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Rolling bearings — Thrust bearings — Geometrical product specification (GPS) and tolerance values

Roulements — Butées — Spécification géométrique des produits (GPS) et valeurs de tolérance

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Foreword

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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).

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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 fourth edition cancels and replaces the third edition (ISO 199:2005), which has been technically revised.

Introduction

This International Standard is a machine element geometry standard as defined in the geometrical product specification (GPS) system as presented in master plan of ISO/TR 14638.[10]

The fundamental rules of ISO/GPS given in ISO 8015[7] apply to this International Standard and the default decision rules given in ISO 14253-1[8] 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.[5] For measurement uncertainty it is intended that ISO 14253-2[9] should be considered.

Rolling bearings — Thrust bearings — Geometrical product specification (GPS) and tolerance values

1 Scope

This International Standard specifies dimensional characteristics, limit deviations from nominal values, and tolerance values to define the interface (except chamfers) of thrust rolling bearings. Nominal boundary dimensions are defined in ISO 104[1].

This International Standard is not applicable to certain thrust bearings (e.g. thrust needle roller bearings) or for particular fields of application (e.g. special thrust precision 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 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 5593, *Rolling bearings — Vocabulary*

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

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

3 Terms and definitions

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

4 Symbols

To express that the ISO/GPS system, ISO 8015 [7] is applied, the dimensional characteristics shall be included in the technical product documentation (for example on the drawing). The dimensional specifications, associated to these characteristics, are described in Table 1 and Figures 1 to 4.

Descriptions for symbols are in accordance with GPS terminology; relationships with traditional terms are described in Annex A.

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

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. Some specification modifiers are described in Annex D.

The detailed definitions for terms in ISO 14405-1 and traditional terms in ISO 1132-1[4] are not fully equal, for differences, see Annex C.

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

Symbol for nominal size [a]	Symbol for characteristic [a]	GPS symbol and specification modifier [b c]	Description [d]	See Figure
d			Nominal bore diameter of shaft washer, single-direction bearing	1; 2
	Δdmp	LP SD ACS	Deviation of a mid-range size (out of two-point sizes) of shaft washer bore diameter in any cross-section from its nominal size	1; 2
	Vdsp	LP SR ACS	Range of two-point sizes of shaft washer bore diameter in any cross-section	1; 2
d_2			Nominal bore diameter of central shaft washer, double-direction bearing	3; 4
	Δd2mp	LP SD ACS	Deviation of a mid-range size (out of two-point sizes) of central shaft washer bore diameter in any cross-section from its nominal size	3; 4
	Vd2sp	LP SR ACS	Range of two-point sizes of central shaft washer bore diameter in any cross-section	3; 4
D			Nominal outside diameter of housing washer	1; 2; 3; 4
	ΔDmp	LP SD ACS	Deviation of a mid-range size (out of two-point sizes) of housing washer outside diameter in any cross-section from its nominal size	1; 2; 3; 4
	VDsp	LP SR ACS	Range of two-point sizes of housing washer outside diameter in any cross-section	1; 2; 3; 4
T			Nominal assembled bearing height, single-direction bearing	1; 2
	ΔTs	GN [e]	Deviation of minimum circumscribed size of assembled bearing height from its nominal size, single-direction bearing	1; 2

Table 1 — *(continued)*

Symbol for nominal size[a]	Symbol for characteristic[a]	GPS symbols and specification modifiers[b c]	Descriptions[d]	See Figure
T_1			Nominal assembled bearing height, double-direction bearing	3; 4
	ΔT1s	GN [e]	Deviation of minimum circumscribed size of assembled bearing height from its nominal size, double-direction bearing	3; 4
	Se [f]	LP SR	**Thrust cylindrical roller bearings**: range of two-point sizes of thickness between housing washer raceway and the back face	2; 4
		LS SN ALS SR ⌯	**Thrust ball bearings**: range of minimum spherical sizes between the raceway and the opposite back face of the housing washer, obtained from any longitudinal section which includes the housing washer outside surface axis	1; 3
	Si [f]	LP SR	**Thrust cylindrical roller bearings**: range of two-point sizes of thickness between shaft washer raceway and the back face	2
		LS SN ALS SR ⌯	**Thrust ball bearings**: range of minimum spherical sizes between the raceway and the opposite back face of the shaft washer, obtained from any longitudinal section which includes the shaft washer bore axis	1

[a] Symbols as defined in ISO 15241[12] except for the format used.

[b] Symbols as defined in 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] Descriptions based on ISO 14405-1.

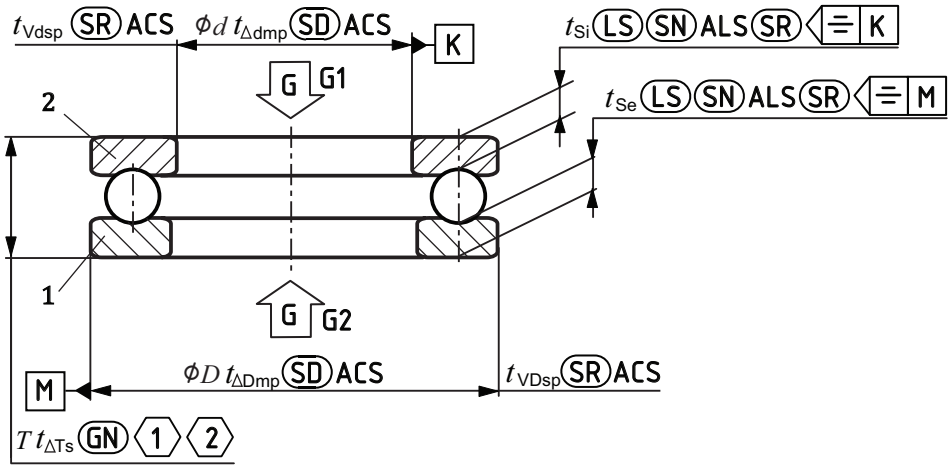
[e] symbols for direction of gravity G according to ISO/TS 17863, see Figures 1 to 4.

[f] Applies only to thrust ball bearings with 90° contact angle and thrust cylindrical roller bearings with 90° contact angle.

The indications in Figures 1 to 4 illustrate the correlation of interface dimensions and corresponding dimensional tolerance symbols.

NOTE Figures 1 to 4 are drawn schematically and do not necessarily show all design details.

Two examples of a real drawing indication are given in Annex B.



1 = G1 or G2

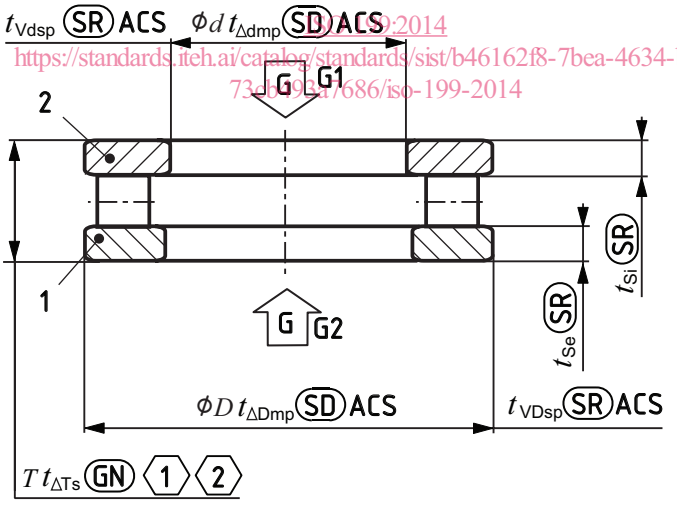
2 = the rolling elements shall be in contact with both shaft and housing washer raceways

Key

1 housing washer

2 shaft washer

Figure 1 — Size specification for single-direction bearing — Thrust ball bearing



1 = G1 or G2

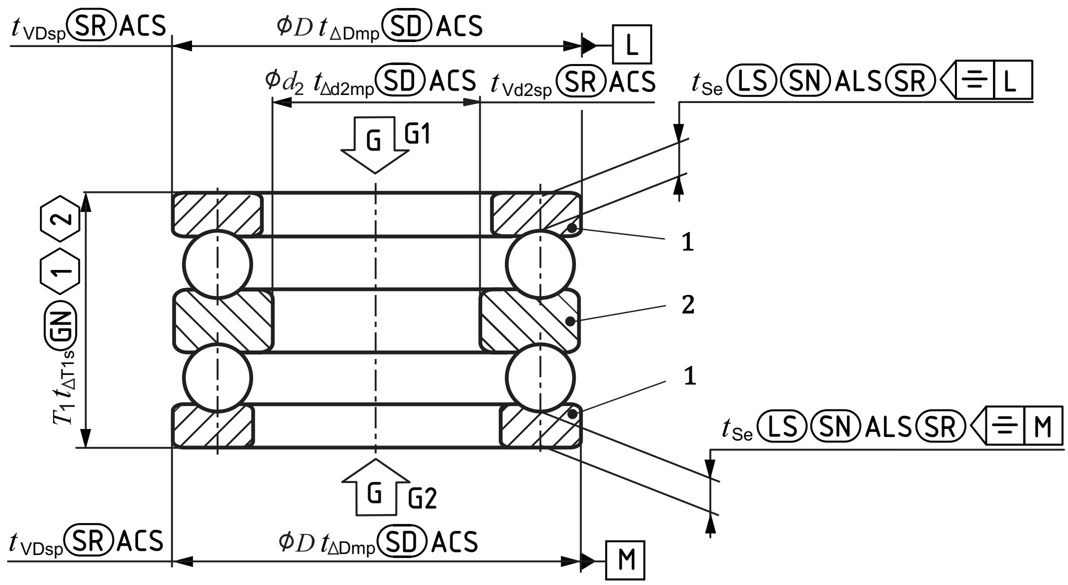
2 = the rolling elements shall be in contact with both shaft and housing washer raceways

Key

1 housing washer

2 shaft washer

Figure 2 — Size specification for single-direction bearing — Thrust cylindrical roller bearing



⟨1⟩ = G1 or G2

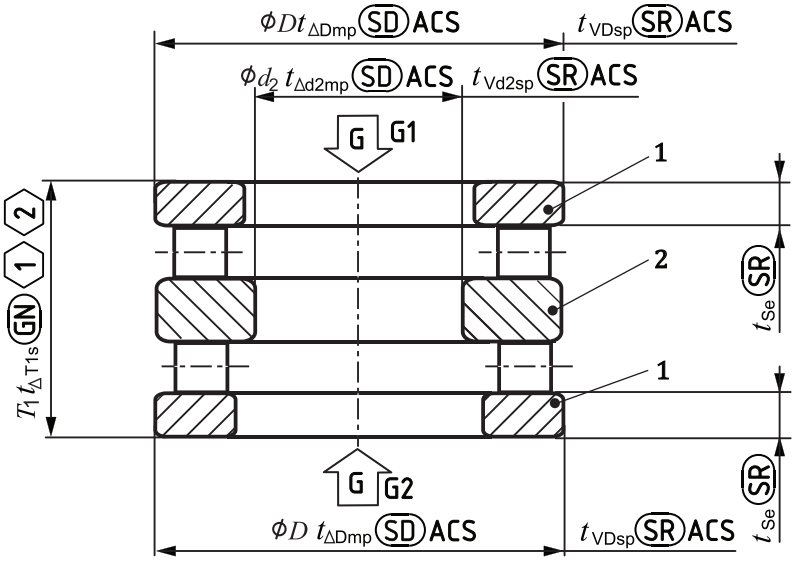
⟨2⟩ = the rolling elements shall be in contact with both shaft and housing washer raceways

Key

1 housing washer

2 central shaft washer

Figure 3 — Size specification for double-direction bearing — Thrust ball bearing



(1) = G1 or G2

(2) = the rolling elements shall be in contact with both shaft and housing washer raceways

Key

1 housing washer

2 central shaft washer

Figure 4 — Size specification for double-direction bearing — Thrust cylindrical roller bearing

5 Limit deviations and tolerance values

5.1 General

Limit deviations and tolerance values for single-direction and double-direction thrust bearings are given in Tables 2 to 9.

NOTE Details, except for inner diameter, of the central washer will be dealt with in a future revision of this International Standard.

In Tables 2 to 9, the symbols U and L are used as follows:

U = upper limit deviation;

L = lower limit deviation.