TECHNICAL SPECIFICATION

ISO/TS 23768-1

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Rolling bearings — Parts library —

Part 1: Reference dictionary for rolling bearings

Roulements — Bibliothèque de composants —

Partie 1: 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.

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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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 23768-1 was prepared by Technical Committee ISO/TC 4, *Rolling bearings*.

ISO 23768 consists of the following parts, under the general title *Rolling bearings — Parts library*:

— *Part 1: Reference dictionary for rolling bearings* [Technical Specification]

The intent is that a reference dictionary for linear motion rolling bearings will form the subject of a part 2 and a reference dictionary for spherical plain bearings will form the subject of a part 3.

Introduction

This part of ISO 23768 defines the means to achieve an electronic representation of rolling bearing data by providing a reference dictionary needed to describe various data about rolling bearings. This part of ISO 23768 is intended to facilitate the use, manipulation and exchange of rolling bearing data for manufacturing, distribution and usage.

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 part of ISO 23768 include, but are not limited to, geometrical and dimensional data, identification and designation data, miscellaneous and spare part data, 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 part of ISO 23768 is intended for use, among others, by manufacturers, rolling bearing vendors or producers, and developers of manufacturing software. This part of ISO 23768 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,

— 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 [11].

Rolling bearings — Parts library —

Part 1:
Reference dictionary for rolling bearings

1 Scope

This part of ISO 23768 specifies a reference dictionary for all rolling bearings described in the various International Standards relevant to rolling bearings, together with their descriptive properties and domains of values.

This part of ISO 23768 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 part of ISO 23768. 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, resulting from a joint effort between ISO/TC 184/SC 4/WG 2 and IEC SC 3D, and in their extensions defined in ISO 13584-24 and ISO 13584-25.

The following are within the scope of this part of ISO 23768:

— 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 part of ISO 23768:

— methodology for structuring parts families used for specifying standard data defined in this part of ISO 23768;

— an implementation method by which the standard data defined in this part of ISO 23768 can be exchanged.

NOTE 1 The structure of the physical file used for exchanging the standard data defined in this part of ISO 23768 is specified in ISO 10303-21. This physical file containing all the standard data for rolling bearings is also provided as Annex E.

NOTE 2 The physical file used for exchanging the standard data is compliant with ISO 13584-42:1998.

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

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 199, *Rolling bearings — Thrust bearings — Tolerances*

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

ISO 492, *Rolling bearings — Radial bearings — Tolerances*

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

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

ISO 3096, *Rolling bearings — Needle rollers — Dimensions and tolerances*

ISO 4378-1, *Plain bearings — Terms, definitions, classification and symbols — Part 1: Design, bearing materials and their properties*

ISO 5593:1997, *Rolling bearings — Vocabulary*

ISO 7063, *Rolling bearings — Needle roller bearing track rollers — Boundary dimensions and tolerances*

ISO 9628, *Rolling bearings — Insert bearings and eccentric locking collars — Boundary dimensions and tolerances*

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 10303-21, *Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation methods: Clear text encoding of the exchange structure*

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

ISO 13584-24, *Industrial automation systems and integration — Parts library — Part 24: Logical resource: Logical model of supplier library*

ISO 13584-25, *Industrial automation systems and integration — Parts library — Part 25: Logical resource: Logical model of supplier library with aggregate values and explicit content*

ISO 13584-42:1998[1)] , *Industrial automation systems and integration — Parts library — Part 42: Description methodology: Methodology for structuring parts families*

ISO 13584-511, *Industrial automation systems and integration — Parts library — Part 511: Mechanical systems and components for general use — Reference dictionary for fasteners*

ISO 21107, *Rolling bearings and spherical plain bearings — Search structure for electronic media — Characteristics and performance criteria identified by attribute vocabulary*

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

ISO/IEC Guide 77-2, *Guide for specification of product properties and classes — Part 2: Technical principles and guidance*

IEC 61360-2, *Standard data element types with associated classification scheme for electric components — Part 2: EXPRESS dictionary schema*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in ISO 286-1, ISO 1998-1, ISO 3096, ISO 4378-1, ISO 5593, ISO 10303-1, ISO 10303-11, ISO 13584-1, ISO 13584-24, ISO 13584-42 and ISO/IEC Guide 77-2 and the following apply.

3.1 Terms and definitions

3.1.1
applicable property
AP
property that is defined for some family of parts and that shall apply to any part that belongs to this family of parts

[ISO 13584-24:2003, definition 3.3.]

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

3.1.2
basic semantic unit
BSU
entity that provides an absolute and universal identification of certain objects of the application domain

EXAMPLE Classes, data element types.

NOTE Adapted from ISO 13584-42:1998, definition 3.4.1.

3.1.3
characteristic of a part
part characteristic
constant property, characteristic of a part, of which the value is fixed once the part is defined

[ISO 13584-24:2003, definition 3.12]

NOTE Changing the value of a characteristic of a part means changing the part.

EXAMPLE For a rolling bearing, the bore diameter and the outside diameter are part characteristics.

1) Withdrawn. (Replaced by ISO 13584-42:2010)

3.1.4
categorization class
class of products that constitutes an element of a categorization

EXAMPLE *Rolling bearing part* and *bearing housing element* are examples of product categorization class defined in this part of ISO 23768.

NOTE There is no property associated with a categorization class.

3.1.5
common dictionary schema
information model for a dictionary, using the EXPRESS modelling language, resulting from a joint effort between ISO TC 184/SC 4/WG 2 and IEC SC 3D

NOTE 1 Adapted from ISO 13584-42:1998, definition 3.4.3.

NOTE 2 The common dictionary schema is specified in IEC 61360-2, and its content is provided in Annex D of ISO 13584-42:1998.

3.1.6
data
representation of information in a formal manner suitable for communication, interpretation, or processing by human beings or computers

[ISO 10303-1:1994, definition 3.2.14]

3.1.7
data element type
DET
unit of data for which the identification, the description and value representation have been specified

[ISO 13584-42:1998, definition 3.4.4]

3.1.8
data exchange
storing, accessing, transferring, and archiving of data

[ISO 10303-1:1994, definition 3.2.15]

3.1.9
data type
DT
domain of values

[ISO 10303-11:2004, definition 3.3.5]

3.1.10
dictionary
table consisting of a series of entries. One meaning corresponds to each entry in the dictionary and one dictionary entry identifies one single meaning

[ISO 13584-1:2001, definition 3.1.2]

NOTE 1 In ISO 13584 (all parts), a dictionary is the formal and computer-sensible representation of an ontology.

NOTE 2 In ISO 13584 (all parts), the kinds of meaning intended to constitute dictionary entries are

— supplier,

— class,

— property,

— program library,

— type,

— table, and

— document.

NOTE 3 In ISO 13584 (all parts), 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 that describes the dictionary entry by describing its content.

3.1.11
dictionary data
set of data that describes hierarchies of families of parts and properties of these parts

[ISO 13584-42:1998, definition 3.4.6]

3.1.12
dictionary element
set of attributes that constitutes the dictionary description of certain objects of the application domain

EXAMPLE Classes, data element types.

NOTE Adapted from ISO 13584-42:1998, definition 3.4.7.

3.1.13
entity
class of information defined by common properties

[ISO 10303-11:2004, definition 3.3.6]

3.1.14
entity data type
representation of an entity

NOTE An entity data type establishes a domain of values defined by common attributes and constraints.

[ISO 10303-11:2004, definition 3.3.7]

3.1.15
entity (data type) instance
named entity data type value

NOTE The name of an entity instance is used for referencing the instance.

[ISO 10303-11:2004, definition 3.3.8]

3.1.16
family of parts
simple or generic family of parts

See ISO 13584-42:1998.

3.1.17
generic family of parts
grouping of simple or generic families of parts done for purposes of classification or for factoring common information

See ISO 13584-42:1998.

3.1.18
implementation method
technique used by computers to exchange data that is described using the EXPRESS data specification language

3.1.19
is-case-of relationship
relationship providing a formal expression of the fact that an object conforms to the partial specification defined by another object

[ISO 13584-24:2003, definition 3.62]

3.1.20
item
thing that can be characterized by means of a characterization class to which it belongs and a set of property value pairs

NOTE 1 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 In ISO 13584 (all parts), both products and features of products that correspond to composite properties are items.

3.1.21
item class
set of items with common properties

See ISO 13584-42:1998.

3.1.22
leaf characterization class
characterization class that is not further subdivided into more precise characterization classes

[ISO/IEC Guide 77-2:2008, definition 2.11]

3.1.23
library integrated information model
LIIM
EXPRESS schema that integrates resource constructs from different EXPRESS schemas for representing supplier libraries for the purpose of exchange and that is associated with conformance requirements

[ISO 13584-24:2003, definition 3.72]

3.1.24
non-leaf characterization class
characterization class that is further subdivided into more precise characterization classes

See ISO/IEC Guide 77-2:2008, definition 2.11.

3.1.25
ontology
explicit and consensual specification of concepts of an application domain independent of any use of these concepts

NOTE In ISO 13584 (all parts), a dictionary is the formal and computer-sensible representation of ontology.

[ISO 13584-511:2006, definition 3.1.20]

3.1.26
part
material or functional element that is intended to constitute a component of different products

[ISO 13584-1:2001, definition 3.1.16]

3.1.27
property
information that may be represented by a data element type

[ISO 13584-42:1998, definition 3.4.10]

3.1.28
simple family of parts
set of parts of which each part may be described by the same group of properties

See ISO 13584-42:1998.

3.1.29
visible property
property that is defined for some families of parts and that may or may not apply to the different parts of this family of parts

See ISO 13584-42:1998.

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 The code of the class where a property is defined as visible is part of the identification of the data element type that represents this property.

3.1.30
standard data
requirement on a software system defined by means of EXPRESS entity (data type) instances that are supposed to be recognized by this software system

[ISO 13584-24:2003, definition 3.99]

3.1.31
superclass
class that is one step above another class in class inclusion hierarchy

NOTE In the common ISO 13584/IEC 61360 dictionary model, a class has at most one superclass specified by means of an *is-a* relationship.

[ISO/IEC Guide 77-2:2008, definition 2.22]

3.2 Abbreviated terms

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

ABS Abstract class

AP Applicable property

BSU Basic semantic unit

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

LIIM Library integrated information model

PLS Preferred letter symbol

PTC Property type classification

SD Simplified drawing

SDD Source document of definition

VF Value format

4 Representation of ontology concepts as dictionary entries

4.1 Bearing classes

4.1.1 Modelled classes

The bearing class is classified in a single subclass in this part of ISO 23768 (see Figure 1): rolling bearing.

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

EXAMPLE The bearing reference dictionary does not represent plain bearings. It may 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 part of ISO 23768 are shown in Annex C.

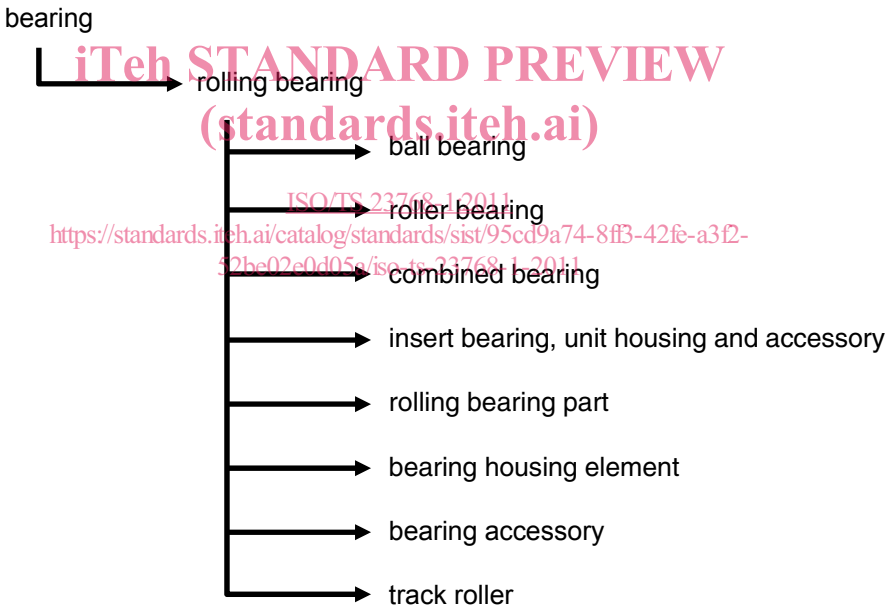

Figure 1 — Subclasses of the bearing and the rolling bearing classes in this part of ISO 23768

4.1.1.1 Class constructor

The **item_class** class specified in **ISO13584_extended_dictionary_schema** is used for describing the rolling bearing data dictionary defined in this part of ISO 23768 (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.