INTERNATIONAL STANDARD

ISO
4378-4

Second edition
2009-09-01

Plain bearings — Terms, definitions, classification and symbols —

Part 4:
Basic symbols

Paliers lisses — Termes, définitions, classification et symboles —

Partie 4: Symboles de base

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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 4378-4 was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 6, *Terms and common items*.

This second edition cancels and replaces the first edition (ISO 4378-4:1997) and ISO 7904-1:1995, which have been technically revised.

ISO 4378 consists of the following parts, under the general title *Plain bearings — Terms, definitions, classification and symbols*:

— *Part 1: Design, bearing materials and their properties*

— *Part 2: Friction and wear*

— *Part 3: Lubrication*

— *Part 4: Basic symbols*

— *Part 5: Application of symbols*

Introduction

As there is a large number of multiple designations in the domain of plain bearings, there is a considerable risk of error in the interpretation of standards and technical literature. This uncertainty leads to the continuous addition of supplementary designations, which only serves to increase the misunderstanding.

This part of ISO 4378 is an attempt to elaborate a uniform basic system of symbols.

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Plain bearings — Terms, definitions, classification and symbols —

Part 4:
Basic symbols

1 Scope

This part of ISO 4378 defines basic symbols for use in the field of plain bearings. Additional signs are also defined for use as superscripts and subscripts.

The characters employed are drawn from the Latin and Greek alphabets, Arabic numerals and other signs, for example points, commas, horizontal lines or asterisks. In the simplest case, an application symbol consists of the basic character alone; in the most complex, of the basic character with subscripts and superscripts (additional signs).

For the purposes of international applicability, all basic symbols and additional signs have been derived from English words, and designations used in technical literature up to now have been adopted as far as possible. Wide conformity of the symbols for all types of plain bearings has been attempted.

This classification is established for use in calculations and technological and geometrical determinations, as well as in the quality assurance of plain bearings.

Quantities having a fixed value for a certain construction are designated by capital letters, where possible. Depending on the special field of application, the basic characters specified are for stand-alone use or appropriately combined with additional signs, where necessary, to minimize the risk of confusion; multiple designations can be avoided by suitable indexing with additional signs.

2 Normative references

The following referenced documents are indispensable for the application 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 4378-5, *Plain bearings — Terms, definitions, classification and symbols — Part 5: Application of symbols*

3 Basic characters

Basic characters consist of one or, in exceptional cases, two capital or lower-case letters.

Variables shall be in italic typeface, abbreviations shall be in Roman typeface.

EXAMPLE N = rotational speed, VG = Viscosity Grade.

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4 Additional signs

4.1 Subscripts

Subscripts may consist of one, two or three letters, digits or letter/digit combinations. In general, the first letter of a subscript corresponds to the first letter of the English concept, which is referred to by the subscript. Subsequent letters shall also follow this concept. The expressions used should be as short as possible.

When the signs correspond to a variable, they shall be in italic typeface; when they refer to an abbreviation, they shall be in Roman typeface.

EXAMPLE   c = circular, cr = critical, cal = calculated.

If subscripts are combined, they shall be separated by means of commas but without a space between. For example, the permissible minimum lubricant film thickness at the transition to mixed friction would then be designated as $h_{\mathrm{lim,tr}}$. As such expressions are rather awkward, use of substitute expressions in these cases is also permitted, such as one single letter or (better still) one digit as subscript which has not yet been used, e.g. h_1 instead of $h_{\mathrm{lim,tr}}$.

4.2 Superscripts

Superscripts shall consist of points, lines, commas, asterisks or other characteristic signs. A maximum of two superscripts are permitted per letter symbol.

EXAMPLE $\bar{u}^{*}$

5 Application and distinction by means of basic characters, subscripts and superscripts

Angles and directions of rotation are defined positively as rotating in a left-hand (anticlockwise) direction; the same applies to rotational frequencies and peripheral and angular velocities.

A parameter is represented by the basic character with an asterisk (*), e.g. F^* for the bearing force parameter. If the bearing force parameter of a journal bearing is to be distinguished from that of a thrust bearing, this can be done using the designation F_{r}^* or F_{ax}^*. However, if several different bearing force parameters are used, they can be distinguished in the relevant standard or publication by appropriate subscripts, e.g. 1, 2, 3.

6 Symbols and terms

6.1 General

The following listings are not necessarily complete. They may be enlarged, if necessary.

NOTE   Some letters of the Roman and Greek alphabet have not yet been used. Nevertheless, for the sake of completeness, these letters are also included below.

6.2 Basic characters of the Roman alphabet

The basic characters of the Roman alphabet include the following:

A area, elongation at fracture

a distance, acceleration, thermal diffusivity, inertia factor

B width parallel to the sliding surface, normal to the direction of motion (breadth);

b width parallel to the sliding surface, normal to the direction of motion or flow (breadth);

C clearance, circumference, chamfer, concentration

c specific heat capacity, stiffness

D diameter

d diameter, distance, depth, damping

E Young's modulus (modulus of elasticity)

e eccentricity (distance between the centre points or the centre axes of two shaped elements)

F force, load, load-carrying capacity

f friction factor (coefficient of friction), deflection, function, frequency

G shear modulus

g acceleration due to gravity

H height, hardness

h height, depth, thickness, gap

I geometrical moment of inertia

i $\sqrt{-1}$

J mass moment of inertia

j $\sqrt{-1}$

K coefficient, constant, factor, parameter, auxiliary variable

k heat transition coefficient

L length; length parallel to the sliding surface, in the direction of motion

l length, length in the circumferential direction or in the direction of flow, exponent

M moment, mixing factor

m mass, preload

N rotational speed (rotational frequency) (revolutions per time unit)

Nu Nusselt number

n number

O   point of origin, centre, centreline, order of magnitude

o N/A

P power, heat flow