PD ISO/TS 13399-50:2013

BSI Standards Publication

Cutting tool data representation and exchange

Part 50: Reference dictionary for reference systems and common concepts

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National foreword

This Published Document is the UK implementation of ISO/TS 13399-50:2013. It supersedes DD ISO/TS 13399-50:2007 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MTE/18, Tools tips and inserts for cutting applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

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TECHNICAL SPECIFICATION

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Second edition
2013-12-01

Cutting tool data representation and exchange —

Part 50: Reference dictionary for reference systems and common concepts

Représentation et échange des données relatives aux outils coupants —

Partie 50: Dictionnaire de référence pour les systèmes de coordonnées et les concepts communs

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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. www.iso.org/directives

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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 13399-50:2007), 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 the 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 assembly 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/TS 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 connection systems, coordinate reference systems and other features and characteristics that are shared with several components of a cutting tool with defined cutting edges. 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,[1)] solid tools,[2)] assembled tools,[3)] adaptors,[4)] components[5)] and their relationships can be represented by this part of 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. This representation will facilitate the processing and exchange of cutting tool data within and among different software systems and computer platforms and support the application of these 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, *Automation systems and integration*, SC 4, *Industrial data*, 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 interests 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:

a) the EXPRESS language defined in ISO 10303-11 for defining the information model;

b) the file format for data exchange derived from the model and defined in ISO 10303-21;

c) the data dictionary defined in the ISO 13584 series.

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1) For example regular and irregular shaped replaceable cutting items.

2) For example solid drill and endmill.

3) For example boring bars, indexable drills and indexable milling cutters.

4) For example milling arbor and drilling chuck.

5) For example shims, screws and clamps.

The ISO 13399 series is intended for use by tool producers and vendors, manufacturers, and developers of manufacturing software, among others. ISO 13399 provides a common structure for exchanging data about cutting tools with defined cutting edges. The ISO 13399 series 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 to 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 that information which could be communicated; it does not specify what information shall be communicated.

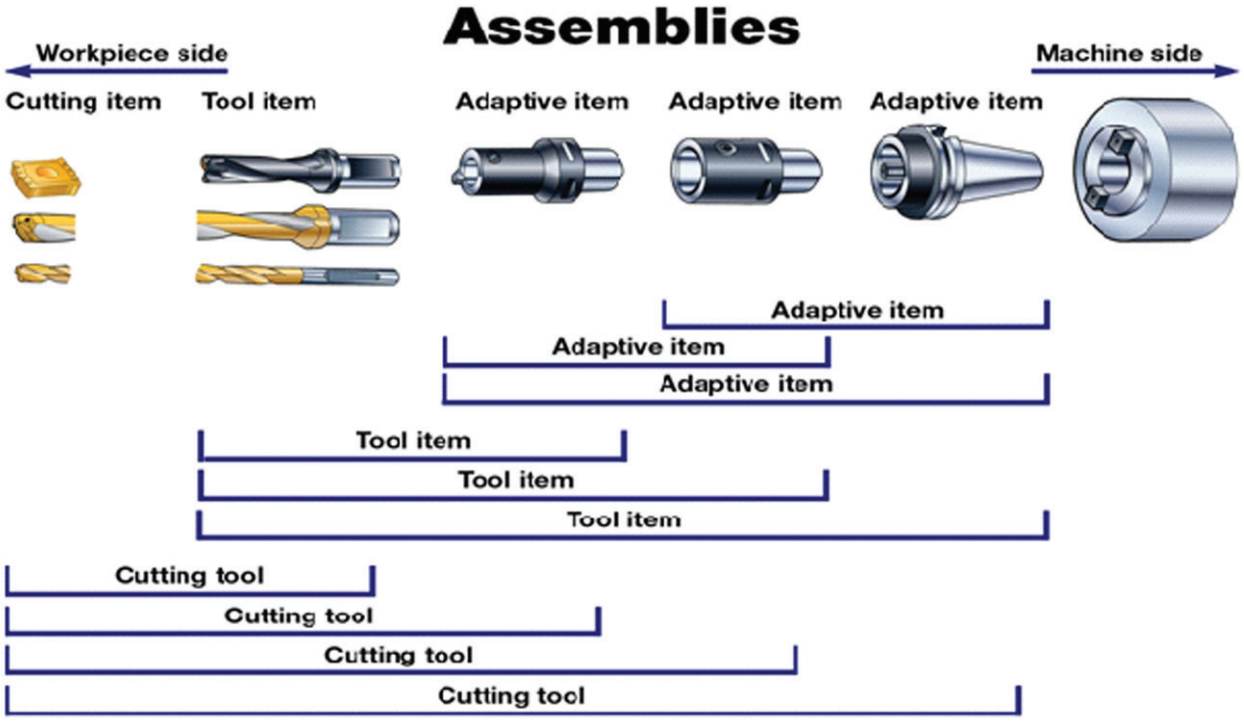

Figure 1 — Possible assemblies of components of a cutting tool

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;

— 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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F-92038 Paris La Défense CEDEX

France

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.

The following permission notice and disclaimer shall be included in all copies of this EXPRESS schema ("the Schema"), and derivations of the Schema:

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Cutting tool data representation and exchange —

Part 50:
Reference dictionary for reference systems and common concepts

1 Scope

This part of ISO 13399 specifies a reference dictionary for reference systems for cutting tools, 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 reference systems for cutting tools, with an associated classification scheme;

— definitions and identifications of the data element types that represent the properties of reference systems for cutting tools;

— 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 SC3D, 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 connection systems for cutting tools;

— standard data that represent the various properties of connection systems for cutting tools;

— standard data that represent domains of values used for properties of connection systems for cutting tools;

— standard data that represent the various classes of reference systems for cutting tools;

— standard data that represent the various properties of reference systems for cutting tools;

— standard data that represent domains of values used for properties of reference systems for cutting tools;

— 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:

— applications where these standard data might be stored or referenced;

— implementation methods other than the one defined in this part of ISO 13399 by which the standard data might 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 for cutting tools.

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, adaptive items, assembly items and connection systems are provided in ISO/TS 13399-2, ISO/TS 13399-3, ISO/TS 13399-4, ISO/TS 13399-5 and ISO/TS 13399-60, respectively.

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 1832:2012, *Indexable inserts for cutting tools — Designation*

ISO 3002-1, *Basic quantities in cutting and grinding — Part 1: Geometry of the active part of cutting tools — General terms, reference systems, tool and working angles, chip breakers*

ISO 13399-1:2006, *Cutting tool data representation and exchange — Part 1: Overview, fundamental principles and general information model*

ISO/TS 13399-2:2014, *Cutting tool data representation and exchange — Part 2: Reference dictionary for cutting items*

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given 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, which relate to adaptive items and their properties, 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, 3.3]

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 workpiece material through a shearing action at the defined cutting edge or edges of the device

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.

[SOURCE: ISO 13399-1:2006, 3.1]

3.5
data
formal representation of facts, concepts or instructions suitable for communication, interpretation or processing by human beings or by computers

[SOURCE: ISO 10303-1:1994, 3.2.14, modified — The definition has been amended.]

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, modified — The definition has been amended from two sentences to one.]

Note 1 to entry: In the ISO 13399 series, a dictionary is a formal and computer-sensible representation of an 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 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 13399-2:2014, 3.15]

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
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.

3.20
property
defined parameter suitable for the description and differentiation of products

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

3.21
visible property
property that has a definition meaningful in the scope of a given characterization class, but that does not necessarily apply to the various products belonging to this class

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

3.22
workpiece
object on which a cutting action is performed

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

3.23
workpiece side
identification of a direction pointing towards the workpiece

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

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 linked by an underscore character.

EXAMPLE "chamfer" is the name of a concept in the ontology. Therefore, "chamfer" is the identifier of the class in the dictionary that represents the concept.

Each classified item in the following subclauses is associated with its definition from the dictionary.

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 may be made unique by the addition of a code, which is a reference to the supplier of the dictionary.

The structure of the classification is summarized in Annex B. The complete definitions of the classes in this part of ISO 13399are provided in Annex C. The properties applicable to these classes are defined in Annex D.

5.2 Common concepts

The following subclauses identify and define features of cutting tools shared between several types of components of the cutting tool.

5.2.1 adjustment

An **adjustment** is a device for making an alteration to achieve a different position.

adjustment has the following subclasses:

— adjustment axial;

— adjustment radial.

5.2.1.1 adjustment_axial

An **adjustment_axial** is a device for making an alteration to achieve a different position in a direction parallel to the longitudinal axis of a component.

5.2.1.2 adjustment_radial

An **adjustment_radial** is a device for making an alteration to achieve a different position in a direction perpendicular to the longitudinal axis of the component.

5.2.1.3 bolt_hole_circle

A **bolt_hole_circle** is an arrangement of holes in a circle to enable a bolted connection.

5.2.2 Coolant_supply

A **coolant_supply** is a system of channels to supply a fluid to reduce the temperature of the cutting operation.

NOTE The fluid could be a liquid or a gas.

5.2.3 Cutting_operation

A **cutting_operation** is a generic family of actions, which remove material from a workpiece. The actions included in the generic class are not exclusive and other actions are possible. The intention of the ISO 13399 series is to avoid, if possible, the association of a particular type of tool with a particular cutting operation. These concepts are included in the dictionary so that they can be referenced from the information model defined in ISO 13399-1. **Cutting_operation** has the following simple subclasses:

— Boring;

— broaching circular;

— broaching linear;

— counterboring;

— countersinking;

— drilling;

— drilling deep hole;

— drilling step;

— grooving;

— milling face;

— milling profile;

— milling shoulder;

— milling slot;

— parting;

— reaming cylindrical;

— reaming profile;

— slitting;

— threading external;

— threading internal;

— trepanning;

— turning external;

— turning internal.

5.2.3.1 boring

Changing the diameter of an existing hole in a workpiece with one or more passes of a cutting tool.

5.2.3.2 broaching_circular

Changing the dimensions of an existing surface profile by a single circular motion of a cutting tool.

5.2.3.3 broaching_linear

Changing the dimensions of an existing surface profile by a single linear motion of a cutting tool.

5.2.3.4 counterboring

Creating an enlarged section of a hole to provide concentric holes with the transitory shoulder between the holes at 90° to the axis of the holes.

5.2.3.5 countersinking

Creating an enlarged section of a hole to provide concentric holes with the transitory shoulder between the holes at an angle to the axis of the holes.

5.2.3.6 drilling

Creating a new cylindrical hole in a workpiece where the depth of the hole is normally less than 10 times the diameter of the hole.

NOTE Either the cutting tool or the workpiece can rotate.

5.2.3.7 drilling_deep_hole

Creating a new cylindrical hole in a workpiece where the depth of the hole is normally more than 10 times the diameter of the hole.

5.2.3.8 drilling_step

Creating a new hole with more than one diameter by a single operation.

5.2.3.9 grooving

Creating multiple connected surfaces on a circular section of a workpiece

5.2.3.10 milling_face

Creating a single flat external surface on a workpiece by a rotating tool.

NOTE The feed is achieved by the motion of the workpiece or by the motion of the cutting tool or by the combination of both motions.

5.2.3.11 milling_profile

Creating curved surfaces on a workpiece by a rotating cutting tool

NOTE The feed is achieved by the motion of the workpiece or by the motion of the cutting tool or by the combination of both motions

5.2.3.12 milling_shoulder

Creating perpendicular connected surfaces on a workpiece by a rotating cutting tool.

NOTE The feed is achieved by the motion of the workpiece or by the motion of the cutting tool or by the combination of both motions.

5.2.3.13 Milling_slot

Creating multiple connected surfaces in the workpiece by a rotating cutting tool.

NOTE The feed is achieved by the motion of the workpiece or by the motion of the cutting tool or by the combination of both motions.

5.2.3.14 parting

Separating a rotating workpiece into two parts with a stationary cutting tool.

5.2.3.15 reaming cylindrical

Changing the diameter of an existing cylindrical hole to achieve a close tolerance on the diameter and to improve the surface finish.

5.2.3.16 reaming_profile

Changing the diameter of an existing profiled hole to achieve a close tolerance on the diameter and to improve the surface finish.

5.2.3.17 slitting

Separating a stationary workpiece into two parts with a rotating tool.

5.2.3.18 threading_external

Creating a screw thread on the external surface of a workpiece with a cutting tool.

NOTE This operation includes: die threading, thread turning and thread milling operations.

5.2.3.19 Threading_internal

Creating a screw thread on an internal surface of a workpiece with a cutting tool.

NOTE This operation includes: tapping, thread turning and thread milling operations.

5.2.3.20 trepanning

Creating a new annular hole that leaves the central portion of the hole intact.

NOTE The central portion can be left attached to the workpiece or can be detached.

5.2.3.21 turning_external

Creation of a new external surface on a rotating workpiece with a stationary cutting tool.

5.2.3.22 turning_internal

Creating a new internal surface on a rotating workpiece by a stationary cutting tool.

5.2.4 Cutting_tool

A **Cutting_tool** is a device or assembly of items for removing workpiece material through a shearing action at the edge or edges of the device.

NOTE A cutting tool could be an assembly of one or more adaptive items a tool item and several cutting items on a tool item.

5.2.5 flange

A **flange** is a projecting rim or edge on the outside of an object.

5.2.6 keyway

A **keyway** is a slot in which a shaped piece of metal can be inserted to transfer torque between two connected items.

5.2.7 locking_mechanism

A **locking_mechanism** is a device that can be actuated to secure the coupling of two items together.

5.2.8 runout_axial

A **runout_axial** is a variation in the location of the end surface of the cutting reference point of a rotating tool item or the end surface of an adaptive item.

5.2.9 runout_radial

A **runout_radial** is a variation in the location of the circumference of a rotating tool item or adaptive item.

5.2.10 tool_thread_external

A **tool_thread_external** is a continuous and projecting helical ridge of uniform section on an external cylindrical surface.

tool_thread_external has the following subclasses:

— **thread_inch_external**;

— **thread_metric_external**;

— **thread_trapezoidal_external**.

5.2.10.1 thread_inch_external

A **thread_inch_external** is an external tool thread with dimensions conforming to ISO 725.

5.2.10.2 thread_metric_external

A **thread_metric_external** is an external tool thread with dimensions conforming to ISO 724.

5.2.10.3 thread_trapezoidal_external

A **thread_trapezoidal_external** is an external tool thread with dimensions conforming to ISO 2904.

5.2.11 tool_thread_internal

A **tool_thread_internal** is a continuous and projecting helical ridge of uniform section on a cylindrical or conical internal surface.

tool_thread_internal has the following subclasses:

— **thread_inch_internal**

— **thread_metric_internal**

— **thread_trapezoidal_internal**

5.2.11.1 thread_inch_internal

internal screw thread with dimensions conforming to ISO 725.

5.2.11.2 thread metric internal

internal screw thread with dimensions conforming to ISO 724.

5.2.11.3 thread trapezoidal internal

internal screw thread conforming to the dimensions in ISO 2904.

5.3 reference system

reference_system is a generic of family of items that provide a reference basis for the definitions of properties.

NOTE The convention for all the reference systems is the tool-in-hand system.

reference system has the following subclasses:

— **coordinate_axis_system;**

— **coordinate_system_workpiece_side;**

— **cutting_reference_point;**

— **feed_direction_primary;**

— **irregular_insert_position;**

— **master_insert;**

— **mirror_plane;**

— **prismatic_adaptive_item_position;**

— **prismatic_tool_item_position;**

— **regrinding;**

— **regular_insert_position;**

— **round_adaptive_item_position;**

— **round_tool_item_position;**

— **theoretical_sharp_point;**

— **tool_cutting_edge_plane;**

— **tool_feed_plane;**

— **tool_rake_plane;**

— **xy_plane;**

— **xyw_plane;**

— **xz_plane;**

— **xzw_plane;**

— **yz_plane;**

— **yzw_plane.**

5.3.1 primary coordinate_axis_system

The **coordinate_axis_system** is a right-handed rectangular Cartesian system in three-dimensional space with three principal axes labelled X, Y and Z.

5.3.2 coordinate_axis_system_workpiece_side

The **coordinate_axis_system_workpiece_side** is a right-handed rectangular Cartesian system in three-dimensional space with three axes, labelled XW, YW and ZW, which are the intersections of the xyw-plane, the xzw-plane and the yzw-plane, respectively.

5.3.3 cutting_reference_point

The **cutting_reference_point** is the theoretical point of the tool from which the major functional dimensions are taken.

For the calculation of this point, the following cases apply.

a) Case 1: Tool cutting edge angle ≤ 90 - the point is the intersection of: the **tool_cutting_edge_plane**, the **tool_feed_plane**, and the **tool_rake_plane**.

b) Case 2: Tool cutting edge > 90 - the point is the intersection of: the **tool_feed_plane**, a plane perpendicular to tool feed plane and tangential to the cutting corner, and the tool rake plane.

c) Case 3: ISO tool styles D and V with only axial rake. The point is the intersection of: a plane perpendicular to the primary feed direction and tangential to the cutting edge (tangential point), a plane parallel to the feed direction through the tangential point, and the **tool_rake_plane**.

d) Case 4: Round inserts:

1) One feed direction parallel to the tool axis, primary used for turning tools. The point is the intersection of: a plane perpendicular to the primary feed direction and tangential to the cutting edge (tangential point), a plane parallel to the feed direction through the tangential point, and the tool rake plane.

2) One feed direction perpendicular to the tool axis, primarily used for milling tools. The point is the intersection of: a plane perpendicular to the primary feed direction and tangential to the cutting edge (tangential point), a plane parallel to the feed direction through the tangential point, and the tool rake plane.

3) Two feed directions, one parallel to the tool axis and one perpendicular to the tool axis with two cutting reference points. Each point is the intersection of: a plane perpendicular to its feed direction and tangential to the cutting edge (tangential point), a plane parallel to the feed direction through the tangential point, and the tool rake plane.

REMARKS In Case 3, the theoretical sharp corner of the insert and the cutting reference point are on the plane that is perpendicular to the tool feed plane.

5.3.4 feed_direction_primary

A **feed_direction_primary** is a direction of movement of a cutting tool to achieve the main cutting function of the tool.

5.3.5 irregular_insert_position

The **irregular_insert_position** is a location of an irregular cutting item on the coordinate axis system.

NOTE 1 The cutting edges are in the xy-plane with the insert located in the XY quadrant, the cutting profile is pointing in the negative Y direction, the physical extremity of the cutting profile is on the positive x-axis and the extreme physical point of the insert is on the y-axis.

NOTE 2 The definition applies to right-handed inserts. The position of left-handed inserts is as mirrored through the xz-plane.

5.3.6 master_insert

A **master_insert** is a nominal replaceable cutting item used for defining the dimensions of a cutting tool.

NOTE A master insert can substitute for either a regular or an irregular insert and uses the position of the item that it replaces.

REMARKS Definitions making use of a master insert also apply to solid and brazed tools.

5.3.7 mirror_plane

A **mirror_plane** is the YZ-plane in the **primary_coordinate_system**.

5.3.8 prismatic_adaptive_item_position

A **prismatic_adaptive_item_position** is a location on the primary coordinate system of an adaptive item with planar sides.

The following apply:

— 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 siderear backing surface shall be coplanar with the YZ-plane;

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

5.3.9 prismatic_tool_item_position

A **prismatic_tool_item_position** is a location on the primary coordinate system of a tool item with planar sides.

The following apply:

— the base of the tool 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 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;

— the rake face of the primary cutting item shall be completely visible in the XZ quadrant;

— for cartridges, the top of the axial adjustment screw shall be coincident with XY-plane.

REMARKS Applies to right-handed tools. Left-handed items are as defined for right-handed items, but mirrored through the YZ-plane.

5.3.10 regrinding

A **regrinding** is modifying the shape of a component of a cutting tool to restore the original shape or to create a new shape.

5.3.11 regular_insert_position

A **regular_insert_position** is a location of a regular cutting item on the primary coordinate system.

NOTE 1 The cutting edges are placed on the XY-plane of the primary coordinate system with the insert located in the XY quadrant; the major cutting edge is on the positive x-axis and the extreme theoretical sharp point of the insert is on the y-axis.

NOTE 2 The definition applies to right-handed inserts. The position of left-handed inserts is as mirrored through the YZ-plane.

REMARKS The diagrams illustrate the positions for different shapes of inserts.

5.3.12 round_adaptive_item_position

A **round_adaptive_item_position** is a location on the primary coordinate system of an adaptive item with a non-planar sided cross section.

The following apply:

— 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 points in the Z direction shall also point towards the workpiece side.

REMARKS Applies to right-handed adaptive items. Left-handed items are as defined for right-handed items, but mirrored through the YZ-plane.

5.3.13 round_tool_item_position

A **round_tool_item_position** is a location on the primary coordinate system of a tool item with non-planar sided cross section.

The following apply:

— the axis of the tool 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;

— the rake face of the primary cutting item shall be visible in the XZ quadrant;

— if a bore is present, the vector of the bore of the item that points in the Z direction shall also point towards the workpiece side.

REMARKS Applicable to right-handed tools. Left-handed items are as defined for right-handed items, but mirrored through the YZ-plane.

5.3.14 theoretical_sharp_point

A **theoretical_sharp_point** is an intersection in the tool rake plane of the two planes that are perpendicular to the XZ-plane through the major and the minor cutting edges of a cutting item.

5.3.15 tool_cutting_edge_plane

A **tool_cutting_edge_plane** is a plane perpendicular to the XZ plane through the major cutting edge of a master insert or of a solid tool.

5.3.16 tool_feed_plane

A **tool_feed_plane** is a plane perpendicular to the XZ-plane and that is parallel to the primary feed direction of the tool and that is tangential to the cutting corner of a master insert or of a solid tool.

5.3.17 tool_rake_plane

A **tool_rake_plane** is a plane that contains the cutting edges of a master insert or of a solid tool.

5.3.18 xy_plane

The **xy_plane** is a plane in the **primary_coordinate_system** that contains the X and Y axes with the normal of the plane in the positive Z direction.

5.3.19 xyw_plane

The **xyw_plane** is a plane in the **primary_coordinate_system** related to the **xy_plane** in the primary coordinate system by the rotation angle PHI about the x-axis in a counterclockwise (anticlockwise) direction and a distance XYWD from the origin of the **primary_coordinate_system**.

NOTE The **xzw_plane**, the **xyw_plane** and the **yzw_plane** are mutually perpendicular

5.3.20 xz_plane

The **xz_plane** is a plane in the **primary_coordinate_system** that contains the X and Z axes with the normal of the plane in the positive Y direction.

5.3.21 xzw-plane

The **xzw_plane** is a plane in the **primary_coordinate_system** related to the **xz_plane** in the primary coordinate system by the rotation angle KAPPA about the Z axis in a counterclockwise (anticlockwise) direction and a distance XZWD from the origin of the **primary_coordinate_system**.

NOTE The **xzw_plane**, the **xyw_plane** and the **yzw_plane** are mutually perpendicular.

5.3.22 yz_plane

The **yz_plane** is a plane in the **primary_coordinate_system** that contains the Y and Z axes with the normal of the plane in the positive X direction.

5.3.23 yzw_plane

The **yzw_plane** is a plane in the **primary_coordinate_system** related to the **yz_plane** in the primary coordinate system by the rotation angle RHO about the y-axis in a counter-clockwise direction and a distance YZWD from the origin of the **primary_coordinate_system**.

NOTE The **xzw_plane**, the **xyw_plane** and the **yzw_plane** are mutually perpendicular.

6 Properties for connection systems, reference systems and common features

The properties of connection systems, reference systems and common features 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 may be applicable for connection systems, reference systems and common features, 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 code for the supplier of the dictionary as a prefix to the identification code.

EXAMPLE The unique BSU for **body height** would be: 0112/1///13399-2–71EBB332C60EB for version two of the dictionary.

Table 1 — Properties for connection systems, reference systems and common features

Property name	Identification code (BSU)
actuation force	71EBBA9B56D06
actuation method	71EBBA9BCB5F2
adaptor clamp	71CED04F3300A
adaptor tool clamp	71CED04F920EC
adjusting screw protrusion	71EAC0F0EFDB6

Table 1 *(continued)*

Property name	Identification code (BSU)
balance quality code	71DF151EA5CF1
balanced by design	71EAC0CAB861F
body clearance depth	71EAC81F88336
body diameter	71ED6A9AF7D1D
body diameter maximum	71D08462F8185
body half taper angle	71EAC472BD116
body height	71EBB332C60EB
body length	71ED6AA478A3D
body length maximum	71DCD3B16750B
body material code	71DF1523224D8
body taper end length	71EADEA2BF8DF
body width	71EBB33230236
bolt hole circle count	71ED6E58E5A62
cartridge size code	71DF1523EE184
chisel edge angle	71EAC82B2A50E
chisel edge length	71EAC82ADE5EA
clamping force maximum	71CED05149532
clamping length	71EBAF896BE9A
clamping length maximum	71ED6E54B15C4
clamping length minimum	71EBB339ED2BD
clamping width	71EBAF85006BD
clearance angle axial	71EAC83CD450B
clearance angle radial	71EAC83B73825
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 entry centre line distance	71EBDBF22CF58
coolant entry diameter	71CF2985AA87C
coolant entry inclination angle	71EBDBF2CEE6A
coolant entry rotation angle	71EBDBF289BB9
coolant entry style code	71CF2985DCED3

Table 1 *(continued)*

Property name	Identification code (BSU)
coolant entry thread size	71D07558CEF8A
coolant exit diameter	71CF298AA8D1F
coolant exit style code	71CF2985FC5FC
coolant exit thread size	71D075633189D
coolant pressure	71EAC478A4164
coolant radial entry thread size	71CF298963036
coolant ring seat width	71CF298EB6D72
coolant supply property	71EBB342CC751
cutting point translation X-direction	71FD1E2EDD973
cutting point translation Y-direction	71FD1E2F66B38
damping property	71CED03D70452
data chip provision	71CF29869CA0F
diameter access hole	71EBB2F865924
diameter bolt circle	71EAC0DECE78F
drill back taper	71EAC81AD9AE1
driving key type	71EC5E1ECC776
flange diameter	71EC61D8A1771
flange diameter internal	71EC61D7F2071
flange height	71EEF5384E141
flange location	71F90EA1ED67E
flange thickness	71EEF53809764
flange width	71EEF5387E914
fluted land width	71EAC8210DF36
functional height	71CF29994E737
functional length	71DCD39338974
functional length minimum	71EBC1EB8456A
functional width	71CF29984CDA7
hand	71CF29872F0AB
inscribed circle property	71D1C82A5036D
insert included angle	71CE7A96BC122
insert interface code	71CE7A9936610
insert length	71CE7A9DFA23A
insert seat size code	71CEAEBF2A69F
insert shape code	71CE7A9F0C79F
insert thickness	71CE7A9F5308C
insert width	71CE7A9FB11C3
kappa	71ED6E4A7EFBA
keyway property	71DF5C0761888
keyway width	71D0841ADC9E0
margin width	71EAC828C8308
overall height	71D078EB73E87

Table 1 *(continued)*

Property name	Identification code (BSU)
overall length	71D078EB7C086
overall length minimum	71EBC1E8857BE
overall width	71CF299257986
phi	71ED6E4AE850B
protruding length	71DCD394BB20E
rho	71ED6E4B254E5
rotational speed maximum	71DF153A691F2
rounded corner property	71DD7011A3D86
runout axial	71ED6A70807F7
runout axial adjustment	71D0845C77193
runout radial	71DF8C660035E
runout radial adjustment	71D0846298D19
shank diameter	71CF29862B277
shank height	71CF29883E014
shank length	71CF298870946
shank width	71CF298751FCF
side	71EBDBF130AE6
thread diameter	71E02C5C2EED3
thread hand	71E033FCBB61C
thread length	71FC209CD4A91
thread pitch	71CEAEC08D4B0
thread starts	71FC06ABEA7D3
thread tolerance class	71DF153FA5F85
threads per inch	71D1A6AAC8707
tool changer interference diameter maximum	71CF298A3A99A
tool changer interference length minimum	71CF2989AF0E0
tool style code	71D078FBF6C68
torque	71DF153B14F02
unit system	71EBBA9ED6C0A
usable length	71EBB33490FDA
usable length maximum	71CF2992BDBCC
web taper	71EAC823D95A7
web thickness	71EAC82313165
weight of item	71CED03C97AAB
wiper edge property	71CED022114EC
xyw plane distance	71ED6E4F42626
xzw plane distance	71ED6E4F7A8CF
yzw plane distance	71ED6E4FA83F6

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 (50) 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 technical specification 13399 part (50) version (2) object (2) reference systems (2)}

Annex B
(informative)

Classification table

Table C.1 shows the classification structure of the generic families in the dictionary with an expanded structure for the classes of reference systems and other common concepts. The purpose of the table is to show the relationships between the classes related to reference systems, common concepts and the other classes in the ISO 13399 series.

NOTE Annex C contains the full definition of all the classes that are relevant to reference systems and common concepts.

Table C.1 — Classification

Classification structure	Parent	BSU
cutting tool library	Root	71CE7A72B6DA7
adaptive item type	71CE7A72B6DA7	71EAD37F18F34
adjustment	71CE7A72B6DA7	71ED884159C90
adjustment axial	71ED884159C90	71ED88419A97C
adjustment radial	71ED884159C90	71ED8841BA543
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
boring	71DFF83D21D50	71DFF83D3B0A4
broaching circular	71DFF83D21D50	71DFF83D551E3
broaching linear	71DFF83D21D50	71DFF83D6FA17
counterboring	71DFF83D21D50	71DFF83D897BB
countersinking	71DFF83D21D50	71DFF83DB5E40
drilling	71DFF83D21D50	71DFF83DD3EAA
drilling deep hole	71DFF83D21D50	71DFF83E498D2
drilling step	71DFF83D21D50	71DFF83E67286
grooving	71DFF83D21D50	71DFF83E92592
milling face	71DFF83D21D50	71DFF83EA9476
milling profile	71DFF83D21D50	71DFF83EE1225
milling shoulder	71DFF83D21D50	71DFF83EF5A57
milling slot	71DFF83D21D50	71DFF83F249B1
parting	71DFF83D21D50	71DFF83F56124
reaming cylindrical	71DFF83D21D50	71DFF83F6CC6E
reaming profile	71DFF83D21D50	71DFF83F888E5

Table C.1 *(continued)*

Classification structure	Parent	BSU
slitting	71DFF83D21D50	71DFF83FA2ED7
threading external	71DFF83D21D50	71DFF83FB8E3A
threading internal	71DFF83D21D50	71DFF83FE65D6
trepanning	71DFF83D21D50	71DFF84016666
turning external	71DFF83D21D50	71DFF84041924
turning internal	71DFF83D21D50	71DFF8404F82C
cutting tool	71CE7A72B6DA7	71CE7A7A5038B
flange	71CE7A72B6DA7	71EC5A767182E
keyway	71CE7A72B6DA7	71DF5C026BCE7
locking mechanism	71CE7A72B6DA7	71EBAB85BB5FA
reference system	71CE7A72B6DA7	71CF2968F7A9E
primary coordinate system	71CF2968F7A9E	71D188F129725
coordinate system workpiece side	71CF2968F7A9E	71EF00655FB61
cutting reference point	71CF2968F7A9E	71CF29A40396A
feed direction primary	71CF2968F7A9E	71ED6A7959A34
irregular insert position	71CF2968F7A9E	71D1A2CB23A32
master insert	71CF2968F7A9E	71D0808DA853B
mirror plane	71CF2968F7A9E	71D19F532AC75
prismatic adaptive item position	71CF2968F7A9E	71D19F4A9D1AE
prismatic tool item position	71CF2968F7A9E	71D10668FA109
regrinding	71CF2968F7A9E	71EAC81A64368
regular insert position	71CF2968F7A9E	71D0181931BAE
round adaptive item position	71CF2968F7A9E	71DF0A33D2E7A
round tool item position	71CF2968F7A9E	71D19F4B58F60
theoretical sharp point	71CF2968F7A9E	71FAE7B6D87BC
tool cutting edge plane	71CF2968F7A9E	71DF0A34A8156
tool feed plane	71CF2968F7A9E	71DF0A38E1098
tool rake plane	71CF2968F7A9E	71DF0A3C6BB36
xy-plane	71CF2968F7A9E	71D188FC65486
xyw-plane	71CF2968F7A9E	71ED6E3F268C6
xz-plane	71CF2968F7A9E	71CF29A3CDE2F
xzw-plane	71CF2968F7A9E	71ED6E3E9AECB
yz-plane	71CF2968F7A9E	71D188F971983
yzw-plane	71CF2968F7A9E	71ED6E3F84723
runout axial	71CE7A72B6DA7	71EDD2B84143C
runout radial	71CE7A72B6DA7	71EDD2B858274
tool item feature	71CE7A72B6DA7	71DD70376771D
tool item type	71CE7A72B6DA7	71E01A004C775
tool thread external	71CE7A72B6DA7	71FC1D22BF4CD
thread inch external	71FC1D22BF4CD	71FC20991AEE8
thread metric external	71FC1D22BF4CD	71FC2098BC963

Table C.1 *(continued)*

Classification structure	Parent	BSU
thread trapezoidal external	71FC1D22BF4CD	71FC209969F43
tool thread internal	71CE7A72B6DA7	71FC1D25097D7
thread inch internal	71FC1D25097D7	71FC209ACEA25
thread metric internal	71FC1D25097D7	71FC209A5C7F3
thread trapezoidal internal	71FC1D25097D7	71FC209B39D51

Annex C
(informative)

Class definitions

The content of this annex is limited to the classes of common concepts and the reference systems needed to define the classes and properties in ISO 13399.

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:

Illustration reference: < BSU of reference diagram > Figure < Annex.illustration number >

71ED884159C90–001 **001**

adjustment **adj**

device for making an alteration to achieve a different position

Subclasses:

71ED88419A97C-001	adjustment axial
71ED8841BA543–001	adjustment radial

Properties:

71EBBE66AA8A3–001	adjustment datum
71EBBE67E4BD6–001	adjustment deviation lower
71EBBE682E490–001	adjustment deviation upper
71EBBE6A5BF09–001	adjustment direction
71EBBE7266DA2–001	adjustment increment
71EBBE664BCBD-001	adjustment limit maximum
71EBBE668A8F3–001	adjustment limit minimum
71EBBE72A6287–001	adjustment range

71ED88419A97C-001 **001**

adjustment axial **adjax**

device for making an alteration to achieve a different position in a direction parallel to the longitudinal axis of a component

71ED8841BA543–001 **001**

adjustment radial **adjra**

device for making an alteration to achieve a different position in a direction perpendicular to the longitudinal axis of the component.

71E02520881F1–001 **001**

bolt hole circle **bhcirc**

arrangement of holes in a circle to enable a bolted connection.

Properties:

71ED6E58E5A62–001	bolt hole circle count
71EBB2F865924–001	diameter access hole
71EAC0DECE78F-001	diameter bolt circle

71DF8C3C065EB-001 **001**

coolant supply **cool**

system of channels to supply a fluid to reduce the temperature of the cutting operation.

NOTE The fluid could be a liquid or a gas.

Properties:

71EBDBF22CF58–001	coolant entry centre line distance
71CF2985AA87C-001	coolant entry diameter
71EBDBF2CEE6A-002	coolant entry inclination angle
71EBDBF289BB9–002	coolant entry rotation angle
71CF2985DCED3–001	coolant entry style code
71D07558CEF8A-001	coolant entry thread size
71CF298AA8D1F-001	coolant exit diameter
71CF2985FC5FC-001	coolant exit style code
71D075633189D-001	coolant exit thread size
71EAC478A4164–001	coolant pressure
71CF298963036–001	coolant radial entry thread size
71CF298EB6D72–001	coolant ring seat width

71DFF83D21D50–001 **001**

cutting operation **ctp**

Removal of material from a workpiece by a defined cutting edge or edges.

Subclasses:

71DFF83D3B0A4–001	boring
71DFF83D551E3–001	broaching circular
71DFF83D6FA17–001	broaching linear
71DFF83D897BB-001	counterboring
71DFF83DB5E40–001	countersinking
71DFF83DD3EAA-001	drilling
71DFF83E498D2–001	drilling deep hole
71DFF83E67286–001	drilling step
71DFF83E92592–001	grooving
71DFF83EA9476–001	milling face
71DFF83EE1225–001	milling profile
71DFF83EF5A57–001	milling shoulder
71DFF83F249B1–001	milling slot
71DFF83F56124–001	parting
71DFF83F6CC6E-001	reaming cylindrical
71DFF83F888E5–001	reaming profile
71DFF83FA2ED7–001	slitting
71DFF83FB8E3A-001	threading external
1DFF83FE65D6–001	threading internal
71DFF84016666–001	trepanning
71DFF84041924–001	turning external
71DFF8404F82C-001	turning internal

71DFF83D3B0A4–001 **001**

boring **brg**

changing the diameter of an existing hole in a workpiece with one or more passes of a cutting tool

71DFF83D551E3–001 **001**

broaching circular **bchc**

changing the dimensions of an existing surface profile by a single circular motion of a cutting tool

71DFF83D6FA17–001 **001**

broaching linear **bchl**

changing the dimensions of an existing surface profile by a single linear motion of a cutting tool

71DFF83D897BB-001 **001**

counterboring **ctbg**

creating an enlarged section of a hole to provide concentric holes with the transitory shoulder between the holes at 90° to the axis of the holes

71DFF83DB5E40–001 **001**

countersinking **cntsg**

creating an enlarged section of a hole to provide concentric holes with the transitory shoulder between the holes at an angle to the axis of the holes

71DFF83DD3EAA-001 **001**

drilling **drg**

creating a new cylindrical hole in a workpiece where the depth of the hole is normally less than 10 times the diameter of the hole

NOTE Either the cutting tool or the workpiece can rotate.

71DFF83E498D2–001 **001**

drilling deep hole **dpdg**

creating a new cylindrical hole in a workpiece where the depth of the hole is normally more than 10 times the diameter of the hole

71DFF83E67286–001 **001**

drilling step **drlsp**

creating a new hole with more than one diameter by a single operation

71DFF83E92592–001 **001**

grooving **gvg**

creating multiple connected surfaces on a circular section of a workpiece

71DFF83EA9476–001 **001**

milling face **mlfc**

creating a single flat external surface on a workpiece by a rotating tool

NOTE The feed is achieved by the motion of the workpiece or by the motion of the cutting tool or by the combination of both motions.

71DFF83EE1225–001 **001**

milling profile **mlprf**

creating curved surfaces on a workpiece by a rotating cutting tool

NOTE The feed is achieved by the motion of the workpiece or by the motion of the cutting tool or by the combination of both motions.

71DFF83EF5A57–001 **001**

milling shoulder **mlshd**

creating perpendicular connected surfaces on a workpiece by a rotating cutting tool

NOTE The feed is achieved by the motion of the workpiece or by the motion of the cutting tool or by the combination of both motions.

71DFF83F249B1–001 **001**

milling slot **mlslt**

creating multiple connected surfaces in the workpiece by a rotating cutting tool

NOTE The feed is achieved by the motion of the workpiece or by the motion of the cutting tool or by the combination of both motions.

71DFF83F56124–001 **001**

parting **part**

separating a rotating workpiece into two parts with a stationary cutting tool

71DFF83F6CC6E-001 **001**

reaming cylindrical **rmcyl**

changing the diameter of an existing cylindrical hole to achieve a close tolerance on the diameter and to improve the surface finish

71DFF83F888E5–001 **001**

reaming profile **rmprf**

changing the diameter of an existing profiled hole to achieve a close tolerance on the diameter and to improve the surface finish

71DFF83FA2ED7–001 **001**

slitting **sltg**

separating a stationary workpiece into two parts with a rotating tool

71DFF83FB8E3A-001 **001**

threading external **thext**

creating a screw thread on the external surface of a workpiece with a cutting tool

NOTE This operation includes: die threading, thread turning and thread milling operations.

71DFF83FE65D6–001 **001**

threading internal **thint**

creating a screw thread on an internal surface of a workpiece with a cutting tool

NOTE This operation includes: tapping, thread turning and thread milling operations.

71DFF84016666–001 **001**

trepanning **trpg**

creating a new annular hole that leaves the central portion of the hole intact

NOTE The central portion can be left attached to the workpiece or can be detached.

71DFF84041924–001 **001**

turning external **trnext**

creation of a new external surface on a rotating workpiece with a stationary cutting tool

71DFF8404F82C-001 **001**

turning internal **trnint**

creating a new internal surface on a rotating workpiece by a stationary cutting tool

71CE7A7A5038B-001 **001**

cutting tool **tool**

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

NOTE A cutting tool could be an assembly of one or more adaptive items a tool item and several cutting items on a tool item.

71EC5A767182E-001 **001**

flange **flange**

projecting rim or edge on the outside of an object

Properties:

71EC61D8A1771–001	flange diameter
71EC61D7F2071–001	flange diameter internal
71EEF5384E141–001	flange height
71F90EA1ED67E-002	flange location
71EEF53809764–001	flange thickness
71EEF5387E914–001	flange width

71DF5C026BCE7–001 **001**

keyway **kwy**

slot in which a shaped piece of metal can be inserted to transfer torque between two connected items

Properties:

71D0841ADC9E0–001 keyway width

71EBAB85BB5FA-001 **001**

locking mechanism **lock**

device that can be actuated to secure the coupling of two items together

Properties:

71EBBA9B56D06–001 actuation force

71EBBA9BCB5F2–001 actuation method

71DF153B14F02–001 torque

71CF2968F7A9E-001 **001**

reference system **refsys**

family of items that provide a reference basis for the definitions of properties

NOTE The convention for all the reference systems is the tool-in-hand system.

Subclasses:

71D188F129725–001	primary coordinate system
71EF00655FB61–001	coordinate system workpiece side
71CF29A40396A-001	cutting reference point
71ED6A7959A34–001	feed direction primary
71D1A2CB23A32–001	irregular insert position
71D0808DA853B-002	master insert
71D19F532AC75–002	mirror plane
71D19F4A9D1AE-002	prismatic adaptive item position
71D10668FA109–002	prismatic tool item position
71EAC81A64368–001	regrinding
71D0181931BAE-002	regular insert position
71DF0A33D2E7A-002	round adaptive item position
71D19F4B58F60–002	round tool item position
71FAE7B6D87BC-002	theoretical sharp point
71DF0A34A8156–002	tool cutting edge plane
71DF0A38E1098–002	tool feed plane
71DF0A3C6BB36–001	tool rake plane
71D188FC65486–001	xy-plane
71ED6E3F268C6–001	xyw-plane
71CF29A3CDE2F-001	xz-plane
71ED6E3E9AECB-001	xzw-plane
71D188F971983–001	yz-plane
71ED6E3F84723–001	yzw-plane

71D188F129725–001 001

primary coordinate system pcs

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

71EF00655FB61–001 001

coordinate system workpiece side csw

right-handed rectangular Cartesian system in three-dimensional space with three axes labelled XW, YW and ZW that are the intersections of the xyw-plane, the xzw-plane and the yzw-plane, respectively

71CF29A40396A-001 001

cutting reference point crp

theoretical point of the tool from which the major functional dimensions are taken

EXPLANATION For the calculation of this point, the following cases apply.

a) Case 1: Tool cutting edge angle ≤ 90 - the point is the intersection of: the tool cutting edge plane, the tool feed plane, and the tool rake plane.

b) Case 2: Tool cutting edge > 90 - the point is the intersection of: the tool feed plane, a plane perpendicular to tool feed plane and tangential to the cutting corner, and the tool rake plane.

c) Case 3: ISO tool styles D and V with only axial rake. The point is the intersection of: a plane perpendicular to the primary feed direction and tangential to the cutting edge (tangential point), a plane parallel to the feed direction through the tangential point, and the tool rake plane.

d) Case 4: Round inserts:

   — one feed direction parallel to the tool axis, primary used for turning tools. The point is the intersection of: a plane perpendicular to the primary feed direction and tangential to the cutting edge (tangential point), a plane parallel to the feed direction through the tangential point, and the tool rake plane.

   — one feed direction perpendicular to the tool axis, primarily used for milling tools. The point is the intersection of: a plane perpendicular to the primary feed direction and tangential to the cutting edge (tangential point), a plane parallel to the feed direction through the tangential point, and the tool rake plane.

   — two feed directions, one parallel to the tool axis and one perpendicular to the tool axis with two cutting reference points. Each point is the intersection of: a plane perpendicular to its feed direction and tangential to the cutting edge (tangential point), a plane parallel to the feed direction through the tangential point, and the tool rake plane.

REMARKS In Case 3, the theoretical sharp corner of the insert and the cutting reference point are on the plane that is perpendicular to the tool feed plane.

Illustration reference: Figures F.1, F.2 and F.3.

71ED6A7959A34–001 **001**

feed direction primary **fdp**

direction of movement of a cutting tool to achieve the main cutting function of the tool

71D1A2CB23A32–001 **001**

irregular insert position **irpos**

location of an irregular cutting item on the primary coordinate system

NOTE 1 The cutting edges are in the xy-plane with the insert located in the XY quadrant, the cutting profile is pointing in the negative Y direction, the physical extremity of the cutting profile is on the positive x-axis and the extreme physical point of the insert is on the y-axis.

NOTE 2 The definition applies to right-handed inserts. The position of left-handed inserts is as mirrored through the xz-plane.

Illustration reference: Figure F.10

71D0808DA853B-002 **001**

master insert **minst**

nominal replaceable cutting item used for defining the dimensions of a cutting tool

NOTE A master insert can substitute for either a regular or an irregular insert and uses the position of the item that it replaces.

REMARKS Definitions making use of a master insert also apply to solid and brazed tools.

Properties:

71FD1E2EDD973–001	cutting point translation X-direction
71FD1E2F66B38–001	cutting point translation Y-direction
71CF29872F0AB-001	hand
71D1C82A5036D-001	inscribed circle property
71CE7A96BC122–001	insert included angle
71CE7A9936610–001	insert interface code
71CE7A9DFA23A-001	insert length
71CEAEBF2A69F-001	insert seat size code
71CE7A9F0C79F-001	insert shape code
71CE7A9F5308C-001	insert thickness
71CE7A9FB11C3–001	insert width
71DD7011A3D86–001	rounded corner property
71CED022114EC-001	wiper edge property

71D19F532AC75–002 **001**

mirror plane **mplane**

YZ-plane in the primary coordinate system

Illustration reference: Figures F.5, F.7 and F.9

71D19F4A9D1AE-002 **001**

prismatic adaptive item position **paip**

location on the primary coordinate system of an adaptive item with planar sides

EXPLANATION 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.

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

71D10668FA109–002 **001**

prismatic tool item position **ptipos**

location on the primary coordinate system of a tool item with planar sides

EXPLANATION The base of the tool 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; the rake face of the primary cutting item shall be completely visible in the XZ quadrant; for cartridges, the top of the axial adjustment screw shall be coincident with XY-plane.

REMARKS Applies to right-handed tools. Left-handed items are as defined for right-handed items, but mirrored through the YZ-plane.

Illustration reference: Figure F.4

71EAC81A64368–001 **001**

regrinding **rgnd**

modifying the shape of a component of a cutting tool to restore the original shape or to create a new shape

Properties:

71EAC81F88336–001	body clearance depth
71EAC82B2A50E-001	chisel edge angle
71EAC82ADE5EA-001	chisel edge length
71EAC83CD450B-002	clearance angle axial
71EAC83B73825–002	clearance angle radial
71EAC81AD9AE1–001	drill back taper
71EAC8210DF36–001	fluted land width
71EAC828C8308–001	margin width
71EBC1E8857BE-001	overall length minimum
71EAC823D95A7–001	web taper
71EAC82313165–001	web thickness
71D0181931BAE-002	**001**
regular insert position	**ripos**

location of a regular cutting item on the primary coordinate system

NOTE 1 The cutting edges are placed on the XY-plane of the primary coordinate system with the insert located in the XY quadrant, the major cutting edge is on the positive x-axis and the extreme theoretical sharp point of the insert is on the y-axis.

NOTE 2 The definition applies to right-handed inserts. The position of left-handed inserts is as mirrored through the YZ-plane.

REMARKS The diagrams illustrate the positions for different shapes of inserts.

Illustration reference: See ISO/TS 13399-2:2014, Annex G.

71DF0A33D2E7A-002 **001**

round adaptive item position **raip**

location on the primary coordinate system of an adaptive item with a non-planar sided cross section

EXPLANATION The axis of the adaptive item shall be collinear 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 points in the Z direction shall also point towards the workpiece side.

REMARKS Applies to right-handed adaptive items. Left-handed items are as defined for right-handed items, but mirrored through the YZ-plane.

Illustration reference: Figure F.6

71D19F4B58F60–002 **001**

round tool item position **rtipos**

location on the primary coordinate system of a tool item with non-planar sided cross section

EXPLANATION The axis of the tool item shall be collinear 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; the rake face of the primary cutting item shall be visible in the XZ quadrant; if a bore is present, the vector of the bore of the item that points in the Z direction shall also point towards the workpiece side.

REMARKS Applicable to right-handed tools. Left-handed items are as defined for right-handed items, but mirrored through the YZ-plane.

Illustration reference: Figure F.8

71FAE7B6D87BC-002 **001**

theoretical sharp point **tsp**

intersection in the tool rake plane of the two planes that are perpendicular to the XZ-plane through the major and the minor cutting edges of a cutting item

Illustration reference: Figures F2 and F.3

71DF0A34A8156–002 **001**

tool cutting edge plane **tcep**

plane perpendicular to the XZ-plane through the major cutting edge of a master insert or of a solid tool

Illustration reference: Figures F.2 and F.3

71DF0A38E1098–002 **001**

tool feed plane **tfp**

plane perpendicular to the XZ-plane and that is parallel to the primary feed direction of the tool and that is tangential to the cutting corner of a master insert or of a solid tool

Illustration reference: Figures F.2 and F.3

71DF0A3C6BB36–001 **001**

tool rake plane **trp**

plane that contains the cutting edges of a master insert or of a solid tool

Illustration reference: Figures F.2 and F.3

71D188FC65486–001 **001**

xy-plane **xyp**

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

71ED6E3F268C6–001 **001**

xyw-plane **xywp**

plane in the primary coordinate system related to the xy-plane in the primary coordinate system by the rotation angle PHI about the x-axis in a counterclockwise (anticlockwise) direction and a distance XYWD from the origin of the primary coordinate system

NOTE The xzw-plane, the xyw-plane and the yzw-plane are mutually perpendicular.

Properties:

71ED6E4AE850B-001	phi
71ED6E4F42626–001	xyw plane distance

71CF29A3CDE2F-001 **001**

xz-plane **xzp**

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

71ED6E3E9AECB-001 **001**

xzw-plane **xzwp**

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

NOTE The xzw-plane, the xyw-plane and the yzw-plane are mutually perpendicular.

Properties:

71ED6E4A7EFBA-002	kappa
71ED6E4F7A8CF-001	xzw plane distance

71D188F971983–001 **001**

yz-plane **yzp**

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

71ED6E3F84723–001 **001**

yzw-plane **yzwp**

plane in the primary coordinate system related to the yz-plane in the primary coordinate system by the rotation angle RHO about the y-axis in a counterclockwise direction and a distance YZWD from the origin of the primary coordinate system

NOTE The xzw-plane, the xyw plane and the yzw plane are mutually perpendicular.

Properties:

71ED6E4B254E5–001	rho
71ED6E4FA83F6–001	yzw plane distance

71EDD2B84143C-001 **001**

runout axial **rnoutax**

variation in the location of the end surface of the cutting reference point of a rotating tool item or the end surface of an adaptive item

Properties:

71ED6A70807F7–002	runout axial
71D0845C77193–002	runout axial adjustment

71EDD2B858274–001 **001**

runout radial **rnoutrd**

variation in the location of the circumference of a rotating tool item or adaptive item

Properties:

71DF8C660035E-002	runout radial
71D0846298D19–002	runout radial adjustment

71FC1D22BF4CD-001 **001**

tool thread external **thdex**

continuous and projecting helical ridge of uniform section on an external cylindrical surface

Subclasses:

71FC20991AEE8–001 thread inch external

71FC2098BC963–001 thread metric external

71FC209969F43–001 thread trapezoidal external

Properties:

71E02C5C2EED3–001 thread diameter

71E033FCBB61C-001 thread hand

71FC209CD4A91–001 thread length

71CEAEC08D4B0–001 thread pitch

71FC06ABEA7D3–001 thread starts

71DF153FA5F85–001 thread tolerance class

71D1A6AAC8707–001 threads per inch

71FC20991AEE8–001 **001**

thread inch external **thinex**

external tool thread with dimensions conforming to ISO 725

71FC2098BC963–001 **001**

thread metric external **thmtex**

external tool thread with dimensions conforming to ISO 724

71FC209969F43–001 **001**

thread trapezoidal external **thtzex**

external tool thread with dimensions conforming to ISO 2904

71FC1D25097D7–001 **001**

tool thread internal **thit**

continuous and projecting helical ridge of uniform section on a cylindrical or conical internal surface

Subclasses:

71FC209ACEA25–001 thread inch internal

71FC209A5C7F3–001 thread metric internal

71FC209B39D51–001 thread trapezoidal internal

Properties:

71E02C5C2EED3–001 thread diameter

71E033FCBB61C-001 thread hand

71FC209CD4A91–001 thread length

71CEAEC08D4B0–001 thread pitch

71FC06ABEA7D3–001 thread starts

71DF153FA5F85–001 thread tolerance class

71D1A6AAC8707–001 threads per inch

71FC209ACEA25–001 **001**

thread inch internal **thinit**

internal screw thread with dimensions conforming to ISO 725

71FC209A5C7F3–001 **001**

thread metric internal **thmtin**

internal screw thread with dimensions conforming to ISO 724

71FC209B39D51–001 **001**

thread trapezoidal internal **thtzin**

internal screw thread conforming to the dimensions in ISO 2904

Annex D
(informative)

Property definitions for reference systems and common concepts

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		
NOTE		
source of definition		
BSU of condition property	= name of condition property	
Code value	= meaning of code	
Source of code definition		

Illustration reference: Figure < Annex.illustration number >

Visible class:

Applicable classes:

Allowed values:

71EBBA9B56D06–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	N	
actuation force	**lmaf**	**LMAF**

linear force needed to actuate a locking mechanism

NOTE The actuation force could be applied either to lock or unlock the mechanism.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EBAB85BB5FA-001	locking mechanism

71EBBA9BCB5F2–001 **001** **X17**

NON_QUANTITATIVE_CODE_TYPE

actuation method **lam** **LAM**

description of how the locking mechanism is actuated

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71EBAB85BB5FA-001 locking mechanism

Allowed values:

man	=	manual
auto	=	automatic

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

STRING_TYPE

adaptor clamp **adc** **ADC**

Method of retaining an adaptor

Visible class:

71CE7A72B6DA7–001 **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:

71CE7A72B6DA7–001 **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

REMARKS: See diagram

Visible class:

71CE7A72B6DA7–001	**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

Visible class:

71CE7A72B6DA7–001	**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**	**1**
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 Balanced by design is not determined by rotational testing.

Visible class:

71CE7A72B6DA7–001	**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

71EAC81F88336–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
body clearance depth	**bcdp**	**BCDP**

the radial distance from the leading edge of the land to the portion of a fluted land reduced in diameter to provide diameter clearance

NOTE Twice the value of the body clearance depth subtracted from the cutting diameter equals the body clearance diameter.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**	

Applicable classes:

71E01A069566C-002	chamfer drill	
71E01A0751456–002	conical drill	
71FAE7AAE8247–001	core drill	
71E01A06BF88D-002	counterbore drill	
71E01A06A8A08–002	countersink drill	
71E01A05D27A8–002	end mill	
71EAC81A64368–001	regrinding	
71E01A067F73C-002	step drill	
71E01A0608FE4–002	twist drill	
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

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

Visible class:

71CE7A72B6DA7–001	**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

Visible class:

71CE7A72B6DA7–001	**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 This angle is not used for any connection taper.

REMARKS Applicable to both tool items and adaptive items.

Visible class:

71CE7A72B6DA7–001	**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**

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

Visible class:

71CE7A72B6DA7–001	**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 identifers.

Visible class:		
71CE7A72B6DA7–001	**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**

the 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.

Visible class:

71CE7A72B6DA7–001	**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:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71EADEA2BF8DF-001	**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:

71CE7A72B6DA7–001	**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**

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

Visible class:

71CE7A72B6DA7–001	**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

71ED6E58E5A62–001	**001**	**NR1..1**	
INT_TYPE			
bolt hole circle count	**bhcc**		**BHCC**

Number of bolt hole circles on a connection interface feature

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E02520881F1–001	bolt hole circle

71DF1523EE184–001	**001**	**X17**	
STRING_TYPE			
cartridge size code	**casc**		**CASC**

identifier for the size of a cartridge

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71EAC82B2A50E-001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	deg	
chisel edge angle	**cea**	**CEA**

the obtuse angle between the chisel edge and a line from the cutting reference point to the corresponding chisel edge corner.

ISO 5419

NOTE The angle is measured in a plane perpendicular to the tool item axis.

Illustration reference:	Figure E.5

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAC81A64368–001	regrinding

71EAC82ADE5EA-001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
chisel edge length	**cel**	**CEL**

length of the edge formed by the intersection of the flanks

ISO 5419

Illustration reference: Figure E.5

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAC81A64368–001	regrinding

71CED05149532–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	MPa	
clamping force maximum	**mxc**	**MXC**

Greatest force that can be applied by an assembly item

Visible class:

71CE7A72B6DA7–001	**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

Visible class:

71CE7A72B6DA7–001	**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:

71CE7A72B6DA7–001	**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:

71CE7A72B6DA7–001	**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:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAD3871D313–002	converter
71E01A0838E9B-001	prismatic broach
71E01A0E85121–001	prismatic tool holder
71EAD385E51A0–002	reducer

71EAC83CD450B-002	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	deg	
clearance angle axial	**alp**	**ALP**

angle between the flank of the major or minor cutting edge and a plane parallel to the XY plane passing through that cutting edge measured in the YZ plane

ISO 3002-1

NOTE This property is applicable to tool items.

Illustration reference:	See ISO/TS 13399-3:2014, Figure E.23
Visible class:	
71CE7A72B6DA7–001	**cutting tool library**
Applicable classes:	
71E01A04C377D-002	broach
71D1066F279AD-002	cartridge
71E01A00BD93C-002	drill
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAC81A64368–001	regrinding
71E01A05104CF-002	turn

71EAC83B73825–002	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	deg	
clearance angle radial	**alf**	**ALF**

angle between the flank of the major or minor cutting edge and a plane parallel to the YZ plane passing through that cutting edge measured in the XY plane

ISO 3002-1

NOTE This property is applicable to tool items.

Illustration reference:	See ISO/TS 13399-3:2014, Figure E.23
Visible class:	
71CE7A72B6DA7–001	**cutting tool library**
Applicable classes:	
71E01A04C377D-002	broach
71D1066F279AD-002	cartridge
71E01A00BD93C-002	drill
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAC81A64368–001	regrinding
71E01A05104CF-002	turn

71EAC48CAD407–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
connection bore depth	**cdbp**	**CBDP**

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

Visible class:

71CE7A72B6DA7–001	**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.

Visible class:

71CE7A72B6DA7–001	**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

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EC61E726811–001	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

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EC61E726811–001	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.

EXPLANATION The value of a code shall be 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 1 Two items might be connected together if they have the same value of the code.

NOTE 2 The connection code is not applicable to assembly items, in general, but is applicable to the collet class.

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

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAD37F18F34–002	adaptive item type
71EC61E726811–001	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.

EXPLANATION The value of a code shall be 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 1 Two items might be connected together if they have the same value of the code.

NOTE 2 The connection code is not applicable to cutting items or assembly items in general but is applicable to the collet class.

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

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAD37F18F34–002	adaptive item type
71E01A04C377D-002	broach
71EC61E726811–001	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:

71CE7A72B6DA7–001	**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

Visible class:

71CE7A72B6DA7–001 **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

Visible class:

71CE7A72B6DA7–001 **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.

Visible class:

71CE7A72B6DA7–001	**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.

REMARKS The C value of this property is used to identify the design basis of tapered shanks such as Steep taper.

Visible class:

71CE7A72B6DA7–001 **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.

REMARKS See diagram.

Visible class:

71CE7A72B6DA7–001 **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.

REMARKS See diagram.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71EBDBF22CF58–001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

coolant entry centre line distance **cecid** **CECID**

Dimension between the tool item axis or the adaptive item axis and the axis of the coolant entry supply feature measured radially perpendicular to the item axis

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71DF8C3C065EB-001 coolant supply

71CF2985AA87C-001 **001** **NR2 S..7.3**

REAL_MEASURE_TYPE mm

coolant entry diameter **cnd** **CND**

Dimension of the opening through which coolant can enter the machine side of a tool item or an adaptive item.

REMARKS If there is a thread at the opening then the property: coolant entry thread size shall be used instead of this property.

Illustration reference: Figure E.1

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71DF8C3C065EB-001 coolant supply

71EBDBF2CEE6A-002	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	deg	

coolant entry inclination angle **ceia** **CEIA**

Angle between the tool item axis or the adaptive item axis and the coolant entry supply feature measured in a plane that is colinear with the coolant entry rotation angle and perpendicular to the XY-plane

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DF8C3C065EB-001	coolant supply

71EBDBF289BB9–002	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	deg	

coolant entry rotation angle **cera** **CERA**

Angle between the XZ-plane and a line between the axis of the coolant entry supply feature and either the tool item axis or the adaptive item axis measured in the negative direction (clockwise)

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DF8C3C065EB-001	coolant supply

71CF2985DCED3–001 **001** **NR1 S..1**

NON_QUANTITATIVE_INT_TYPE

coolant entry style code **cnsc** **CNSC**

Identifier for the arrangement for the entry of the coolant supply.

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71DF8C3C065EB-001 coolant supply

Allowed values:

0 = without coolant

1 = axial concentric entry

2 = radial entry

3 = axial concentric and radial entry

4 = axial concentric entry on circle

5 = radial entry before adaptor

6 = decentral over flange

7 = decentral over flange and axial

8 = decentral over slots on the shank

71D07558CEF8A-001 **001** **X17**

STRING_TYPE

coolant entry thread size **cnt** **CNT**

Identifier for the thread at the axial coolant entry on the machine side.

REMARKS If there is no thread at the opening then the property then coolant entry diameter shall be used instead of this property.

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71DF8C3C065EB-001 coolant supply

71CF298AA8D1F-001	**001**	**NR2 ..7.3**
REAL_MEASURE_TYPE	mm	
coolant exit diameter	**CXD**	

Dimension of the opening through which coolant can exit the workpiece side of a tool item or an adaptive item.

Illustration reference: Figure E.1

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DF8C3C065EB-001	coolant supply

71CF2985FC5FC-001 **001** **NR1 S..1**

NON_QUANTITATIVE_INT_TYPE

coolant exit style code **cxsc** **CXSC**

Identifier for the arrangement for the exit of the coolant supply

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71DF8C3C065EB-001 coolant supply

Allowed values:

0 = no coolant exit

1 = axial concentric exit

2 = radial exit

3 = axial inclined exit

4 = axial concentric on circle

5 = axial inclined exit with nozzle, adjustable

6 = decentral exit with nozzles, adjustable

71D075633189D-001 **001** **X17**

STRING_TYPE

coolant exit thread size **cxt** **CXT**

Identifier for the thread at the coolant exit on the workpiece side.

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71DF8C3C065EB-001 coolant supply

71EAC478A4164–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	MPa	
coolant pressure	**cp**	**CP**

Pressure of the coolant media at the entry of the tool item or adaptive item

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DF8C3C065EB-001	coolant supply

71CF298963036–001	**001**	**X17**
STRING_TYPE		
coolant radial entry thread size	**crnt**	**CRNT**

Identifier for the thread at the radial coolant entry on the machine side.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DF8C3C065EB-001	coolant supply

71CF298EB6D72–001	**001**	**NR2..7.3**
REAL_MEASURE_TYPE	mm	
coolant ring seat width	**crw**	**CRW**

Space needed to mount a coolant ring.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DF8C3C065EB-001	coolant supply

71EBB342CC751–001 **001** **1**

BOOLEAN_TYPE

coolant supply property **csp** **CSP**

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

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71EAD37F18F34–002 adaptive item type

71DF8C37D9115–002 connection interface feature

71E01A004C775–002 tool item type

71FD1E2EDD973–001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

cutting point translation X-direction **ctx** **CTX**

Difference in the direction of the x-axis between the cutting reference point and the theoretical sharp point.

Illustration reference: 71FC0A6E489FC-1 Figures F.2 and F.3

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71D1AA486FF89–002 equilateral equiangular

71D1AE11B8B77–002 equilateral nonequiangular

71D0808DA853B-002 master insert

7224CCDD587CF-001 non replaceable cutting item

71D1AE120D96E-002 nonequilateral equiangular

71D1AA489FD6E-002 nonequilateral nonequiangular

71DDA089C8D1E-002 specific profile insert

71FD1E2F66B38–001	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	mm		
cutting point translation Y-direction		**cty**	**CTY**

Difference in the direction of the y-axis between the cutting reference point and the theoretical sharp point.

Illustration reference: Figures F.2 and F.3

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
7224CCDD587CF-001	non replaceable cutting item
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71DDA089C8D1E-002	specific profile insert

71CED03D70452–001	**001**		**1**
BOOLEAN_TYPE			
damping property	**dpc**	**DPC**	

Ability to reduce the amplitude of vibrations

Visible class:

71CE7A72B6DA7–001	**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**	**1**
BOOLEAN_TYPE		
data chip provision	**dcp**	**DCP**

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

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71EBB2F865924–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
diameter access hole	**dah**	**DAH**

Dimension of a hole through an item to provide access to a screw or other feature

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E02520881F1–001	bolt hole circle

71EAC0DECE78F-001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
diameter bolt circle	**dbc**	**DBC**

The diameter of a circle on which the centres of cylindrical or threaded holes are placed to form a connection between a tool and an adaptive item.

Illustration reference: Figure E.3

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E02520881F1–001	bolt hole circle

71EAC81AD9AE1–001	**001**	**X17**
STRING_TYPE		
drill back taper	**dbt**	**DBT**

The reduction in diameter from the outer corners towards the shank expressed by the ratio of the reduction in diameter and the length of measurement.

ISO 5419

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAC81A64368–001	regrinding
71E01A0608FE4–002	twist drill

71EC5E1ECC776–001	**001**	**X17**
NON_QUANTITATIVE_CODE_TYPE		
driving key type	**dkty**	**DKTY**

Form of a driving key.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

Allowed values:

	Woodruff =	Woodruff
	parallel =	parallel sides
	tenon =	tenon

71EC61D8A1771–001	**001**	
REAL_MEASURE_TYPE	mm	
flange diameter	**df**	**DF**

Dimension between two parallel tangents on the outside edge of a flange.

Illustration reference: Figure E.4

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EC5A767182E-001	flange

71EC61D7F2071–001	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	mm		
flange diameter internal	**dfin**		**DFIN**

Largest dimension across the inside edge of an internal flange aperture

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EC5A767182E-001	flange

71EEF5384E141–001	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	mm		
flange height	**flgh**		**FLGH**

greatest dimension across a rectangular projecting rim or edge

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EC5A767182E-001	flange

71F90EA1ED67E-002	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	mm		
flange location	**flgl**		**FLGL**

Distance from the designated coordinate system to the front of a projecting rim or edge.

NOTE 1 For flanges on the machine side of an item, the distance is measured from the XY-plane to the front side of the flange (the flange face farthest from the XY-plane).

NOTE 2 For flanges on the workpiece side of an item, the distance is measured from the XYW-plane.

REMARKS For flanges on the workpiece side of an item, the front flange face is the connecting surface, therefore it is coincident with the XYW-plane and the distance (FLGL) from the XYW-plane is zero.

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71EC5A767182E-001 flange

71EEF53809764–001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

flange thickness **flgt** **FLGT**

Dimension through the body of a projecting rim or edge.

Illustration reference: Figure E.4

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71EC5A767182E-001 flange

71EEF5387E914–001 **001** **NR2 S..3.3**

REAL_MEASURE_TYPE mm

flange width **flgw** **FLGW**

The least of the two largest dimensions across a rectangular projecting rim or edge

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71EC5A767182E-001 flange

71EAC8210DF36–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
fluted land width	**flw**	**FLW**

Distance between the leading edge of the margin and the heel

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A0751456–002	conical drill
71FAE7AAE8247–001	core drill
71EAC81A64368–001	regrinding
71E01A067F73C-002	step drill
71E01A0608FE4–002	twist drill

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

Visible class:

71CE7A72B6DA7–001	**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..3.3**
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.

Visible class:

71CE7A72B6DA7–001	**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:

71CE7A72B6DA7–001	**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

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71CF29872F0AB-001 **001** **X1**

NON_QUANTITATIVE_CODE_TYPE

hand **hand** **HAND**

Identifier used for the direction of rotation of rotating tool items and rotating adaptive items and for the position of the cutting edge of a stationary tool item and for the position of the connection used for a tool item or adaptive item with respect to the axis of the item and for the orientation of a replaceable cutting item with respect to the insert reference system and for the orientation of a clamp.

ISO 3002-1

Visible class:

71CE7A72B6DA7–001 **cutting tool library**

Applicable classes:

71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71EC56B608ADC-001	insert wedge
71FAD54E2FE26–001	lever top clamp
71D0808DA853B-002	master insert
7224CCDD587CF-001	non replaceable cutting item
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71DDA089C8D1E-002	specific profile insert
71E01A004C775–002	tool item type

Allowed values:

R = right hand

L = left hand

N = neutral (both) hand

71D1C82A5036D-001	**001**	**1**
BOOLEAN_TYPE		
inscribed circle property	**inclp**	**INCLP**

Possession by a cutting insert type of an inscribed circle

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71D1AA6635E76–002	round insert

71CE7A96BC122–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	deg	
insert included angle	**epsr**	**EPSR**

Angle between the major and the minor cutting edges of a cutting item.

Illustration reference: See ISO/TS 13399-3:2014, Figures E.3, E.4, E.9, E.10 and E.18.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
7224CCDD587CF-001	non replaceable cutting item
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71DDA089C8D1E-002	specific profile insert

71CE7A9936610–001	**001**	**X17**

STRING_TYPE

insert interface code	**iic**	**IIC**

Identifier for the condition that a particular replaceable cutting item can be mounted on a particular tool item

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71D1AA6635E76–002	round insert
71DDA089C8D1E-002	specific profile insert
71E01A004C775–002	tool item type

71CE7A9DFA23A-001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
insert length	**insl**	**INSL**

Largest dimension of a replaceable cutting item.

Illustration reference: See ISO/TS 13399-2:2014, Figures E.13, E.17 and E.19.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DD700BC8BE2–002	ball nosed profile
71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71DDA089C8D1E-002	specific profile insert

71CEAEBF2A69F-001	**001**	**X17**
STRING_TYPE		
insert seat size code	**ssc**	**SSC**

Identifier for the size of a replaceable cutting item and the seat on a tool item or an assembly item.

NOTE The value of this identifier depends on both the shape of the cutting item and the size of the cutting item

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A04C377D-002	broach
71D1066F279AD-002	cartridge
71E01A00BD93C-002	drill
71D0808DA853B-002	master insert
71EAD70F1B95A-001	nest
71E01A04A8AEC-002	ream
71E0251F304E1–002	rotating borer
71E01A05104CF-002	turn

71CE7A9F0C79F-001	**001**	**X17**

NON_QUANTITATIVE_CODE_TYPE

insert shape code	**sc**	**SC**

Identifier for the shape of a regular insert.

ISO 1832:2012, 4.1

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
71EAD70F1B95A-001	nest
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71D1AA6635E76–002	round insert

Allowed values:

T = triangular 60° included angle

S = square

C = rhombic 80° included angle

D = rhombic 55° included angle

E = rhombic 75° included angle

M = rhombic 86° included angle

V = rhombic 35° included angle

L = rectangular

A = parallelogram 85° included angle

B = parallelogram 82° included angle

K = parallelogram 55° included angle

P = pentagonal

H = hexagonal

W = trigon

O = octagonal

R = round

71CE7A9F5308C-001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
insert thickness	**s**	**S**

Distance between the bottom and the cutting edge of a replaceable cutting item.

Illustration reference: See ISO/TS 13399-2:2014, Figures F.1 to F.8.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DD700BC8BE2–002	ball nosed profile
71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71D1AA6635E76–002	round insert
71DDA089C8D1E-002	specific profile insert

71CE7A9FB11C3–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
insert width	**w1**	**W1**

Distance between two sides of an insert when the inscribed circle cannot be used because of the shape of the insert.

Illustration reference: See ISO/TS 13399-2:2014, Figures E.9, E.10, E.14 and E.19

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DD700BC8BE2–002	ball nosed profile
71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71DDA089C8D1E-002	specific profile insert

71ED6E4A7EFBA-002	**002**	**NR2 S..3.3**
REAL_MEASURE_TYPE	deg	
kappa	**kap**	**KAP**

Rotation angle for the yzw-plane counterclockwise about the y-axis

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAD3871D313–002	converter
71EAD388173EE-001	driver
71EAD385E51A0–002	reducer
71ED6E3E9AECB-001	xzw-plane

71DF5C0761888–001	**001**	**1**

BOOLEAN_TYPE

keyway property	**kyp**	**KYP**

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

Visible class:

71CE7A72B6DA7–001	**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

71D0841ADC9E0–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
keyway width	**kww**	**KWW**

Nominal width of a keyway in a tool item and an adaptive item.

Illustration reference: Figure E.2

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DF5C026BCE7–001	keyway

71EAC828C8308–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
margin width	**mw**	**MW**

Dimension of the cylindrical leading edge of the fluted land measured perpendicular to the leading edge.

ISO 5419

REMARKS Called “land” in ISO 5419.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAC81A64368–001	regrinding

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:

71CE7A72B6DA7–001	**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..3.3**
REAL_MEASURE_TYPE	mm	
overall length	**oal**	**OAL**

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

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71EBC1E8857BE-001	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	mm		
overall length minimum	**oaln**		**OALN**

Least allowable length of an item after regrinding

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A0E9CBA9–001	boring bar
71EAC81A64368–001	regrinding

71CF299257986–002	**001**	**NR2 7.3**	
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:

71CE7A72B6DA7–001	**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-001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	deg	
phi	**phi**	**PHI**

Rotation angle for the xyw-plane counterclockwise about the x-axis

Visible class:

71CE7A72B6DA7–001 cutting tool library

Applicable classes:

71EAD3871D313–002	converter
71EAD388173EE-001	driver
71EAD385E51A0–002	reducer
71ED6E3F268C6–001	xyw-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.

Visible class:

71CE7A72B6DA7–001	**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

71ED6E4B254E5–001	**001**	**NR2 S..3.6**
REAL_MEASURE_TYPE	deg	
rho	**rho**	**RHO**

Rotation angle for the yzw-plane counterclockwise about the y-axis

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71CE7A72B6DA7–001	**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

71DD7011A3D86–001	**001**	**0,1**
BOOLEAN_TYPE		
rounded corner property	**RCP**	

Possession of a corner with a constant radius.

Illustration reference: 71DD6C8802580–1 = corner identity

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DD700BE1D04–002	drilling profile
71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71DD700BFD9B9–002	grooving parting profile
71D0808DA853B-002	master insert
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71DDA089C8D1E-002	specific profile insert
71DD700C151B5–002	threading profile

71ED6A70807F7–002	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
runout axial	**rna**	**RNA**

Total variation of all cutting reference points from the XY plane measured in the direction of the Z axis in a defined plane of rotation

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EDD2B84143C-001	runout axial

71D0845C77193–002	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	microns		
runout axial adjustment	**adjar**		**ADJAR**

Magnitude of the range of adjustment parallel to the Z axis to align cutting edges into the same axial position

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EDD2B84143C-001	runout axial

71DF8C660035E-002	**001**		**NR2 S..3.3**
REAL_MEASURE_TYPE	mm		
runout radial	**rnr**		**RNR**

Total variation of all cutting reference points from the Z-axis measured perpendicular to the Z-axis in a defined plane of rotation

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EDD2B858274–001	runout radial

71D0846298D19–002	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	microns		
runout radial adjustment	**adjrr**		**ADJRR**

Magnitude of the range of adjustment perpendicular to the Z axis to align cutting edges to the same radial position

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EDD2B858274–001	runout radial

71CF29862B277–001	**001**	**NR2 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:

71CE7A72B6DA7–001	**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

71CF29883E014–001	**001**	**NR2 7.3**
REAL_MEASURE_TYPE	mm	
shank height	**h**	**H**

Dimension of the height of a shank

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A0E9CBA9–001	boring bar
71D1066F279AD-002	cartridge
71EAD3871D313–002	converter
71EAD388173EE-001	driver
71E01A0838E9B-001	prismatic broach
71E01A0E85121–001	prismatic tool holder
71EAD385E51A0–002	reducer

71CF298870946–001	**001**	**NR2 7.3**
REAL_MEASURE_TYPE	mm	
shank length	**ls**	**LS**

Dimension of the length of a shank

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A0E9CBA9–001	boring bar
71E02C544BABE-002	burr tool
71D1066F279AD-002	cartridge
71EAD3871D313–002	converter
71E0250E32A07–002	cylindrical broach
71E01A00BD93C-002	drill
71EAD388173EE-001	driver
71E01A008D13F-002	mill
71E01A0838E9B-001	prismatic broach
71E01A0E85121–001	prismatic tool holder
71E01A04A8AEC-002	ream
71EAD385E51A0–002	reducer
71E01A081855D-002	tapered broach
71E01A04E0236–002	threading tap

71CF298751FCF-001	**001**	**NR2..7.3**
REAL_MEASURE_TYPE	mm	
shank width	**b**	**B**

Dimension of the width of a shank

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A0E9CBA9–001	boring bar
71D1066F279AD-002	cartridge
71EAD3871D313–002	converter
71EAD388173EE-001	driver
71E01A0838E9B-001	prismatic broach
71E01A0E85121–001	prismatic tool holder
71EAD385E51A0–002	reducer

71EBDBF130AE6–001	**001**	**X17**
NON_QUANTITATIVE_CODE_TYPE		
side	**side**	**SIDE**

identifier of a condition to assign the value of a property of a tool item or adaptive item to either the machine side or the workpiece side of the item

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAD37F18F34–002	adaptive item type
71DF8C37D9115–002	connection interface feature

Allowed values:

mach = machine side

wkps = workpiece side

71E02C5C2EED3–001	**001**	**NR2 S..3**
REAL_MEASURE_TYPE	mm	
thread diameter	**td**	**TD**

Diameter of an imaginary cylindrical surface tangential to the crests of an external thread or to the roots of an internal thread.

NOTE This definition applies to both internal and external threads.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A04F70F7–002	threading die
71E01A04E0236–002	threading tap
71FC1D22BF4CD-001	tool thread external
71FC1D25097D7–001	tool thread internal

71E033FCBB61C-001	**001**	**X17**
NON_QUANTITATIVE_CODE_TYPE		
thread hand	**thdh**	**THDH**

Direction of the screwing motion of a screw thread.

ISO 5408

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DD700C151B5–002	threading profile
71FC1D22BF4CD-001	tool thread external
71FC1D25097D7–001	tool thread internal

Allowed values:

LEFT = left hand

RIGHT = right hand

71FC209CD4A91–001	**001**	**NR2 3..3**	
REAL_MEASURE_TYPE	mm		
thread length	**thlgth**		**THLGTH**

Distance between the ends of a portion of an item that includes the full profile of a thread

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71FC1D22BF4CD-001	tool thread external
71FC1D25097D7–001	tool thread internal

71CEAEC08D4B0–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
thread pitch	**TP**	

Axial distance between a point on a thread flank and the equivalent point of the immediately adjacent and corresponding flank.

ISO 5408

Illustration reference: See ISO/TS 13399-2:2014, Figures E.14, E.15 and E.18.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DD700C151B5–002	threading profile
71FC1D22BF4CD-001	tool thread external
71FC1D25097D7–001	tool thread internal

71FC06ABEA7D3–001	**001**	**NR1 S..1**	
INT_TYPE			
thread starts	**thsts**		**THSTS**

Number of starting points for a screw thread

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71FC1D22BF4CD-001	tool thread external
71FC1D25097D7–001	tool thread internal

71DF153FA5F85–001	**001**	**X17**

STRING_TYPE

thread tolerance class	**tctr**	**TCTR**

Identifier for the tolerances of a thread.

REMARKS The value for an internal metric thread could be 4H. The value for an external metric thread could be 5g.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DDA089C8D1E-002	specific profile insert
71E01A04F70F7–002	threading die
71EF07E083383–002	threading grooving mill
71E01A04E0236–002	threading tap
71FC1D22BF4CD-001	tool thread external
71FC1D25097D7–001	tool thread internal
71E01A05104CF-002	turn

71D1A6AAC8707–001	**001**	**NR2 S..3.3**

REAL_TYPE

threads per inch	**TPI**	**TPI**

Number of threads in a one inch length of a thread.

Illustration reference: See ISO/TS 13399-2:2014, Figure E.18.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71DD700C151B5–002	threading profile
71FC1D22BF4CD-001	tool thread external
71FC1D25097D7–001	tool thread internal

71CF298A3A99A-001	**001**	**NR2 S..3.3**

LEVEL_TYPE mm

tool changer interference diameter maximum	**dix**	**DIX**

Maximum diameter of a portion of a tool item or adaptive item body, that will not interfere with the tool changing operation.

NOTE It is intended to be used in conjunction with tool changer interference length minimum

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAD3871D313–002	converter
71E0250E32A07–002	cylindrical broach
71E01A00BD93C-002	drill
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAD385E51A0–002	reducer
71E01A0EAF067–001	system tool

71CF2989AF0E0–001	**001**	**NR2 S..3.3**	
LEVEL_TYPE	mm		
tool changer interference length minimum		**lin**	**LIN**

Minimum length of a portion of a tool item or adaptive item body that will not interfere with the tool changing operation.

NOTE It is intended to be used in conjunction with tool interference diameter maximum.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EAD3871D313–002	converter
71E0250E32A07–002	cylindrical broach
71E01A00BD93C-002	drill
71E01A008D13F-002	mill
71E01A04A8AEC-002	ream
71EAD385E51A0–002	reducer
71E01A0EAF067–001	system tool

71D078FBF6C68–001	**001**	**X17**	
STRING_TYPE			
tool style code	**tsyc**		**TSYC**

Identifier for the main design or shape of tool item or adaptive item.

NOTE A tool can be used for applications other than its main use.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71DF153B14F02–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	Nm	
torque	**tq**	**TQ**

Rotational force applied to an item

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71EBAB85BB5FA-001	locking mechanism

71EBBA9ED6C0A-001	**001**	**X17**
STRING_TYPE		
unit system	**ust**	**UST**

Description of the system of units in which the characteristics of an item are defined

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71EBB33490FDA-001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
usable length	**lu**	**LU**

Recommended length of a cutting tool that can be used in a particular cutting operation

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E02C544BABE-002	burr tool
71EAD3871D313–002	converter
71E01A00BD93C-002	drill
71E01A05D27A8–002	end mill
71E01A05B627B-002	face mill
71E01A0838E9B-001	prismatic broach
71E01A04A8AEC-002	ream
71EAD385E51A0–002	reducer
71E01A0540BE7–002	slab mill
71E01A081855D-002	tapered broach
71EF07E083383–002	threading grooving mill
71E01A04E0236–002	threading tap

71CF2992BDBCC-001	**002**	**NR2 S..3.3**
LEVEL_TYPE	mm	
usable length maximum	**lux**	**LUX**

Maximum length of a cutting tool that can be used in a particular cutting operation.

NOTE The usable length can be limited by interference between the tool body and the workpiece.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E02C544BABE-002	burr tool
71EAD3871D313–002	converter
71E0250E32A07–002	cylindrical broach
71E01A00BD93C-002	drill
71E01A008D13F-002	mill
71E01A0838E9B-001	prismatic broach
71E01A04A8AEC-002	ream
71E01A081855D-002	tapered broach
71E01A04E0236–002	threading tap

71EAC823D95A7–001	**001**	**X17**
STRING_TYPE		
web taper	**wbtp**	**WBTP**

The increase in web thickness from the front end of a fluted tool item towards the shank expressed by the ratio of the reduction in diameter and the length of measurement.

ISO 5419

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A0751456–002	conical drill
71E01A05D27A8–002	end mill
71EAC81A64368–001	regrinding
71E01A067F73C-002	step drill
71E01A04E0236–002	threading tap
71E01A0608FE4–002	twist drill

71EAC82313165–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
web thickness	**wbthk**	**WBTHK**

Dimension of the web measured normal to the axis at the front end of a fluted tool item.

ISO 5419

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71E01A0751456–002	conical drill
71E01A05D27A8–002	end mill
71EAC81A64368–001	regrinding
71E01A067F73C-002	step drill
71E01A04E0236–002	threading tap
71E01A0608FE4–002	twist drill

71CED03C97AAB-001	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	kg		
weight of item	**wt**	**WT**	

Force exerted by the mass of an item

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

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

71CED022114EC-001	**001**	**1**	
BOOLEAN_TYPE			
wiper edge property	**wep**		**WEP**

Possession of a wiper edge on a cutting item.

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71D1AA486FF89–002	equilateral equiangular
71D1AE11B8B77–002	equilateral nonequiangular
71D0808DA853B-002	master insert
71D1AE120D96E-002	nonequilateral equiangular
71D1AA489FD6E-002	nonequilateral nonequiangular
71DDA089C8D1E-002	specific profile insert

71ED6E4F42626–001	**001**	**NR2 S..3.3**	
REAL_MEASURE_TYPE	mm		
xyw plane distance	**xywd**		**XYWD**

Displacement of the xyw-plane from the origin of the coordinate reference system

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71ED6E3F268C6–001	xyw-plane

71ED6E4F7A8CF-001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
xzw plane distance	**xzwd**	**XZWD**

Displacement of the xzw-plane from the origin of the coordinate reference system

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71ED6E3E9AECB-001	xzw-plane

71ED6E4FA83F6–001	**001**	**NR2 S..3.3**
REAL_MEASURE_TYPE	mm	
yzw plane distance	**yzwd**	**YZWD**

Displacement of the yzw-plane from the origin of the coordinate reference system

Visible class:

71CE7A72B6DA7–001	**cutting tool library**

Applicable classes:

71ED6E3F84723–001	yzw-plane

Annex E
(informative)

Illustrations of properties

The diagrams in this annex illustrate properties that are defined in Annex D.

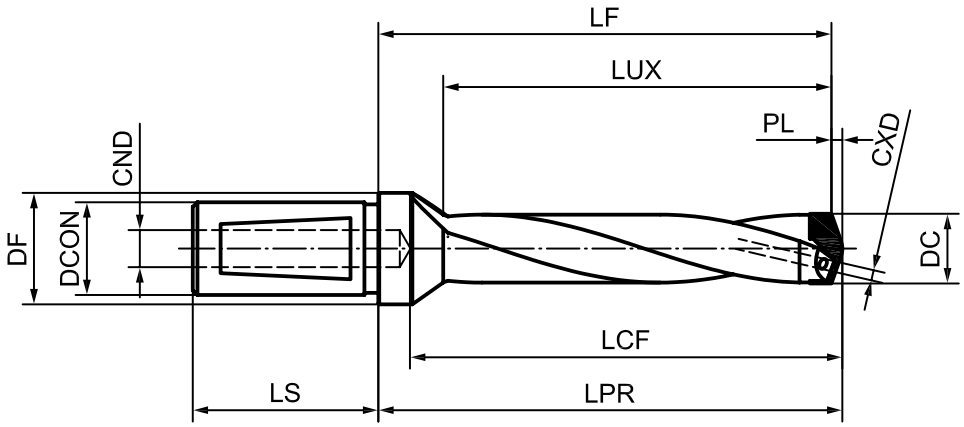

Figure E.1

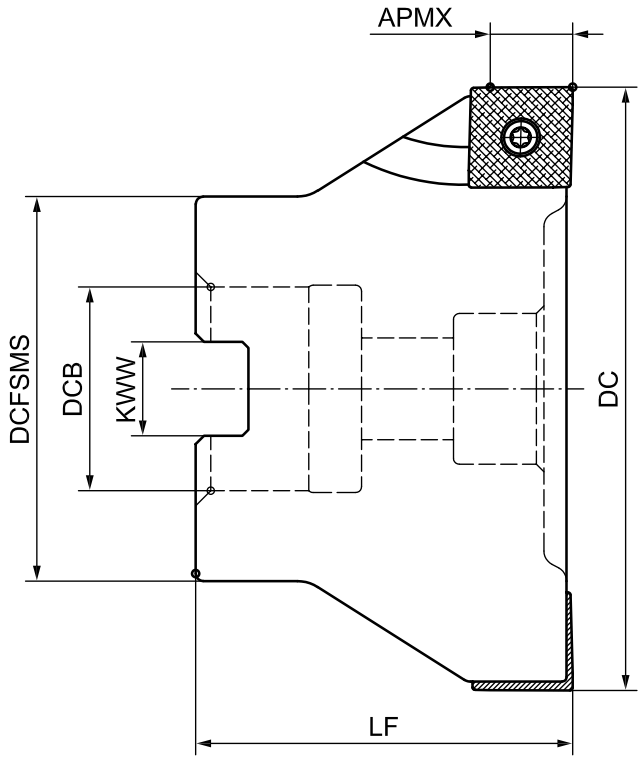

Figure E.2

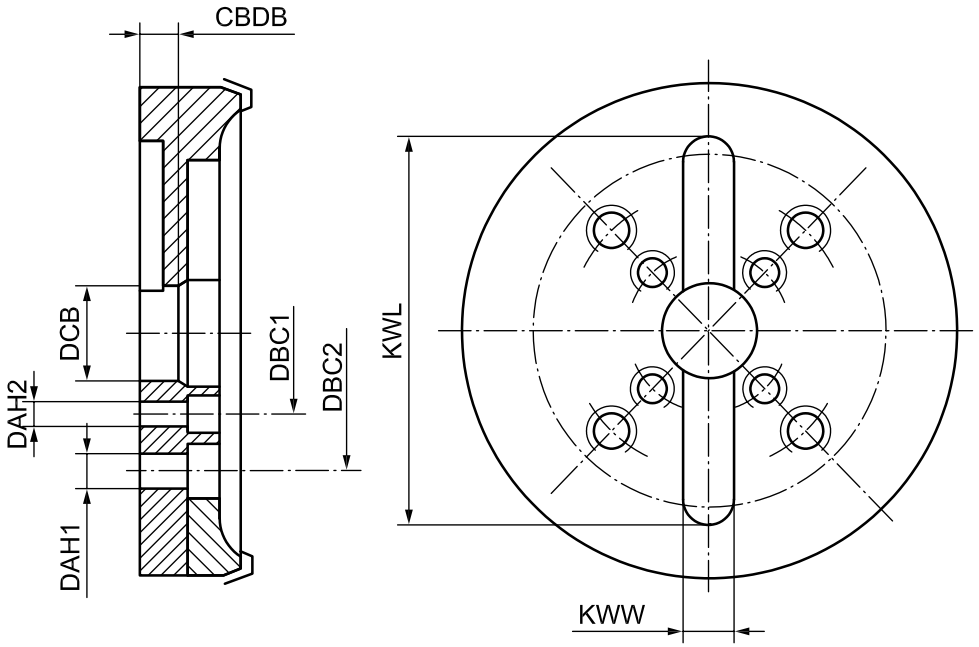

Figure E.3

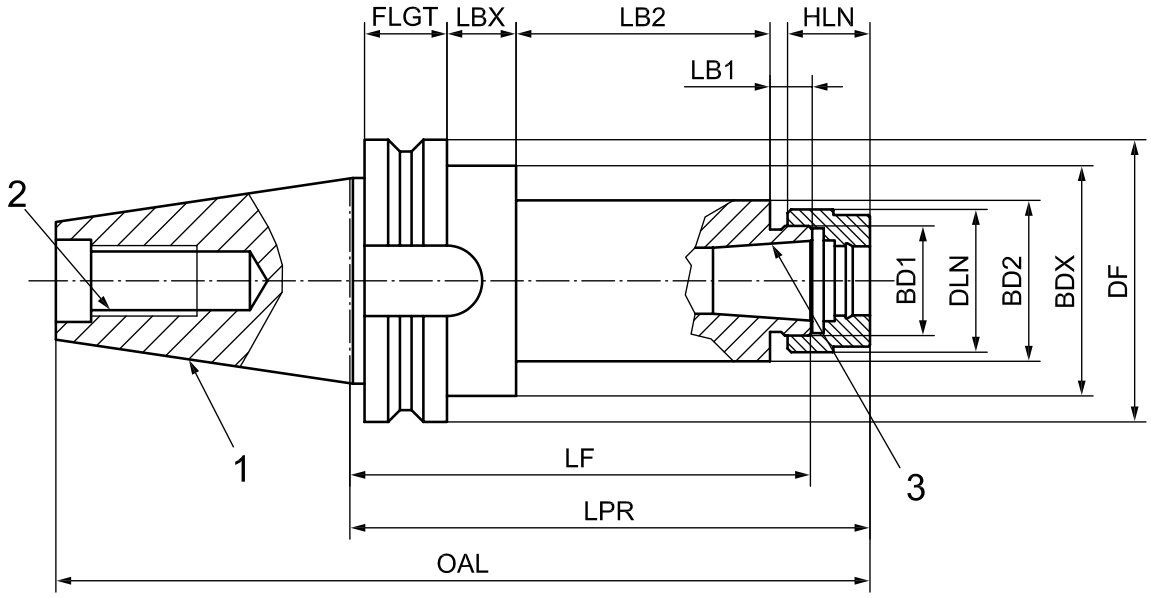

Figure E.4

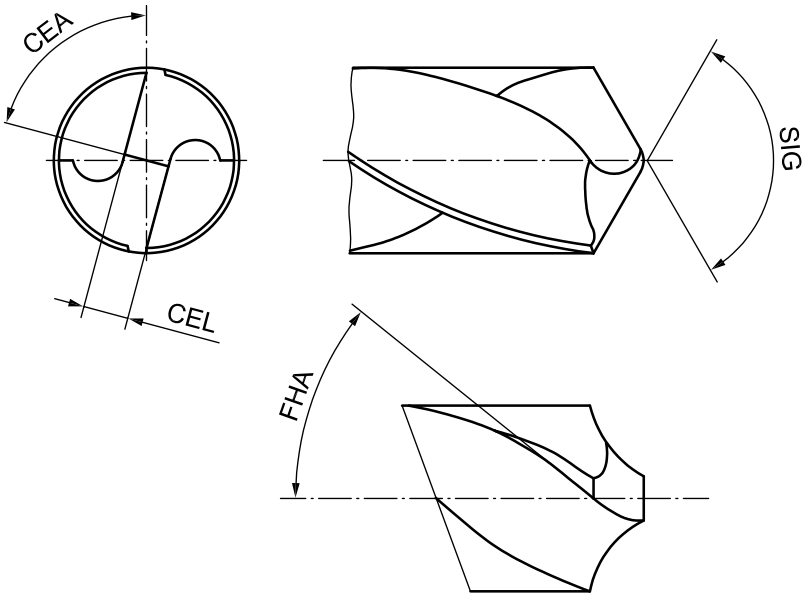

Figure E.5

Annex F
(informative)

Illustrations of reference systems

The diagrams in this annex illustrate reference systems that are defined in Annex C.

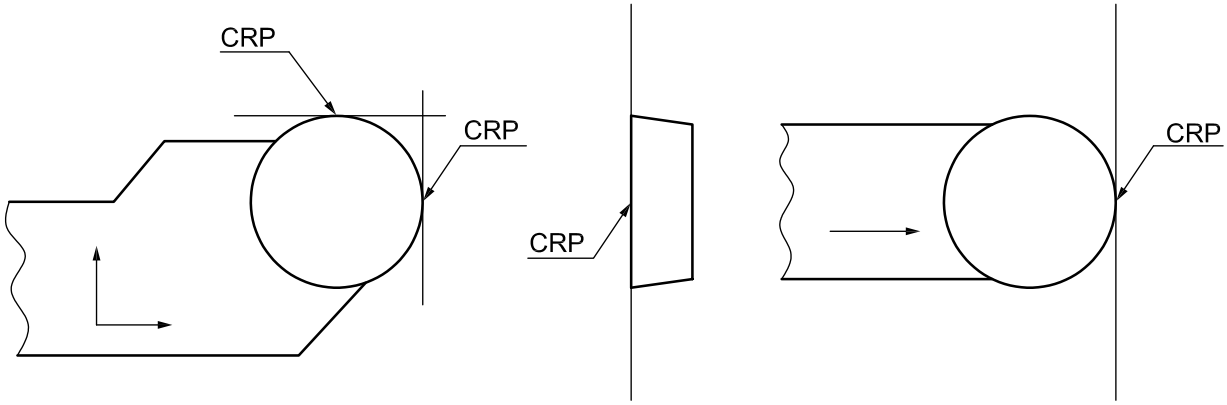

Figure F.1 — Cutting reference point for round inserts

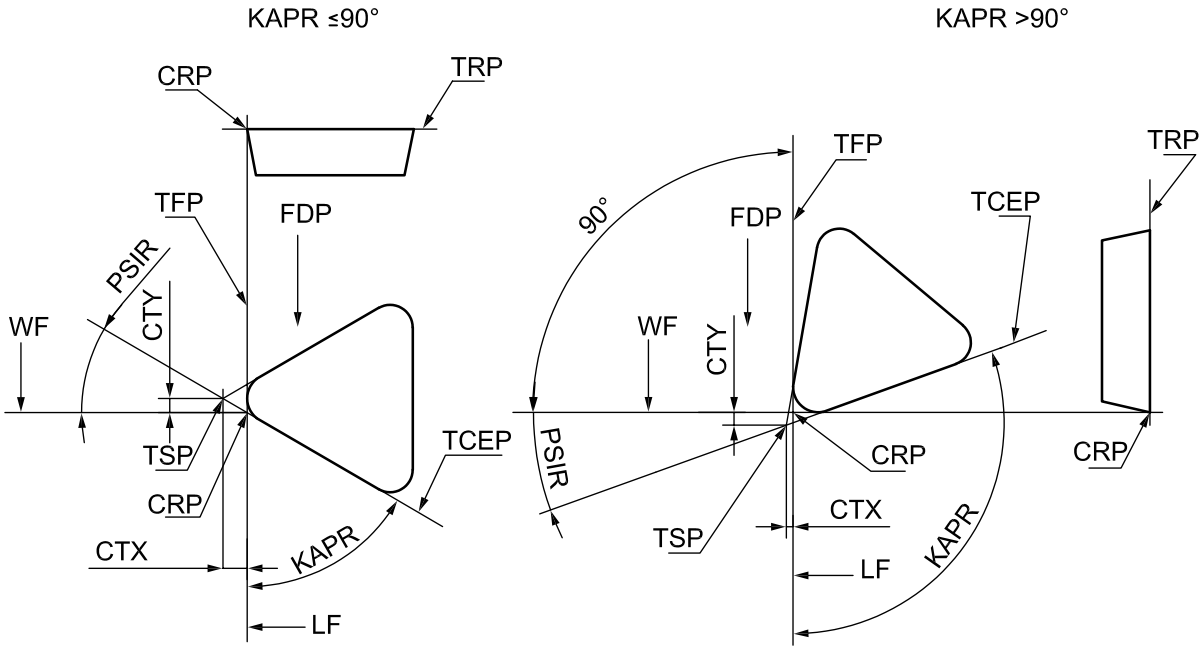

Figure F.2

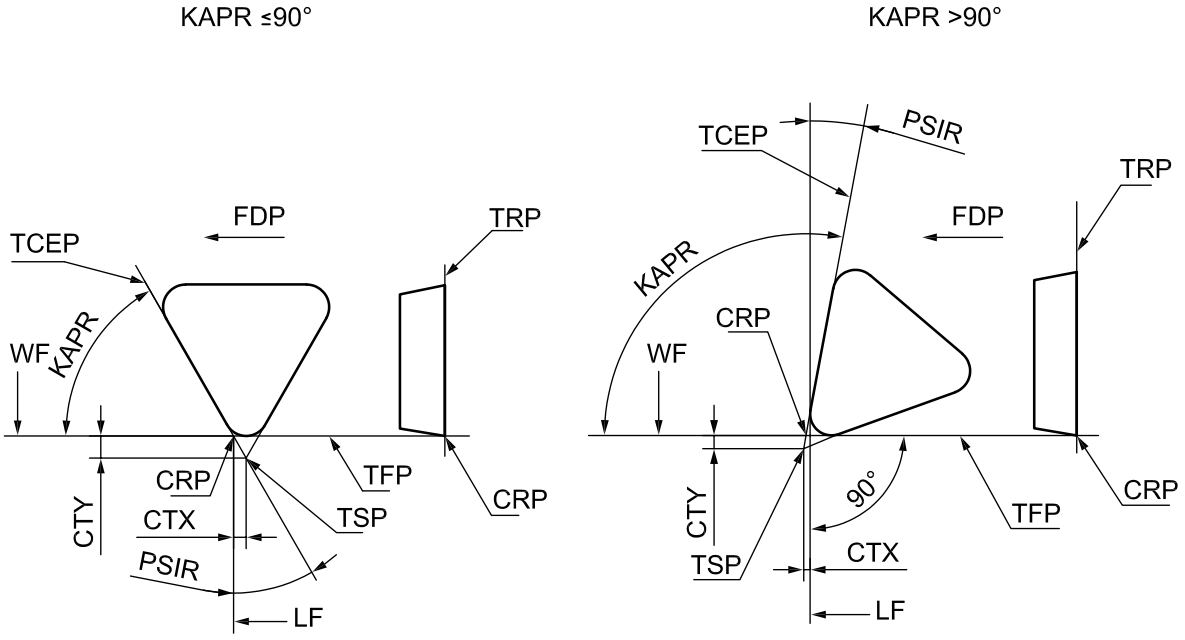

Figure F.3

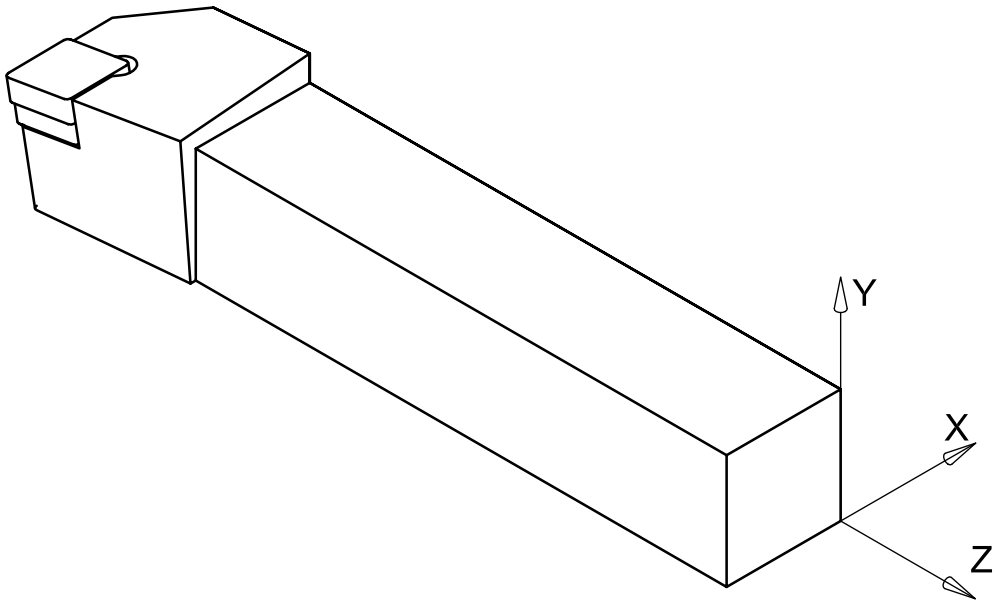

Figure F.4 — Prismatic item position

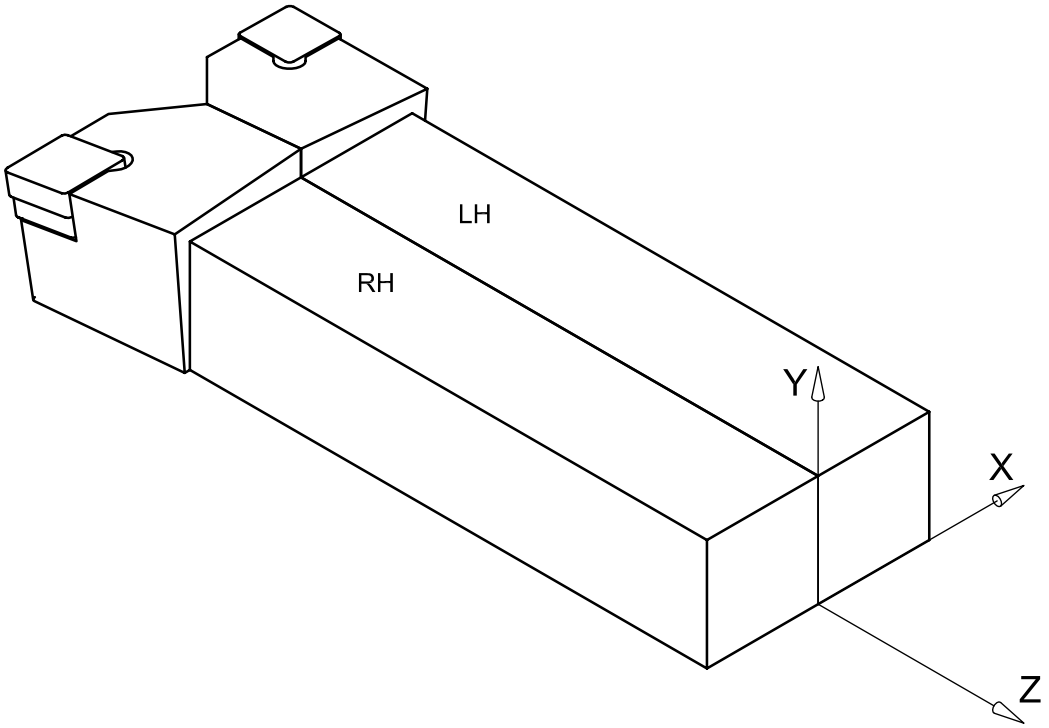

Figure F.5 — Mirror plane

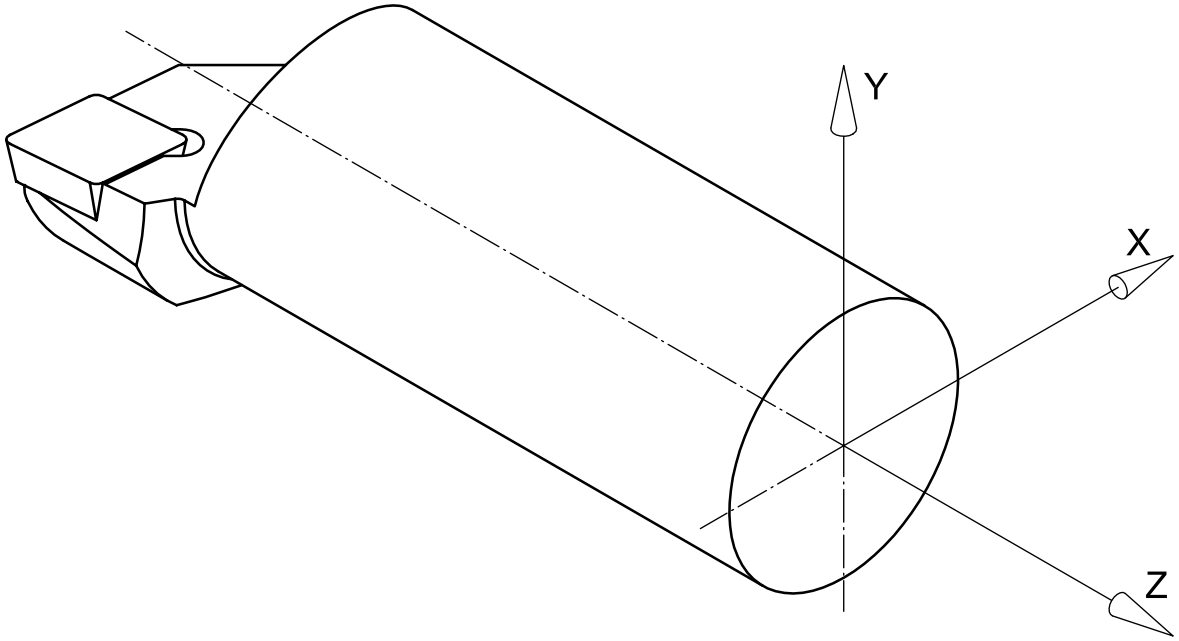

Figure F.6 — Round adaptive item position

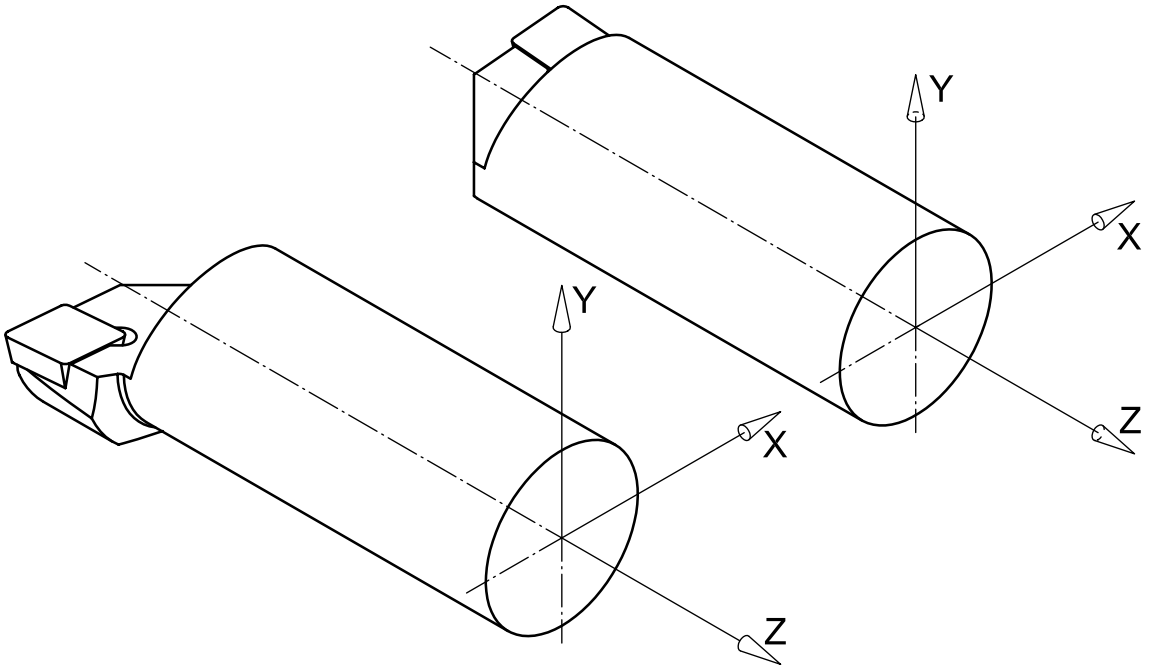

Figure F.7 — Mirror plane

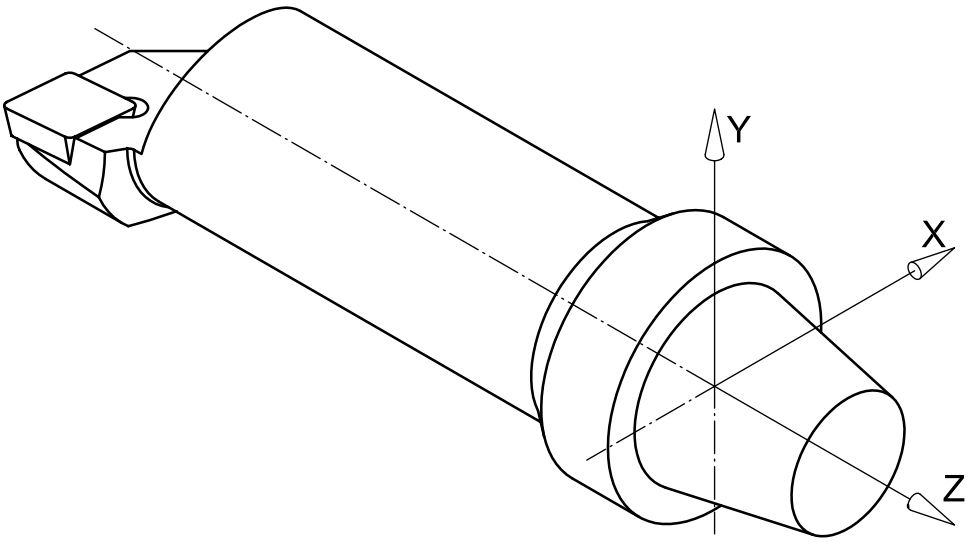

Figure F.8 — Round tool item position

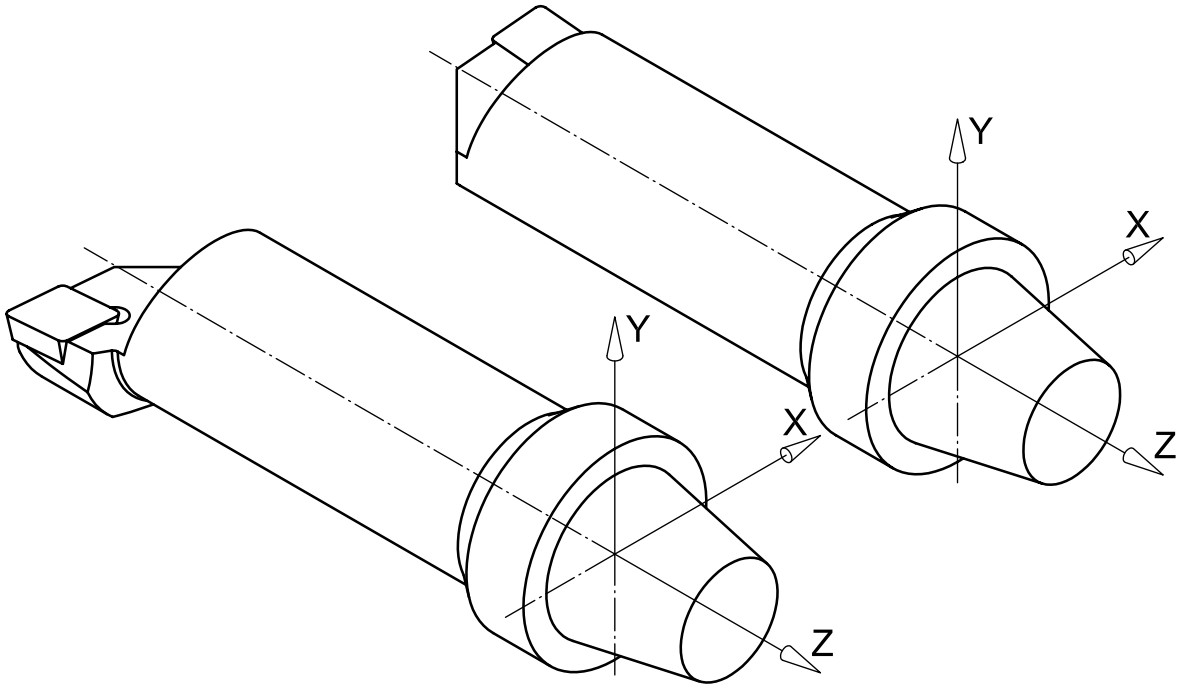

Figure F.9 — Mirror plane

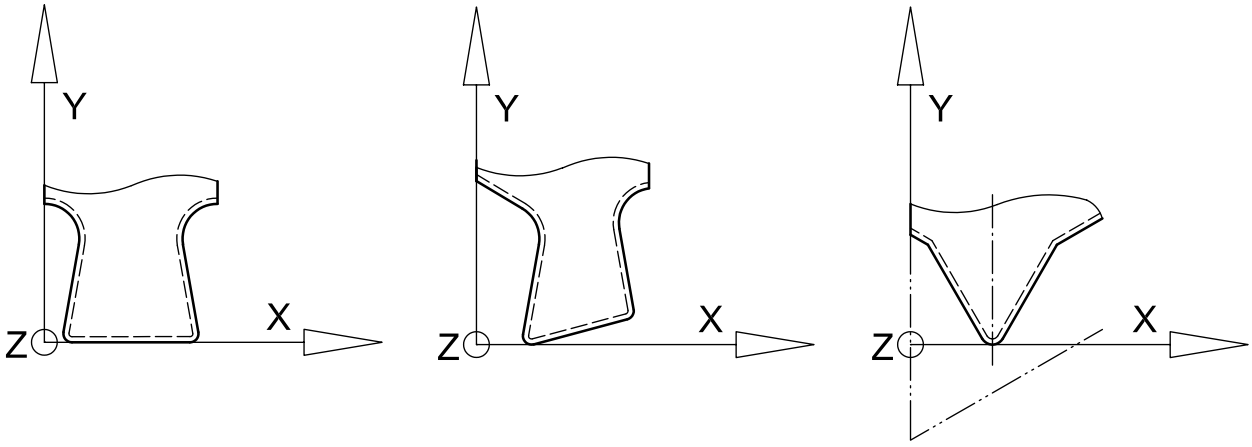

Figure F.10 — Irregular insert position

Bibliography

[1] ISO 724, *ISO general-purpose metric screw threads — Basic dimensions*

[2] ISO 725, *ISO inch screw threads — Basic dimensions*

[3] ISO 2904, *ISO metric trapezoidal screw threads — Basic dimensions*

[4] ISO 3338-2, *Cylindrical shanks for milling cutters — Part 2: Dimensional characteristics of flatted cylindrical shanks*

[5] ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles*

[6] ISO 10303-11:2004, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual*

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

[8] ISO 13584-24:2003, *Industrial automation systems and integration — Parts library — Part 24: Logical resource: Logical model of supplier library*

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

[10] ISO 13584-511:2006, *Industrial automation systems and integration — Parts library — Part 511: Mechanical systems and components for general use — Reference dictionary for fasteners*

[11] DIN 6499, *Collet chucks*

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