SVENSK STANDARD
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Rullningslager – Symboler för fysikaliska storheter (ISO 15241:2012, IDT)

Rolling bearings – Symbols for physical quantities (ISO 15241:2012, IDT)

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Den internationella standarden ISO 15241:2012 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 15241:2012.

The International Standard ISO 15241:2012 has the status of a Swedish Standard. This document contains the official version of ISO 15241:2012.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Rullningslager, SIS/TK 105.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 15241 was prepared by Technical Committee ISO/TC 4, *Rolling bearings*.

This second edition cancels and replaces the first edition (ISO 15241:2001), which has been technically revised. In particular, references ISO 31-0 and ISO 31-11 have been replaced by ISO 80000-1 and ISO 80000-2, respectively. ISO 281:1990/Amd.1:2000 has been replaced by the new edition of ISO 281 as well. In addition, items 8.04, 8.05, 8.11 and 8.14 in Table 10 have been deleted, which means that other item numbers in Table 10 have been updated.

Rolling bearings — Symbols for physical quantities

1 Scope

This International Standard establishes the presentation of symbols for physical quantities (dimensions, dimensional tolerances, accuracy, load ratings, life, etc.) in the field of rolling bearings. These symbols are primarily intended for use in International Standards and ISO documents relating to rolling bearings, but they are also suitable for use in other printed materials, such as handbooks, illustrations/drawings and pamphlets.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are dispensable 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 281, *Rolling bearings — Dynamic load ratings and rating life*

ISO 1132-1, *Rolling bearings — Tolerances — Part 1: Terms and definitions*

ISO 5593, *Rolling bearings — Vocabulary*

ISO 80000-1, *Quantities and units — Part 1: General*

ISO 80000-2, *Quantities and units — Part 2: Mathematical signs and symbols to be used in the natural sciences and technology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 281, ISO 1132-1 and ISO 5593 apply.

4 Symbols for physical quantities

4.1 Principles of the system of symbols

The following principles apply in this International Standard.

— Generally, the principles of the system of symbols shall be in accordance with ISO 80000-1 and ISO 80000-2.

— Symbols for physical quantities used in the field of rolling bearings are defined as quantities in physics. Symbols for dimensionless values such as coefficients, factors and parameters are thus also involved. Mathematical variables, e.g. probability (n), are also included.

— Subscripts of subscripts shall not be adopted; for example the subscript letters "$d$mp" of $V_{d\mathrm{mp}}$ shall be reproduced in the same point size. The form $V_{d_{\mathrm{mp}}}$ should not be used (see Figure 1).

— Superscripts shall not be used.

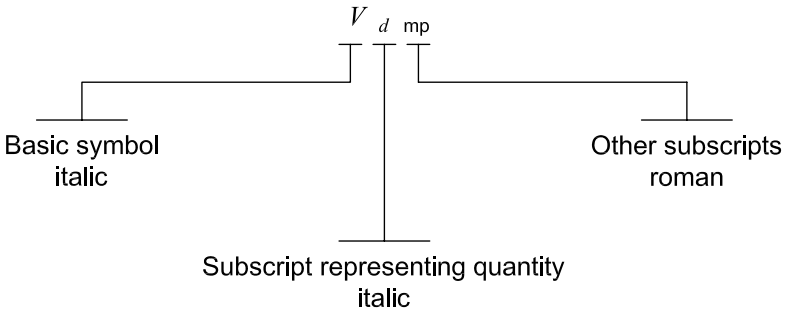

Figure 1 — Principle of symbols

4.2 Symbols — Composition

The symbols for physical quantities shall be shown as basic symbols, which are single letters from the Latin or Greek alphabet, or basic symbols with subscripts, composed of one or more letters of the accepted Latin or Greek alphabet or Arabic numerals. They shall not be followed by a full stop.

4.3 Basic symbols

Basic symbols represent physical quantities and may sometimes represent different physical quantities. The typical basic symbols are shown in Table 1.

4.4 Subscripts

Subscripts appended to a basic symbol modify the basic physical quantity with respect to properties, feature, numbering, etc. The subscripts used are shown in Table 2. Subscripts representing physical quantities have the same typography as the basic symbols (e.g. $V_{\underline{d}\mathrm{mp}}$, $\Delta_{\underline{d}\mathrm{s}}$).

4.5 Style of printing/reproduction of symbols

Basic symbols shall be printed/reproduced in italic (sloping) typeface with serifs. Subscripts representing physical quantities shall be printed/reproduced in italic typeface with serifs. Subscripts representing numbers and other symbols shall be printed/reproduced in roman (upright) typeface, e.g. e (with respect to outer ring), r (radial), d (with respect to bore). All subscript characters shall be of the same point size.

EXAMPLE 1 In $V_{d\mathrm{mp}}$ (variation of mean bore diameter), subscript "d" represents "bore diameter" and is printed/reproduced in italic typeface. Subscripts "m" representing "mean" and "p" representing "in a single plane" are printed/reproduced in roman typeface. The subscript characters have the same point size.

EXAMPLE 2 In S_{d} (perpendicularity of inner ring face with respect to the bore), "d" represents "per bore surface" and is reproduced/printed in roman typeface.

5 Classification of symbols for physical quantities

Symbols are classified as follows in Tables 3 to 10:

— dimensions and features for bearings, rings and washers (see Table 3);

— dimensions and tolerances for bearings, rings and washers (see Table 4);

— running accuracy for bearings, rings and washers (see Table 5);

— dimensions and tolerances for subunits (see Table 6);

— dimensions and tolerances for rolling elements (see Table 7);

— dimensions for shafts and housings (see Table 8);

— bearing loads and load ratings (see Table 9);

— bearing life (see Table 10).

6 Definitions of physical quantities

Definitions of physical quantities shall be in accordance with ISO 5593 and ISO 1132-1; in certain cases, definitions of physical quantities shall conform to other relevant International Standards concerning rolling bearings.

7 Use of square brackets

If two closely related physical quantities in Tables 3 to 10 are defined by the same text, apart from a few words, the physical quantities and their descriptions shall be grouped in a single entry. The words that are substituted for those which precede them in order to obtain the different meanings shall be placed in square brackets, i.e. “[ ]”.

8 Presentation of symbols for physical quantities

The symbols used in the field of rolling bearings are presented in Tables 1 to 10.

Table 1 — Basic symbols

Property	Basic symbol	Physical quantity
Dimension	A	width of housing
	B	width
		height of shaft washer
	C	width of outer ring
		height of housing washer
	D	outside diameter
		diameter of outer ring or housing washer except diameter of raceway
		diameter of bearing seat
	d	bore diameter
		diameter of inner ring or shaft washer except diameter of raceway
	E	diameter of raceway for outer ring
	F	diameter of raceway for inner ring
	G	designation of a screw thread
	H	eccentricity
		centre height of housing
	J	centre distance between bolt holes
	L	length of housing or roller
	l	length of screw thread
	N	dimension of bolt hole
	r	chamfer dimension
		(groove) radius
	s	(washer) thickness
	T	(assembled) width
		height
Tolerance and running accuracy	K	radial runout
		variation in thickness
	S	axial runout
		variation in thickness (thrust bearing)
	V	variation of dimension
	Δ	deviation from nominal dimension
Load and life	C	load rating
	F	bearing load
	L	life
	P	equivalent load
	Q	load on rolling element
Others	G	internal clearance
	i	number of rows of rolling elements
	Z	number of rolling elements per row
	α	contact angle or angle of taper

Table 2 — Subscripts

Property	Subscript	Definition
General	e	effective
	m	arithmetical mean
	max	maximum or greatest limit
	min	minimum or least limit
	p	plane in which measurement is made
	s	single or actual
	0	static (zero)
Direction	a	axial
	r	radial
Part or feature	a	assembled
	a, b, c, . . .	identification symbol where there is more than one diameter applied to closely associated parts (e.g. shaft, housing, spacer, collar)
	c	cage
	D	per outside surface
	d	per bore surface
	e	outer ring or housing washer
	i	inner ring or shaft washer
	w	rolling element
	1, 2, 3, . . .	identification number where there is more than one diameter, width or height, applied to primarily associated parts (e.g. aligning housing ring, aligning seat washer, locating snap ring and loose rib)
Life	a	adjusted
	h	time, hours
	m	modified
	n	probability of failure, related to (100 – n) % reliability
	10	90 % reliability ($n = 10$)
	50	50 % reliability ($n = 50$)
Others	L	lot or gauge lot

NOTE For subscripts, see 4.4.