
Cutting tool data representation and exchange —

Part 4: Reference dictionary for adaptive items

*Représentation et échange des données relatives aux outils
coupants —*

*Partie 4: Dictionnaire de référence pour les éléments relatifs aux
attachements*



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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).

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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 29, *Small tools*.

This second edition cancels and replaces the first edition (ISO/TS 13399-4:2007), which has been technically revised.

ISO 13399 consists of the following parts, under the general title *Cutting tool data representation and exchange*:

- *Part 1: Overview, fundamental principles and general information model*
- *Part 2: Reference dictionary for cutting items* [Technical Specification]
- *Part 3: Reference dictionary for tool items* [Technical Specification]
- *Part 4: Reference dictionary for adaptive items* [Technical Specification]
- *Part 5: Reference dictionary for accessory and auxiliary items* [Technical Specification]
- *Part 50: Reference dictionary for reference systems and common concepts* [Technical Specification]
- *Part 60: Reference dictionary for connection systems* [Technical Specification]
- *Part 100: Definitions, principles and methods for reference dictionaries* [Technical Specification]
- *Part 150: Usage guidelines* [Technical Specification]
- *Part 301: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of thread-cutting taps, thread-forming taps and thread-cutting dies* [Technical Specification]
- *Part 302: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of solid drills and countersinking tools* [Technical Specification]

The following parts are under preparation:

- *Part 51: Designation system for customer solution cutting tools*

- *Part 80: Concept for the design of 3D models based on properties according to ISO 13399: Overview and principles* [Technical Specification]
- *Part 201: Concept for the design of 3D models based on properties according to ISO/TS 13399-2: Modelling of regular inserts* [Technical Specification]
- *Part 202: Concept for the design of 3D models based on properties according to ISO/TS 13399-2: Modelling of irregular inserts* [Technical Specification]
- *Part 203: Concept for the design of 3D models based on properties according to ISO/TS 13399-2: Modelling of exchangeable inserts for drilling* [Technical Specification]
- *Part 204: Concept for the design of 3D models based on properties according to ISO/TS 13399-2: Modelling of inserts for reaming* [Technical Specification]
- *Part 303: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of end mills with non-indexable cutting edges* [Technical Specification]
- *Part 304: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of milling cutters with arbor hole and non-indexable cutting edges* [Technical Specification]
- *Part 307: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of end mills for indexable inserts* [Technical Specification]
- *Part 308: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of milling cutter with arbor hole for indexable inserts* [Technical Specification]
- *Part 309: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Tool holders for indexable inserts* [Technical Specification]
- *Part 311: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of solid reamers* [Technical Specification]
- *Part 312: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of reamers for indexable inserts* [Technical Specification]
- *Part 401: Concept for the design of 3D models based on properties according to ISO/TS 13399-4: Modelling of converting, extending and reducing adaptive items* [Technical Specification]
- *Part 405: Concept for the design of 3D models based on properties according to ISO/TS 13399-4: Modelling of collets* [Technical Specification]

Introduction

This part of ISO 13399 defines the terms, properties, and definitions for those portions of a cutting tool that remove material from a workpiece. Cutting items include replaceable inserts, brazed tips, and the cutting portions of solid cutting tools. The purpose of this part of ISO 13399 is to provide a reference dictionary to support the use of the general information model defined in ISO 13399-1.

A cutting tool with defined cutting edges is used on a machine to remove material from a workpiece by a shearing action at the cutting edges of the tool. Cutting tool data that can be described by ISO 13399 (all parts) include, but are not limited to, everything between the workpiece and the machine tool. Information about inserts (e.g. regular and irregular shaped replaceable cutting items), solid tools (e.g. solid drill and solid endmill), assembled tools (e.g. boring bars, indexable drills and indexable milling cutters), adaptors (e.g. milling arbor and drilling chuck), components (e.g. shims, screws and clamps) and their relationships can be represented by ISO 13399. Possible assemblies of the components of a cutting tool are illustrated in [Figure 1](#).

The objective of ISO 13399 (all parts) is to provide the means to represent the information that describes cutting tools in a computer-sensible form that is independent from any particular computer system. The representation will facilitate the processing and exchange of cutting tool data within and between different software systems and computer platforms and support the application of this data in manufacturing planning, cutting operations, and the supply of tools. The nature of this description makes it suitable not only for neutral file exchange but also as a basis for implementing and sharing product databases and for archiving. The methods used for these representations are those developed by ISO/TC 184/SC 4 for the representation of product data by using standardized information models and reference dictionaries.

An information model is a formal specification of types of ideas, facts, and processes which together describe a portion of interest of the real world and which provides an explicit set of interpretation rules. Information is knowledge of ideas, facts, and/or processes. Data are symbols or functions that represent information for processing purposes. Data are interpreted to extract information by using rules for how that should be done and a dictionary to define the terms that identify the data. Everyone in a communication process is expected to use the same information model, the same set of explicit rules and the same dictionary in order to avoid misunderstanding. If an information model and its dictionary are written in a computer-sensible language, then there is the additional benefit that they can be computer processable.

An engineering information model is therefore a specification for data that establishes the meaning of that data in a particular engineering context. A model has to be developed by formal methods to ensure that it meets the needs of the situation that it represents. An engineering information model defines the information objects that represent the concepts in an engineering application, the attributes of the objects, their relationships, and the constraints that add further meaning. An information model is an abstract concept that can be used repeatedly for any example of the real-world situation that it represents. An instance of the model is produced when it is populated with the data items and their values that are applicable to a particular example of that situation.

This part of ISO 13399 uses the following International Standards developed by ISO/TC 184/SC 4:

- the EXPRESS language defined in ISO 10303-11 for defining the information model in ISO 13399-1;
- the file format for data exchange derived from the model and defined in ISO 10303-21;
- the data dictionary defined in the ISO 13584 series.

The ISO 13399 series is intended for use by, among others, tool producers and vendors, manufacturers, and developers of manufacturing software. ISO 13399 provides a common structure for exchanging data about cutting tools with defined cutting edges. ISO 13399 is intended to provide for, or improve, several manufacturing activities, including

- the integration and sharing of data for cutting tools and assemblies between different stages for the manufacturing cycle and between different software applications,

- the direct import of data from cutting tool suppliers into a customer's database, and
- the management of cutting tool information from multiple sources and for multiple applications.

Different companies use different business models that determine their need for the communication of information about their products. For example, one cutting tool manufacturer could regrind its customers' tools while another could allow its customers to do the regrinding and provide the information to enable them to do so. Therefore, the two cutting tool manufacturers could have a different set of cutting tool properties to communicate using the information model and dictionaries provided in ISO 13399.

ISO 13399 defines only the information that could be communicated, but does not specify what information shall be communicated.

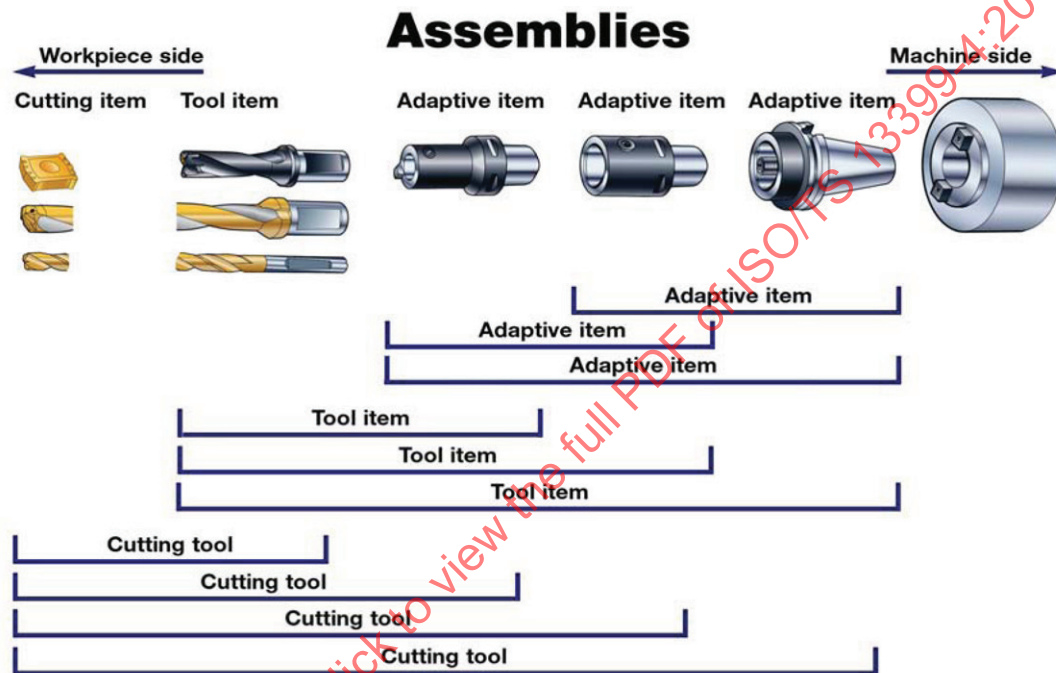


Figure 1 — Possible assemblies of the components of a cutting tool

Since the content of those dictionaries evolves according to industrial innovations and constant improvement of technology in cutting tools, a Maintenance Agency has been established for the purposes of

- correcting errors in the entries of existing classes and properties,
- adding new properties to existing classes,
- adding new classes and their properties,
- managing the status of those properties and classes, and
- migrating the dictionary to subsequent editions of ISO 13399 (all parts).

The secretariat of this Maintenance Agency has been assigned to:

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by the ISO Technical Management Board.

The website of the Maintenance Agency is available at: http://www.unm.fr/main/core.php?pag_id=135

The reference dictionaries are available in the form of EXPRESS files on the website of the Maintenance Agency. These files are considered complementary to this part of ISO 13399; they can be freely downloaded and used for cutting tool data representation and exchange.

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Cutting tool data representation and exchange —

Part 4: Reference dictionary for adaptive items

1 Scope

This part of ISO 13399 specifies a reference dictionary for adaptive items, together with their descriptive properties and domains of values.

This part of ISO 13399 specifies a reference dictionary containing:

- definitions and identifications of the classes of adaptive items, with an associated classification scheme;
- definitions and identifications of the data element types that represents the properties of adaptive items;
- definitions and identifications of domains of values 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 13399. It is associated with a computer-sensible and human-readable definition and with a computer-sensible identification. Identification of a dictionary entry allows unambiguous reference to it from any application that implements the information model defined in ISO 13399-1.

Definitions and identifications of dictionary entries are defined by means of standard data that 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 and IEC SC 3D, and in its extensions defined in ISO 13584-24 and ISO 13584-25.

The following are within the scope of this part of ISO 13399:

- standard data that represent the various classes of adaptive items;
- standard data that represent the various properties of adaptive items;
- standard data that represent domains of values used for properties of adaptive items;
- one implementation method by which the standard data defined in this part of ISO 13399 can be exchanged.

NOTE 1 The implementation method by which the standard data defined in this part of ISO 13399 can be exchanged is specified in ISO 10303-21.

The following are outside the scope of this part of ISO 13399:

- specialized or expert knowledge in the design and use of cutting tools;
- rules to determine what information should be communicated;
- applications where these standard data can be stored or referenced;
- implementation methods other than the one defined in this part of ISO 13399 by which the standard data can be exchanged and referenced;

- information model for cutting tools;
- definitions of classes and properties for cutting items;
- definitions of classes and properties for tool items;
- definitions of classes and properties for assembly items;
- definitions of classes and properties for connection systems;
- definitions of classes and properties for reference systems.

NOTE 2 The information model for cutting tools is defined in ISO 13399-1.

NOTE 3 The definitions of classes and properties for cutting items, tool items, and assembly items are provided in ISO 13399-2, ISO 13399-3, and ISO 13399-5.

NOTE 4 The definitions of classes and properties for connection systems and reference systems are provided in ISO 13399-50.

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/TS 13399-100, *Cutting tool data representation and exchange — Part 100: Definitions, principles and methods for reference dictionaries*

3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO/TS 13399-100 (structure and contents of the dictionary) and the following apply.

NOTE The main collection of the terms and their definitions in the reference dictionary is provided in [Annexes B to D](#).

3.1 applicable property

property that is defined for some family of items and that shall apply to any member of this family

[SOURCE: ISO 13584-24:2003]

3.2 basic semantic unit

entity that provides an absolute and universally unique identification of a certain object of the application domain that is represented as a dictionary element

[SOURCE: ISO 13584-42:2010, 3.4]

3.3 chip

material removed from a workpiece by a cutting process

[SOURCE: ISO/TS 13399-2:2014, 3.3]

3.4**cutting tool**

device or assembly of items for removing material from a workpiece through a shearing action at the defined cutting edge or edges of the device

[SOURCE: ISO 13339-1:2006, 3.1]

Note 1 to entry: A cutting tool could be an assembly of one or more adaptive items, a tool item and several cutting items on a tool item. See [Figure 1](#).

3.5**data**

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

[SOURCE: ISO 10303-1:1994, 3.2.14]

3.6**data element type**

unit of data for which the identification, description, and value representation have been specified

[SOURCE: ISO 13584-42:2010, 3.13]

3.7**data exchange**

storing, accessing, transferring, and archiving of data

[SOURCE: ISO 10303-1:1994, 3.2.15]

3.8**data type**

domain of values

[SOURCE: ISO 10303-11:2004, 3.3.5]

3.9**dictionary**

table consisting of a series of entries with one meaning corresponding to each entry in the dictionary and one dictionary entry identifying a single meaning

[SOURCE: ISO 13584-511:2006, 3.1.9]

Note 1 to entry: In the ISO 13399 series, a dictionary is a formal and computer-sensible representation of ontology.

3.10**entity**

class of information defined by its attributes that establishes a domain of values defined by common attributes and constraints

[SOURCE: ISO/TS 13399-2:2014, 3.10]

3.11**entity data type**

representation of an entity

[SOURCE: ISO/TS 13399-2:2014, 3.11]

3.12**entity instance**

named unit of data that represents a unit of information within the class defined by an entity

Note 1 to entry: An entity instance is a member of the domain established by an entity data type.

[SOURCE: ISO/TS 13399-2:2014, 3.12]

3.13

family of products

set of products represented by the same characterization class

[SOURCE: ISO 13584-42:2010, 3.16]

3.14

implementation method

means for computers to exchange data

[SOURCE: ISO/TS 13399-2:2014, 3.14]

3.15

information

facts, concepts, or instructions

[SOURCE: ISO 10303-1:1994, 3.2.20]

3.16

information model

formal model of a bounded set of facts, concepts, or instructions to meet a specific requirement

[SOURCE: ISO 10303-1:1994, 3.2.21]

3.17

machine side

identification of a direction pointing towards the machine

3.18

machined surface

desired surface produced by the action of the cutting tool

[SOURCE: ISO 3002-1:1982, 3.1.2]

3.19

mirror plane

xz plane in the coordinate axis system

[SOURCE: ISO/TS 13399-50:2013, 5.3.7]

3.20

ontology

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

[SOURCE: ISO 13584-511:2006, 3.1.20]

Note 1 to entry: In the ISO 13399 series, a dictionary is the formal and computer-sensible representation of an ontology.

3.21

primary coordinate system

right-handed rectangular Cartesian coordinate system in three-dimensional space with three principal axes labelled X, Y, and Z

[SOURCE: ISO/TS 13399-50:2013, 5.3.1]

3.22**property**

defined parameter suitable for the description and differentiation of products

[SOURCE: ISO 13584-42:2010, 3.37]

3.23**visible property**

property that has a definition meaningful in the scope of a given characterization class but does not necessarily apply to the various products belonging to this class

[SOURCE: ISO 13584-42:2010, 3.46]

3.24**workpiece**

object on which a cutting action is performed

[SOURCE: ISO/TS 13399-2:2014, 3.24]

3.25**workpiece side**

identification of a direction pointing towards the workpiece

3.26**xy plane**

plane in the coordinate axis system that contains the X and Y axes with the normal of the plane in the positive Z direction

[SOURCE: ISO/TS 13399-50:2013, 5.3.18]

3.27**xyw plane**

plane in the coordinate axis system related to the xy plane by the rotation angle PHI about the X axis in a anticlockwise (counter-clockwise) direction and by a distance located at a distance XYWD from the origin of the coordinate axis system

[SOURCE: ISO/TS 13399-50:2013, 5.3.19]

3.28**xz plane**

plane in the coordinate axis system that contains the X and Z axes with the normal of the plane in the positive Y direction

[SOURCE: ISO/TS 13399-50:2013, 5.3.20]

3.29**xzw plane**

plane in the coordinate system related to the xz plane by the rotation angle KAPPA about the Z axis in a counter clockwise direction and located at a distance XZWD from the origin of the primary coordinate system

[SOURCE: ISO/TS 13399-50:2013, 5.3.21]

3.30**yz plane**

plane in the coordinate system that contains the Y and Z axes with the normal of the plane in the positive X direction

[SOURCE: ISO/TS 13399-50:2013, 5.3.22]

3.31

yzw plane

plane in the coordinate system related to the yz plane by the rotation angle ρ about the Y axis in a counter-clockwise direction and located at a distance YZWD from the origin of the primary coordinate system

[SOURCE: ISO/TS 13399-50:2013, 5.3.23]

Note 1 to entry: The xzw plane, the xyw plane, and the yzw plane are mutually perpendicular.

4 Abbreviated terms

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

BSU basic semantic unit

DET data element type

5 Representation of the ontology concepts as dictionary entries

5.1 General

The generic family of adaptive items is divided into several simple families and classes determined by their main function.

NOTE An adaptive item can have one or more than one function.

In the following subclauses, a concept in the ontology is identified by a name in lower-case characters. The name of a class that represents the concept in the dictionary is identified by bold, lower-case characters with multiple words joined by an underscore character.

EXAMPLE round shape conversion is the name for a function of an adaptive item. **round_shape_conversion** is the identifier of the class in the dictionary that represents the concept.

Some of the definitions of properties that are applicable to adaptive items are defined in terms of a primary coordinate system. The coordinate system is the same for adaptive items, cutting items, and tool items and is defined in ISO/TS 13399-50. The applications of this system to adaptive items are described in this part of ISO 13399.

Each entry in the dictionary, either a class or a property, is identified with a numerical code (BSU) that is generated at random when the dictionary is compiled. A BSU can be made unique by the addition of a code that is a reference to the supplier of the dictionary. Each classified item in the following subclauses is associated with its definition from the dictionary.

The structure of the classification is summarized in [Annex B](#). The complete definitions of the adaptive item classes are provided in [Annex C](#). The properties applicable to adaptive items are defined in [Annex D](#).

5.2 adaptive_item_type

5.2.1 General

Family of objects for the assembly of a cutting tool classified by their main function.

NOTE An adaptive item can have one or more functions.

adaptive_item_type has the following subclasses:

— collet;

- **converter;**
- **driver;**
- **extender;**
- **reducer.**

5.2.2 collet

A **collet** is a segmented band that can be expanded or contracted to grip a shaft.

NOTE 1 This class is for general engineering use and is not specific to cutting tools.

NOTE 2 This class can become an **item_class_case_of** an entry in another dictionary conforming to ISO 13584.

5.2.3 converter

A **converter** is an adaptive item with a different connection type, style, and size on the machine side from the workpiece side.

5.2.4 driver

A **driver** is an adaptive item with the capability to rotate a cutting tool for cutting operations not on the main machine spindle axis.

5.2.5 extender

An **extender** is an adaptive item that increases the length of an assembled cutting tool.

NOTE The adaptive item has the same connection type, style, and size on both the machine side and workpiece side.

5.2.6 reducer

A **reducer** is an adaptive item that diminishes the size of a connection in an assembled cutting tool.

NOTE 1 The adaptive item has the same connection type and style on the machine side and workpiece side.

NOTE 2 The connections on either side of an item must be different in gender, i.e. male and female.

5.3 Reference system for adaptive items

5.3.1 General

The primary coordinate system used for adaptive items in this part of ISO 13399 is defined in ISO/TS 13399-50. The additional reference entities relevant for adaptive items are:

- **prismatic_adaptive_item_position;**
- **round_adaptive_item_position.**

5.3.2 prismatic_adaptive_item_position

A **prismatic_adaptive_item_position** identifies the location of a prismatic adaptive item where:

- the base of the adaptive item shall be coplanar with the XZ-plane;
- the normal for the base of the item shall be in the -Y direction;
- the rear backing surface shall be coplanar with the YZ-plane;

- the normal for the rear backing surface shall be in the –X direction;
- the end of the item shall be coplanar with the XY-plane;
- the normal for the end of the item shall be in the –Z direction;
- if with a bore, then the vector of the bore of the item that points in the Z direction shall also point towards the workpiece side.

NOTE Applicable to right-handed adaptive items. Left-hand items are defined as for right-hand items but mirrored through the YZ-plane.

5.3.3 round_adaptive_item_position

A **round_adaptive_item_position** identifies the location of a round adaptive item where:

- the axis of the adaptive item shall be colinear with the Z axis;
- the vector of the shank that points in the Z direction shall also point towards the workpiece side;
- the drive slots or clamping flats if present shall be parallel with the XZ-plane;
- the contact surface of the coupling, the gauge plane, or the end of the cylindrical shank shall be coplanar with the XY-plane;
- if with a bore, then the vector of the bore of the item that point in the Z direction shall also point towards the workpiece side.

NOTE The conditions listed above apply to right-handed adaptive items. Left-handed adaptive items are defined as for right-handed items but mirrored though the YZ-plane.

6 Properties for adaptive items

The properties of adaptive items are defined in [Annex D](#), where the association of a property with a class is specified. In the compilation of the dictionary, all properties are visible properties at the root class of the dictionary and are made applicable properties at the class level where they apply. The names of properties that can be applicable for adaptive item types, with their identification codes (BSU), are shown in [Table 1](#). The order of names in the table should be read in rows from left to right.

NOTE The BSU can be made unique by the addition of the supplier of the dictionary as a prefix to the identification code.

EXAMPLE The unique BSU for **adaptor clamp** would be: 0112/1///13399__2-71CED04F3300A for version two of the dictionary.

Table 1 — Names of properties for adaptive items

Property name	Identification code (BSU)
adaptor clamp	71CED04F3300A
adaptor tool clamp	71CED04F920EC
adjusting screw protrusion	71EAC0F0EFDB6
balance quality code	71DF151EA5CF1
balanced by design	71EAC0CAB861F
body diameter	71ED6A9AF7D1D
body diameter maximum	71D08462F8185
body half taper angle	71EAC472BD116
body height	71EBB332C60EB

Table 1 (continued)

Property name	Identification code (BSU)
body length	71ED6AA478A3D
body length maximum	71DCD3B16750B
body material code	71DF1523224D8
body taper end length	71EAD6A2BF8DF
body width	71EBB33230236
cartridge size code	71DF1523EE184
clamping force maximum	71CED05149532
clamping length	71EBAF896BE9A
clamping length maximum	71ED6E54B15C4
clamping length minimum	71EBB339ED2BD
clamping width	71EBAF85006BD
connection bore depth	71EAC48CAD407
connection bore diameter	71E01D92C41E8
connection bore diameter maximum	71EBDBF4D0F49
connection bore diameter minimum	71EBDBF49F96C
connection code machine side	71D102AE3B252
connection code workpiece side	71D102AE8A5A9
connection count workpiece side	71EDD2C17746F
connection diameter	71EBDBF5060E6
connection retention knob thread size	71CF298A76B66
connection size code	71FC193318002
connection unit basis	71ED6E16D5978
contact surface diameter machine side	71D087D97FCE3
contact surface diameter workpiece side	71EAC0DD5D650
coolant supply property	71EBB342CC751
damping property	71CED03D70452
data chip provision	71CF29869CA0F
driving key type	71EC5E1ECC776
functional height	71CF29994E737
functional length	71DCD39338974
functional length minimum	71EBC1EB8456A
functional width	71CF29984CDA7
kappa	71ED6E4A7EFBA
keyway property	71DF5C0761888
overall height	71D078EB73E87
overall length	71D078EB7C086
overall width	71CF299257986
phi	71ED6E4AE850B
protruding length	71DCD394BB20E
rho	71ED6E4B254E5
rotational speed maximum	71DF153A691F2

Table 1 (continued)

Property name	Identification code (BSU)
shank diameter	71CF29862B277
shank height	71CF29883E014
shank length	71CF298870946
shank width	71CF298751FCF
side	71EBDBF130AE6
tool changer interference diameter maximum	71CF298A3A99A
tool changer interference length minimum	71CF2989AF0E0
tool style code	71D078FBF6C68
unit system	71EBBA9ED6C0A
usable length	71EBB33490FDA
usable length maximum	71CF2992BDBCC
weight of item	71CED03C97AAB

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Annex A

(normative)

Information object registration

A.1 Document identification

In order to provide for unambiguous identification of an information object in an open system, the object identifier:

{iso technical specification 13399 part (4) version (2)}

is assigned to this part of ISO 13399. The meaning of this value is defined in ISO/IEC 8824-1 and is described in ISO 13584-1.

A.2 Dictionary identification

The dictionary defined in this part of ISO 13399 is assigned the object identifier:

{iso standard 13399 part (4) version (2) object (2) adaptive items (2)}

Annex B (informative)

Classification tables

[Table B.1](#) shows the classification structure of the generic families in the dictionary with an expanded structure for the classes of adaptive item types. The purpose of [Table B.1](#) is to show the relationships between the classes of cutting items and the other classes in the ISO 13399 series.

NOTE [Annex C](#) contains the definition of all the classes that are relevant to adaptive items and definitions of those classes of reference systems that are used in the definition of the properties of adaptive item types.

Table B.1 — Classification tables

Classification structure	Parent	BSU
cutting tool library	Root	71CE7A72B6DA7
adaptive item type	71CE7A72B6DA7	71EAD37F18F34
collet	71EAD37F18F34	726F59BDC3B08
converter	71EAD37F18F34	71EAD3871D313
driver	71EAD37F18F34	71EAD388173EE
extender	71EAD37F18F34	71EEBDADB63BE
reducer	71EAD37F18F34	71EAD385E51A0
adjustment	71CE7A72B6DA7	71ED884159C90
assembly item type	71CE7A72B6DA7	71CE7A795C05C
bolt hole circle	71CE7A72B6DA7	71E02520881F1
connection interface feature	71CE7A72B6DA7	71DF8C37D9115
coolant supply	71CE7A72B6DA7	71DF8C3C065EB
cutting item feature	71CE7A72B6DA7	71DD6C82F72DA
cutting item type	71CE7A72B6DA7	71D1AA6C8FC75
cutting operation	71CE7A72B6DA7	71DFF83D21D50
cutting tool	71CE7A72B6DA7	71CE7A7A5038B
flange	71CE7A72B6DA7	71EC5A767182E
keyway	71CE7A72B6DA7	71DF5C026BCE7
locking mechanism	71CE7A72B6DA7	71EBAB85BB5FA
reference system	71CE7A72B6DA7	71CF2968F7A9E
runout axial	71CE7A72B6DA7	71EDD2B84143C
runout radial	71CE7A72B6DA7	71EDD2B858274
tool item feature	71CE7A72B6DA7	71DD70376771D
tool item type	71CE7A72B6DA7	71E01A004C775
tool thread external	71CE7A72B6DA7	71FC1D22BF4CD
tool thread internal	71CE7A72B6DA7	71FC1D25097D7

Annex C (informative)

Class definitions

The content of this Annex is limited to the classes of adaptive items and the reference systems required defining the properties of these classes.

The layout of the information for each class in this Annex is:

BSU code-version number	Revision number
Preferred name	Short name
Definition	
NOTE	
REMARKS	
Subclasses:	
Properties:	
71EAD37F18F34-002	001
adaptive item type	ait
family of objects for the assembly of a cutting tool classified by their main function	
NOTE	An adaptive item can have one or more functions.
Subclasses:	
726F59BDC3B08-002	collet
71EAD3871D313-002	converter
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71EAD385E51A0-002	reducer
Properties:	
71CED04F3300A-001	adaptor clamp
71CED04F920EC-001	adaptor tool clamp
71DF1523224D8-001	body material code
71D102AE3B252-001	connection code machine side
71D102AE8A5A9-001	connection code workpiece side
71EBDBF5060E6-001	connection diameter
71FC193318002-001	connection size code
71ED6E16D5978-001	connection unit basis

71EBB342CC751-001	coolant supply property
71CF29869CA0F-001	data chip provision
71DCD39338974-001	functional length
71D078EB7C086-002	overall length
71DCD394BB20E-002	protruding length
71DF153A691F2-002	rotational speed maximum
71CF29862B277-001	shank diameter
71EBDBF130AE6-001	side
71D078FBF6C68-001	tool style code
71EBBA9ED6C0A-001	unit system
71CED03C97AAB-001	weight of item

726F59BDC3B08-002 003

collet collet

segmented band that can be expanded or contracted to grip a shaft

NOTE 1 This class is for general engineering use and is not specific to cutting tools.

NOTE 2 This class can become an **item_class_case** of an entry in another dictionary conforming to ISO 13584.

Properties:

71EBDBF4D0F49-001	connection bore diameter maximum
71EBDBF49F96C-001	connection bore diameter minimum
71D102AE3B252-001	connection code machine side
71D102AE8A5A9-001	connection code workpiece side
71EAC4A2B6544-001	taper angle
71CEAEC02FEBD-001	taper gradient

71EAD3871D313-002 001

converter cnvtr

adaptive item with a different connection type, style, and size on the machine side from the workpiece side

Properties:

71EAC0F0EFDB6-001	adjusting screw protrusion
71DF151EA5CF1-001	balance quality code
71EAC0CAB861F-001	balanced by design
71ED6A9AF7D1D-001	body diameter

71D08462F8185-001	body diameter maximum
71EAC472BD116-001	body half taper angle
71EBB332C60EB-002	body height
71ED6AA478A3D-002	body length
71DCD3B16750B-002	body length maximum
71EAD6A2BF8DF-001	body taper end length
71EBB33230236-002	body width
71DF1523EE184-001	cartridge size code
71CED05149532-001	clamping force maximum
71EBAF896BE9A-001	clamping length
71ED6E54B15C4-001	clamping length maximum
71EBB339ED2BD-001	clamping length minimum
71EBAF85006BD-001	clamping width
71EAC48CAD407-001	connection bore depth
71E01D92C41E8-001	connection bore diameter
71EBDBF4D0F49-001	connection bore diameter maximum
71EBDBF49F96C-001	connection bore diameter minimum
71EDD2C17746F-001	connection count workpiece side
71CF298A76B66-001	connection retention knob thread size
71D087D97FCE3-001	contact surface diameter machine side
71EAC0DD5D650-001	contact surface diameter workpiece side
71CED03D70452-001	damping property
71EC5E1ECC776-001	driving key type
71CF29994E737-002	functional height
71EBC1EB8456A-001	functional length minimum
71CF29984CDA7-001	functional width
71ED6E4A7EFBA-002	kappa
71DF5C0761888-001	keyway property
71D078EB73E87-002	overall height
71CF299257986-002	overall width
71ED6E4AE850B-002	phi
71ED6E4B254E5-002	rho
71CF29883E014-001	shank height

71CF298870946-001	shank length
71CF298751FCF-001	shank width
71CF298A3A99A-001	tool changer interference diameter maximum
71CF2989AF0E0-001	tool changer interference length minimum
71EBB33490FDA-001	usable length
71CF2992BDBCC-001	usable length maximum

71EAD388173EE-002

002

driver

drvr

adaptive item with the capability to rotate a cutting tool for cutting operations not on the main machine spindle axis

Properties:

71EBB332C60EB-002	body height
71ED6AA478A3D-002	body length
71DCD3B16750B-002	body length maximum
71EBB33230236-002	body width
71CED05149532-001	clamping force maximum
71EAC48CAD407-001	connection bore depth
71E01D92C41E8-001	connection bore diameter
71EAC0DD5D650-001	contact surface diameter workpiece side
71E03063ABD6E-002	drive size
71EC5E1ECC776-001	driving key type
71CF29994E737-002	functional height
71EBC1EB8456A-001	functional length minimum
71CF29984CDA7-001	functional width
71ED6E4A7EFBA-002	kappa
71DF5C0761888-001	keyway property
71D078EB73E87-002	overall height
71CF299257986-002	overall width
71ED6E4AE850B-002	phi
71ED6E4B254E5-002	rho
71CF29883E014-001	shank height
71CF298870946-001	shank length
71CF298751FCF-001	shank width

71EEBDADB63BE-002**001****extender****extdr**

adaptive item that increases the length of an assembled cutting tool

NOTE The adaptive item has the same connection type, style, and size on both the machine side and workpiece side.

Properties:

71DF151EA5CF1-001	balance quality code
71EAC0CAB861F-001	balanced by design
71ED6A9AF7D1D-001	body diameter
71D08462F8185-001	body diameter maximum
71EAC472BD116-001	body half taper angle
71EBB332C60EB-002	body height
71ED6AA478A3D-002	body length
71DCD3B16750B-002	body length maximum
71EAD6A2BF8DF-001	body taper end length
71EBB33230236-002	body width
71CED05149532-001	clamping force maximum
71EAC48CAD407-001	connection bore depth
71E01D92C41E8-001	connection bore diameter
71CF298A76B66-001	connection retention knob thread size
71D087D97FCE3-001	contact surface diameter machine side
71EAC0DD5D650-001	contact surface diameter workpiece side
71CED03D70452-001	damping property
71EC5E1ECC776-001	driving key type
71EBC1EB8456A-001	functional length minimum
71DF5C0761888-001	keyway property
71D078EB73E87-002	overall height
71CF299257986-002	overall width

71EAD385E51A0-002**001****reducer****red**

adaptive item that diminishes the size of a connection in an assembled cutting tool

NOTE 1 The adaptive item has the same connection type and style on the machine side and workpiece side.

NOTE 2 The connections on either side of an item must be different in gender, i.e. male and female.

Properties:

71DF151EA5CF1-001	balance quality code
71EAC0CAB861F-001	balanced by design
71ED6A9AF7D1D-001	body diameter
71D08462F8185-001	body diameter maximum
71EBB332C60EB-002	body height
71ED6AA478A3D-002	body length
71DCD3B16750B-002	body length maximum
71EBB33230236-002	body width
71CED05149532-001	clamping force maximum
71EBAF85006BD-001	clamping width
71EAC48CAD407-001	connection bore depth
71E01D92C41E8-001	connection bore diameter
71CF298A76B66-001	connection retention knob thread size
71D087D97FCE3-001	contact surface diameter machine side
71EAC0DD5D650-001	contact surface diameter workpiece side
71CED03D70452-001	damping property
71EC5E1ECC776-001	driving key type
71CF29994E737-002	functional height
71EBC1EB8456A-001	functional length minimum
71CF29984CDA7-001	functional width
71ED6E4A7EFBA-002	kappa
71DF5C0761888-001	keyway property
71D078EB73E87-002	overall height
71CF299257986-002	overall width
71ED6E4AE850B-002	phi
71ED6E4B254E5-002	rho
71CF29883E014-001	shank height
71CF298870946-001	shank length
71CF298751FCF-001	shank width
71CF298A3A99A-001	tool changer interference diameter maximum
71CF2989AF0E0-001	tool changer interference length minimum

71EBB33490FDA-001

usable length

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Annex D (informative)

Adaptive item property definitions

The layout of the entries in this Annex is as follows.

NOTE 1 An entry might not contain all the information specified.

NOTE 2 The value formats of properties are specified in ISO/TS 13399-100.

BSU – version number	Revision number	Value format
data type group	data type	unit identifier
preferred name	short name	SYMBOL
synonymous name		
definition		
source of definition		
BSU of condition property = name of condition property		
Non-quantitative code = meaning of code		
Source of code definition		
NOTE		
REMARKS		
Illustration reference: Figure <Annex.illustration number>		
Visible class:		
Applicable classes:		
Allowed values:		

71CED04F3300A-001	001	X17
--------------------------	------------	------------

STRING_TYPE

adaptor clamp	adc	ADC
----------------------	------------	------------

method of retaining an adaptor

Visible class:

71CE7A72B6DA7-002	cutting tool library
--------------------------	-----------------------------

Applicable classes:

71EAD37F18F34-002	adaptive item type
--------------------------	---------------------------

71CED04F920EC-001 **001** **X17**

STRING_TYPE

adaptor tool clamp **atc** **ATC**

method of holding a tool item in an adaptive item

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002 adaptive item type

71EAC0F0EFDB6-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

adjusting screw protrusion **asp** **ASP**

distance from the body of the tool item or adaptive item to the end of the adjusting screw.

ISO 5611

Illustration reference: [Figure E.8](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002 converter

71DF151EA5CF1-001 **001** **X17**

STRING_TYPE

balance quality code **blq** **BLQ**

identifier for the residual out-of-balance effect of a rotating tool

ISO 1940-1

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002 converter

71E0250E32A07-002 cylindrical broach

71E01A00BD93C-002 drill

71EEBDADB63BE-002 extender

71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer

71EAC0CAB861F-001 **001** **X1**

BOOLEAN_TYPE

balanced by design **bbd** BBD

identifier whether the tool item or adaptive item is designed with its centre of gravity on the rotational centre line or not

NOTE Balance by design is not determined by rotational testing.

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71E0250E32A07-002	cylindrical broach
71E01A00BD93C-002	drill
71EEBDADB63BE-002	extender
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer

71ED6A9AF7D1D-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

body diameter **bd** BD

distance between parallel tangents on the circular cross section of a tool item or an adaptive item

NOTE For an item with several changes in external form, the multiple values of body diameter would be aggregated with indexable identifiers.

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71E02C544BABE-002	burr tool
-------------------	-----------

71EAD3871D313-002	converter
71E01A082DE72-001	disk broach
71E01A00BD93C-002	drill
71EEBDADB63BE-002	extender
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer
71E01A081855D-002	tapered broach

71D08462F8185-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

body diameter maximum **bdx** BDX

largest diameter of the body of a tool item or an adaptive item

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71E0250E32A07-002	cylindrical broach
71E01A0E4EE75-001	cylindrical die
71E01A082DE72-001	disk broach
71E01A00BD93C-002	drill
71EEBDADB63BE-002	extender
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E01A081855D-002	tapered broach

71EAC472BD116-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE deg

body half taper angle **bhta** BHTA

angle of the transition between two diameters of the body of a tool item or adaptive item measured from the item axis

NOTE 1 This angle is not used for any connection taper.

NOTE 2 Applicable for both tool items and adaptive items.

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71E01A05D27A8-002	end mill
71EEBDADB63BE-002	extender
71E01A04A8AEC-002	ream
71E01A04E0236-002	threading tap

71EBB332C60EB-002 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

body height **htb** HTB

distance measured along the Y-axis between the extremes of the body excluding any protrusion of the locking mechanisms

Illustration reference: [Figure E.4](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71D1066F279AD-002	cartridge
71EAD3871D313-002	converter
71E01A082DE72-001	disk broach
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71E01A0838E9B-001	prismatic broach
71E01A0E85121-001	prismatic tool holder
71EAD385E51A0-002	reducer
71E01A04F70F7-002	threading die
71E01A04E0236-002	threading tap

71ED6AA478A3D-002 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

body length lb LB

distance measured along the Z-axis from that point of the item closest to the workpiece, including the cutting item for a tool item but excluding a protruding locking mechanism for an adaptive item, to a defined change in the external form of a tool item or an adaptive item

REMARKS For an item with several changes in external form, the multiple values of body length would be aggregated with indexable identifiers.

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 cutting tool library

Applicable classes:

71D1066F279AD-002	cartridge
71E01A069566C-002	chamfer drill
71EAD3871D313-002	converter
71E01A06BF88D-002	counterbore drill
71E01A06A8A08-002	countersink drill
71EF07DFC283C-002	double half side mill
71EAD388173EE-001	driver
71E01A05D27A8-002	end mill
71EEBDADB63BE-002	extender
71E01A05B627B-002	face mill
71E01A0838E9B-001	prismatic broach
71E01A07ECCCF-001	profile reamer
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer
71E01A0540BE7-002	slab mill
71E01A067F73C-002	step drill
71E01A07FF350-001	stepped reamer
71E01A0EAF067-001	system tool
71E01A081855D-002	tapered broach
71E01A04F70F7-002	threading die
71EF07E083383-002	threading grooving mill
71E01A04E0236-002	threading tap
71E01A0769982-002	trepanning drill

71DCD3B16750B-002 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

body length maximum **lbx** **LBX**

distance measured along the Z-axis from that point of the item closest to the workpiece, including the cutting item for a tool item but excluding a protruding locking mechanism for an adaptive item, to either the front of the flange on a flanged body or the beginning of the connection interface feature on the machine side for cylindrical or prismatic shanks

NOTE If a connection interface feature overlaps with the body of the item, then this dimension of the body length includes the overlapping portion of the connection interface feature.

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71E0250E32A07-002	cylindrical broach
71E01A00BD93C-002	drill
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71E01A008D13F-002	mill
71E01A0838E9B-001	prismatic broach
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer
71E01A0EAF067-001	system tool
71E01A081855D-002	tapered broach
71E01A04E0236-002	threading tap

71DF1523224D8-001 **001** **X17**

STRING_TYPE

body material code **bmc** **BMC**

identifier for the main material constituent of the tool item or adaptive item

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002 adaptive item type

71E01A004C775-002 tool item type

71EAD37F18F34-002 001 NR2 S..3.3

REAL_MEASURE_TYPE mm

body taper end length btel BTEL

dimension from the front of a tool item or adaptive item to the end of the tool body taper measured along the tool item axis or adaptive item axis

Visible class:

71CE7A72B6DA7-002 cutting tool library

Applicable classes:

71EAD3871D313-002 converter

71EEBDADB63BE-002 extender

71EBB33230236-002 001 NR2 S..3.3

REAL_MEASURE_TYPE mm

body width wb WB

distance measured along the X-axis between the extremes of the body excluding any protrusion of the locking mechanisms

Visible class:

71CE7A72B6DA7-002 cutting tool library

Applicable classes:

71D1066F279AD-002 cartridge

71EAD3871D313-002 converter

71EAD388173EE-001 driver

71EEBDADB63BE-002 extender

71E01A0E79239-001 hexagonal die

71E01A0838E9B-001 prismatic broach

71E01A0E85121-001 prismatic tool holder

71EAD385E51A0-002 reducer

71DF1523EE184-001 001 X17

STRING_TYPE

cartridge size code casc CASC

identifier for the size of a cartridge

ISO 5608, ISO 5611

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71E01A04C377D-002	broach
71D1066F279AD-002	cartridge
71EAD3871D313-002	converter

71CED05149532-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE MPa

clamping force maximum **mx** **MXC**

greatest force that can be applied by an assembly item

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71EAD385E51A0-002	reducer

71EBAF896BE9A-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

clamping length **lsc** **LSC**

dimension of the length of that portion of a tool item or an adaptive item that can participate in a connection

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71E01A0E9CBA9-001	boring bar
71DF8C37D9115-002	connection interface feature
71EAD3871D313-002	converter

71ED6E54B15C4-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

clamping length maximum **lscx** LSCX

greatest portion of the connection feature that is necessary to ensure the normal function of the tool item or the adaptive item

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71E01A0E9CBA9-001 boring bar

71DF8C37D9115-002 connection interface feature

71EAD3871D313-002 converter

71EBB339ED2BD-001 **001** **NR2 S..3.3**

LEVEL_TYPE mm

clamping length minimum **lscn** LSCN

smallest portion of the connection feature that is necessary to ensure that no damage is caused neither to the tool item nor to the adaptive item

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71E01A0E9CBA9-001 boring bar

71DF8C37D9115-002 connection interface feature

71EAD3871D313-002 converter

71EBAF85006BD-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

clamping width **wsc** WSC

dimension of the width of that portion of a tool item or an adaptive item that can participate in a connection

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002 converter

71E01A0838E9B-001 prismatic broach

71E01A0E85121-001 prismatic tool holder

71EAD385E51A0-002 reducer

71EAC48CAD407-001 001 NR2 S..3.3

REAL_MEASURE_TYPE mm

connection bore depth cdbp CDBP

depth of the hole in the centre of a tool or adaptive item used for making a connection

71EBDBF130AE6-1 = side

Illustration reference: [Figure E.3](#)

Visible class:

71CE7A72B6DA7-002 cutting tool library

Applicable classes:

71DF8C37D9115-002 connection interface feature

71EAD3871D313-002 converter

71E01A06BF88D-002 counterbore drill

71E01A06A8A08-002 countersink drill

71E0250E32A07-002 cylindrical broach

71E01A082DE72-001 disk broach

71EF07DFC283C-002 double half side mill

71EAD388173EE-001 driver

71EEBDADB63BE-002 extender

71E01A05B627B-002 face mill

71E01A05EA320-002 half side mill

71E01A04A8AEC-002 ream

71EAD385E51A0-002 reducer

71E0251F304E1-002 rotating borer

71E01A0540BE7-002 slab mill

71EF07E037025-002 slotting cutter

71E01D92C41E8-001 001 NR2 S..3.3

REAL_MEASURE_TYPE mm

connection bore diameter dcb DCB

diameter of the hole in the centre of a tool or adaptive item used for making a connection

71EBDBF130AE6-1 = side

Illustration reference: [Figure E.3](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71E01A06BF88D-002	counterbore drill
71E01A06A8A08-002	countersink drill
71E0250E32A07-002	cylindrical broach
71E01A082DE72-001	disk broach
71EF07DFC283C-002	double half side mill
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71E01A05EA320-002	half side mill
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer
71E01A0540BE7-002	slab mill
71EF07E037025-002	slotting cutter

71EBDBF4D0F49-001 **001** **NR2 S..3.3**

LEVEL_TYPE mm

connection bore diameter maximum **dcbx** DCBX

greatest internal diameter of an adaptive item that can participate in a connection

71EBDBF130AE6-1 = side

Illustration reference: [Figure E.5](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

726F59BDC3B08-002	collet
71EAD3871D313-002	converter

71EBDBF49F96C-001 **001** **NR2 S..3.3**

LEVEL_TYPE mm

connection bore diameter minimum **dcbn** DCBN

least internal diameter of an adaptive item that can participate in a connection.

71EBDBF130AE6-1 = side

Illustration reference: [Figure E.5](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

726F59BDC3B08-002 collet

71EAD3871D313-002 converter

71D102AE3B252-001 **001** **X14**

STRING_TYPE

connection code machine side **ccms** CCMS

identifier for the capability to connect a component of a cutting tool to another component on the machine side

NOTE 1 The value of a code is constructed from the combination of the item feature class short name and the values of connection size code, variant, connection units basis, coolant supply property and form type.

NOTE 2 Two items can be connected together if they have the same value of the code.

NOTE 3 The connection code is not applicable to assembly items in general but is applicable to the collet class.

EXAMPLE Example of a cylindrical shank conforming to ISO 3338-2 with shank diameter of 25 mm, with internal coolant would be: ZYL025010M1EXT.

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002 adaptive item type

726F59BDC3B08-002 collet

71DF8C37D9115-002 connection interface feature

71E01A004C775-002 tool item type

71D102AE8A5A9-001 **001** **X14**

STRING_TYPE

connection code workpiece side **ccws** CCWS

identifier for the capability to connect a component to another component of a cutting tool on the workpiece side

NOTE 1 The value of a code is constructed from the combination of the item feature class short name and the values of connection size code, variant, connection units basis, coolant supply property, and form type.

NOTE 2 Two items can be connected together if they have the same value of the code.

NOTE 3 The connection code is not applicable to assembly items in general but is applicable to the collet class.

EXAMPLE Example of a collet chuck adaptor fitting a collet conforming to DIN 6499 with a size of 16 mm without coolant would be: SZD016002M0INT.

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002	adaptive item type
71E01A04C377D-002	broach
726F59BDC3B08-002	collet
71DF8C37D9115-002	connection interface feature
71E01A00BD93C-002	drill
71E01A008D13F-002	mill
71E0251F304E1-002	rotating borer
71E01A05104CF-002	turn

71EDD2C17746F-001 **001** **NR1..4**

INT_TYPE

connection count workpiece side **cconws** **CCONWS**

effective numbers of connections that can participate in a connection between any component of a cutting tool, except cutting items and assembly items, on the workpiece side

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71E0251F304E1-002	rotating borer

71EBDBF5060E6-001 **001** **NR2 S..3.3**

LEVEL_TYPE mm

connection diameter **dcon** **DCON**

nominal dimension of the diameter of a cylindrical portion of a tool item or an adaptive item that can participate in a connection.

71EBDBF130AE6-1 = side

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002	adaptive item type
71E01A04C377D-002	broach
71E01A00BD93C-002	drill
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71E0251F304E1-002	rotating borer
71E01A04F70F7-002	threading die
71E01A04E0236-002	threading tap
71E01A05104CF-002	turn

71CF298A76B66-001 **001** **X17**

STRING_TYPE

connection retention knob thread size **crks** **CRKS**

identifier for the size of the thread size of the device that pulls a cutting tool into the machine tool

71EBDBF130AE6-1 = side

Illustration reference: [Figure E.2](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71E0250E32A07-002	cylindrical broach
71E01A00BD93C-002	drill
71EEBDADB63BE-002	extender
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer

71E01A081855D-002 tapered broach

71FC193318002-001 001 X17

STRING_TYPE

connection size code czc CZC

identifier for the size of the connection between items of a cutting tool, excluding cutting items.

NOTE The connection to the machine tool is included.

71EBDBF130AE6-1 = side

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 cutting tool library

Applicable classes:

71EAD37F18F34-002 adaptive item type

71DF8C37D9115-002 connection interface feature

71E01A004C775-002 tool item type

71ED6E16D5978-001 001 X1

NON_QUANTITATIVE_CODE_TYPE

connection unit basis cub CUB

label to identify the system of units in which the design of the connection is defined.

Visible class:

71CE7A72B6DA7-002 cutting tool library

Applicable classes:

71EAD37F18F34-002 adaptive item type

71DF8C37D9115-002 connection interface feature

71E01A004C775-002 tool item type

Allowed values:

M = metric

N = inch

C = coded neither metric nor inch

71D087D97FCE3-001 001 NR2 S..3.3

REAL_MEASURE_TYPE mm

contact surface diameter machine side dcsfms DCSFMS

diameter of the surface on the machine side forming the contact between a tool item and an adaptor item

NOTE See diagram.

Illustration reference: [Figure E.10](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71E0250E32A07-002	cylindrical broach
71E01A00BD93C-002	drill
71EEBDADB63BE-002	extender
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer
71E01A0EAF067-001	system tool

71EAC0DD5D650-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

contact surface diameter workpiece side **dcsfws** DCSFWS

diameter of the surface on the workpiece side forming the contact between a tool item and an adaptor item

NOTE See diagram.

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002	converter
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71EAD385E51A0-002	reducer

71EBB342CC751-001 **001** **X1**

BOOLEAN_TYPE

coolant supply property **csp** CSP

identification for whether a tool item or an adaptive item has a coolant supply

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002 adaptive item type
 71DF8C37D9115-002 connection interface feature
 71E01A004C775-002 tool item type

71CED03D70452-001 **001** **X1**

BOOLEAN_TYPE

damping property **dpc** DPC

ability to reduce the amplitude of vibrations

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002 converter
 71E0250E32A07-002 cylindrical broach
 71E01A05D27A8-002 end mill
 71EEBDADB63BE-002 extender
 71EAD385E51A0-002 reducer
 71E01A05104CF-002 turn

71CF29869CA0F-001 **001** **NR1 S..1**

BOOLEAN_TYPE

data chip provision **dcp** DCP

indication of provision for a data chip on a tool item or an adaptive item

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002 adaptive item type
 71E01A004C775-002 tool item type

71EC5E1ECC776-001 **001** **X17**

NON_QUANTITATIVE_CODE_TYPE

driving key type **dkty** DKTY

form of a driving key

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002 converter

71EAD388173EE-001 driver

71EEBDADB63BE-002 extender

71EAD385E51A0-002 reduce

Allowed values:

Woodruff = Woodruff

parallel = parallel sides

tenon = tenon

71CF29994E737-002 **001** **NR2..7.3**

REAL_MEASURE_TYPE mm

functional height **hf** HF

distance from the XZ-plane of the tool item to the cutting point

Illustration reference: [Figure E.4](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71D1066F279AD-002 cartridge

71EAD3871D313-002 converter

71EAD388173EE-001 driver

71E01A0838E9B-001 prismatic broach

71EAD385E51A0-002 reducer

71E01A05104CF-002 turn

71DCD39338974-001 **001** **NR2 S..3**

REAL_MEASURE_TYPE mm

functional length **lf** LF

distance from the gauge plane or from the end of the shank, if a gauge plane does not exist, to the cutting reference point determined by the main function of the tool

NOTE The functional length is multiplied on stepped tools.

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002	adaptive item type
71E01A04C377D-002	broach
71E02C544BABE-002	burr tool
71D1066F279AD-002	cartridge
71E01A00BD93C-002	drill
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71E01A04E0236-002	threading tap
71E01A05104CF-002	turn

71EBC1EB8456A-001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

functional length minimum **lfn** LFN

least distance from the gauge plane or from the end of the shank, if a gauge plane does not exist, to the cutting reference point determined by the main function of the tool

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71E01A0E9CBA9-001	boring bar
71EAD3871D313-002	converter
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71E01A0E85121-001	prismatic tool holder
71EAD385E51A0-002	reducer

71CF29984CDA7-001 **001** **NR2..7.3**

REAL_MEASURE_TYPE mm

functional width **wf** WF

distance between the cutting reference point and the rear backing surface of a turning tool or the axis of a boring bar

ISO 5609, ISO 5610

Illustration reference: [Figure E.6](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71D1066F279AD-002	cartridge
71EAD3871D313-002	converter
71EAD388173EE-001	driver
71EAD385E51A0-002	reducer
71E01A05104CF-002	turn

71ED6E4A7EFBA-002 **002** **NR2 S..3.3**

REAL_MEASURE_TYPE deg

kappa **kapr** KAPR

rotation angle for the yzw-plane counter clockwise about the Y-axis

Visible class:

71CE7A72B6DA7-002 **cutting tool library.**

Applicable classes:

71EAD3871D313-002	converter
71EAD388173EE-001	driver
71EAD385E51A0-002	reducer
71ED6E3F84723-001	yzw-plane

71DF5C0761888-001 **001** **X1**

BOOLEAN_TYPE

keyway property **kyp** KYP

possession of a keyway by either a tool item or an adaptive item

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71E01A04C377D-002	broach
71EAD3871D313-002	converter
71E01A06BF88D-002	counterbore drill

71E01A06A8A08-002	countersink drill
71EF07DFC283C-002	double half side mill
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71E01A05B627B-002	face mill
71E01A05EA320-002	half side mill
71E01A04A8AEC-002	ream
71EAD385E51A0-002	reducer
71E0251F304E1-002	rotating borer
71E01A0540BE7-002	slab mill
71EF07E037025-002	slotting cutter
71E01A0769982-002	trepanning drill

71D078EB73E87-002 **001** **NR2 S..7.3**

REAL_MEASURE_TYPE mm

overall height **oah** OAH

largest dimension of an item in the direction of the Y-axis that would cause interference, including the master insert and clamping where applicable

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71D1066F279AD-002	cartridge
71EAD3871D313-002	converter
71EAD388173EE-001	driver
71EEBDADB63BE-002	extender
71E01A0838E9B-001	prismatic broach
71EAD385E51A0-002	reducer
71E01A05104CF-002	turn

71D078EB7C086-002 **001** **NR2 S..7.3**

REAL_MEASURE_TYPE mm

overall length **oal** OAL

largest dimension of an item in the direction of the Z-axis

Illustration reference: [Figure E.6](#)

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002 adaptive item type

71E01A004C775-002 tool item type

71CF299257986-002 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

overall width **oaw** OAW

largest dimension of an item in the direction of the X-axis including the master insert where applicable

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71D1066F279AD-002 cartridge

71EAD3871D313-002 converter

71EAD388173EE-001 driver

71EEBDADB63BE-002 extender

71E01A0838E9B-001 prismatic broach

71EAD385E51A0-002 reducer

71E01A05104CF-002 turn

71ED6E4AE850B-002 **02** **NR2 S..3.3**

REAL_MEASURE_TYPE deg

phi **phi** PHI

rotation angle for the xzw-plane counter clockwise about the Z-axis

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD3871D313-002 converter

71EAD388173EE-001 driver

71EAD385E51A0-002 reducer

71ED6E3E9AECB-001 xzw-plane

71DCD394BB20E-002 001 NR2 S..3.3

REAL_MEASURE_TYPE mm

protruding length lpr LPR

dimension from the XY-plane to the furthest point of the tool item or adaptive item measured in the Z direction

NOTE 1 For tool items, the protruding length can be equal to the functional length if the furthest point is the cutting reference point.

NOTE 2 For adaptive items, the protruding length can be equal to the functional length if the furthest point is the origin of the coordinate system workpiece side.

Illustration reference: [Figure E.1](#)

Visible class:

71CE7A72B6DA7-002 cutting tool library

Applicable classes:

71EAD37F18F34-002 adaptive item type

71E01A04C377D-002 broach

71E01A00BD93C-002 drill

71E01A008D13F-002 mill

71E01A04A8AEC-002 ream

71E0251F304E1-002 rotating borer

71E01A0EAF067-001 system tool

71E01A04E0236-002 threading tap

71ED6E4B254E5-002 002 NR2 S..3.6

REAL_MEASURE_TYPE deg

rho rho RHO

rotation angle for the xyw-plane counter-clockwise about the X-axis

Visible class:

71CE7A72B6DA7-002 cutting tool library

Applicable classes:

71EAD3871D313-002 converter

71EAD388173EE-001 driver

71EAD385E51A0-002 reducer

71ED6E3F268C6-001 xyw plane

71DF153A691F2-002 001 NR2 S..3.3

LEVEL_TYPE rpm
rotational speed maximum rpmx RPMX
 maximum rotational speed allowed for an item

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002 adaptive item type
 71E01A00BD93C-002 drill
 71E01A008D13F-002 mill
 71E01A04A8AEC-002 ream
 71E0251F304E1-002 rotating borer
 71E01A04F70F7-002 threading die
 71E01A04E0236-002 threading tap

71CF29862B277-001 **001** **NR2 S..7.3**

REAL_MEASURE_TYPE mm

shank diameter **dmm** DMM

dimension of the diameter of a cylindrical portion of a tool item or an adaptive item that can participate in a connection

Visible class:

71CE7A72B6DA7-002 **cutting tool library**

Applicable classes:

71EAD37F18F34-002 adaptive item type
 71E01A0E9CBA9-001 boring bar
 71E02C544BABE-002 burr tool
 71E0250E32A07-002 cylindrical broach
 71E01A00BD93C-002 drill
 71E01A008D13F-002 mill
 71E01A04A8AEC-002 ream
 71E0251F304E1-002 rotating borer
 71E01A0EAF067-001 system tool
 71E01A081855D-002 tapered broach
 71E01A04E0236-002 threading tap