions:

$$d = 260 \text{ mm}$$

$$D = 360 \text{ mm}$$

$$f_S = (360-260)/260^{0,9} = 0,67$$

⇒ Values for V_{dsp} and V_{Dsp} according to stiffness series B “light”

NOTE 3 Refer to [Annex B](#) for stiffness series for radial tapered roller bearings with boundary dimensions according to ISO 355.

6.2 Radial bearings except tapered roller bearings

6.2.1 Tolerance class Normal

See [Tables 4](#) and [5](#).

Table 4 — Radial bearings except tapered roller bearings — Inner ring — Tolerance class Normal

Deviation limits and tolerance values in micrometres

d mm		t _{Δdmp}		t _{Vdsp} ^b			t _{Vdmp}	t _{Kia}	t _{ΔBs}			t _{VBs} t _{VBgp} ^c
									t _{ΔBgp} ^{c d}			
				Diameter series					All	Normal	Modified ^a	
>	≤	U	L	9	0, 1	2, 3, 4			U	L		
—	0,6	0	−8	10	8	6	6	10	0	−40	—	12
0,6	2,5	0	−8	10	8	6	6	10	0	−40	—	12
2,5	10	0	−8	10	8	6	6	10	0	−120	−250	15
10	18	0	−8	10	8	6	6	10	0	−120	−250	20
18	30	0	−10	13	10	8	8	13	0	−120	−250	20
30	50	0	−12	15	12	9	9	15	0	−120	−250	20
50	80	0	−15	19	19	11	11	20	0	−150	−380	25
80	120	0	−20	25	25	15	15	25	0	−200	−380	25
120	180	0	−25	31	31	19	19	30	0	−250	−500	30
180	250	0	−30	38	38	23	23	40	0	−300	−500	30
250	315	0	−35	44	44	26	26	50	0	−350	−500	35
315	400	0	−40	50	50	30	30	60	0	−400	−630	40
400	500	0	−45	56	56	34	34	65	0	−450	—	50
500	630	0	−50	63	63	38	38	70	0	−500	—	60
630	800	0	−75	—	—	—	—	80	0	−750	—	70
800	1 000	0	−100	—	—	—	—	90	0	−1 000	—	80
1 000	1 250	0	−125	—	—	—	—	100	0	−1 250	—	100
1 250	1 600	0	−160	—	—	—	—	120	0	−1 600	—	120
1 600	2 000	0	−200	—	—	—	—	140	0	−2 000	—	140
2 000	2 500	0	−250	—	—	—	—	170	0	−2 200	—	160
2 500	3 150	0	−310	—	—	—	—	210	0	−2 350	—	180
3 150	4 000	0	−385	—	—	—	—	260	0	−2 500	—	200

^a Applies to inner rings and outer rings of single bearings made for paired and stacked assemblies. Also applies to inner rings with tapered bore with $d \geq 50$ mm.

^b No values have been established for diameter series 7 and 8.

^c Applies only to asymmetrical rings.

^d Applies only to upper deviation limit.

Table 5 — Radial bearings except tapered roller bearings — Outer ring — Tolerance class Normal

Deviation limits and tolerance values in micrometres

D mm		t _{ΔDmp}		t _{VDsp} ^{a c}				t _{VDmp} ^a	t _{Kea}	t _{ΔCs}		t _{VCs} t _{VC1s} ^b t _{VCgp} ^d	
				Open bearings		Capped bearings				t _{ΔC1s} ^b t _{ΔCgp} ^{de}			
				Diameter series						U	L		
>	≤	U	L	9	0, 1	2, 3, 4	2, 3, 4						
—	2,5	0	−8	10	8	6	10	6	15	For symmetrical rings, identical to t_{ΔBs} and t_{VBs} of an inner ring of the same bearing as the outer ring. For asymmetrical rings, identical to t_{ΔBgp} and t_{VBgp} of an inner ring of the same bearing as the outer ring.			
2,5	6	0	−8	10	8	6	10	6	15				
6	18	0	−8	10	8	6	10	6	15				
18	30	0	−9	12	9	7	12	7	15				
30	50	0	−11	14	11	8	16	8	20				
50	80	0	−13	16	13	10	20	10	25				
80	120	0	−15	19	19	11	26	11	35				
120	150	0	−18	23	23	14	30	14	40				
150	180	0	−25	31	31	19	38	19	45				
180	250	0	−30	38	38	23	—	23	50				
250	315	0	−35	44	44	26	—	26	60				
315	400	0	−40	50	50	30	—	30	70				
400	500	0	−45	56	56	34	—	34	80				
500	630	0	−50	63	63	38	—	38	100				
630	800	0	−75	94	94	55	—	55	120				
800	1 000	0	−100	125	125	75	—	75	140				
1 000	1 250	0	−125	—	—	—	—	—	160				
1 250	1 600	0	−160	—	—	—	—	—	190				
1 600	2 000	0	−200	—	—	—	—	—	220				
2 000	2 500	0	−250	—	—	—	—	—	250				
2 500	3 150	0	−300	—	—	—	—	—	300				
3 150	4 000	0	−350	—	—	—	—	—	350				
4 000	5 000	0	−400	—	—	—	—	—	400				

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in [Table 27](#).^a Applies before mounting and after removal of internal or external snap ring.^b Applies to groove ball bearings only.^c No values have been established for diameter series 7 and 8.^d Applies only to asymmetrical rings.^e Applies only to upper deviation limit.**6.2.2 Tolerance class 6**See [Tables 6](#) and [7](#).

Table 6 — Radial bearings except tapered roller bearings — Inner ring — Tolerance class 6

Deviation limits and tolerance values in micrometres

d mm		t _{Δdmp}		t _{Vdsp} ^b			t _{Vdmp}	t _{Kia}	t _{ΔBs}			t _{VBs} t _{VBgp} ^c
									t _{ΔBgp} ^{c d}			
				Diameter series					All	Normal	Modified ^a	
>	≤	U	L	9	0, 1	2, 3, 4			U	L		
—	0,6	0	−7	9	7	5	5	5	0	−40	—	12
0,6	2,5	0	−7	9	7	5	5	5	0	−40	—	12
2,5	10	0	−7	9	7	5	5	6	0	−120	−250	15
10	18	0	−7	9	7	5	5	7	0	−120	−250	20
18	30	0	−8	10	8	6	6	8	0	−120	−250	20
30	50	0	−10	13	10	8	8	10	0	−120	−250	20
50	80	0	−12	15	15	9	9	10	0	−150	−380	25
80	120	0	−15	19	19	11	11	13	0	−200	−380	25
120	180	0	−18	23	23	14	14	18	0	−250	−500	30
180	250	0	−22	28	28	17	17	20	0	−300	−500	30
250	315	0	−25	31	31	19	19	25	0	−350	−500	35
315	400	0	−30	38	38	23	23	30	0	−400	−630	40
400	500	0	−35	44	44	26	26	35	0	−450	—	45
500	630	0	−40	50	50	30	30	40	0	−500	—	50
630	800	0	−50	—	—	—	—	50	0	−750	—	60
800	1 000	0	−60	—	—	—	—	60	0	−1 000	—	70
1 000	1 250	0	−75	—	—	—	—	75	0	−1 250	—	80
1 250	1 600	0	−95	—	—	—	—	95	0	−1 600	—	95
1 600	2 000	0	−120	—	—	—	—	115	0	−2 000	—	110
2 000	2 500	0	−145	—	—	—	—	145	0	−2 200	—	130
2 500	3 150	0	−180	—	—	—	—	180	0	−2 350	—	150

^a Applies to inner rings and outer rings of single bearings made for paired and stacked assemblies. Also applies to inner rings with tapered bore with $d \geq 50$ mm.

^b No values have been established for diameter series 7 and 8.

^c Applies only to asymmetrical rings.

^d Applies only to upper deviation limit.

Table 7 — Radial bearings except tapered roller bearings — Outer ring — Tolerance class 6

Deviation limits and tolerance values in micrometres

D mm		t _{ΔDmp}		t _{VDsp} ^{a c}				t _{VDmp} ^a	t _{Kea}	t _{ΔCs}		t _{VCs} t _{VC1s} ^b t _{VCgp} ^d
				Open bearings		Capped bearings	t _{ΔC1s} ^b t _{ΔCgp} ^{de}					
				Diameter series						U	L	
>	≤	U	L	9	0, 1	2, 3, 4	0, 1, 2, 3, 4					
—	2,5	0	−7	9	7	5	9	5	8	For symmetrical rings, identical to t _{ΔBs} and t _{VBs} of an inner ring of the same bearing as the outer ring. For asymmetrical rings, identical to t _{ΔBgp} and t _{VBgp} of an inner ring of the same bearing as the outer ring.		
2,5	6	0	−7	9	7	5	9	5	8			
6	18	0	−7	9	7	5	9	5	8			
18	30	0	−8	10	8	6	10	6	9			
30	50	0	−9	11	9	7	13	7	10			
50	80	0	−11	14	11	8	16	8	13			
80	120	0	−13	16	16	10	20	10	18			
120	150	0	−15	19	19	11	25	11	20			
150	180	0	−18	23	23	14	30	14	23			
180	250	0	−20	25	25	15	—	15	25			
250	315	0	−25	31	31	19	—	19	30			
315	400	0	−28	35	35	21	—	21	35			
400	500	0	−33	41	41	25	—	25	40			
500	630	0	−38	48	48	29	—	29	50			
630	800	0	−45	56	56	34	—	34	60			
800	1 000	0	−60	75	75	45	—	45	75			
1 000	1 250	0	−75	—	—	—	—	—	90			
1 250	1 600	0	−95	—	—	—	—	—	110			
1 600	2 000	0	−120	—	—	—	—	—	135			
2 000	2 500	0	−145	—	—	—	—	—	165			
2 500	3 150	0	−180	—	—	—	—	—	205			
3 150	4 000	0	−225	—	—	—	—	—	260			

NOTE The deviation limits for the outside diameter, D₁, of an outer ring flange are given in [Table 27](#).

^a Applies before mounting and after removal of internal or external snap ring.

^b Applies to groove ball bearings only.

^c No values have been established for diameter series 7 and 8.

^d Applies only to asymmetrical rings.

^e Applies only to upper deviation limit.

6.2.3 Tolerance class 5See [Tables 8](#) and [9](#).

Table 8 — Radial bearings except tapered roller bearings — Inner ring — Tolerance class 5

Deviation limits and tolerance values in micrometres

d mm		t _{Δdmp}		t _{Vdsp} ^c			t _{Vdmp}	t _{Kia}	t _{Sd}	t _{Sia} ^a	t _{ΔBs} t _{ΔBgp} ^{d,e}			t _{VBs} t _{VBgp} ^d
											All	Normal	Modi- fied ^b	
				>	≤	U					L	9	0, 1	
—	0,6	0	−5	5	4	4	3	4	7	7	0	−40	−250	5
0,6	2,5	0	−5	5	4	4	3	4	7	7	0	−40	−250	5
2,5	10	0	−5	5	4	4	3	4	7	7	0	−40	−250	5
10	18	0	−5	5	4	4	3	4	7	7	0	−80	−250	5
18	30	0	−6	6	5	5	3	4	8	8	0	−120	−250	5
30	50	0	−8	8	6	6	4	5	8	8	0	−120	−250	5
50	80	0	−9	9	7	7	5	5	8	8	0	−150	−250	6
80	120	0	−10	10	8	8	5	6	9	9	0	−200	−380	7
120	180	0	−13	13	10	10	7	8	10	10	0	−250	−380	8
180	250	0	−15	15	12	12	8	10	11	13	0	−300	−500	10
250	315	0	−18	18	14	14	9	13	13	15	0	−350	−500	13
315	400	0	−23	23	18	18	12	15	15	20	0	−400	−630	15
400	500	0	−28	—	—	—	—	18	19	25	0	−450	—	18
500	630	0	−35	—	—	—	—	21	22	30	0	−500	—	21
630	800	0	−45	—	—	—	—	26	27	35	0	−750	—	26
800	1 000	0	−60	—	—	—	—	32	32	40	0	−1 000	—	32
1 000	1 250	0	−75	—	—	—	—	40	38	50	0	−1 250	—	40
1 250	1 600	0	−90	—	—	—	—	50	46	60	0	−1 600	—	50

^a Applies to groove ball bearings only.^b Applies to inner rings and outer rings of single bearings made for paired and stacked assemblies. Also applies to inner rings with tapered bore with $d \geq 50$ mm.^c No values have been established for diameter series 7 and 8.^d Applies only to asymmetrical rings.^e Applies only to upper deviation limit.

Table 9 — Radial bearings except tapered roller bearings — Outer ring — Tolerance class 5

Deviation limits and tolerance values in micrometres

D mm		t _{ΔDmp}		t _{VDsp} ^{a b e}			t _{VDmp} ^b	t _{Kea}	t _{SD} ^c t _{SD1} ^d	t _{Sea} ^{c d}	t _{Sea1} ^d	t _{ΔCs} t _{ΔC1s} ^d t _{ΔCgp} ^{f g}		t _{VCs} t _{VC1s} ^d t _{VCgp} ^f
				Diameter series								U	L	
>	≤	U	L	9	0, 1	2, 3, 4								
—	2,5	0	−5	5	4	4	3	5	4	8	11	For symmetrical rings, identical to t _{ΔBs} of an inner ring of the same bearing as the outer ring.	5	
2,5	6	0	−5	5	4	4	3	5	4	8	11		5	
6	18	0	−5	5	4	4	3	5	4	8	11		5	
18	30	0	−6	6	5	5	3	6	4	8	11		5	
30	50	0	−7	7	5	5	4	7	4	8	11		5	
50	80	0	−9	9	7	7	5	8	4	10	14		6	
80	120	0	−10	10	8	8	5	10	4,5	11	16		8	
120	150	0	−11	11	8	8	6	11	5	13	18		8	
150	180	0	−13	13	10	10	7	13	5	14	20		8	
180	250	0	−15	15	11	11	8	15	5,5	15	21		10	
250	315	0	−18	18	14	14	9	18	6,5	18	25		11	
315	400	0	−20	20	15	15	10	20	6,5	20	28		13	
400	500	0	−23	23	17	17	12	23	7,5	23	33		15	
500	630	0	−28	28	21	21	14	25	9	25	35		18	
630	800	0	−35	35	26	26	18	30	10	30	42	20		
800	1 000	0	−50	—	—	—	—	37	12	37	51	25		
1 000	1 250	0	−63	—	—	—	—	45	14	45	62	30		
1 250	1 600	0	−80	—	—	—	—	55	17	55	75	36		
1 600	2 000	0	−100	—	—	—	—	66	21	66	90	44		

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in [Table 27](#).^a No values have been established for capped bearings.^b Applies before mounting and after removal of internal or external snap ring.^c Does not apply to bearings with flanged outer ring.^d Applies to groove ball bearings only.^e No values have been established for diameter series 7 and 8.^f Applies only to asymmetrical rings.^g Applies only to upper deviation limit.**6.2.4 Tolerance class 4**See [Tables 10](#) and [11](#).

Table 10 — Radial bearings except tapered roller bearings — Inner ring — Tolerance class 4

Deviation limits and tolerance values in micrometres

d mm		t _{Δdmp} ^a t _{Δds} ^b		t _{Vdsp} ^e Diameter series			t _{Vdmp}	t _{Kia}	t _{Sd}	t _{Sia} ^c	t _{ΔBs} t _{ΔBgp} ^{fg}			t _{VBs} t _{VBgp} ^f
											All	Normal	Modified ^d	
		>	≤	U	L	9					0, 1	2, 3, 4	U	
—	0,6	0	−4	4	3	3	2	2,5	3	3	0	−40	−250	2,5
0,6	2,5	0	−4	4	3	3	2	2,5	3	3	0	−40	−250	2,5
2,5	10	0	−4	4	3	3	2	2,5	3	3	0	−40	−250	2,5
10	18	0	−4	4	3	3	2	2,5	3	3	0	−80	−250	2,5
18	30	0	−5	5	4	4	2,5	3	4	4	0	−120	−250	2,5
30	50	0	−6	6	5	5	3	4	4	4	0	−120	−250	3
50	80	0	−7	7	5	5	3,5	4	5	5	0	−150	−250	4
80	120	0	−8	8	6	6	4	5	5	5	0	−200	−380	4
120	180	0	−10	10	8	8	5	6	6	7	0	−250	−380	5
180	250	0	−12	12	9	9	6	8	7	8	0	−300	−500	6
250	315	0	−15	—	—	—	—	9	8	9	0	−350	—	8
315	400	0	−19	—	—	—	—	11	10	12	0	−400	—	10
400	500	0	−23	—	—	—	—	13	12	15	0	−450	—	12
500	630	0	−28	—	—	—	—	16	14	18	0	−500	—	14

^a These deviation limits apply to diameter series 7, 8 and 9 only.

^b These deviation limits apply to diameter series 0, 1, 2, 3 and 4 only.

^c Applies to groove ball bearings only.

^d Applies to inner rings and outer rings of single bearings made for paired or stacked assemblies.

^e No values have been established for diameter series 7 and 8.

^f Applies only to asymmetrical rings.

^g Applies only to upper deviation limit.

Table 11 — Radial bearings except tapered roller bearings — Outer ring — Tolerance class 4

Deviation limits and tolerance values in micrometres

D mm		t _{ΔDmp} ^a t _{ΔDs} ^b		t _{VDsp} ^{c d g}			t _{VDmp} ^d	t _{Kea}	t _{SD} ^e t _{SD1} ^f	t _{Sea} ^{e f}	t _{Sea1} ^f	t _{ΔCs} t _{ΔC1s} ^f t _{ΔCgp} ^{h i}		t _{VCs} t _{VC1s} ^f t _{VCgp} ^h
				Diameter series								U	L	
>	≤	U	L	9	0, 1	2, 3, 4								
—	2,5	0	−4	4	3	3	2	3	2	5	7	For symmetrical rings, identical to t _{ΔBs} and t _{VBs} of an inner ring of the same bearing as the outer ring.		2,5
2,5	6	0	−4	4	3	3	2	3	2	5	7			2,5
6	18	0	−4	4	3	3	2	3	2	5	7			2,5
18	30	0	−5	5	4	4	2,5	4	2	5	7			2,5
30	50	0	−6	6	5	5	3	5	2	5	7			2,5
50	80	0	−7	7	5	5	3,5	5	2	5	7			3
80	120	0	−8	8	6	6	4	6	2,5	6	8			4
120	150	0	−9	9	7	7	5	7	2,5	7	10		For asymmetrical rings, identical to t _{ΔBgp} and t _{VBgp} of an inner ring of the same bearing as the outer ring.	5
150	180	0	−10	10	8	8	5	8	2,5	8	11			5
180	250	0	−11	11	8	8	6	10	3,5	10	14	7		
250	315	0	−13	13	10	10	7	11	4	10	14	7		
315	400	0	−15	15	11	11	8	13	5	13	18	8		
400	500	0	−19	—	—	—	—	15	6	15	22	10		
500	630	0	−24	—	—	—	—	18	7	18	27	12		
630	800	0	−29	—	—	—	—	22	8,5	22	33	15		

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in [Table 27](#).^a These deviation limits apply to diameter series 7, 8 and 9 only.^b These deviation limits apply to diameter series 0, 1, 2, 3 and 4 only.^c No values have been established for capped bearings.^d Applies before mounting and after removal of internal or external snap ring.^e Does not apply to bearings with flanged outer ring.^f Applies to groove ball bearings only.^g No values have been established for diameter series 7 and 8.^h Applies only to asymmetrical rings.ⁱ Applies only to upper deviation limit.

6.2.5 Tolerance class 2

See [Tables 12](#) and [13](#).

Table 12 — Radial bearings except tapered roller bearings — Inner ring — Tolerance class 2

Deviation limits and tolerance values in micrometres

d mm		t _{Δdmp} ^a t _{Δds} ^b		t _{Vdsp}	t _{Vdmp}	t _{Kia}	t _{Sd}	t _{Sia} ^c	t _{ΔBs} t _{ΔBgp} ^{e f}			t _{VBs} t _{VBgp} ^e
									All	Normal	Modified ^d	
		>	≤						U	L	U	
—	0,6	0	−2,5	2,5	1,5	1,5	1,5	1,5	0	−40	−250	1,5
0,6	2,5	0	−2,5	2,5	1,5	1,5	1,5	1,5	0	−40	−250	1,5
2,5	10	0	−2,5	2,5	1,5	1,5	1,5	1,5	0	−40	−250	1,5
10	18	0	−2,5	2,5	1,5	1,5	1,5	1,5	0	−80	−250	1,5
18	30	0	−2,5	2,5	1,5	2,5	1,5	2,5	0	−120	−250	1,5
30	50	0	−2,5	2,5	1,5	2,5	1,5	2,5	0	−120	−250	1,5
50	80	0	−4	4	2	2,5	1,5	2,5	0	−150	−250	1,5
80	120	0	−5	5	2,5	2,5	2,5	2,5	0	−200	−380	2,5
120	150	0	−7	7	3,5	2,5	2,5	2,5	0	−250	−380	2,5
150	180	0	−7	7	3,5	5	4	5	0	−250	−380	4
180	250	0	−8	8	4	5	5	5	0	−300	−500	5
250	315	0	−10	—	—	6	5,5	6	0	−350	—	6
315	400	0	−12	—	—	7	7	9	0	−400	—	7
400	500	0	−15	—	—	8,5	8,5	11	0	−450	—	8,5

^a These deviation limits apply to diameter series 7, 8 and 9 only.^b These deviation limits apply to diameter series 0, 1, 2, 3 and 4 only.^c Applies to groove ball bearings only.^d Applies to inner rings and outer rings of single bearings made for paired or stacked assemblies.^e Applies only to asymmetrical rings.^f Applies only to upper deviation limit.

Table 13 — Radial bearings except tapered roller bearings — Outer ring — Tolerance class 2

Deviation limits and tolerance values in micrometres

D mm		$t_{\Delta Dmp}^a$ $t_{\Delta Ds}^b$		$t_{VDsp}^{c,d}$	t_{VDmp}^d	t_{Kea}	t_{SD}^e t_{SD1}^f	$t_{Sea}^{e,f}$	t_{Sea1}^f	$t_{\Delta Cs}$ $t_{\Delta C1s}^f$ $t_{\Delta Cgp}^{g,h}$	t_{VCs} t_{VC1s}^f t_{VCgp}^g
>	≤	U	L							U	L
—	2,5	0	−2,5	2,5	1,5	1,5	0,75	1,5	3	For symmetrical rings, identical to $t_{\Delta Bs}$ and t_{VBs} of an inner ring of the same bearing as the outer ring. For asymmetrical rings, identical to $t_{\Delta Bgp}$ and t_{VBgp} of an inner ring of the same bearing as the outer ring.	1,5
2,5	6	0	−2,5	2,5	1,5	1,5	0,75	1,5	3		1,5
6	18	0	−2,5	2,5	1,5	1,5	0,75	1,5	3		1,5
18	30	0	−4	4	2	2,5	0,75	2,5	4		1,5
30	50	0	−4	4	2	2,5	0,75	2,5	4		1,5
50	80	0	−4	4	2	4	0,75	4	6		1,5
80	120	0	−5	5	2,5	5	1,25	5	7		2,5
120	150	0	−5	5	2,5	5	1,25	5	7		2,5
150	180	0	−7	7	3,5	5	1,25	5	7		2,5
180	250	0	−8	8	4	7	2	7	10		4
250	315	0	−8	8	4	7	2,5	7	10		5
315	400	0	−10	10	5	8	3,5	8	11		7
400	500	0	−12	—	—	10	4,5	10	14		8
500	630	0	−15	—	—	12	5,5	12	17		10

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in [Table 27](#).^a These deviation limits apply to diameter series 7, 8 and 9 only.^b These deviation limits apply to diameter series 0, 1, 2, 3 and 4 only.^c No values have been established for capped bearings.^d Applies before mounting and after removal of internal or external snap ring.^e Does not apply to bearings with flanged outer ring.^f Applies to groove ball bearings only.^g Applies only to asymmetrical rings.^h Applies only to upper deviation limit.

6.3 Radial tapered roller bearings

6.3.1 Tolerance class Normal

See [Tables 14](#) to [16](#).

Table 14 — Radial tapered roller bearings — Inner ring — Tolerance class Normal

Deviation limits and tolerance values in micrometres

d mm		$t_{\Delta\text{dmp}}$		$t_{\text{Vdsp}}^{\text{a b}}$			t_{Vdmp}	t_{Kia}
				Stiffness series				
>	≤	U	L	B	C	S		
—	10	0	−12	12	12	12	9	15
10	18	0	−12	12	12	12	9	15
18	30	0	−12	12	12	12	9	18
30	50	0	−12	15	15	12	9	20
50	80	0	−15	22	18	15	11	25
80	120	0	−20	30	25	20	15	30
120	180	0	−25	38	30	25	19	35
180	250	0	−30	45	38	30	23	50
250	315	0	−35	52	44	35	26	60
315	400	0	−40	60	50	40	30	70
400	500	0	−45	68	56	45	34	80
500	630	0	−60	90	75	60	40	90
630	800	0	−75	—	—	—	—	100
800	1 000	0	−100	—	—	—	—	115
1 000	1 250	0	−125	—	—	—	—	130
1 250	1 600	0	−160	—	—	—	—	150
1 600	2 000	0	−200	—	—	—	—	170
2 000	2 500	0	−250	—	—	—	—	200
2 500	3 150	0	−310	—	—	—	—	240
3 150	4 000	0	−385	—	—	—	—	300

^a No values have been established for stiffness series A.^b Tolerances for stiffness series B and C are newly introduced in this edition of this document and can be subject to agreement between customer and manufacturer.**Table 15 — Radial tapered roller bearings — Outer ring — Tolerance class Normal**

Deviation limits and tolerance values in micrometres

S^D mm		$t_{\Delta Dmp}$		$t_{VDsp}^{a\ b}$			t_{VDmp}	t_{Kea}
				Stiffness series				
>	≤	U	L	B	C	S		
—	18	0	−12	12	12	12	9	18
18	30	0	−12	12	12	12	9	18
30	50	0	−14	15	14	14	11	20
50	80	0	−16	20	20	16	12	25
80	120	0	−18	27	22	18	14	35

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in [Table 27](#).^a No values have been established for stiffness series A.^b Tolerances for stiffness series B and C are newly introduced in this edition of this document and can be subject to agreement between customer and manufacturer.

Table 15 (continued)

D mm		t _{ΔDmp}		t _{VDsp} ^{a b}			t _{VDmp}	t _{Kea}
				Stiffness series				
>	≤	U	L	B	C	S		
120	150	0	-20	30	25	20	15	40
150	180	0	-25	38	30	25	19	45
180	250	0	-30	45	38	30	23	50
250	315	0	-35	52	44	35	26	60
315	400	0	-40	60	50	40	30	70
400	500	0	-45	68	56	45	34	80
500	630	0	-50	90	75	60	38	100
630	800	0	-75	120	100	80	55	120
800	1 000	0	-100	150	125	100	75	140
1 000	1 250	0	-125	—	—	—	—	160
1 250	1 600	0	-160	—	—	—	—	180
1 600	2 000	0	-200	—	—	—	—	200
2 000	2 500	0	-250	—	—	—	—	220
2 500	3 150	0	-300	—	—	—	—	270
3 150	4 000	0	-350	—	—	—	—	330
4 000	5 000	0	-400	—	—	—	—	400

NOTE The deviation limits for the outside diameter D_o of an outer ring flange are given in Table 27.

^a No values have been established for stiffness series A.

^b Tolerances for stiffness series B and C are newly introduced in this edition of this document and can be subject to agreement between customer and manufacturer.

Table 16 — Radial tapered roller bearings — Width of inner rings, outer rings, single-row bearings and single-row subunits — Tolerance class Normal

Deviation limits in micrometres

d mm		$t_{\Delta Bs}$		$t_{\Delta Cs}$		$t_{\Delta Tg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$	
		$t_{\Delta Bgp}^a$		$t_{\Delta Cgp}^a$		$t_{\Delta TFg}$				$t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
—	10	0	-120	0	-120	+200	0	+100	0	+100	0
10	18	0	-120	0	-120	+200	0	+100	0	+100	0
18	30	0	-120	0	-120	+200	0	+100	0	+100	0
30	50	0	-120	0	-120	+200	0	+100	0	+100	0
50	80	0	-150	0	-150	+200	0	+100	0	+100	0
80	120	0	-200	0	-200	+200	-200	+100	-100	+100	-100
120	180	0	-250	0	-250	+350	-250	+150	-150	+200	-100
180	250	0	-300	0	-300	+350	-250	+150	-150	+200	-100
250	315	0	-350	0	-350	+350	-250	+150	-150	+200	-100

^a Applies only to upper deviation limit of asymmetrical rings.

Table 16 (continued)

d mm		$t_{\Delta Bs}$ $t_{\Delta Bgp}^a$		$t_{\Delta Cs}$ $t_{\Delta Cgp}^a$		$t_{\Delta Tg}$ $t_{\Delta Tfg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$ $t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
315	400	0	-400	0	-400	+400	-400	+200	-200	+200	-200
400	500	0	-450	0	-450	+450	-450	+225	-225	+225	-225
500	630	0	-500	0	-500	+500	-500	—	—	—	—
630	800	0	-750	0	-750	+600	-600	—	—	—	—
800	1 000	0	-1 000	0	-1 000	+750	-750	—	—	—	—
1 000	1 250	0	-1 250	0	-1 250	+900	-900	—	—	—	—
1 250	1 600	0	-1 600	0	-1 600	+1 050	-1 050	—	—	—	—
1 600	2 000	0	-2 000	0	-2 000	+1 200	-1 200	—	—	—	—
2 000	2 500	0	-2 500	0	-2 500	+1 600	-1 600	—	—	—	—
2 500	3 150	0	-3 150	0	-3 150	+2 000	-2 000	—	—	—	—
3 150	4 000	0	-4 000	0	-4 000	+2 500	-2 500	—	—	—	—

^a Applies only to upper deviation limit of asymmetrical rings.

6.3.2 Tolerance class 6X

See Table 17.

The diameter tolerances, t_{Kia} and t_{Kea} for inner and outer rings of this tolerance class are the same as those given in Tables 14 and 15 for the tolerance class Normal.

Table 17 — Radial tapered roller bearings — Width of inner rings, outer rings, single-row bearings and single-row subunits — Tolerance class 6X

Deviation limits in micrometres

d mm		$t_{\Delta Bs}$ $t_{\Delta Bgp}^a$		$t_{\Delta Cs}$ $t_{\Delta Cgp}^a$		$t_{\Delta Tg}$ $t_{\Delta Tfg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$ $t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
—	10	0	-50	0	-100	+100	0	+50	0	+50	0
10	18	0	-50	0	-100	+100	0	+50	0	+50	0
18	30	0	-50	0	-100	+100	0	+50	0	+50	0
30	50	0	-50	0	-100	+100	0	+50	0	+50	0
50	80	0	-50	0	-100	+100	0	+50	0	+50	0
80	120	0	-50	0	-100	+100	0	+50	0	+50	0
120	180	0	-50	0	-100	+150	0	+50	0	+100	0
180	250	0	-50	0	-100	+150	0	+50	0	+100	0
250	315	0	-50	0	-100	+200	0	+100	0	+100	0
315	400	0	-50	0	-100	+200	0	+100	0	+100	0
400	500	0	-50	0	-100	+200	0	+100	0	+100	0
500	630	0	-100	0	-150	+250	0	—	—	—	—

^a Applies only to upper deviation limit of asymmetrical rings.

Table 17 (continued)

d mm		$t_{\Delta Bs}$ $t_{\Delta Bgp}^a$		$t_{\Delta Cs}$ $t_{\Delta Cgp}^a$		$t_{\Delta Tg}$ $t_{\Delta TFg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$ $t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
630	800	0	-120	0	-170	+300	0	—	—	—	—
800	1 000	0	-140	0	-185	+400	0	—	—	—	—
1 000	1 250	0	-165	0	-210	+500	0	—	—	—	—
1 250	1 600	0	-200	0	-250	+600	0	—	—	—	—
1 600	2 000	0	-240	0	-290	+750	0	—	—	—	—
2 000	2 500	0	-300	0	-350	+900	0	—	—	—	—

^a Applies only to upper deviation limit of asymmetrical rings.

6.3.3 Tolerance class 5

See [Tables 18](#) to [20](#).

Table 18 — Radial tapered roller bearings — Inner ring — Tolerance class 5

Deviation limits and tolerance values in micrometres

d mm		$t_{\Delta dmp}$		$t_{Vdsp}^{a,b}$ Stiffness series			t_{Vdmp}	t_{Kia}	t_{Sd}
>	≤	U	L	B	C	S			
—	10	0	-7	5	5	5	5	5	7
10	18	0	-7	5	5	5	5	5	7
18	30	0	-8	6	6	6	5	5	8
30	50	0	-10	10	10	8	5	6	8
50	80	0	-12	14	11	9	6	7	8
80	120	0	-15	17	14	11	8	8	9
120	180	0	-18	21	18	14	9	11	10
180	250	0	-22	26	21	17	11	13	11
250	315	0	-25	29	24	19	13	13	13
315	400	0	-30	35	29	23	15	15	15
400	500	0	-35	—	—	—	—	20	17
500	630	0	-40	—	—	—	—	25	20
630	800	0	-50	—	—	—	—	30	25
800	1 000	0	-60	—	—	—	—	37	30
1 000	1 250	0	-75	—	—	—	—	45	40
1 250	1 600	0	-90	—	—	—	—	55	50

^a No values have been established for stiffness series A.

^b Tolerances for stiffness series B and C are newly introduced in this edition of this document and can be subject to agreement between customer and manufacturer.

Table 19 — Radial tapered roller bearings — Outer ring — Tolerance class 5

Deviation limits and tolerance values in micrometres

D mm		t _{ΔDmp}		t _{VDsp} ^{a b}			t _{VDmp}	t _{Kea}	t _{SD} ^c t _{SD1}
				Stiffness series					
>	≤	U	L	B	C	S			
—	18	0	−8	6	6	6	5	6	4
18	30	0	−8	6	6	6	5	6	4
30	50	0	−9	11	9	7	5	7	4
50	80	0	−11	13	10	8	6	8	4
80	120	0	−13	15	13	10	7	10	4,5
120	150	0	−15	17	14	11	8	11	5
150	180	0	−18	21	18	14	9	13	5
180	250	0	−20	23	19	15	10	15	5,5
250	315	0	−25	29	24	19	13	18	6,5
315	400	0	−28	33	28	22	14	20	6,5
400	500	0	−33	39	33	26	17	24	8,5
500	630	0	−38	45	38	30	20	30	10
630	800	0	−45	57	48	38	25	36	12,5
800	1 000	0	−60	—	—	—	—	43	15
1 000	1 250	0	−80	—	—	—	—	52	19
1 250	1 600	0	−100	—	—	—	—	62	25
1 600	2 000	0	−125	—	—	—	—	73	32,5

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in [Table 27](#).^a No values have been established for stiffness series A.^b Tolerances for stiffness series B and C are newly introduced in this edition of this document and can be subject to agreement between customer and manufacturer.^c Does not apply to bearings with flanged outer ring.**Table 20 — Radial tapered roller bearings — Width of inner rings, outer rings, single-row bearings and single-row subunits — Tolerance class 5**

Deviation limits in micrometres

d mm		$t_{\Delta Bs}$		$t_{\Delta Cs}$		$t_{\Delta Tg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$	
		$t_{\Delta Bgp}^a$		$t_{\Delta Cgp}^a$		$t_{\Delta TFg}$		$t_{\Delta TF1g}$		$t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
—	10	0	−200	0	−200	+200	−200	+100	−100	+100	−100
10	18	0	−200	0	−200	+200	−200	+100	−100	+100	−100
18	30	0	−200	0	−200	+200	−200	+100	−100	+100	−100
30	50	0	−240	0	−240	+200	−200	+100	−100	+100	−100
50	80	0	−300	0	−300	+200	−200	+100	−100	+100	−100
80	120	0	−400	0	−400	+200	−200	+100	−100	+100	−100
120	180	0	−500	0	−500	+350	−250	+150	−150	+200	−100

^a Applies only to the upper deviation limit of asymmetrical rings.

Table 20 (continued)

d mm		$t_{\Delta Bs}$ $t_{\Delta Bgp}^a$		$t_{\Delta Cs}$ $t_{\Delta Cgp}^a$		$t_{\Delta Tg}$ $t_{\Delta TFg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$ $t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
180	250	0	-600	0	-600	+350	-250	+150	-150	+200	-100
250	315	0	-700	0	-700	+350	-250	+150	-150	+200	-100
315	400	0	-800	0	-800	+400	-400	+200	-200	+200	-200
400	500	0	-900	0	-900	+450	-450	+225	-225	+225	-225
500	630	0	-1 100	0	-1 100	+500	-500	—	—	—	—
630	800	0	-1 600	0	-1 600	+600	-600	—	—	—	—
800	1 000	0	-2 000	0	-2 000	+750	-750	—	—	—	—
1 000	1 250	0	-2 000	0	-2 000	+750	-750	—	—	—	—
1 250	1 600	0	-2 000	0	-2 000	+900	-900	—	—	—	—

^a Applies only to the upper deviation limit of asymmetrical rings.

6.3.4 Tolerance class 4

See [Tables 21](#) to [23](#).

Table 21 — Radial tapered roller bearings — Inner ring — Tolerance class 4

Deviation limits and tolerance values in micrometres

d mm		$t_{\Delta dmp}^a$ $t_{\Delta ds}^b$		t_{Vdsp}^{cd} Stiffness series			t_{Vdmp}	t_{Kia}	t_{Sd}	t_{Sia}
>	≤	U	L	B	C	S				
—	10	0	-5	4	4	4	4	3	3	3
10	18	0	-5	4	4	4	4	3	3	3
18	30	0	-6	5	5	5	4	3	4	4
30	50	0	-8	8	6	6	5	4	4	4
50	80	0	-9	9	7	7	5	4	5	4
80	120	0	-10	10	8	8	5	5	5	5
120	180	0	-13	13	10	10	7	6	6	7
180	250	0	-15	14	11	11	8	8	7	8
250	315	0	-18	—	—	—	—	9	8	9
315	400	0	-21	—	—	—	—	11	10	12
400	500	0	-25	—	—	—	—	13	12	15
500	630	0	-29	—	—	—	—	16	14	18

^a These deviation limits apply to stiffness series A and B.

^b These deviation limits apply to stiffness series C and S.

^c No values have been established for stiffness series A.

^d Tolerances for stiffness series B and C are newly introduced in this edition of this document and can be subject to agreement between customer and manufacturer.

Table 22 — Radial tapered roller bearings — Outer ring — Tolerance class 4

Deviation limits and tolerance values in micrometres

D mm		t _{ΔDmp} ^a t _{ΔDs} ^b		t _{VDsp} ^{c d}			t _{VDmp}	t _{Kea}	t _{SD} ^e t _{SD1}	t _{Sea} ^e	t _{Sea1}
				Stiffness series							
>	≤	U	L	B	C	S					
—	18	0	−6	5	5	5	4	4	2	5	7
18	30	0	−6	5	5	5	4	4	2	5	7
30	50	0	−7	5	5	5	5	5	2	5	7
50	80	0	−9	9	7	7	5	5	2	5	7
80	120	0	−10	10	8	8	5	6	2,5	6	8
120	150	0	−11	10	8	8	6	7	2,5	7	10
150	180	0	−13	13	10	10	7	8	2,5	8	11
180	250	0	−15	14	11	11	8	10	3,5	10	14
250	315	0	−18	18	14	14	9	11	4	10	14
315	400	0	−20	19	15	15	10	13	5	13	18
400	500	0	−25	—	—	—	—	15	6	15	22
500	630	0	−29	—	—	—	—	18	7	18	27
630	800	0	−35	—	—	—	—	22	8,5	22	33

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in [Table 27](#).^a These deviation limits apply to stiffness series A and B.^b These deviation limits apply to stiffness series C and S.^c No values have been established for stiffness series A.^d Tolerances for stiffness series B and C are newly introduced in this edition of this document and can be subject to agreement between customer and manufacturer.^e Does not apply to bearings with flanged outer ring.**Table 23 — Radial tapered roller bearings — Width of inner rings, outer rings, single-row bearings and single-row subunits — Tolerance class 4**

Deviation limits in micrometres

d mm		$t_{\Delta Bs}$ $t_{\Delta Bgp}^a$		$t_{\Delta Cs}$ $t_{\Delta Cgp}^a$		$t_{\Delta Tg}$ $t_{\Delta TFg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$ $t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
—	10	0	−200	0	−200	+200	−200	+100	−100	+100	−100
10	18	0	−200	0	−200	+200	−200	+100	−100	+100	−100
18	30	0	−200	0	−200	+200	−200	+100	−100	+100	−100
30	50	0	−240	0	−240	+200	−200	+100	−100	+100	−100
50	80	0	−300	0	−300	+200	−200	+100	−100	+100	−100
80	120	0	−400	0	−400	+200	−200	+100	−100	+100	−100
120	180	0	−500	0	−500	+350	−250	+150	−150	+200	−100
180	250	0	−600	0	−600	+350	−250	+150	−150	+200	−100
250	315	0	−700	0	−700	+350	−250	+150	−150	+200	−100
315	400	0	−800	0	−800	+400	−400	+200	−200	+200	−200

^a Applies only to upper deviation limit of asymmetrical rings.

Table 23 (continued)

d mm		$t_{\Delta Bs}$ $t_{\Delta Bgp}^a$		$t_{\Delta Cs}$ $t_{\Delta Cgp}^a$		$t_{\Delta Tg}$ $t_{\Delta TFg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$ $t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
400	500	0	-900	0	-900	+450	-450	+225	-225	+225	-225
500	630	0	-1 100	0	-1 100	+500	-500	—	—	—	—

^a Applies only to upper deviation limit of asymmetrical rings.

6.3.5 Tolerance class 2

See [Tables 24](#) to [26](#).

Table 24 — Radial tapered roller bearings — Inner ring — Tolerance class 2

Deviation limits and tolerance values in micrometres

d mm		$t_{\Delta dmp}^a$ $t_{\Delta ds}^b$		t_{Vdsp}	t_{Vdmp}	t_{Kia}	t_{Sd}	t_{Sia}
>	≤	U	L					
—	10	0	-4	2,5	1,5	2	1,5	2
10	18	0	-4	2,5	1,5	2	1,5	2
18	30	0	-4	2,5	1,5	2,5	1,5	2,5
30	50	0	-5	3	2	2,5	2	2,5
50	80	0	-5	4	2	3	2	3
80	120	0	-6	5	2,5	3	2,5	3
120	180	0	-7	7	3,5	4	3,5	4
180	250	0	-8	7	4	5	5	5
250	315	0	-8	—	—	6	5,5	6
315	400	0	-12	—	—	7	7	9
400	500	0	-15	—	—	8,5	8,5	11

^a These deviation limits apply to stiffness series A and B.
^b These deviation limits apply to stiffness series C and S.

Table 25 — Radial tapered roller bearings — Outer ring — Tolerance class 2

Deviation limits and tolerance values in micrometres

D mm		$t_{\Delta Dmp}^a$ $t_{\Delta DS}^b$		t_{VDsp}	t_{VDmp}	t_{Kea}	t_{SD}^c t_{SD1}	t_{Sea}^c	t_{Sea1}
>	≤	U	L						
—	18	0	-5	4	2,5	2,5	0,75	2,5	4
18	30	0	-5	4	2,5	2,5	0,75	2,5	4
30	50	0	-5	4	2,5	2,5	1	2,5	4
50	80	0	-6	4	2,5	4	1,25	4	6

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in [Table 27](#).

^a These deviations limits apply to stiffness series A and B.
^b These deviations limits apply to stiffness series C and S.
^c Does not apply to bearings with flanged outer ring.

Table 25 (continued)

D mm		$t_{\Delta Dmp}^a$ $t_{\Delta Ds}^b$		t_{VDsp}	t_{VDmp}	t_{Kea}	t_{SD}^c t_{SD1}	t_{Sea}^c	t_{Sea1}
>	≤	U	L						
80	120	0	-6	5	3	5	1,5	5	7
120	150	0	-7	5	3,5	5	1,75	5	7
150	180	0	-7	7	4	5	2	5	7
180	250	0	-8	8	5	7	2,5	7	10
250	315	0	-9	8	5	7	3	7	10
315	400	0	-10	10	6	8	3,5	8	11
400	500	0	-12	—	—	10	4,5	10	14
500	630	0	-15	—	—	12	5,5	12	17

NOTE The deviation limits for the outside diameter, D_1 , of an outer ring flange are given in Table 27.

^a These deviations limits apply to stiffness series A and B.

^b These deviations limits apply to stiffness series C and S.

^c Does not apply to bearings with flanged outer ring.

Table 26 — Radial tapered roller bearings — Width of inner rings, outer rings, single-row bearings and single-row subunits — Tolerance class 2

Deviation limits in micrometres

d mm		$t_{\Delta Bs}$ $t_{\Delta Bgp}^a$		$t_{\Delta Cs}$ $t_{\Delta Cgp}^a$		$t_{\Delta Tg}$ $t_{\Delta TFg}$		$t_{\Delta T1g}$		$t_{\Delta T2g}$ $t_{\Delta TF2g}$	
>	≤	U	L	U	L	U	L	U	L	U	L
—	10	0	-200	0	-200	+200	-200	+100	-100	+100	-100
10	18	0	-200	0	-200	+200	-200	+100	-100	+100	-100
18	30	0	-200	0	-200	+200	-200	+100	-100	+100	-100
30	50	0	-240	0	-240	+200	-200	+100	-100	+100	-100
50	80	0	-300	0	-300	+200	-200	+100	-100	+100	-100
80	120	0	-400	0	-400	+200	-200	+100	-100	+100	-100
120	180	0	-500	0	-500	+200	-250	+100	-100	+100	-150
180	250	0	-600	0	-600	+200	-300	+100	-150	+100	-150
250	315	0	-700	0	-700	+200	-300	+100	-150	+100	-150
315	400	0	-800	0	-800	+300	-300	+150	-150	+150	-150
400	500	0	-900	0	-900	+350	-350	+175	-175	+175	-175

^a Applies only to upper deviation limit of asymmetrical rings.

6.4 Radial bearings, outer ring flanges

See [Table 27](#).

Table 27 — Flange outside diameter deviation limits

Deviation limits in micrometres

D_1 mm		$t_{\Delta D1s}$			
		Locating flange		Non-locating flange	
>	≤	U	L	U	L
—	6	0	−36	+220	−36
6	10	0	−36	+220	−36
10	18	0	−43	+270	−43
18	30	0	−52	+330	−52
30	50	0	−62	+390	−62
50	80	0	−74	+460	−74
80	120	0	−87	+540	−87
120	180	0	−100	+630	−100
180	250	0	−115	+720	−115
250	315	0	−130	+810	−130
315	400	0	−140	+890	−140
400	500	0	−155	+970	−155
500	630	0	−175	+1 100	−175
630	800	0	−200	+1 250	−200
800	1 000	0	−230	+1 400	−230
1 000	1 250	0	−260	+1 650	−260
1 250	1 600	0	−310	+1 950	−310
1 600	2 000	0	−370	+2 300	−370
2 000	2 500	0	−440	+2 800	−440

6.5 Basically tapered bores, tapers 1:12 and 1:30

Tolerances for tapered bores for tolerance class Normal are given in [Tables 28](#) and [29](#).

The tolerances for a tapered bore comprise

- $t_{\Delta dmp}$;
- a taper tolerance, given by deviation limits for tapered slope, $t_{\Delta SL}$;
- t_{Vdsp} .

NOTE See [Figure 7](#).