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Rolling bearings — Parts library — Reference dictionary for rolling bearings

Roulements — Bibliothèque de composants — Dictionnaire de référence des roulements

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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 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*.

This first edition cancels and replaces ISO/TS 23768-1:2011, which has been technically revised.

The main changes are as follows:

— the part number of this document has been deleted as no further parts will be being developed;

— the scope has been clarified to clearly state that linear motion rolling bearings and spherical plain bearings are out of the scope;

— this document has been made compatible with ISO 13584-42:2010;

— this document has been aligned with the classes and properties with ISO 21107:2015;

— some figures have been updated.

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

Rolling bearing data consist of entities of the rolling bearing application domain together with their descriptive properties and domains of values. Descriptive properties specified by this document include, but are not limited to, geometrical and dimensional data, identification and designation data, miscellaneous and spare part data, and material data.

Each entity, property or domain of values defines an entry of the rolling bearing reference dictionary. The rolling bearing reference dictionary constitutes the formal and computer-sensible representation of the rolling bearing data. Each rolling bearing datum is associated with a computer-sensible and human-readable definition, and with a computer-sensible identification. Identification of a dictionary entry allows for unambiguous reference from any application. Definitions and identifications of dictionary entries consist of instances of the EXPRESS entity data types defined in the common dictionary schema, resulting from a joint effort between ISO/TC 184/SC 4/WG 2 and IEC SC 3D, or in its extensions defined in the logical series of parts of ISO 13584.

This document is intended for use, among others, by manufacturers, rolling bearing vendors or producers, and developers of manufacturing software. This document is intended to allow or improve several capabilities, including:

— the provision of a common set of definitions for use in describing rolling bearings,

— the integration and sharing of rolling bearing data between software applications,

— the direct import of vendor rolling bearing data into customer databases or applications, and

— a reduction of the level of effort required for manufacturers to maintain accurate and current rolling bearing information from multiple sources and for multiple applications.

Some of the definitions of classes and properties of rolling bearings are taken from International Standards on rolling bearings and from Reference [12].

Rolling bearings — Parts library — Reference dictionary for rolling bearings

1 Scope

This document establishes the means to achieve an electronic representation of rolling bearing data by providing a reference dictionary needed to describe various data about rolling bearings together with their descriptive properties and domains of values in various International Standards relevant to rolling bearings.

This document is intended to facilitate the use, manipulation and exchange of rolling bearing data, for example, manufacturing, distribution and usage.

This document specifies a reference dictionary that contains:

— a definition of a general class of bearings intended to be further extended by reference dictionaries specifying bearings in other International Standards;

— definitions and identifications of the classes of rolling bearings as they are described in the various International Standards relevant to rolling bearings, with associated classification scheme;

— definitions and identifications of data element types that represent properties of rolling bearings;

— definitions and identifications of domains of values that prove useful for describing the above-mentioned data element types.

Each class, property or domain of values of this application domain constitutes an entry of the reference dictionary defined in this document. It is associated with a computer-sensible and a human-readable definition, and with a computer-sensible identification. Identification of a dictionary entry allows for unambiguous reference from any application.

Definitions and identifications of dictionary entries are defined by means of standard data, which consist of instances of the EXPRESS entity data types defined in the common dictionary schema and in their extensions defined in ISO 13584-25.

Identification dictionary is given in Annex A.

The following are within the scope of this document:

— standard data that represent the classes of rolling bearings;

— standard data that represent the properties of rolling bearings;

— standard data that represent domains of values used for properties of rolling bearings.

The following are outside of the scope of this document:

— methodology for structuring parts families used for specifying standard data defined in this document;

— an implementation method by which the standard data defined in this document can be exchanged.

NOTE 1 The structure of the physical file used for exchanging the standard data defined in this document is specified in ISO 10303-21.

NOTE 2 The physical file used for exchanging the standard data is compliant with ISO 13584-42:2010.

NOTE 3 It is intended to provide an OntoML-based (XML) representation of the standard data when ISO 13584-32 (OntoML) is published.

This document does not establish the reference dictionaries for linear motion rolling bearings and spherical plain bearings.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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/IEC Guide 77-2, *Guide for specification of product properties and classes — Part 2: Technical principles and guidance*

ISO 286-1, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 1: Basis of tolerances, deviations and fits*

ISO 1998-1, *Petroleum industry — Terminology — Part 1: Raw materials and products*

ISO 3096, *Rolling bearings — Needle rollers — Boundary dimensions, geometrical product specifications (GPS) and tolerance values*

ISO 5593, *Rolling bearings — Vocabulary*

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 1: Specification of basic notation*

ISO 10303-1, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles*

ISO 10303-11, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual*

ISO 13584-1, *Industrial automation systems and integration — Parts library — Part 1: Overview and fundamental principles*

ISO 13584-42:2010, *Industrial automation systems and integration — Parts library — Part 42: Description methodology: Methodology for structuring parts families*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC Guide 77-2, ISO 286-1, ISO 1998-1, ISO 3096, ISO 5593, ISO 10303-1, ISO 10303-11, ISO 13584-1, ISO 13584-42 and the following 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/

3.1.1
abstract class
ABS
class (3.1.6) of which all members are also members of one of its *subclasses* (3.1.37)

[SOURCE: ISO 13584-42:2010, 3.1, modified — the abbreviation has been added and Notes 1, 2 and 3 to entries have been deleted.]

3.1.2
applicable property of a class
AP
applicable *property* (3.1.34) necessarily possessed by each *part* (3.1.28) that is a member of a *characterization class* (3.1.32)

EXAMPLE For a roller bearing *generic family of parts* (3.1.21), the bore diameter is an applicable property: this characteristic applies to any bearing.

[SOURCE: ISO 13584-42:2010, 3.2, modified — the abbreviation and the example have been added, and Notes 1, 2, 3, 4 and 5 to entries have been deleted.]

3.1.3
attribute
data (3.1.10) element for the computer-sensible description of a *property* (3.1.34), a relation or a *class* (3.1.6)

[SOURCE: ISO 13584-42:2010, 3.3, modified — the example and Note 1 to entry have been deleted.]

3.1.4
basic semantic unit
BSU
entity (3.1.18) that provides an absolute and universally unique identification of a certain object of the application domain that is represented as a *dictionary element* (3.1.16)

[SOURCE: ISO 13584-42:2010, 3.4, modified — the abbreviation has been added, and the examples and Note 1 to entry have been deleted.]

3.1.6
class
abstraction of a set of similar *products* (3.1.30)

[SOURCE: ISO 13584-42:2010, 3.6, modified — the example and Notes 1, 2, 3, 4 and 5 to entries have been deleted.]

3.1.7
class inclusion relationship
relationship between *classes* (3.1.6) that means inclusion of *class members* (3.1.8): if A is a *superclass* (3.1.38) of A1 this means that, in any context, any member of A1 is also member of A

[SOURCE: ISO 13584-42:2010, 3.7, modified — Examples 1 and 2, and Notes 1, 2, 3 and 4 to entries have been deleted.]

3.1.8
class member
product (3.1.30) that complies with the abstraction defined by a *class* (3.1.6)

[SOURCE: ISO 13584-42:2010, 3.8]

3.1.9
common ISO 13584/IEC 61360 dictionary model
data (3.1.10) model for *product ontology* (3.1.33), using the information modelling language EXPRESS, resulting from a joint effort between ISO TC 184/SC 4/WG 2 and IEC SC 3D

Note 1 to entry: The common *dictionary* (3.1.14) schema is specified in IEC 61360-2 and its content is provided in ISO 13584-42:2010, Annex D.

[SOURCE: IEC 61360-2,2012 3.10, modified — the reference "ISO 13584-42:1998" has been replaced with "ISO 13584-42:2010" in Note 1 to entry.]

3.1.10
data
representation of information in a formal manner suitable for communication, interpretation, or processing by human beings or computers

[SOURCE: ISO 10303-1:2021, 3.1.29]

3.1.11
data element type
DET
unit of *data* (3.1.10) for which the identification, the description and value representation have been specified

[SOURCE: ISO 13584-42:2010, 3.13, modified — the abbreviation has been added and Note 1 to entry has been deleted.]

3.1.13
data type
DT
domain of values

[SOURCE: ISO 10303-11:2004, 3.3.5, modified — the abbreviation has been added.]

3.1.14
dictionary
table consisting of a series of entries

Note 1 to entry: One meaning corresponds to each entry in the dictionary and one dictionary entry identifies one single meaning.

Note 2 to entry: In the ISO 13584 series, a dictionary is the formal and computer-sensible representation of an ontology.

Note 3 to entry: In the ISO 13584 series, the kinds of meaning intended to constitute dictionary entries are

— supplier,

— *class* (3.1.6),

— *property* (3.1.34),

— program library,

— type,

— table, and

— document.

Note 4 to entry: In the ISO 13584 series, the information that represents a dictionary entry is split into three entities:

— a **basic_semantic_unit** (BSU), that provides for reference,

— a **dictionary_element** that describes the dictionary entry by means of attributes, and

— possibly, a **content_item** *entity* (3.1.18) that describes the dictionary entry by describing its content.

Note 5 to entry: The link available in Annex E shall be used to access the official version of the reference dictionary for rolling bearings.

[SOURCE: ISO 13584-1:2001, 3.1.2, modified — Notes 2, 3, 4 and 5 to entry have been added.]

3.1.16
dictionary element
set of *attributes* (3.1.3) that constitutes the *dictionary* (3.1.14) description of certain objects of the application domain

EXAMPLE *Classes* (3.1.6), *data* (3.1.10) element types.

[SOURCE: ISO 13584-42:2010, 3.15, modified — Example 1 has been replaced and Example 2 has been deleted.]

3.1.17
dictionary identification
unique character string that identifies the *dictionary* (3.1.14)

Note 1 to entry: The reference dictionary for rolling bearings given in Annex A shall be referred to.

3.1.18
entity
class (3.1.6) of information defined by common properties

[SOURCE: ISO 10303-11:2004, 3.3.6]

3.1.19
entity data type
representation of an *entity* (3.1.18)

Note 1 to entry: An entity *data type* (3.1.13) establishes a domain of values defined by common *attributes* (3.1.3) and constraints.

[SOURCE: ISO 10303-11:2004, 3.3.7]

3.1.20
feature
aspect of a *product* (3.1.30) that can be described by a *characterization class* (3.1.32) and a set of property-value pairs

[SOURCE: ISO 13584-42:2010, 3.17, modified — Notes 1, 2 and 3 to entries and Examples 1 and 2 have been deleted.]

3.1.21
generic family of parts
grouping of simple or generic *parts* (3.1.28) done for purposes of classification or for factoring common information

3.1.22
implementation method
technique used by computers to exchange *data* (3.1.10) that is described using the EXPRESS data specification language

3.1.23
is-a relationship
class inclusion relationship (3.1.7) associated with inheritance: if A1 is-a A, then each *product* (3.1.30) belonging to A1 belongs to A, and all what is described in the context of A is automatically duplicated in the context of A1

[SOURCE: ISO 13584-42:2010, 3.23, modified — Notes 1 and 2 to entries have been deleted.]

3.1.24
is-case-of relationship
property (3.1.34) importation mechanism: if A1 is case-of A, then the definition of A *products* (3.1.30) also covers A1 products, thus A1 can import any property from A

[SOURCE: ISO 13584-42:2010, 3.24, modified — Notes 1, 2, 3 and 4 to entries have been deleted.]

3.1.25
item
thing that can be characterized by means of a *characterization class* (3.1.32) to which it belongs and a set of *property* (3.1.34) value pairs

Note 1 to entry: This definition supersedes the definition given in ISO 13584-24:2003, that was the following: “a thing that can be captured by a class structure and a set of properties”.

Note 2 to entry: In ISO 13584 (all parts), both products and *features* (3.1.20) of products that correspond to composite properties are items.

[SOURCE: ISO 13584-42:2010, 3.25]

3.1.26
leaf characterization class
characterization class (3.1.32) that is not further subdivided into more precise characterization classes

[SOURCE: ISO 13584-42:2010, 3.26, modified — "specialized" has been replaced with "subdivided" in the definition and the example has been deleted.]

3.1.27
non-leaf characterization class
characterization class (3.1.32) that is further subdivided into more precise characterization classes

[SOURCE: ISO 13584-42:2010, 3.27, modified — "specialized" has been replaced with "subdivided" in the definition and the example has been deleted.]

3.1.28
part
material or functional element that is intended to constitute a component of different *products* (3.1.30)

[SOURCE: ISO 13584-1:2001, 3.1.16]

3.1.29
parts library
computer-sensible *product ontology* (3.1.33) and computer-sensible description of a set of *products* (3.1.30) by means of references to this ontology

[SOURCE: ISO 13584-42:2010, 3.30, modified — Note 1 to entry has been deleted.]

3.1.30
product
thing or substance produced by a natural or artificial process

[SOURCE: ISO 13584-42:2010, 3.31, modified — Note 1 to entry has been deleted.]

3.1.31
product categorization
part categorization
categorization
recursive partition of a set of products into subsets for a specific purpose

[SOURCE: ISO 13584-42:2010, 3.32, modified — the example and Notes 1, 2, 3, 4 and 5 to entries have been deleted.]

3.1.32
characterization class
product characterization class
part characterization class
class (3.1.6) of products that fulfil the same function and that share common properties

[SOURCE: ISO 13584-42:2010, 3.35, modified — the example and Note 1 to entry has been deleted.]

3.1.33
product ontology
part ontology
ontology
model of product knowledge, done by a formal and consensual representation of the concepts of a product domain in terms of identified *characterization classes* (3.1.32), of *class* (3.1.6) relations and of identified properties

[SOURCE: ISO 13584-42:2010, 3.36, modified — the example and Notes 1, 2, 3, 4, 5, 6 and 7 to entries have been deleted.]

3.1.34
property
defined parameter suitable for the description and differentiation of products

[SOURCE: ISO 13584-42:2010, 3.37, modified — Notes 1, 2, 3, 4 and 5 to entries have been deleted.]

3.1.35
property data type
allowed set of values of a *property* (3.1.34)

[SOURCE: ISO 13584-42:2010, 3.38]

3.1.36
visible property
property (3.1.34) that has a definition meaningful in the scope of a given *characterization class* (3.1.32), but that does not necessarily apply to the various products belonging to this *class* (3.1.6)

EXAMPLE For a generic family of bearings, contact angle is a visible property: it is clearly defined for any rolling bearing, but only thrust angular contact ball bearing, angular contact ball bearing or tapered roller bearing have a value for this property. Contact angle would then be a visible (it has a clear meaning for all the rolling bearings) and applicable (it may be used to describe any kind of rolling bearing) property.

Note 1 to entry: The code of the *class* (3.1.6) where a property is defined as visible is *part* (3.1.28) of the identification of the *data element type* (3.1.11) that represents this property.

[SOURCE: ISO 13584-42:2010, 3.46, modified — the example and Note 1 to entry have been modified, and Notes 2, 3, 4 and 5 to entries have been deleted.]

3.1.37
subclass
class (3.1.6) that is one step below another class in a class inclusion hierarchy

[SOURCE: ISO 13584-42:2010, 3.43]

3.1.38
superclass
class (3.1.6) that is one step above another class in class inclusion hierarchy

Note 1 to entry: In the *common ISO 13584/IEC 61360 dictionary model* (3.1.9), a class has at most one superclass specified by means of an *is-a relationship* (3.1.23).

[SOURCE: ISO 13584-42:2010, 3.44, modified — Note 1 to entry has been deleted.]

3.2 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

AP Applicable property

BSU Basic semantic unit

CD Class definition

CST Constraints

DC Definition class

DCR Date of current revision

DCV Date of current version

DER Derived value

DET Data element type

DOD Date of original definition

DT Data type

PLS Preferred letter symbol

SDD Source document of definition

VF Value format

4 Representation of ontology concepts as dictionary entries

4.1 Identification of data element type

In order to identify a data element type uniquely within the ISO/TS 23768 reference dictionaries and for electronic information exchange, a language-independent combination of characters as described in Annex C and Annex D shall be used.

4.2 Bearing classes

4.2.1 Modelled classes

The bearing class is classified in a single subclass in this document (see Figure 1): rolling bearing.

NOTE The role of this classification level allows for the extension of the bearing reference dictionary by adding other subclasses to the bearing class.

The classification of rolling bearings shall correspond to the classification provided in Annex B.

EXAMPLE The bearing reference dictionary does not represent plain bearings. It can be extended by creating a new subclass of the bearing class.

The rolling bearing class is classified into the following eight subclasses (see Figure 1):

— ball bearing;

— roller bearing;

— combined bearing;

— insert bearing, unit housing and accessory;

— rolling bearing part;

— bearing housing element;

— bearing accessory;

— track roller.

All modelled classes defined in this document are shown in Annex C.

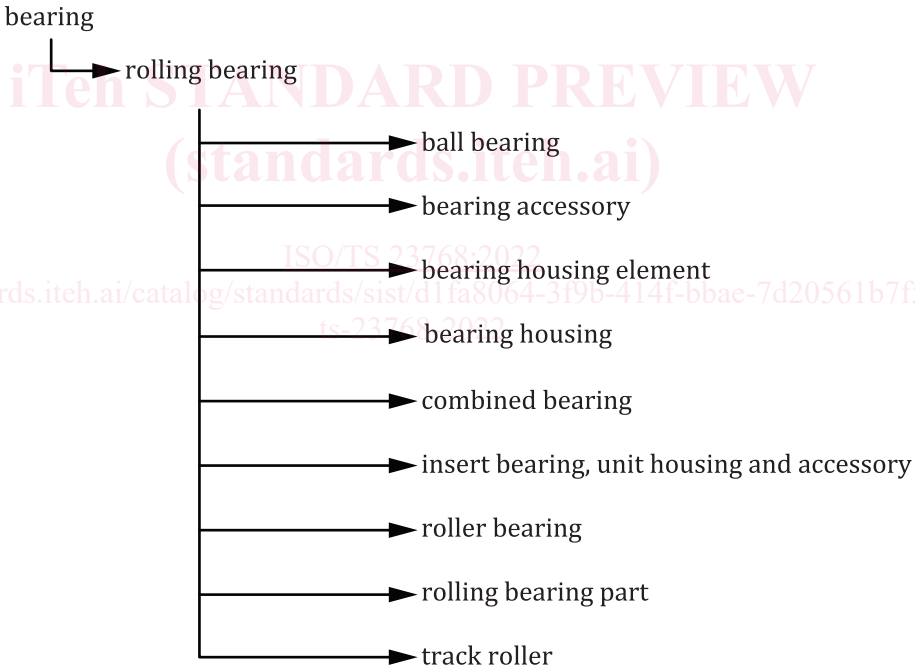

Figure 1 — Subclasses of the bearing and the rolling bearing classes in this document

4.2.1.1 Class constructor

The **categorization_class** and the **item_class** classes specified in **ISO13584_IEC61360_dictionary_schema** are used for describing the rolling bearing data dictionary defined in this document (see Figure 2).

NOTE 1 Words in bold letters and words linked with possible underscores stand for names given to the items declared in the underlying ISO 13584/IEC 61360 series reference model for describing data dictionaries.