

Cutting tool data representation and exchange —

Part 2: Reference dictionary for the cutting items

ICS 25.100.01; 35.240.50

National foreword

This Draft for Development is the UK implementation of ISO/TS 13399-2:2005, incorporating corrigendum March 2011. It supersedes BS ISO/TS 13399-2:2005, which is withdrawn.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature. It should be applied on this provisional basis, so that information and experience of its practical application can be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European standard. A review of this publication will be initiated two years after its publication by the European organization so that a decision can be taken on its status. Notification of the start of the review period will be made in a an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent to the Secretary of the responsible BSI Technical Committee at British Standards House, 389 Chiswick High Road, London, W4 4AL.

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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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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



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

- *Part 1: Overview, fundamental principles and general information model*
- *Part 2: Reference dictionary for the cutting items*
- *Part 3: Reference dictionary of terms for tools*
- *Part 4: Reference dictionary of terms for attachments*
- *Part 5: Reference dictionary of terms for accessories*
- *Part 100: Definitions, principles and methods for reference dictionaries*

Introduction

This Technical Specification 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 ISO/TS 13399-2 is to provide a reference dictionary to support the use of the general information model defined in ISO 13399-1.

A cutting tool is used in 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 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 this standard. Possible assemblies of the components of a cutting tool are illustrated in Figure 1.

The objective of ISO 13399 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 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 that are used for these representations are those developed by ISO TC184/SC4 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 must 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 ^[1].

An engineering information model is therefore a specification for data that establishes the meaning of those 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 and 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.

ISO 13399 uses the following standards developed by ISO TC184/SC4:

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

ISO 13399 is intended for use by, among others, tool producers and vendors, and manufacturers and developers of manufacturing software. ISO 13399 provides a common structure for exchanging data about cutting tools. The standard 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 of the manufacturing cycle and between different software applications;
- the direct import of data from cutting tool suppliers into customer's databases;
- the management of cutting tool information from multiple sources and for multiple applications.

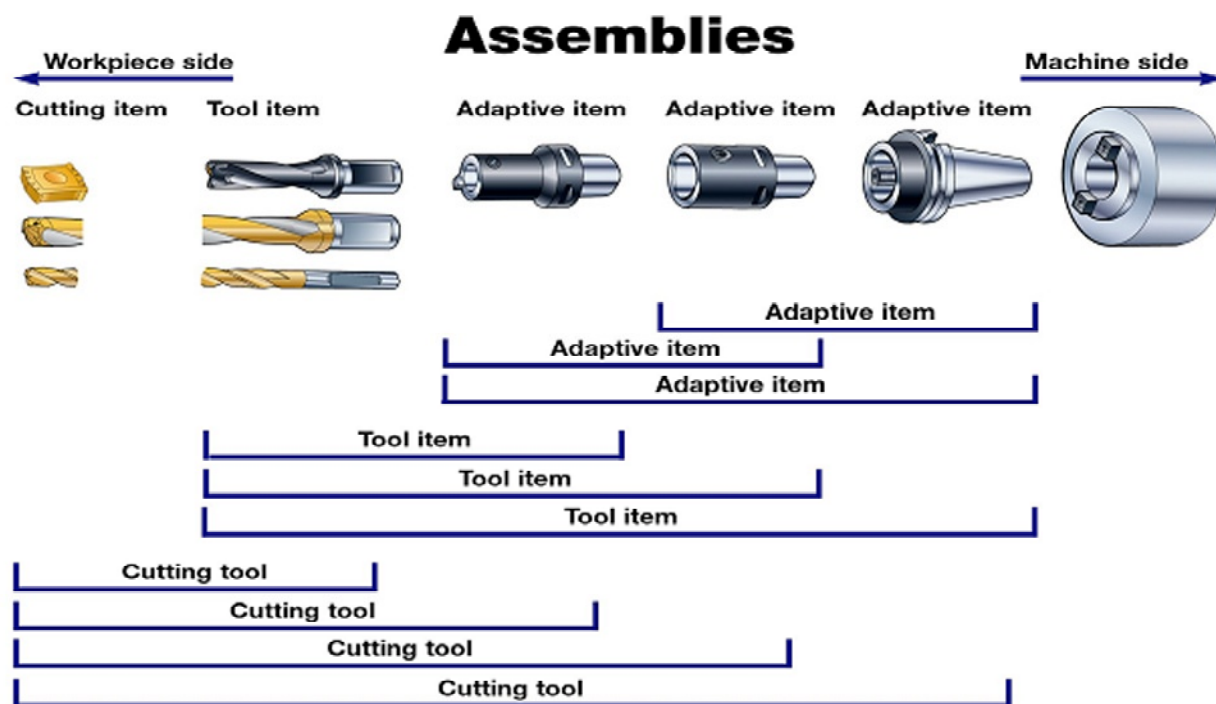


Figure 1 — Possible assemblies of components of a cutting tool

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

Union de Normalisation de la Mécanique
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/en/general/iso13399/default.htm>.

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 Technical Specification; 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 Technical Specification specifies a reference dictionary for cutting items, together with their descriptive properties and domains of values, for use in cutting tool data representation. The reference dictionary contains

- 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, and
- definitions and identifications of domains of values for describing those data element types.

Each class, property or domain of values of this application domain constitutes an entry of the reference dictionary defined in this Technical Specification. 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 TC184/SC4/WG2 and IEC SC3D, and in its extensions defined in ISO 13584-24 and ISO 13584-25.

The following are within the scope of this Technical Specification:

- 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 may be exchanged.

NOTE 1 The implementation method by which the standard data defined in this Technical Specification may be exchanged is given in ISO 10303-21.

The following are outside its scope:

- applications where these standard data may be stored or referenced;
- implementation methods other than the one defined by which the standard data may be exchanged and referenced;

- information model for cutting tools;
- 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, 4 and 5 respectively.

NOTE 4 Terms and definitions used in the compilation of this reference dictionary are provided in Clause 3. The main collection of the terms and their definitions in the reference dictionary is provided in Annexes B to D. Terms used to define the structure and contents of the dictionary are specified in ISO/TS 13399-100.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1832, *Indexable inserts for cutting tools — Designation*

ISO 3002-1:1982, *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 3002-3:1984, *Basic quantities in cutting and grinding — Part 3: Geometric and kinematic quantities in cutting*

ISO 3365:1985, *Indexable hardmetal (carbide) inserts with wiper edges, without fixing hole — Dimensions*

ISO 5608:1995, *Turning and copying tool holders and cartridges for indexable inserts — Designation*

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

ISO 10303-11:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual*

ISO 10303-21:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation methods: Clear text encoding of the exchange structure*

ISO 13399-1¹⁾, *Cutting tool data representation and exchange — Part 1: Overview, fundamental principles and general information model*

ISO/TS 13399-100¹⁾, *Cutting tool data representation and exchange — Part 100: Definitions, principles and methods for reference dictionaries*

ISO 13584-1:2000, *Industrial automation systems and integration — Parts library — Part 1: Overview and fundamental principles*

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

1) To be published.

ISO 13584-25:2004, *Industrial automation systems and integration — Parts library — Part 25: Logical resource: Logical model of supplier library with aggregate values and explicit content*

ISO 13584-42:1998, *Industrial automation systems and integration — Parts library — Part 42: Description methodology: Methodology for structuring part families*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10303-1, ISO 10303-11, ISO 13584-1, ISO 13584-42, ISO 13584-24 and the following apply.

3.1

applicable property

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

[ISO 13584-24:2002]

3.2

basic semantic unit

BSU

entity that provides an absolute and universal identification of classes and data element types in an application domain

[ISO 13584-42:1998]

3.3

chip

material removed from a workpiece by a cutting process

3.4

cutting tool

assembly of items able to perform a cutting operation

See Figure 1.

NOTE A cutting tool could be the assembly of several cutting items on a tool item.

3.5

data

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

[ISO 10303-1:1994]

3.6

data element type

DET

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

[ISO 13584-42:1998]

3.7

data exchange

storing, accessing, transferring and archiving of data

[ISO 10303-1:1994]

3.8
data type

domain of values

[ISO 10303-11:1994]

3.9
dictionary

structured set of entries with one and only one meaning corresponding to each entry and one and only one entry identifying a single meaning

NOTE In ISO 13399, 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

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 and it is a member of the domain established by an entity data type

3.13
family of items

simple or generic family of items

[ISO 13584-42:1998]

3.14
generic family of items

grouping of simple or generic families of items for the purpose of classification or for associating common information

[ISO 13584-42:1998]

3.15
implementation method

means for computers to exchange data

3.16
information

facts, concepts or instructions

[ISO 10303-1:1994]

3.17
information model

formal description of a bounded set of information to meet a specific requirement

[ISO 10303-1:1994]

3.18
irregular insert

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

3.19

machined surface

surface produced by the action of a cutting tool

[ISO 3002-1:1982]

3.20

ontology

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

NOTE In ISO 13399 a dictionary is the formal and computer-sensible representation of an ontology.

3.21

property

information that may be represented by a data element type

[ISO 13584-42:1998]

3.22

regular insert

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

3.23

simple family of items

set of items in which each item may be described by the same group of properties

[ISO 13584-42:1998]

3.24

transient surface

part of the surface which is formed on the workpiece by the cutting operation and is removed during the following cutting action either during the following revolution of the tool or the workpiece or by the following cutting edge

[ISO 3002-1:1982]

3.25

visible property

property that is defined for some family of items that may or may not be applicable to the different members of the family

[ISO 13584-42:1998]

3.26

workpiece

object on which a cutting action is performed

3.27

work surface

surface that is to be removed on the workpiece

[ISO 3002-1:1982]

4 Representation of the ontological concepts as dictionary entries

4.1 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.

For example, “cutting item type” is the name of a concept in the ontology, while **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**, **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.

4.2 Cutting_item_feature

4.2.1 General

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**;
- **flank**;
- **gauge_circle**;
- **inscribed_circle**.

4.2.2 chip_breaker

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

4.2.3 cutting_corner

Transition between two cutting edges.

cutting_corner has the following subclasses:

- **chamfered_corner**;
- **rounded_corner**.

4.2.4 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.**

4.2.5 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.

4.2.6 cutting_item_material

Substance from which a cutting item is made.

4.2.7 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.**

4.2.8 fixing_hole

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

4.2.9 flank

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

flank has the following subclasses:

- **flank_major;**
- **flank_minor;**
- **flank_wiper_edge.**

4.2.10 gauge_circle

Circle established by a measurement device on a cutting item that does not have an inscribed circle (see 4.2.11).

4.2.11 inscribed_circle

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

4.3 Cutting_item_type

4.3.1 General

cutting_item_type is a generic class of cutting items describable by their geometrical characteristics.

cutting_item_type has the following simple families of items as subclasses:

- **equilat_equiang;**
- **equilat_nonequiang;**
- **nonequilat_equiang;**
- **nonequilat_nonequiang;**
- **round_insert;**
- **specific_profile_insert.**

4.3.2 equilat_equiang

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.

equilat_equiang has the following items as subclasses:

- **hexagonal_insert;**
- **octagonal insert;**
- **pentagonal_insert;**
- **square_insert;**
- **triangular_insert.**

4.3.3 equilat_nonequiang

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.

equilat_nonequiang has the following items as subclasses:

- **rhombic_insert;**
- **trigon_insert.**

4.3.4 nonequilat_equiang

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.

nonequilat_equiang has the following item as a subclass:

— **rectangular_insert.**

4.3.5 nonequilat_nonequiang

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.

nonequilat_nonequiang has the following items as subclasses:

— **parallelogram_insert.**

4.3.6 round_insert

Type of cutting item with circular cutting edges.

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

4.3.7 specific_profile_insert

Type of cutting item that possesses a defined profile shape.

NOTE A synonymous name is **irregular_insert.**

4.4 Reference systems for cutting items

4.4.1 General

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 (see ISO 3002-1:1982).

The classes of reference systems for cutting items are:

— **coordinate_axis_system;**

— **irregular_insert_position;**

— **mirror_plane;**

— **regular_insert_position;**

— **xy_plane;**

— **xz_plane;**

— **yz_plane.**

4.4.2 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.

4.4.3 irregular_insert_position

An irregular insert is located on the coordinate axis 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, the side extremity of the insert on the Y axis.

4.4.4 mirror_plane

The **mirror_plane** is the XZ-plane in the coordinate axis system.

4.4.5 regular_insert_position

A regular insert is located on the coordinate axis system in the XY-quadrant with: the cutting edges on the XY-plane, the major cutting edge on the positive X-axis, the theoretical sharp point of the insert on the Y axis.

NOTE 1 The definition applies to right-hand inserts. The position of left-hand inserts is as mirrored through the XZ-plane.

NOTE 2 The positions of right-hand and left-hand regular inserts are illustrated in Figure G.12.

4.4.6 xy_plane

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

4.4.7 xz_plane

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

4.4.8 yz_plane

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

5 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 may 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 may be made unique by the addition of the supplier of the dictionary as a prefix to the identification code.

EXAMPLE The unique BSU for **ball_nosed** would be: ISO 13399-71D1AE0CB32D1.

Table 1 — Names of properties for cutting items

Property name	Identification code	Property name	Identification code
ball nosed	71D1AE0CB32D1	chamfer corner	71DD700D27A8A
chip breaker	71CED0217FA18	chip breaker face count	71CE7A85CC4F9
chip breaker width	71CE7A870948A	clamping type code	71E0C8E2B1CDB
clearance angle major	71DD70308D3E3	clearance angle minor	71DD7030E0A00
clearance angle wiper edge	71DD7031A98E9	coated	71DD703B84298
connection code machine side	71D102AE3B252	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 lh	71CE7AA3440B4
cutting edge angle major rh	71CE7AA78C2F0	cutting edge condition	71DD701137BA8
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 width	71CEAEBE2B825	depth of cut maximum	71D07576C0558
drilling profile	71D1AE126DEFD	face land angle	71DD6C9332D2C
face land size code	71DD6C9371B86	face land width	71DD6C9394F40
fixing hole	71DC829BC044	fixing hole diameter	71CE7A968C8FE
flank identity	7DD70158265C	gauge diameter	71E037869D06C
gauge distance	71E0378746578	grind style code	71E037892110A
grooving parting profile	71D1AE0A99D63	inscribed circle	71D1C82A5036D
inscribed circle diameter	71CE7A96D9F7D	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 lead angle	71CF30F9DFE37	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 width	71CE7A9FB11C3
interrupted edge	71DD701175021	m-dimension	71CE7AA0972DB
m2-dimension	71CE7AA05C819	overall length minimum	71E037863978B
profile angle lh	71CEAEBEAB020	profile angle rh	71CEAEBED837E
profile distance ex	71CEAEBFEB1B4	profile distance ey	71CEAEC0139BB
profile included angle	71CEAEBF0C234	profile radius	71E019EBAE1B1
profile specification	71DF8C5D91804	profile style code	71CE7E6520B87
relief angle	71DD9D00193A7	relief angle lh	71CE7E6520B87
relief angle rh	71CR7E6569AB5	rounded corner	71DD7011A3D86
taper gradient	71CEAEC02FEBD	thread form type	71D1A69F60053
thread height actual	71DF5BE65F86F	thread height difference	71DF5BE617131
thread height theoretical	71DF5BE5BCEBE	thread pitch	71CEAEC08D4B0
thread pitch diameter limit	71DF154936C1D	thread pitch maximum	71D1A6A283836
thread pitch minimum	71D1A6A247E1F	thread profile type	71CEAEC114603
thread type	71D1A6A16E6ED	threading length	71E02C65BB9DA
threading profile	71D1AE0A79DEF	threads per inch	71D1A6AAC8707
threads per inch maximum	71D1A6AB8F739	threads per inch minimum	71D1A6AB6FB19
tipped cutting edge code	71CE7AA1E3D75	tolerance class insert	71CE7AA215888
tolerance class thread	71CED022114EC	tooth count	71CEAEBF8A68E
weight of item	71CED03C97AAB	wiper edge	71CED022114EC
wiper edge length	71CE7AA249F88	wiper edge radius	71CE7AA2E50BE

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 standard 13399 part (2) version (1)}

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

A.2 Dictionary identification

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

{ISO standard 13399 part (2) version (1) object (1) cutting items (1)}.

Annex B (informative)

Classification tables

The tables of this annex show the classification structure of the generic families in the dictionary with an expanded structure for the classes of cutting item 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 ISO 13399.

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.

Classification structure				Parent	BSU
cutting tool library				Root	71CE7A725CDA7
	accessory item feature			71CE7A725CDA7	71DD7037F03CC
	accessory item type			71CE7A725CDA7	71CE7A789BBF8
	adaptive item feature			71CE7A725CDA7	71DD7037C4C2C
	adaptive item type			71CE7A725CDA7	71CE7A78E44BC
	assembly item feature			71CE7A725CDA7	71DD70379BEC9
	assembly item type			71CE7A725CDA7	71CE7A795C05C
	cutting item feature			71CE7A725CDA7	71DD6C82F72DA
			chip breaker	71DD6C82F72DA	71DD6C870BCCA
			cutting corner	71DD6C82F72DA	71DD6C87BB5E1
			chamfered corner	71DD6C87BB5E1	71DD6C884C4BD
			rounded corner	71DD6C87BB5E1	71DD6C8A9985E
			cutting edge	71DD6C82F72DA	71DD6C8B42A9E
			cutting edge conditioned	71DD6C8B42A9E	71DD6C8C4F46C
			cutting edge interrupted	71DD6C8B42A9E	71DD6C93E8F02
			cutting edge major	71DD6C8B42A9E	71DD6C9466F30
			cutting edge minor	71DD6C8B42A9E	71DD6C961D7FE
			wiper edge	71DD6C8B42A9E	71DD6C9A21689
			cutting item coating	71DD6C82F72DA	71DD9D01038CF
			cutting item material	71DD6C82F72DA	71DD703BE6B82
			cutting item profile	71DD6C82F72DA	71DD70030304C
			ball nosed profile	71DD70030304C	71DD700BC8BE2
			drilling profile	71DD70030304C	71DD700BE1D04
			grooving parting profile	71DD70030304C	71DD700BFD9B9
			threading profile	71DD70030304C	71DD700C151B5
			fixing hole	71DD6C82F72DA	71DD7014BF2A1

Classification structure				Parent	BSU
			flank	71DD6C82F72DA	71DD70155A4B1
			flank major	71DD70155A4B1	71DD7015F073B
			flank minor	71DD70155A4B1	71DD701618C71
			flank wiper edge	71DD70155A4B1	71DD70163AA42
			gauge circle	71DD6C82F72DA	71E03787CA636
			inscribed circle	71DD6C82F72DA	71DD7032B51CD
	cutting item type			71CE7A725CDA7	71D1AA6C8FC75
			equilateral equiangular	71D1AA6C8FC75	71D1AA486FF89
			hexagonal insert	71D1AA486FF89	71DD68D7A8E5F
			octagonal insert	71D1AA486FF89	71DD68D7CBFA
			pentagonal insert	71D1AA486FF89	71DD68D80B094
			square insert	71D1AA486FF89	71DD68D829217
			triangular insert	71D1AA486FF89	71DD68D8446CE
			equilateral non equiangular	71D1AA6C8FC75	71D1AE11B8B77
			rhombic insert	71D1AE11B8B77	71DD68D301C30
			trigon insert	71D1AE11B8B77	71DD68D73218C
			non equilateral equiangular	71D1AA6C8FC75	71D1AE120D96E
			rectangular insert	71D1AE120D96E	71DD68D91938A
			non equilateral non equiangular	71D1AA6C8FC75	71DDAA489FD6E
			parallelogram insert	71DDAA489FD6E	71DD68D966F52
			round insert	71D1AA6C8FC75	71D1AA6635E76
			specific profile insert	71D1AA6C8FC75	71DDA089C8D1E
	cutting operation			71CE7A725CDA7	71CECC668E4B
	cutting tool			71CE7A725CDA7	71CE7A7A5038B
	reference system			71CE7A725CDA7	71CF2968F7A9E
			adaptive item position	71CF2968F7A9E	71D9F4A9D1AE
			coordinate axis system	71CF2968F7A9E	71D188F129725
			irregular insert position	71CF2968F7A9E	71D1A2CB23A32
			master insert	71CF2968F7A9E	71D0808DA853B
			mirror plane	71CF2968F7A9E	71D19F532AC75
			prismatic tool item position	71CF2968F7A9E	71D10668FA109
			regular insert position	71CF2968F7A9E	71D0181931BAE
			round tool item position	71CF2968F7A9E	71D19F4B58F60
			XY-plane	71CF2968F7A9E	71D188FC65486
			XZ-plane	71CF2968F7A9E	71CF29A3CDE2F
			YZ-plane	71CF2968F7A9E	71D188F971983
	tool item feature			71CE7A725CDA7	71DD7037671D
	tool item type			71CE7A725CDA7	71CE7A79C0904

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 presentation of the information for each class is as follows:

BSU code-Version no. Revision number
Preferred name Short name
Definition
NOTE(s)
Sub-classes:
Properties:

C.2 Classes

71CE7A72B6DA7-1 1

cutting tool library ctl

library of items that are characterised by their association with machine cutting tools, their components and their assembly

Sub-classes:

71DD6C82F72DA-001 cutting item feature

71D1AA6C8FC75-001 cutting item type

71CF2968F7A9E-001 reference system

71DD6C82F72DA-1 1

cutting item feature cif

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

Sub-classes:

71DD6C870BCCA-001 chip breaker

71DD6C87BB5E1-001 cutting corner

71DD6C8B42A9E-001 cutting edge

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71DD70030304C-001	cutting item profile
71DD7014BF2A1-001	fixing hole
71DD70155A4B1-001	flank
71DD7032B51CD-001	inscribed circle
71DD703BE6B82-001	cutting item material
71DD9D01038CF-001	cutting item coating
71E03787CA636-001	gauge circle

71DD6C870BCCA-1 **1**

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:

71CE7A870948A-1	chip breaker width
71CE7A9EDACA1-1	insert rake angle

71DD6C87BB5E1-1 **1**

cutting corner **corner**

transition between two cutting edges

Properties:

71DD6C8802580-1	corner identity
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Sub-classes:

71DD6C884C4BD-001	chamfered corner
71DD6C8A9985E-001	rounded corner

71DD6C884C4BD-1 **1**

chamfered corner **chcc**

linear transition between two cutting edges

Properties:

71DD6C88F9210-1	corner chamfer angle
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71DD6C895C25B-1 corner chamfer length

71DD6C89A120F-1 corner chamfer width

71DD6C8A9985E-1 1

rounded corner rndc

curved transition between two cutting edges

Properties:

71DD6C8ACA503-1 corner radius

71DD6C8B42A9E-1 1

cutting edge ctedg

junction between two surfaces that performs the cutting operation

Properties:

71DD6C8B86265-1 cutting edge identity

71DD6C9332D2C-1 face land angle

71DD6C9371B86-1 face land size code

71DD6C9394F40-1 face land width

Sub-classes:

71DD6C8C4F46C-001 cutting edge conditioned

71DD6C93E8F02-001 cutting edge interrupted

71DD6C9466F30-001 cutting edge major

71DD6C961D7FE-001 cutting edge minor

71DD6C9A21689-001 wiper edge

71DD6C8C4F46C-1 1

cutting edge conditioned ctec

type of cutting edge with specific characteristics

Properties:

71DD6C90953D8-1 cutting edge condition code

71DD6C93E8F02-1 1

cutting edge interrupted **ceint**

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

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

71DD6C9466F30-1 1

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:

71CE7AA3440B4-1 cutting edge angle major lh
71CE7AA78C2F0-1 cutting edge angle major rh
71DD6C950E7CC-1 cutting edge curvature
71DD6C958C615-1 cutting edge effective length
71DD6C95DA49B-1 cutting edge length

71DD6C961D7FE-1 1

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

71DD6C9A21689-1 1

wiper edge **wpe**

cutting edge with a wiper configuration

Properties:

71CE7AA02C1CC-1 cutting edge angle major
71CE7AA249F88-1 wiper edge length
71CE7AA2E50BE-1 wiper edge radius
71DD7031A98E9-1 clearance angle wiper edge

71DD9D01038CF-1 **1**

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.

71DD703BE6B82-1 **1**

cutting item material **material**

substance from which a cutting item is made

71DD70030304C-1 **1**

cutting item profile **ciprf**

shape traced out by the cutting edges of a cutting item

Sub-classes:

71DD700BC8BE2-001 ball nosed profile

71DD700BE1D04-001 drilling profile

71DD700BFD9B9-001 grooving parting profile

71DD700C151B5-001 threading profile

71DD700BC8BE2-1 **1**

ball nosed profile **bnprf**

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

Properties:

71CE7A9DFA23A-1 insert length

71CE7A9F5308C-1 insert thickness

71CE7A9FB11C3-1 insert width

71D1C829BC044-1 fixing hole

71DD6C8802580-1 corner identity

71DD6C8ACA503-1 corner radius

71DD9D00193A7-1 relief angle

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71DD700BE1D04-1 1

drilling profile **drprf**

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

Properties:

71CE7AA1E3D75-1	tipped cutting edge code
71CEAE9B489F4-1	cutting edge count
71CEAE9B67E4C-1	corner count
71CF30F02C968-1	insert cutting diameter
71DD700D27A8A-1	chamfer corner
71DD701137BA8-1	cutting edge condition
71DD701175021-1	interrupted edge property
71DD7011A3D86-1	rounded corner
71E037892110A-1	grind style code

71DD700BFD9B9-1 1

grooving parting profile **gpprf**

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

Properties:

71CE7A85CC4F9-1	chip breaker face count
71CE7AA1E3D75-1	tipped cutting edge code
71CE7AA3440B4-1	cutting edge angle major lh
71CE7AA78C2F0	cutting edge angle major rh
71CE7E6520B87-1	relief angle lh
71CE7E6569AB5-1	relief angle rh
71CEAE9B489F4-1	cutting edge count
71CEAE9B67E4C-1	corner count
71CEAEBD5A66A-1	cutting depth maximum
71CEAEBDE5798-1	profile style code
71CEAEBE2B825-1	cutting width
71CEAEBEAB020-1	profile angle lh

71CEAEBED837E-1	profile angle rh
71CEAEBF0C234-1	profile included angle
71D07576C0558-1	depth of cut maximum
71DD700D27A8A-1	chamfer corner
71DD701137BA8-1	cutting edge condition
71DD7011A3D86-1	rounded corner

71DD700C151B5-1 1

threading profile thprf

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

Properties:

71CE7A85CC4F9-1	chip breaker face count
71CE7AA1E3D75-1	tipped cutting edge code
71CEAE9B489F4-1	cutting edge count
71CEAE9B67E4C-1	corner count
71CEAEBF0C234-1	profile included angle
71CEAEBF8A68E-1	tooth count
71CEAEBFEF1B4-1	profile distance ex
71CEAEC0139BB-1	profile distance ey
71CEAEC02FEBD-1	taper gradient
71CEAEC08D4B0-1	thread pitch
71CEAEC114603-1	thread profile type
71D1A69F60053-1	thread form type
71D1A6A16E6ED-1	thread type
71D1A6A247E1F-1	thread pitch minimum
71D1A6A283836-1	thread pitch maximum
71D1A6AAC8707-1	threads per inch
71D1A6AB6FB19-1	threads per inch minimum
71D1A6AB8F739-1	threads per inch maximum
71DD701137BA8-1	cutting edge condition
71DD7011A3D86-1	rounded corner

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71DF5BE5BCEBE-1	thread height theoretical
71DF5BE617131-1	thread height difference
71DF5BE65F86F-1	thread height actual

71DD7014BF2A1-1 1

fixing hole **fxhl**

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

Properties:

71CE7A968C8FE-1	fixing hole diameter
71CE7A97711B8-1	insert mounting style code

71DD70155A4B1-1 1

flank **flk**

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

Properties:

71DD70158265C-1	flank identity
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Sub-classes:

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

71DD7015F073B-1 1

flank major **flmj**

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

Properties:

71DD70308D3E3-1	clearance angle major
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71DD701618C71-1 1

flank minor **flmn**

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

Properties:

71DD7030E0A00-1 clearance angle minor

71DD70163AA42-1 1

flank wiper edge **flwe**

flank of a cutting item that has a wiper edge

Properties:

71DD7031A98E9-1 clearance angle wiper edge

71E03787CA636-1 1

gauge circle **gacirc**

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

Properties:

71E037869D06C-1 gauge diameter

71DD7032B51CD-1 1

inscribed circle **insc**

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

Properties:

71CE7A96D9F7D-1 inscribed circle diameter

71D1AA6C8FC75-1 1

cutting item type **cins**

general shape of a cutting item that is replaceable on a tool item

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

Properties:

71CED0217FA18-1 chip breaker