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BSI Standards Publication

Cutting tool data representation and exchange

Part 2: Reference dictionary for the cutting items

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National foreword

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TECHNICAL SPECIFICATION

ISO/TS 13399-2

Second edition
2014-02-15

Cutting tool data representation and exchange —

Part 2: Reference dictionary for the cutting items

Représentation et échange des données relatives aux outils coupants —

Partie 2: Dictionnaire de référence pour les éléments coupants

Reference number
ISO/TS 13399-2:2014(E)

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Contents

Page

Foreword ..... **iv**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **2**
3 Terms and definitions **2**
4 Abbreviated terms **5**
5 Representation of the ontological concepts as dictionary entries **5**
5.1 General 5
5.2 cutting_item_feature 5
5.3 cutting_item_type 7
5.4 Reference systems for cutting items 9
6 Properties for cutting item features and cutting item types **10**
Annex A (normative) **Information object registration** **13**
Annex B (informative) **Classification tables** **14**
Annex C (informative) **Class definitions** **16**
Annex D (informative) **Cutting item property definitions** **34**
Annex E (informative) **Illustrations of properties** **79**
Annex F (informative) **Illustrations of irregular insert profiles and properties** **90**
Annex G (informative) **Illustrations of reference positions for cutting items** **99**
Bibliography **104**

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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The committee responsible for this document is ISO/TC 29, *Small tools*.

This second edition cancels and replaces the first edition (ISO/TS 13399-2:2005), which has been technically revised.

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

— *Part 1: Overview, fundamental principles and general information model*

— *Part 2: Reference dictionary for cutting items* [Technical Specification]

— *Part 3: Reference dictionary for tool items* [Technical Specification]

— *Part 4: Reference dictionary for adaptive items* [Technical Specification]

— *Part 5: Reference dictionary for accessory and auxiliary items* [Technical Specification]

— *Part 50 Reference dictionary for reference systems and common concepts* [Technical Specification]

— *Part 60: Reference dictionary for connection systems* [Technical Specification]

— *Part 100: Definitions, principles and methods for reference dictionaries* [Technical Specification]

— *Part 150: Usage guidelines* [Technical Specification]

— *Part 301: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of thread-cutting taps, thread-forming taps and thread-cutting dies* [Technical Specification]

— *Part 302: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of solid drills and countersinking tools* [Technical Specification]

The following parts are under preparation:

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

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— *Part 80: Concept for the design of 3D models based on properties according to ISO 13399: Overview and principles* [Technical Specification]

— *Part 201: Concept for the design of 3D models based on properties according to ISO/TS 13399-2: Modelling of regular inserts* [Technical Specification]

— *Part 202: Concept for the design of 3D models based on properties according to ISO/TS 13399-2: Modelling of irregular inserts* [Technical Specification]

— *Part 203: Concept for the design of 3D models based on properties according to ISO/TS 13399-2: Modelling of exchangeable inserts for drilling* [Technical Specification]

— *Part 204: Concept for the design of 3D models based on properties according to ISO/TS 13399-2: Modelling of inserts for reaming* [Technical Specification]

— *Part 303: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of end mills with non-indexable cutting edges* [Technical Specification]

— *Part 304: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of milling cutters with arbor hole and non-indexable cutting edges* [Technical Specification]

— *Part 307: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of end mills for indexable inserts* [Technical Specification]

— *Part 308: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of milling cutter with arbor hole for indexable inserts* [Technical Specification]

— *Part 309: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Tool holders for indexable inserts* [Technical Specification]

— *Part 311: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of solid reamers* [Technical Specification]

— *Part 312: Concept for the design of 3D models based on properties according to ISO/TS 13399-3: Modelling of reamers for indexable inserts* [Technical Specification]

— *Part 401: Concept for the design of 3D models based on properties according to ISO/TS 13399-4: Modelling of converting, extending and reducing adaptive items* [Technical Specification]

— *Part 405: Concept for the design of 3D models based on properties according to ISO/TS 13399-4: Modelling of collets* [Technical Specification]

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Introduction

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

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

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

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

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

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

— the EXPRESS language defined in ISO 10303-11 for defining the information model in ISO 13399-1;

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

— the data dictionary defined in the ISO 13584 series.

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

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

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— the direct import of data from cutting tool suppliers into a customer's database, and

— the management of cutting tool information from multiple sources and for multiple applications.

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

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

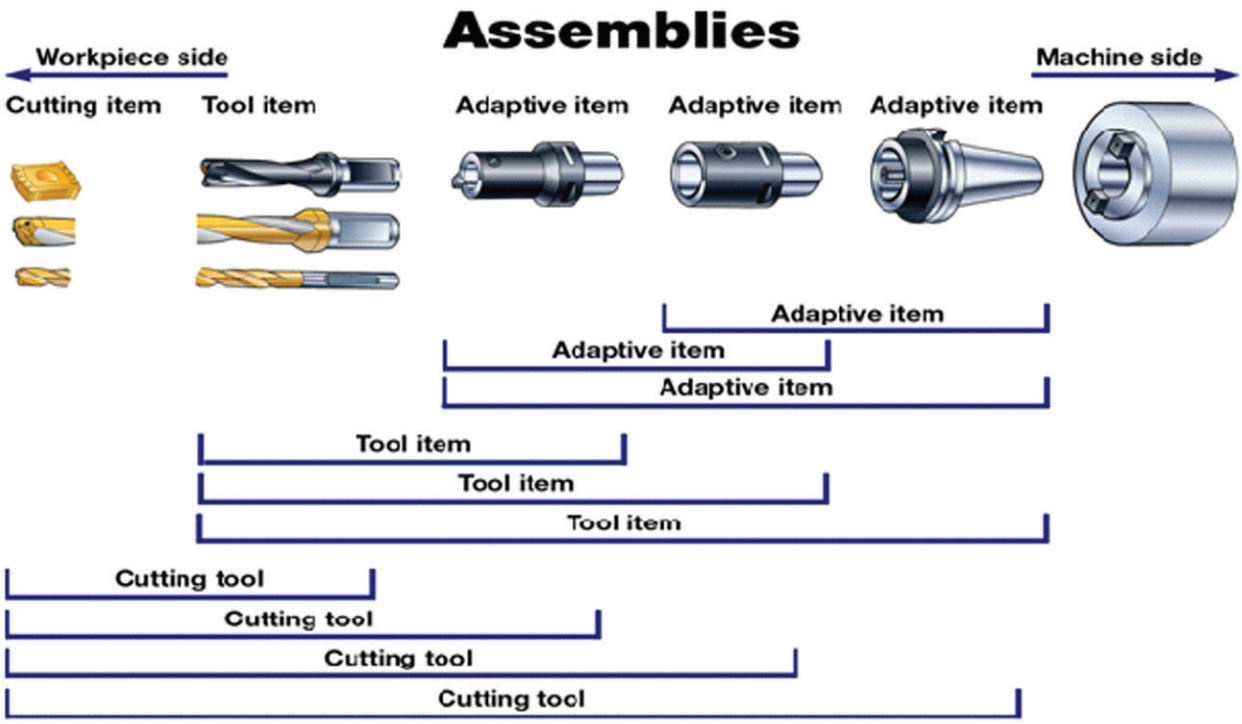

Figure 1 — Possible assemblies of components of a cutting tool

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

— correcting errors in the entries of existing classes and properties,

— adding new properties to existing classes,

— adding new classes and their properties,

— managing the status of those properties and classes, and

— migrating the dictionary to subsequent editions of ISO 13399 (all parts).

The secretariat of this Maintenance Agency has been assigned to:

Union de Normalisation de la Mécanique

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France

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by the ISO Technical Management Board.

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

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

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Cutting tool data representation and exchange —

Part 2: Reference dictionary for the cutting items

1 Scope

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

This part of ISO 13399 specifies a reference dictionary containing:

— definitions and identifications of the classes of cutting items and their features, with an associated classification scheme;

— definitions and identifications of the data element types that represent the properties of cutting items and their features;

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

Each class, property, or domain of values of this application domain constitutes an entry of the reference dictionary defined in this part of ISO 13399. It is associated with a computer-sensible and human-readable definition and with a computer-sensible identification. Identification of a dictionary entry allows unambiguous reference to it from any application that implements the information model defined in ISO 13399-1.

Definitions and identifications of dictionary entries are defined by means of standard data that consist of instances of the EXPRESS entity data types defined in the common dictionary schema, resulting from a joint effort between ISO/TC 184/SC 4 and IEC SC 3D, and in its extensions defined in ISO 13584-24 and ISO 13584-25.

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

— standard data that represent the various classes of cutting items and cutting item features;

— standard data that represent the various properties of cutting items and cutting item features;

— standard data that represent domains of values used for properties of cutting items and cutting item features;

— definitions of reference systems for cutting items and their properties;

— 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 can be stored or referenced;

— implementation methods other than the one defined in this part of ISO 13399 by which the standard data can be exchanged and referenced;

— information model for cutting tools;

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— definitions of classes and properties for tool items;

— definitions of classes and properties for adaptive items;

— definitions of classes and properties for assembly items and auxiliary items.

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

NOTE 3 The definitions of classes and properties for tool items, adaptive items, assembly items, and auxiliary items are provided in ISO/TS 13399-3, ISO/TS 13399-4, and ISO/TS 13399-5, 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, *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/TS 13399-100:2008, *Cutting tool data representation and exchange — Part 100: Definitions, principles and methods for reference dictionaries*

ISO 13584-1:2001, *Industrial automation systems and integration — Parts library — Part 1: Overview and fundamental principles*

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

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 in the reference dictionary is provided in Annexes B to D.

3.1
applicable property
property that is defined for some family of items and that shall apply to any member of this family

[SOURCE: ISO 13584-24:2003]

3.2
basic semantic unit
entity that provides an absolute and universally unique identification of a certain object of the application domain that is represented as a dictionary element

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

3.3
chip
material removed from a workpiece by a cutting process

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3.4
cutting tool
device or assembly of items for removing material from a workpiece through a shearing action at the defined cutting edge or edges of the device

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

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

3.5
data
representation of information in a formal manner suitable for communication, interpretation, or processing by human beings or computers

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

3.6
data element type
unit of data for which the identification, description, and value representation have been specified

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

3.7
data exchange
storing, accessing, transferring, and archiving of data

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

3.8
data type
domain of values

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

3.9
dictionary
table consisting of a series of entries with one meaning corresponding to each entry in the dictionary and one dictionary entry identifying a single meaning

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

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

3.10
entity
class of information defined by its attributes which establishes a domain of values defined by common attributes and constraints

3.11
entity data type
representation of an entity

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.

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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

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
irregular insert
replaceable cutting item that cannot be described by a regular geometric shape

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 ontology.

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

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

3.21
regular insert
replaceable cutting item that can be described by a regular geometric shape

3.22
transient surface
part of the surface which is formed on the workpiece by the cutting edge and removed during the following cutting stroke, during the following revolution of the tool or workpiece, or by the following cutting edge

[SOURCE: ISO 3002-1:1982, 3.1.3]

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3.23
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]

3.24
workpiece
object on which a cutting action is performed

3.25
work surface
surface on the workpiece that is to be removed by machining

[SOURCE: ISO 3002-1:1982, 3.1.1]

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 ontological concepts as dictionary entries

5.1 General

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 letters with multiple words joined by an underscore character.

EXAMPLE cutting item type is the name of a concept in the ontology. **cutting_item_type** is the identifier of the class in the dictionary that represents the concept.

Cutting items are represented by two main classes: **cutting_item_feature** and **cutting_item_type**. The structure of the classification is provided in Annex B. The definitions of the cutting item classes are provided in Annex C.

5.2 cutting_item_feature

Characteristic of a cutting item that cannot exist independently of the cutting item.

cutting_item_feature has the following subclasses:

— **chip_breaker**;

— **cutting_corner**;

— **cutting_edge**;

— **cutting_item_coating**;

— **cutting_item_material**;

— **cutting_item_profile**;

— **fixing_hole**;

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— **flank**;

— **gauge_circle**;

— **inscribed_circle**.

5.2.1 chip_breaker

Modification of the face of a cutting item to control or break the chip.

NOTE A chip breaker is either an integral groove or an obstruction attached to the face.

5.2.2 cutting_corner

Transition between two cutting edges.

cutting_corner has the following subclasses:

— **chamfered_corner**;

— **rounded_corner**.

5.2.3 cutting_edge

Junction between two surfaces that performs the cutting operation.

cutting_edge has the following subclasses:

— **cutting_edge_conditioned**;

— **cutting_edge_interrupted**;

— **cutting_edge_major**;

— **cutting_edge_minor**;

— **wiper_edge**.

5.2.4 cutting_item_coating

Additional material deposited on the surface of a cutting item.

NOTE A cutting item coating can consist of layers of several materials.

5.2.5 cutting_item_material

Substance from which a cutting item is made.

5.2.6 cutting_item_profile

Shape traced out by the cutting edges of a cutting item.

cutting_item_profile has the following subclasses:

— **ball_nosed_profile**;

— **drilling_profile**;

— **grooving_parting profile**;

— **threading_profile**.

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5.2.7 fixing_hole

Hole through the body of a replaceable cutting item that is used for attaching the cutting item to a tool item.

5.2.8 flank

Surface or surfaces of a cutting item that pass over the transient surface of the workpiece.

flank has the following subclasses:

— **flank_major**;

— **flank_minor**;

— **flank_wiper_edge**.

5.2.9 gauge_circle

Circle established by a measurement device on a cutting item that does not have an inscribed circle.

5.2.9.1 inscribed_circle

Circle to which all edges of an equilateral and round regular insert are tangential.

5.3 cutting_item_type

Family of items that can be held by a tool item or be part of a solid tool.

NOTE The cutting item is the part of the cutting tool that is in contact with the workpiece during the cutting operation.

REMARKS The names of items in this class are not intended to refer to the use of the item in a particular cutting operation.

cutting_item_type has the following simple families of items as subclasses:

— **equilateral_equiangular**;

— **equilateral_nonequiangular**;

— **non replaceable_cutting_item**;

— **nonequilateral_equiangular**;

— **nonequilateral_nonequiangular**;

— **round_insert**;

— **specific_profile_insert**.

5.3.1 equilateral_equiangular

Type of cutting item of regular geometric shape with sides of equal length and equal included angles.

NOTE The class contains inserts with the ISO shape codes H, O, P, S, and T.

equilateral_equiangular has the following items as subclasses:

— **hexagonal_insert**;

— **octagonal_insert**;

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— **pentagonal_insert**;

— **square_insert**;

— **triangular_insert**.

5.3.2 equilateral_nonequiangular

Type of cutting item of regular geometric shape with sides of equal length and non-equal included angles.

NOTE The class contains inserts with the ISO shape codes C, D, E, M, and V for rhombic inserts and W for trigon inserts.

equilateral_nonequiangular has the following items as subclasses:

— **rhombic_insert**;

— **trigon_insert.**

5.3.3 non_replaceable_cutting_item

Cutting item that is permanently fixed to, or part of, a tool item.

5.3.4 nonequilateral_equiangular

Type of cutting item of regular geometric shape with sides of non-equal length and equal included angles.

NOTE The class contains inserts with the ISO shape code L.

nonequilateral_equiangular has the following item as a subclass:

— **rectangular_insert**.

5.3.5 nonequilateral_nonequiangular

Type of cutting item of regular geometric shape with sides of non-equal length and non-equal included angles.

NOTE The class contains inserts with the ISO shape codes A, B, and K.

nonequilateral_nonequiangular has the following items as subclasses:

— **parallelogram_insert**.

5.3.6 round_insert

Type of cutting item with circular cutting edges.

NOTE This class contains inserts with the ISO shape code R.

5.3.7 specific_profile_insert

Type of cutting item that possesses a defined profile shape.

NOTE A synonymous name is **irregular_insert**.

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5.4 Reference systems for cutting items

Reference systems are geometrical coordinate axes with planes and locations on these axes that allow the definition of properties of cutting items and other components of a cutting tool. Reference systems are illustrated in Annex G.

NOTE The convention for all the reference systems is the tool-in-hand system (ISO 3002-1:1982).

The classes of reference systems for cutting items are as follows:

— **primary_coordinate_system**;

— **irregular_insert_position**;

— **mirror_plane**;

— **regular_insert_position**;

— **xy_plane**;

— **xz_plane**;

— **yz_plane**.

5.4.1 primary_coordinate_system

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

5.4.2 irregular_insert_position

An irregular insert is located on the primary coordinate system in the XY quadrant with the cutting edges in the xy-plane, the cutting profile pointing in the negative Y direction, the forward extremity of the cutting profile on the positive x-axis, and the side extremity of the insert on the y-axis.

NOTE The definition applies to right-hand inserts. The position of left-hand inserts is as mirrored through the yz-plane.

5.4.3 mirror_plane

The **mirror_plane** is the yz-plane in the primary coordinate system.

5.4.4 regular_insert_position

A regular insert is located on the primary coordinate system in the XY quadrant with the cutting edges on the xy-plane, the major cutting edge on the positive x-axis, and the theoretical sharp point of the insert on the y-axis.

NOTE The definition applies to right-hand inserts. The position of left-hand inserts is as mirrored through the yz-plane.

REMARKS The positions of right-hand and left-hand regular inserts are illustrated in Figure G.13.

5.4.5 xy_plane

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

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5.4.6 xz_plane

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

5.4.7 yz_plane

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

6 Properties for cutting item features and cutting item types

The properties of cutting item types and cutting item 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 can be applicable for cutting item features and cutting item types, with their identification codes (BSU), are shown in Table 1. The order of names in the table should be read in rows from left to right.

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

EXAMPLE The unique BSU for **chip_breaker_face_count** would be: 0112/1///13399__2–71CE7A85CC4F9 for version two of the dictionary.

Table 1 — Names of properties for cutting items

Property name	Identification code (BSU)
chamfer corner property	72550DF97C965
chip breaker face count	71CE7A85CC4F9
chip breaker manufacturers designation	71CE7A86A4264
chip breaker property	71CED0217FA18
chip breaker width	71CE7A870948A
chisel edge angle	71EAC82B2A50E
chisel edge length	71EAC82ADE5EA
clearance angle major	71DD70308D3E3
clearance angle minor	71DD7030E0A00
clearance angle wiper edge	71DD7031A98E9
coating property	71DD703B84298
coolant exit entry code	71CF2985DCED3
coolant exit style code	71CF2985FC5FC
corner chamfer angle	71DD6C88F9210
corner chamfer length	71DD6C895C25B
corner chamfer width	71DD6C89A120F
corner count	71CEAE9B67E4C
corner identity	71DD6C8802580
corner radius	71DD6C8ACA503
cutting depth maximum	71CEAEBD5A66A
cutting edge angle major	71CE7AA02C1CC
cutting edge angle major left hand	71CE7AA3440B4

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Table 1 *(continued)*

Property name	Identification code (BSU)
cutting edge angle major right hand	71CE7AA78C2F0
cutting edge condition code	71DD6C90953D8
cutting edge count	71CEAE9B489F4
cutting edge curvature	71DD6C950E7CC
cutting edge effective length	71DD6C958C615
cutting edge identity	71DD6C8B86265
cutting edge length	71DD6C95DA49B
cutting point translation X-direction	71FD1E2EDD973
cutting point translation Y-direction	71FD1E2F66B38
cutting width	71CEAEBE2B825
depth of cut maximum	71D07576C0558
face land angle	71DD6C9332D2C
face land size code	71DD6C9371B86
face land width	71DD6C9394F40
fixing hole diameter	71CE7A968C8FE
fixing hole property	71D1C829BC044
flank identity	71DD70158265C
fluted land width	71EAC8210DF36
gauge circle property	72550A75A58F9
gauge diameter	71EBC1E1074AB
gauge distance	72550A78BC664
grind style code	72550E3BD998C
hand	71CF29872F0AB
inscribed circle diameter	71CE7A96D9F7D
inscribed circle property	71D1C82A5036D
insert body width	71CE7A9751A90
insert cutting diameter	71CF30F02C968
insert diameter	71D20799C721A
insert hand	71CE7A979F41C
insert included angle	71CE7A96BC122
insert index count	71CE7AA1998FF
insert interface code	71CE7A9936610
insert length	71CE7A9DFA23A
insert mounting style code	71CE7A97711B8
insert rake angle	71CE7A9EDACA1
insert seat size code	71CEAEBF2A69F
insert shape code	71CE7A9F0C79F
insert thickness	71CE7A9F5308C
insert thickness total	72550E143C993
insert width	71CE7A9FB11C3
interrupted edge property	71DD701175021

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Table 1 *(continued)*

Property name	Identification code (BSU)
m-dimension	71CE7AA0972DB
m2-dimension	71CE7AA05C819
overall length minimum	71EBC1E8857BE
point angle	71DCCC4FEF366
point length	71DCCFD064042
profile angle left hand	71CEAEBEAB020
profile angle right hand	71CEAEBED837E
profile distance ex	71CEAEBFEF1B4
profile distance ey	71CEAEC0139BB
profile included angle	71CEAEBF0C234
profile radius	71E019EBAE1B1
profile style code	71CEAEBDE5798
relief angle	71DD9D00193A7
relief angle left hand	71CE7E6520B87
relief angle right hand	71CE7E6569AB5
rounded corner property	71DD7011A3D86
taper gradient	71CEAEC02FEBD
taper thread count	71DF154901E44
thread form type	71D1A69F60053
thread hand	71E033FCBB61C
thread height actual	71DF5BE65F86F
thread height difference	71DF5BE617131
thread height theoretical	71DF5BE5BCEBE
thread pitch	71CEAEC08D4B0
thread pitch maximum	71D1A6A283836
thread pitch minimum	71D1A6A247E1F
thread profile type	71CEAEC114603
thread tolerance class	71DF153FA5F85
thread type	71D1A6A16E6ED
threading length	72550E426D771
threads per inch	71D1A6AAC8707
threads per inch maximum	71D1A6AB8F739
threads per inch minimum	71D1A6AB6FB19
tipped cutting edge code	71CE7AA1E3D75
tolerance class insert	71CE7AA215888
tooth count	71CEAEBF8A68E
weight of item	71CED03C97AAB
wiper edge length	71CE7AA249F88
wiper edge property	71CED022114EC
wiper edge radius	71CE7AA2E50BE

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Annex A
(normative)

Information object registration

A.1 Document identification

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

{iso technical specification 13399 part (2) 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 (2) version (2) object (2) cutting items (2)}

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Annex B
(informative)

Classification tables

Table B.1 shows the classification structure of the generic families in the dictionary with an expanded structure for the classes of cutting items feature and cutting item type. The purpose of the table is to show the relationships between the classes of cutting items and the other classes in the ISO 13399 series.

NOTE Annex C contains the definition of all the classes that are relevant to cutting items and definitions of those classes of reference systems that are used in the definition of the properties of cutting item types and cutting item features.

Table B.1

Classification structure		Parent	BSU
cutting tool library		Root	71CE7A72B6DA7
adaptive item type		71CE7A72B6DA7	71EAD37F18F34
adjustment		71CE7A72B6DA7	71ED884159C90
assembly item type		71CE7A72B6DA7	71CE7A795C05C
bolt hole circle		71CE7A72B6DA7	71E02520881F1
connection interface feature		71CE7A72B6DA7	71DF8C37D9115
coolant supply		71CE7A72B6DA7	71DF8C3C065EB
cutting item feature		71CE7A72B6DA7	71DD6C82F72DA
chip breaker		71DD6C82F72DA	71DD6C870BCCA
cutting corner		71DD6C82F72DA	71DD6C87BB5E1
		71DD6C87BB5E1	71DD6C884C4BD
	chamfered corner	71DD6C87BB5E1	71DD6C8A9985E
	rounded corner	71DD6C82F72DA	71DD6C8B42A9E
cutting edge		71DD6C8B42A9E	71DD6C8C4F46C
	cutting edge condition	71DD6C8B42A9E	71DD6C93E8F02
	cutting edge interrupted	71DD6C8B42A9E	71DD6C9466F30
	cutting edge major	71DD6C8B42A9E	71DD6C961D7FE
	cutting edge minor	71DD6C8B42A9E	71DD6C9A21689
	wiper edge	71DD6C82F72DA	71DD9D01038CF
cutting item coating		71DD6C82F72DA	71DD703BE6B82
cutting item material		71DD6C82F72DA	71DD70030304C
cutting item profile		71DD70030304C	71DD700BC8BE2
	ball nosed profile	71DD70030304C	71DD700BE1D04
	drilling profile	71DD70030304C	71DD700BFD9B9
	grooving parting profile	71DD70030304C	71DD700C151B5

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Table B.1

Classification structure		Parent	BSU
	threading profile	71DD6C82F72DA	71DD7014BF2A1
fixing hole		71DD6C82F72DA	71DD70155A4B1
flank		71DD70155A4B1	71DD7015F073B
	flank major	71DD70155A4B1	71DD701618C71
	flank minor	71DD70155A4B1	71DD70163AA42
	flank wiper edge	71DD6C82F72DA	72550A75A58F9
	gauge circle	71DD6C82F72DA	71DD7032B51CD
	inscribed circle	71CE7A72B6DA7	71D1AA6C8FC75
drilling insert		71D1AA6C8FC75	72550E1361C6C
equilateral equiangular		71D1AA6C8FC75	71D1AA486FF89
	hexagonal insert	71D1AA486FF89	71DD68D7A8E5F
	octagonal insert	71D1AA486FF89	71DD68D7CB4FA
	pentagonal insert	71D1AA486FF89	71DD68D80B094
	square insert	71D1AA486FF89	71DD68D829217
	triangular insert	71D1AA486FF89	71DD68D8446CE
equilateral nonequiangular		71D1AA6C8FC75	71D1AE11B8B77
	rhombic insert	71D1AE11B8B77	71DD68D301C30
	trigon insert	71D1AE11B8B77	71DD68D73218C
non replaceable cutting item		71D1AA6C8FC75	7224CCDD587CF
nonequilateral equiangular		71D1AA6C8FC75	71D1AE120D96E
	rectangular insert	71D1AE120D96E	71DD68D91938A
nonequilateral nonequian-gular		71D1AA6C8FC75	71D1AA489FD6E
	parallelogram insert	71D1AA489FD6E	71DD68D966F52
round insert		71D1AA6C8FC75	71D1AA6635E76
specific profile insert		71D1AA6C8FC75	71DDA089C8D1E
cutting operation		71CE7A72B6DA7	71DFF83D21D50
cutting tool		71CE7A72B6DA7	71CE7A7A5038B
flange		71CE7A72B6DA7	71EC5A767182E
keyway		71CE7A72B6DA7	71DF5C026BCE7
locking mechanism		71CE7A72B6DA7	71EBAB85BB5FA
reference system		71CE7A72B6DA7	71CF2968F7A9E
runout axial		71CE7A72B6DA7	71EDD2B84143C
runout radial		71CE7A72B6DA7	71EDD2B858274
tool item feature		71CE7A72B6DA7	71DD70376771D
	tool item type	71CE7A72B6DA7	71E01A004C775
	tool thread external	71CE7A72B6DA7	71FC1D22BF4CD
	tool thread internal	71CE7A72B6DA7	71FC1D25097D7

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Annex C
(informative)

Class definitions

C.1 Content and presentation

The content of this Annex is limited to the classes of cutting item features, cutting item types, and the reference systems required to define the properties of these classes.

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

BSU code–version number **Revision number**

Preferred name **Short name**

Definition

NOTE

REMARKS

Subclasses:

Properties:

C.2 Classes

71DD6C82F72DA-002 **001**

cutting item feature **cif**

characteristic of a cutting item that cannot exist independently of the cutting item

Subclasses:

71DD6C870BCCA-001	chip breaker
71DD6C87BB5E1-001	cutting corner
71DD6C8B42A9E-001	cutting edge
71DD9D01038CF-001	cutting item coating
71DD703BE6B82-001	cutting item material
71DD70030304C-001	cutting item profile
71DD7014BF2A1-001	fixing hole
71DD70155A4B1-002	flank
72550A77D9DB9-001	gauge circle
71DD7032B51CD-001	inscribed circle

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71DD6C870BCCA-001 **001**

chip breaker **cbkr**

modification of the face of a cutting item to control or break the chip

NOTE A chip breaker is either an integral groove or an obstruction attached to the face.

Properties:

71CE7A86A4264-001 chip breaker manufacturer's designation

71CE7A870948A-001 chip breaker width

71CE7A9EDACA1-001 insert rake angle

71DD6C87BB5E1-001 **001**

cutting corner **corner**

transition between two cutting edges

Subclasses:

71DD6C884C4BD-001 chamfered corner

71DD6C8A9985E-001 rounded corner

Properties:

71DD6C8802580-001 corner identity

71DD6C884C4BD-001 **001**

chamfered corner **chcc**

linear transition between two cutting edges

Properties:

71DD6C88F9210-002 corner chamfer angle

71DD6C895C25B-001 corner chamfer length

71DD6C89A120F-001 corner chamfer width

71DD6C8A9985E-001 **001**

rounded corner **rndc**

curved transition between two cutting edges

Properties:

71DD6C8ACA503-001 corner radius

71DD6C8B42A9E-001 **001**

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cutting edge **ctedg**

junction between two surfaces that performs the cutting operation

Subclasses:

71DD6C8C4F46C-001 cutting edge condition

71DD6C93E8F02-001 cutting edge interrupted

71DD6C9466F30-001 cutting edge major

71DD6C961D7FE-001 cutting edge minor

71DD6C9A21689-001 wiper edge

Properties:

71DD6C8B86265-002 cutting edge identity

71DD6C9332D2C-001 face land angle

71DD6C9371B86-001 face land size code

71DD6C9394F40-001 face land width

71DD6C8C4F46C-001 **001**

cutting edge condition **ctec**

possession by the cutting edge of specific characteristics

Properties:

71DD6C90953D8-001 cutting edge condition code

71DD6C93E8F02-001 **001**

cutting edge interrupted **ceint**

cutting edge with discontinuities of sufficient magnitude to prevent chip formation at the point where they occur

REMARKS The purpose of the discontinuities is to reduce the size of individual chips from certain types of tools.

71DD6C9466F30-001 **001**

cutting edge major **cemj**

junction between the face and the main flank that performs the cutting action to create the transient surface on a workpiece

Properties:

71CE7AA3440B4-001 cutting edge angle major left hand

71CE7AA78C2F0-001 cutting edge angle major right hand

71DD6C950E7CC-002 cutting edge curvature

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71DD6C958C615-001	cutting edge effective length
71DD6C95DA49B-002	cutting edge length

71DD6C961D7FE-001 **001**

cutting edge minor **cemn**

junction between the face and the minor flank that does not contribute to the creation of the transient surface on the workpiece

71DD6C9A21689-001 **001**

wiper edge **wpe**

cutting edge with a wiper configuration

Properties:

71DD7031A98E9-001	clearance angle wiper edge
71CE7AA02C1CC-001	cutting edge angle major
71CE7AA249F88-001	wiper edge length
71CE7AA2E50BE-001	wiper edge radius

71DD9D01038CF-001 **001**

cutting item coating **coating**

additional material deposited on the surface of a cutting item

NOTE A cutting item coating can consist of layers of several materials

71DD703BE6B82-001 **001**

cutting item material **material**

substance from which a cutting item is made

71DD70030304C-001 **001**

cutting item profile **ciprf**

shape traced out by the cutting edges of a cutting item

Subclasses:

71DD700BC8BE2-002	ball nosed profile
71DD700BE1D04-003	drilling profile
71DD700BFD9B9-003	grooving parting profile
71DD700C151B5-003	threading profile

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71DD700BC8BE2-002 **001**

ball nosed profile **bnprf**

shape of the perimeter of a cutting item that creates a semi-spherical profile

Properties:

71DD6C8802580-001	corner identity
71DD6C8ACA503-001	corner radius
71CE7A9DFA23A-001	insert length
71CE7A9FB11C3-001	insert width
71DD9D00193A7-001	relief angle

71DD700BE1D04-003 **002**

drilling profile **drprf**

shape of the perimeter of a cutting item that creates a drilled hole

Properties:

72550DF97C965-001	chamfer corner property
71CEAE9B67E4C-001	corner count
72550E3BD998C-002	grind style code
71CF30F02C968-001	insert cutting diameter
71DD701175021-001	interupted edge property
71DD7011A3D86-002	rounded corner property
71CE7AA1E3D75-001	tipped cutting edge code

71DD700BFD9B9-003 **002**

grooving parting profile **gpprf**

shape of the perimeter of a cutting item that creates the profile of a groove

Properties:

72550DF97C965-001	chamfer corner property
71CE7A85CC4F9-001	chip breaker face count
71CEAE9B67E4C-001	corner count
71DD6C8802580-001	corner identity
71CEAEBD5A66A-001	cutting depth maximum
71CEAEBE2B825-002	cutting width
71D07576C0558-001	depth of cut maximum

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71CEAEBEAB020-003	profile angle left hand
71CEAEBED837E-002	profile angle right hand
71CEAEBF0C234-002	profile included angle
71CEAEBDE5798-002	profile style code
71CE7E6520B87-002	relief angle left hand
71CE7E6569AB5-002	relief angle right hand
71DD7011A3D86-002	rounded corner property
71CE7AA1E3D75-001	tipped cutting edge code

71DD700C151B5-003	**002**
threading profile	**thprf**

shape of the perimeter of a cutting item that creates a screw thread

Properties:

71CE7A85CC4F9-001	chip breaker face count
71CEAE9B67E4C-001	corner count
71DD6C8802580-001	corner identity
71CEAEBEAB020-002	profile angle left hand
71CEAEBED837E-002	profile angle right hand
71CEAEBFEF1B4-001	profile distance ex
71CEAEC0139BB-001	profile distance ey
71CEAEBF0C234-002	profile included angle
71CEAEBDE5798-002	profile style code
71DD7011A3D86-002	rounded corner property
71CEAEC02FEBD-002	taper gradient
71DF154901E44-001	taper thread count
71D1A69F60053-002	thread form type
71E033FCBB61C-001	thread hand
71DF5BE65F86F-001	thread height actual
71DF5BE617131-001	thread height difference
71DF5BE5BCEBE-001	thread height theoretical
71CEAEC08D4B0-002	thread pitch
71D1A6A283836-002	thread pitch maximum
71D1A6A247E1F-001	thread pitch minimum

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71CEAEC114603-002	thread profile type
71D1A6A16E6ED-002	thread type
72550E426D771-001	threading length
71D1A6AAC8707-002	threads per inch
71D1A6AB8F739-002	threads per inch maximum
71D1A6AB6FB19-002	threads per inch minimum
71CE7AA1E3D75-001	tipped cutting edge code
71CEAEBF8A68E-002	tooth count

71DD7014BF2A1-001 **001**

fixing hole **fxhl**

hole through the body of a replaceable cutting item that is used for attaching the cutting item to a tool item

Properties:

71CE7A968C8FE-001	fixing hole diameter
71CE7A97711B8-001	insert mounting style code

71DD70155A4B1-002 **001**

flank **flnk**

surface or surfaces of a cutting item that pass over the transient surface of the workpiece

Subclasses:

71DD7015F073B-001	flank major
71DD701618C71-001	flank minor
71DD70163AA42-001	flank wiper edge

Properties:

71DD70158265C-001	flank identity

71DD7015F073B-001 **001**

flank major **flmj**

surface of a cutting item that moves over the transient surface of the workpiece

Properties:

71DD70308D3E3-001	clearance angle major

71DD701618C71-001 **001**

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flank minor **flmn**

surface of a cutting item that does not move over the transient surface of the workpiece

Properties:

71DD7030E0A00-001 clearance angle minor

71DD70163AA42-001 **001**

flank wiper edge **flew**

flank of a cutting item that has a wiper edge

Properties:

71DD7031A98E9-001 clearance angle wiper edge

72550A77D9DB9-001 **002**

gauge circle **gacirc**

circle established by a measurement device on a cutting item that does not have an inscribed circle

Properties:

71EBC1E1074AB-001 gauge diameter

72550A77D9DB9-001 gauge distance

71DD7032B51CD-001 **001**

inscribed circle **insc**

circle to which all edges of an equilateral and round regular insert are tangential

Properties:

71CE7A96D9F7D-001 inscribed circle diameter

71D1AA6C8FC75-002 **001**

cutting item type **cins**

family of items that can be held by a tool item or be part of a solid tool

NOTE The cutting item is the part of the cutting tool that is in contact with the workpiece during the cutting operation.

REMARKS The names of items in this class are not intended to refer to the use of the item in a particular cutting operation.

Subclasses:

72550E1361C6C-001 drilling insert

71D1AA486FF89-004 equilateral equiangular

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71D1AE11B8B77-003	equilateral nonequiangular
7224CCDD587CF-002	non replaceable cutting item
71D1AE120D96E-003	nonequilateral equiangular
71D1AA489FD6E-004	nonequilateral nonequiangular
71D1AA6635E76-003	round insert
71DDA089C8D1E-003	specific profile insert

Properties:

71CED0217FA18-001	chip breaker property
71DD703B84298-001	coating property
72550A77D9DB9-001	cutting edge condition code

72550E1361C6C-001 **002**

drilling insert **drlins**

type of cutting item that is used for drilling operations

Properties:

72550DF97C965-001	chamfer corner property
71CE7A85CC4F9-001	chip breaker face count
71EAC82B2A50E-001	chisel edge angle
71EAC82ADE5EA-001	chisel edge length
71CF2985DCED3-001	coolant entry style code
71CF2985FC5FC-002	coolant exit style code
71CEAE9B489F4-001	cutting edge count
71D1C829BC044-002	fixing hole property
71EAC8210DF36-001	fluted land width
72550E1361C6C-001	grind style code
71CF29872F0AB-001	hand
71D1C82A5036D-002	inscribed circle property
71CE7A9751A90-001	insert body width
71CF30F02C968-001	insert cutting diameter
71CE7AA1998FF-001	insert index count
71CE7A9936610-001	insert interface code
71CEAEBF2A69F-001	insert seat size code
71CE7A9F5308C-001	insert thickness

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72550E143C993-001	insert thickness total
71CE7A9FB11C3-001	insert width
71DD701175021-001	interrupted edge property
71EAC828C8308-001	margin width
71EBC1E8857BE-001	overall length minimum
71DCCC4FEF366-002	point angle
71DCCFD064042-001	point length
71DD7011A3D86-002	rounded corner property
71CED03C97AAB-001	weight of item

71D1AA486FF89-004	**002**
equilateral equiangular	**eqleqa**

type of cutting item of regular geometric shape with sides of equal length and equal included angles

NOTE The class contains inserts with the ISO shape codes H, O, P, S, and T.

Subclasses:

71DD68D7A8E5F-001	hexagonal insert
71DD68D7CB4FA-001	octagonal insert
71DD68D80B094-001	pentagonal insert
71DD68D829217-001	square insert
71DD68D8446CE-001	triangular insert

Properties:

72550DF97C965-001	chamfer corner property
71CE7A85CC4F9-001	chip breaker face count
71CEAE9B67E4C-001	corner count
71CEAE9B489F4-001	cutting edge count
71DD6C958C615-001	cutting edge effective length
71DD6C95DA49B-002	cutting edge length
71FD1E2EDD973-001	cutting point translation X-direction
71FD1E2F66B38-001	cutting point translation Y-direction
71D1C829BC044-002	fixing hole property
71CF29872F0AB-001	hand
71D1C82A5036D-002	inscribed circle property
71CE7A979F41C-001	insert hand

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