TECHNICAL SPECIFICATION

ISO/TS 13399-2

First edition
2005-02-15

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 13399-2:2005(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn.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.

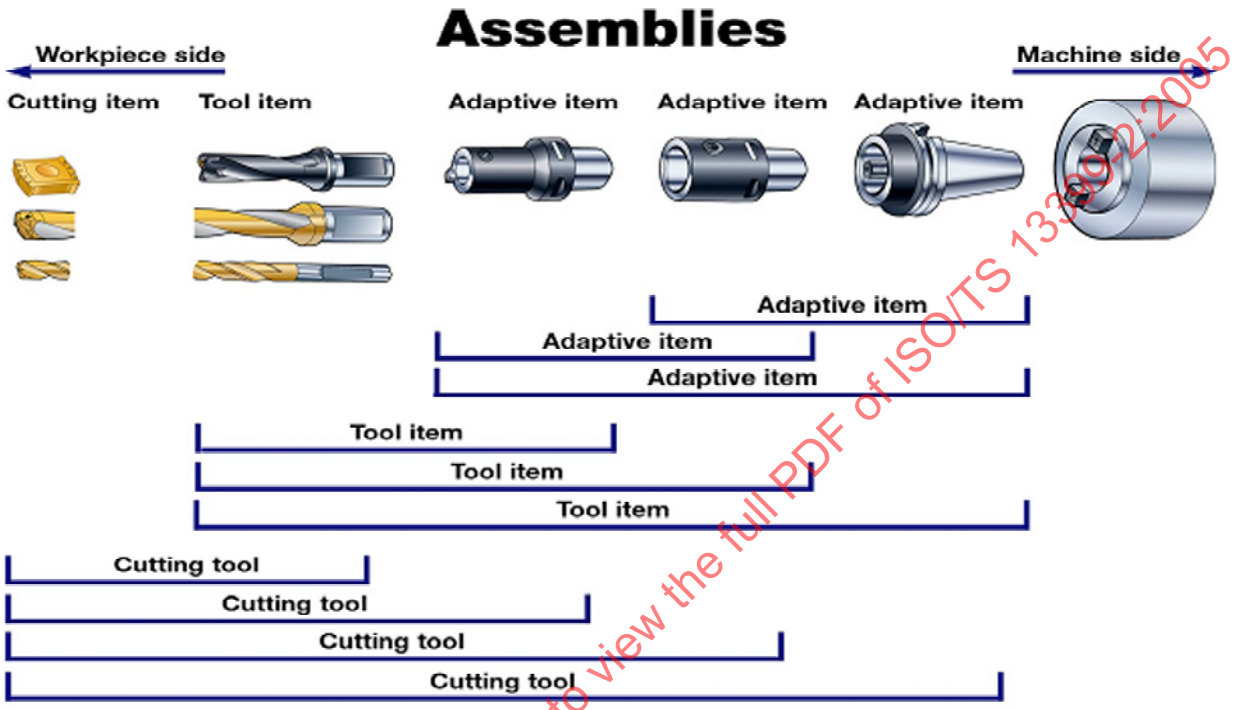

Figure 1 — Possible assemblies of components of a cutting tool

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

ISO/TS 13399-100[1)], *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-axist, 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-axist, 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	71CEAEBFEF1B4	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

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

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

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

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

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

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

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

71DD703B84298-1 coated

71E037863978B-1 overall length minimum

Sub-classes:

71D1AA486FF89-001 equilat equiang

71D1AE11B8B77-001 equilat nonequiang

71D1AE120D96E-001 nonequilat equiang

71D1AA489FD6E-001 nonequilat nonequiang

71D1AA6635E76-001 round insert

71DDA089C8D1E-001 specific profile insert

71D1AA486FF89-1 1

equilat equiang 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.

Properties:

71CE7A85CC4F9-1 chip breaker face count

71CE7A96BC122-1 insert included angle

71CE7A97711B8-1 insert mounting style code

71CE7A979F41C-1 insert hand

71CE7A9936610-1 insert interface code

71CE7A9DFA23A-1 insert length

71CE7A9F0C79F-1 insert shape code

71CE7A9F5308C-1 insert thickness

71CE7A9FB11C3-1 insert width

71CE7AA0972DB-1 m-dimension

71CE7AA1998FF-1 insert index count

71CE7AA1E3D75-1 tipped cutting edge code

71CE7AA215888-1 tolerance class insert

71CEAE9B489F4-1 cutting edge count

71CEAE9B67E4C-1 corner count

71CED022114EC-1 wiper edge

71D1C829BC044-1 fixing hole

71D1C82A5036D-1 inscribed circle

71DD700D27A8A-1 chamfer corner

71DD701137BA8-1 cutting edge condition

71DD701175021-1 interrupted edge property

71DD7011A3D86-1 rounded corner

Sub-classes:

71DD68D7A8E5F-001 hexagonal insert

71DD68D7CB4FA-001 octagonal insert

71DD68D80B094-001 pentagonal insert

71DD68D829217-001 square insert

71DD68D8446CE-001 triangular insert

71DD68D7A8E5F-1 1

hexagonal insert hexin

replaceable cutting item with six equal sides and six equal internal angles

NOTE This shape is identified with the ISO shape code H.

71DD68D7CB4FA-1 1

octagonal insert octins

replaceable cutting item with eight equal sides and eight equal internal angles

NOTE This shape is identified by the ISO shape code O.

71DD68D80B094-1 1

pentagonal insert pentins

replaceable cutting item with five equal sides and five equal internal angles

NOTE This shape is identified by the ISO shape code P.

71DD68D829217-1 **1**

square insert **sqins**

replaceable cutting item with four equal sides and four equal internal angles

NOTE This shape is identified by the ISO shape code S.

71DD68D8446CE-1 **1**

triangular insert **trianins**

replaceable cutting item with three equal sides and three equal internal angles

NOTE This shape is identified by the ISO shape code T.

71D1AE11B8B77-1 **1**

equilat nonequiang **eqlnqa**

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.

Properties:

71CE7A85CC4F9-1 chip breaker face count

71CE7A96BC122-1 insert included angle

71CE7A97711B8-1 insert mounting style code

71CE7A979F41C-1 insert hand

71CE7A9936610-1 insert interface code

71CE7A9DFA23A-1 insert length

71CE7A9F0C79F-1 insert shape code

71CE7A9F5308C-1 insert thickness

71CE7A9FB11C3-1 insert width

71CE7AA05C819-1 m2-dimension

71CE7AA0972DB-1 m-dimension

71CE7AA1998FF-1 insert index count

71CE7AA1E3D75-1 tipped cutting edge code

71CE7AA215888-1 tolerance class insert

71CEAE9B489F4-1 cutting edge count

71CEAE9B67E4C-1 corner count

71CED022114EC-1 wiper edge

71D1C829BC044-1 fixing hole

71D1C82A5036D-1 inscribed circle

71DD700D27A8A-1 chamfer corner

71DD701137BA8-1 cutting edge condition

71DD701175021-1 interrupted edge property

71DD7011A3D86-1 rounded corner

Sub-classes:

71DD68D301C30-001 rhombic insert

71DD68D73218C-001 trigon insert

71DD68D301C30-1 1

rhombic insert rhmbins

replaceable cutting item with two cutting corners, four sides of equal length and four internal angles none of which are equal to ninety degrees

NOTE This class contains inserts with the ISO shape codes: C,D,E,M and V.

71DD68D73218C-1 1

trigon insert trigins

replaceable cutting item with a generally triangular shape with enlarged included angles

NOTE 1 The edges between the corners may be curved or straight.

NOTE 2 The ISO shape code for this insert is W when the edges are straight and T when the edges are curved.

71D1AE120D96E-1 1

nonequilat equiang nqleqa

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.

Properties:

71CE7A85CC4F9-1	chip breaker face count
71CE7A96BC122-1	insert included angle
71CE7A97711B8-1	insert mounting style code
71CE7A979F41C-1	insert hand
71CE7A9936610-1	insert interface code
71CE7A9DFA23A-1	insert length
71CE7A9F0C79F-1	insert shape code
71CE7A9F5308C-1	insert thickness
71CE7A9FB11C3-1	insert width
71CE7AA1998FF-1	insert index count
71CE7AA1E3D75-1	tipped cutting edge code
71CE7AA215888-1	tolerance class insert
71CEAE9B489F4-1	cutting edge count
71CEAE9B67E4C-1	corner count
71CED022114EC-1	wiper edge
71D1C829BC044-1	fixing hole
71DD700D27A8A-1	chamfer corner
71DD701137BA8-1	cutting edge condition
71DD701175021-1 I	interrupted edge property
71DD7011A3D86-1	rounded corner

Sub-classes:

71DD68D91938A-001	rectangular insert

71DD68D91938A-1 **1**

rectangular insert **rectins**

replaceable cutting item with four sides and four equal internal angles

NOTE 1 Opposing sides are equal in length but adjacent sides are not equal in length.

NOTE 2 This shape is identified by the ISO shape code L.

71D1AA489FD6E-1 1

nonequilat nonequiang nqlnqa

type of cutting item of regular geometric shape with sides of non-equal lengths and non-equal included angles

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

Properties:

71CE7A85CC4F9-1	chip breaker face count
71CE7A96BC122-1	insert included angle
71CE7A97711B8-1	insert mounting style code
71CE7A979F41C-1	insert hand
71CE7A9936610-1	insert interface code
71CE7A9DFA23A-1	insert length
71CE7A9F0C79F-1	insert shape code
71CE7A9F5308C-1	insert thickness
71CE7A9FB11C3-1	insert width
71CE7AA1998FF-1	insert index count
71CE7AA1E3D75-1	tipped cutting edge code
71CE7AA215888-1	tolerance class insert
71CEAE9B489F4-1	cutting edge count
71CEAE9B67E4C-1	corner count
71CED022114EC-1	wiper edge
71D1C829BC044-1	fixing hole
71DD700D27A8A-1	chamfer corner
71DD701137BA8-1	cutting edge condition
71DD701175021-1	interrupted edge property
71DD7011A3D86-1	rounded corner

Sub-classes:

71DD68D966F52-001	parallelogram insert

71DD68D966F52-1 **1**

parallelogram insert **parins**

replaceable cutting item with four sides and four internal angles none of which are equal to ninety degrees

NOTE 1 Opposing sides are parallel and equal in length.

NOTE 2 This shape is identified by the ISO shape code K.

71D1AA6635E76-1 **1**

round insert **rndins**

type of cutting item with circular edges

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

Properties:

71CE7A85CC4F9-1 chip breaker face count

71CE7A97711B8-1 insert mounting style code

71CE7A9936610-1 insert interface code

71CE7A9F0C79F-1 insert shape code

71CE7A9F5308C-1 insert thickness

71CE7AA215888-1 tolerance class insert

71CEAE9B489F4-1 cutting edge count

71D1C829BC044-1 fixing hole

71D1C82A5036D-1 inscribed circle

71D20799C721A-1 insert diameter

71DD701137BA8-1 cutting edge condition

71DDA089C8D1E-1 **1**

specific profile insert **spins**

type of cutting item that possess a defined profile shape

Properties:

71CE7A85CC4F9-1 chip breaker face count

71CE7A96BC122-1 insert included angle

71CE7A9751A90-1 insert body width

71CE7A97711B8-1 insert mounting style code

71CE7A979F41C-1 insert hand

71CE7A9936610-1 insert interface code

71CE7A9DFA23A-1 insert length

71CE7A9F5308C-1 insert thickness

71CE7A9FB11C3-1 insert width

71CE7AA1998FF-1 insert index count

71CE7AA1E3D75-1 tipped cutting edge code

71CEAE9B489F4-1 cutting edge count

71CEAE9B67E4C-1 corner count

71CED022114EC-1 wiper edge

71D1AE0A79DEF-1 threading profile

71D1AE0A99D63-1 groove part profile

71D1AE0CB32D1-1 ball nosed

71D1AE126DEFD-1 drilling profile

71D1C829BC044-1 fixing hole

71DD700D27A8A-1 chamfer corner

71DD701137BA8-1 cutting edge condition

71DD701175021-1 interrupted edge property

71DD7011A3D86-1 rounded corner

71E0378746578-1 gauge distance

71CF2968F7A9E-1 1

reference system refsys

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

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

Sub-classes:

71D188F129725-001 coordinate axis system

71D1A2CB23A32-001 irregular insert position

71D19F532AC75-001 mirror plane

71D0181931BAE-001 regular insert position

71D188FC65486-001 XY-plane

71CF29A3CDE2F-001 XZ-plane

71D188F971983-001 YZ-plane

71D188F129725-1 **1**

coordinate axis system **pcs**

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

71D1A2CB23A32-1 **1**

irregular insert position **irpos**

cutting edges in the XY-plane with the insert located in the XY-quadrant, the cutting profile pointing in the negative Y direction, the physical extremity of the cutting profile on the positive X-axist and the extreme physical 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 XZ-plane.

71D19F532AC75-1 **1**

mirror plane **mplane**

the XZ-plane in the coordinate axis system

71D0181931BAE-1 **1**

regular insert position **ripos**

where the cutting edges are placed on the XY-plane of the coordinate axis system with the insert located in the XY-quadrant, the major cutting edge on the positive x axis and the extreme 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 diagrams in Annex G illustrate the positions for different shapes of inserts.

71D188FC65486-1 **1**

xy-plane **xyp**

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

71D188F971983-1 **1**

yz-plane **yzp**

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

71CF29A3CDE2F-1 **1**

xz-plane **xzp**

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

Annex D
(informative)

Cutting item property definitions

D.1 Presentation

The presentation of the entries in this annex is as follows:

BSU-Version no. **Revision no.** **Value format**

data type group data type unit identifier

preferred name **short name** SYMBOL

definition

source of definition

BSU of condition property = name of condition property

Code = meaning of code

Source of code definition

NOTE References to illustrations of the properties are in the form <Annex><illustration number>.

BSU of reference diagram

Visible class:

Applicable classes:

An entry may not contain all the information specified.

The value formats of properties are specified in ISO 13399-100.

D.2 Cutting item properties

71D1AE0CB32D1-1 **1** **X1**

simple Boolean

ball nosed **bnp** BNP

possession of a ball nosed profile by a cutting item

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DDA089C8D1E-1 specific profile insert

71DD700D27A8A-1 **1** **X1**

simple Boolean

chamfer corner **ccp** CCP

possession of a chamfered corner

71DD6C8802580-1 = corner identity

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DD700BE1D04-1 drilling profile

71DD700BFD9B9-1 grooving parting profile

71DDA089C8D1E-1 specific profile insert

71CED0217FA18-1 **1** **X1**

simple Boolean

chip breaker **cbp** CBP

possession by a profile of a chip breaker

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA6C8FC75-1 cutting item type

71CE7A85CC4F9-1 **1** **NR1 S..4**

simple integer

chip breaker face count **cb** CB

number of faces of a cutting item that have chip breakers

NOTE 1 The allowed values are 0, 1 or 2.

NOTE 2 A value of 0 means that there is not a chip breaker on the cutting item.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AA6635E76-1 round insert

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DD700BFD9B9-1 grooving parting profile

71DD700C151B5-1 threading profile

71DDA089C8D1E-1 specific profile insert

71CE7A870948A-1 **1** **NR2..3.3**

simple real measure mm

chip breaker width **lbb** LBB

width of a chip breaker measured at the mid-point of its length

NOTE See Figures E.6, E.10 and F.1 to F.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C870BCCA-1 chip breaker

71E0C8E2B1CDB-1 **1** **X 1**

simple non-quantitative code

clamping type code **mtp** MTP

identifier for the type of clamping mechanism to hold the replaceable insert on the tool item

C = clamp on top of insert

D = clamp on top of insert and into hole

F = wedge clamp behind insert

M = clamp on top of insert and through hole

N = clamp into notch in insert

P = clamp with pin through hole

S = clamp with screw through hole

W = wedge clamp in front of insert

ISO 5608

71DD70308D3E3-1 **1** **NR2 S..3.3**

simple real measure deg

clearance angle major **an** AN

angle of the major flank of the insert measured from a plane tangential to the cutting edge and perpendicular to the XY-plane of the coordinate system

71DD70158265C-1 = flank identity

NOTE The definition applies to regular and irregular cutting items. See Figures E.6, 7, 8, 11, 19 and Figures F.1, F.2, F.4 to F.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD7015F073B-1 flank major

71DD7030E0A00-1 **1** **X 17**

simple string

clearance angle minor **ann** ANN

angle of the minor flank of the insert measured from a plane tangential to the minor cutting edge and perpendicular to the XY-plane of the coordinate system

71DD70158265C-1 = flank identity

NOTE This definition applies to both regular and irregular cutting items. See Figures E.8, E.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD701618C71-1 flank minor

71DD7031A98E9-1 **1** **NR2 S..3.3**

simple real measure deg

clearance angle wiper edge **as** AS

angle of the flank of the wiper edge of the insert measured from a plane tangential to the wiper edge and perpendicular to the XY-plane of the coordinate system

71DD70158265C-1 = flank identity

REMARKS: This definition applies to regular cutting items only. See Figures E.1, E.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9A21689-1 wiper edge

71DD70163AA42-1 flank wiper edge

71DD703B84298-1 **1** **X1**

simple Boolean

coated **ctp** CTP

possession of a coating by a cutting item type

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA6C8FC75-1 cutting item type

71D102AE3B252-1 **1** **X 17**

simple string

conn code machine side **ccms** CCMS

identifier for the capability to connect any component of a cutting tool together, except assembly items, on the machine side

NOTE The term is *connection code machine side*.

71DD6C88F9210-1 **1** **NR2 S..3.3**

simple real measure deg

corner chamfer angle **kch** KCH

angle of a chamfer on a corner measured from the major cutting edge

71DD6C8802580-1 = corner identity

REMARKS: Applies to cutting items with a regular geometric shape. See Figure E.5.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C884C4BD-1 chamfered corner

71DD6C895C25B-1 **1** **NR2 S..3.3**

simple real measure mm

corner chamfer length **bch** BCH

nominal length of a chamfered corner measured in the XY-plane

71DD6C8802580-1 = corner identity

ISO 3002-1

NOTE Applies to cutting items with a regular geometric shape. See Figure E.1.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C884C4BD-1 chamfered corner

71DD6C89A120F-1 **1** **NR2 S..3.3**

simple real measure mm

corner chamfer width **chw** CHW

projected length of the chamfer on a corner of a cutting item measured in the XY-plane parallel to the X-axis

71DD6C8802580-1 = corner identity

REMARK See Figure E.5.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C884C4BD-1 chamfered corner

71CEAE9B67E4C-1 **1** **NR1 S..4**

simple integer

corner count **cnc** CNC

number of corners that participate in the cutting process

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1	equilat equiang
71D1AA489FD6E-1	nonequilat nonequiang
71D1AE11B8B77-1	equilat nonequiang
71D1AE120D96E-1	nonequilat equiang
71DD700BE1D04-1	drilling profile
71DD700BFD9B9-1	grooving parting profile
71DD700C151B5-1	threading profile
71DDA089C8D1E-1	specific profile insert

71DD6C8802580-1 **1** **NR1 S..4**

simple integer

corner identity **cnid** CNID

integer number in the range -n<0<+n that identifies a cutting corner

NOTE The identifier 0 is applied to the corner on the X-axis of the cutting item reference system with the least value of the X dimension. From this point, corners are numbered in sequence by negative integers in a clockwise direction and by positive integers in a counter-clockwise direction.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C87BB5E1-1	cutting corner
71DD700BC8BE2-1	ball nosed profile

71DD6C8ACA503-1 **1** **NR2 S..3.3**

simple real measure mm

corner radius **re** RE

nominal radius of a rounded corner measured in the XY-plane

71DD6C8802580-1 = corner identity

NOTE See Figures E.3, E.4, E.10 and F.3, F.5, F.7 to F.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C8A9985E-1 rounded corner

71DD700BC8BE2-1 ball nosed profile

71CEAEBD5A66A-1 **1** **NR2 S..3.3**

level max real measure mm

cutting depth maximum **cdx** CDX

maximum penetration of a cutting edge in the feed direction on the first infeed motion

NOTE See Figures F.1 to F.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71CE7AA02C1CC-1 **1** **NR2 S..3.3**

simple real measure deg

cutting edge angle major **krins** KRINS

angle between the major cutting edge and the wiper edge

ISO 3365

NOTE Used mainly for regular inserts with wiper edges. See Figures E.1, E.5.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9A21689-1 wiper edge

71CE7AA3440B4-1 **1** **NR2 S..3.3**

simple real measure deg

cutting edge angle major lh **psirl** PSIRL

angle in the XY-plane between the X-axis and the major cutting edge measured in a negative direction (clockwise)

NOTE 1 Used for irregular inserts.

NOTE 2 The term is *cutting edge angle major left hand*. See Figures F.2 to F.4.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9466F30-1 cutting edge major

71DD700BFD9B9-1 grooving parting profile

71CE7AA78C2F0-1 1 NR2 S..3.3

simple real measure deg

cutting edge angle major rh **psirr** PSIRR

angle in the XY-plane between the X-axis and the major cutting edge measured in a positive direction (counter-clockwise/anticlockwise)

NOTE 1 Used for irregular inserts.

NOTE 2 The term is cutting edge angle major right hand. See Figures F.2 to F.4.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9466F30-1 cutting edge major

71DD700BFD9B9-1 grooving parting profile

71DD701137BA8-1 1 X1

simple Boolean

cutting edge condition **cecp** CECP

possession of a cutting edge with a specified condition

71DD6C8B86265-1 = cutting edge identity

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA489FD6E-1 nonequilat nonequiang

71D1AA486FF89-1 equilat equiang

71D1AA6635E76-1 round insert

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DD700BE1D04-1 drilling profile

71DD700BFD9B9-1 grooving parting profile

71DD700C151B5-1 threading profile

71DDA089C8D1E-1 specific profile insert

71DD6C90953D8-1 1 A.1

simple non-quantitative code type

cutting edge condition code cecc CECC

identifier for the state of a cutting edge

F = sharp

E = rounded

T = chamfered

S = chamfered and rounded

K = double rounded

P = rounded and chamfered

71DD6C8B86265-1 = cutting edge identity

ISO 1832

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C8C4F46C-1 cutting edge condition

71CEAE9B489F4-1 1 NR1 S..4

simple integer

cutting edge count cedc CEDC

number of edges of a cutting profile that can participate in the cutting process

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1	equilat equiang
71D1AA489FD6E-1	nonequilat nonequiang
71D1AA6635E76-1	round insert
71D1AE11B8B77-1	equilat nonequiang
71D1AE120D96E-1	nonequilat equiang
71DD700BE1D04-1	drilling profile
71DD700BFD9B9-1	grooving parting profile
71DD700C151B5-1	threading profile
71DDA089C8D1E-1	specific profile insert

71DD6C950E7CC-1 **1** **NR2 S..3.3**

simple real measure mm

cutting edge curvature **cecv** CECV

curvature of the major cutting edge measured in the XY-plane

NOTE Curvature is the inverse of the radius.

71DD6C8B86265-1 = cutting edge identity

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9466F30-1	cutting edge major

71DD6C958C615-1 **1** **NR2 S..3.3**

simple real measure mm

cutting edge effective length **le** LE

portion of the length of a cutting edge of a cutting item that is intended to perform the cutting operation

71DD6C8B86265-1 = cutting edge identity

NOTE See Figures E.9, E.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9466F30-1 cutting edge major

71DD6C8B86265-1 **1** **NR1 S..4**

simple integer

cutting edge identity **ceid** CEID

integer number in the range –n<0<+n that identifies a cutting edge

NOTE The identifier 0 is applied to the edge on the X-axis of the cutting item reference system with the least value of the X dimension. From this point, edges are numbered in sequence by negative integers in a clockwise direction and by positive integers.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C8B42A9E-1 cutting edge

71DD6C95DA49B-1 **1** **NR2 S..3.3**

simple real measure mm

cutting edge length **l** L

theoretical length of the cutting edge of a cutting item over sharp corners

71DD6C8B86265-1 = cutting edge identity

NOTE See Figures E.2, E.3, E.4, E.9, E.10, E.12, E.14, E.16, E.17, E.18.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9466F30-1 cutting edge major

71CEAEBE2B825-1 **1** **NR2 S..3.3**

simple real measure mm

cutting width **cw** CW

width of the cut made by the cutting item(s) as it (they) penetrate(s) into the work surface.

NOTE This is also used as a property of a tool item. See Figures F.1, F.2, F.4, F.5, F.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71D07576C0558-1 **1** **NR2 S..3.3**

level max real measure mm

depth of cut maximum **apmx** APMX

maximum engagement of the cutting edge or edges with the workpiece measured perpendicular to the feed motion

ISO 3002-3

NOTE See Figure F.1.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71D1AE126DEFD-1 **1** **X1**

simple Boolean

drilling profile **drprfp** DRPRF

possession of a drilling profile by a cutting item

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DDA089C8D1E-1 specific profile insert

71DD6C9332D2C-1 **1** **NR2 S..3.3**

simple real measure deg

face land angle **gb** GB

angle of the face land measured from the XY-plane

71DD6C8B86265-1 = cutting edge identity

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C8B42A9E-1 cutting edge

71DD6C9371B86-1 **1** **X 17**

simple string

face land size code **flsc** FLSC

identifier for the width and the angle of a face land

71DD6C8B86265-1 = cutting edge identity

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C8B42A9E-1 cutting edge

71DD6C9394F40-1 **1** **NR2 S..3.3**

simple real measure mm

face land width **bn** BN

projected length of the face land measured from a plane that is orthogonal to the XY-plane and passes through the cutting edge

71DD6C8B86265-1 = cutting edge identity

NOTE See Figure E.7.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C8B42A9E-1 cutting edge

71D1C829BC044-1 **1** **X1**

simple Boolean

fixing hole **fxhlp** FXHLP

possession by a cutting insert type of a hole through the body of the insert that is used for attaching the insert to a tool item

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1	equilat equiang
71D1AA489FD6E-1	nonequilat nonequiang
71D1AA6635E76-1	round insert
71D1AE11B8B77-1	equilat nonequiang
71D1AE120D96E-1	nonequilat equiang
71DD700BC8BE2-1	ball nosed profile
71DDA089C8D1E-1	specific profile insert

71CE7A968C8FE-1 **1** **NR2 S..3.3**

simple real measure mm

fixing hole diameter **d1** D1

diameter of the hole through the body of an insert

NOTE See Figures E.16, E.19.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD7014BF2A1-1 fixing hole

71DD70158265C-1 **1** **NR1 S..4**

simple integer

flank identity **flid** FLID

ordinal number of a flank

NOTE Flank surfaces of a cutting item are numbered in sequence starting from the cutting edge.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD70155A4B1-1 flank

71E037869D06C-1 **1** **NR2 S..3.3**

simple real measure mm

gauge diameter **gad** GAD

diameter of a circle established by a measurement device on cutting items that do not have an inscribed circle

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71E03787CA636-1 gauge circle

71E0378746578-1 **1** **NR2 S..3.3**

simple real measure mm

gauge distance **gads** GADS

distance from the gauge circle to the cutting edge

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DDA089C8D1E-1 specific profile insert

71E037892110A-1 **1** **NR1 S..2**

simple non-quantitative integer code

grind style code **gdsc** GDSC

identifier for the general form of the cutting edges of a drill

1 = SE point

10 = SE high positive

2 = conventional point

3 = TF point

4 = SE four land point

5 = conventional point with four lands

6 = four facet point

7 = brade point

8 = milling point without chisel edge

9 = milling point with chisel edge

99 = special point

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BE1D04-1 drilling profile

71D1AE0A99D63-1 **1** **X1**

simple Boolean

groove part profile **gppfp** GPPFP

possession of a parting or grooving profile by a cutting item

NOTE The term is grooving parting profile.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DDA089C8D1E-1 specific profile insert

71D1C82A5036D-1 **1** **X1**

simple Boolean

inscribed circle **inclp** INCLP

possession by a cutting insert type of an inscribed circle

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA6635E76-1 round insert

71D1AE11B8B77-1 equilat nonequiang

71CE7A96D9F7D-1 **1** **NR2 S..3.3**

simple real measure mm

inscribed circle diameter **ic** IC

diameter of a circle to which all edges of an equilateral insert are tangential

NOTE See Figures E.1 to E.5, E.8, E.12, E.13, E.15, E.16.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD7032B51CD-1 inscribed circle

71CE7A9751A90-1 **1** **NR2 S..3.3**

simple real measure mm

insert body width **ibw** BW

width of the portion of the cutting item which is mounted on the tool item

NOTE See Figure F.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DDA089C8D1E-1 specific profile insert

71CF30F02C968-1 **1** **NR2 S..3.3**

simple real measure

insert cutting diameter **cdi** CDI

diameter of a drilling insert used for making a hole

NOTE See Figure F.11.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BE1D04-1 drilling profile

71D20799C721A-1 **1** **NR2 S..3.3**

simple real measure mm

insert diameter **insd** INSD

distance between two parallel tangents to the cutting edge of a round insert

NOTE The insert diameter and the inscribed circle diameter for a round insert have the same value.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA6635E76-1 round insert

71CE7A979F41C-1 **1** **NR2 S..3.3**

simple real measure mm

insert hand **ih** IH

identifier for the orientation of a replaceable cutting item with respect to the insert reference system

NOTE Allowed values are: “right”, “neutral” and “left”.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DDA089C8D1E-1 specific profile insert

71CE7A96BC122-1 **1** **NR2 S..3.3**

simple real measure deg

insert included angle **epsr** EPSR

angle between the major and the minor cutting edges of a cutting item

NOTE See Figures E.3, E.4, E.9, E.10, E.18.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DDA089C8D1E-1 specific profile insert

71CE7AA1998FF-1 **1** **NR1 S..4**

simple integer

insert index count **noi** NOI

number of equivalent positions in which a replaceable cutting item can be used

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DDA089C8D1E-1 specific profile insert

71CE7A9936610-1 **1** **X 17**

simple string

insert interface code **iic** IIC

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

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1	equilat equiang
71D1AA489FD6E-1	nonequilat nonequiang
71D1AA6635E76-1	round insert
71D1AE11B8B77-1	equilat nonequiang
71D1AE120D96E-1	nonequilat equiang
71DDA089C8D1E-1	specific profile insert

71CF30F9DFE37-1 **1** **NR2 S..3.3**

simple real measure deg

insert lead angle **psirins** PSIRINS

angle between the major edge and a plane that is perpendicular to the wiper edge

NOTE Used mainly for regular inserts with wiper edges.

71CE7A9DFA23A-1 **1** **NR2 S..3.3**

simple real measure mm

insert length **insl** INSL

largest dimension of a replaceable cutting item

NOTE See Figures E.13, E.17, E.19.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1	equilat equiang
71D1AA489FD6E-1	nonequilat nonequiang
71D1AE11B8B77-1	equilat nonequiang
71D1AE120D96E-1	nonequilat equiang
71DD700BC8BE2-1	ball nosed profile
71DDA089C8D1E-1	specific profile insert

71CE7A97711B8-1 **1** **NR1 S..4**

simple non-quantitative integer

insert mounting style code **ifs** IFS

identifier for the method of holding a cutting item onto a tool item

0 = other clamping system

1 = without fixing hole

2 = cylindrical fixing hole

3 = partly cylindrical, 40-60 deg countersink on one or two sides

4 = partly cylindrical, 70-90 deg countersink on one or two sides

5 = notch clamping

6 = convex prismatic cross section

7 = concave prismatic section

NOTE See Figure F.12.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AA6635E76-1 round insert

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DD7014BF2A1-1 fixing hole

71DDA089C8D1E-1 specific profile insert

71CE7A9EDACA1-1 **1** **NR2 S..3.3**

simple real measure deg

insert rake angle **gan** GAN

angle of the rake measured from the XY-plane perpendicular to the cutting edge

NOTE See Figures E.6, E.7 and F.1 to F.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C870BCCA-1 chip breaker

71CEAEBF2A69F-1 **1** **X 3**

simple non-quantitative code

insert seat size code **ssc** SSC

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

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

0 = seat size 0

1 = seat size 1

10 = seat size 10

2 = seat size 2

3 = seat size 3

3+4 = seat size 3+4

4s = seat size 4s

7 = seat size 7

8 = seat size 8

9 = seat size 9

A = seat size A

TN1 = seat size TN1

TN2 = seat size TN2

TN3 = seat size TN3

TN4 = seat size TN4

TN5 = seat size TN5

TN6 = seat size TN6

TN8 = seat size TN8

Z = seat size Z

71CE7A9F0C79F-1 **1** **X 17**

simple non-quantitative code

insert shape code **sc** SC

identifier for the shape of a regular insert

E = rhombic 75 degree included angle

A = parallelogram 85 degree included angle

B = parallelogram 82 degree included angle

C = rhombic 80 degree included angle

D = rhombic 55 degree included angle

H = hexagonal

K = parallelogram 55 degree included angle

L = rectangular

M = rhombic 86 degree included angle

O = octagonal

P = pentagonal

R = round

S = square

T = triangular 60 degree included angle

V = rhombic 35 degree included angle

W = trigon

ISO 1832

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1	equilat equiang
71D1AA489FD6E-1	nonequilat nonequiang
71D1AA6635E76-1	round insert
71D1AE11B8B77-1	equilat nonequiang
71D1AE120D96E-1	nonequilat equiang

71CE7A9F5308C-1 **1** **NR2 S..3.3**

simple real measure mm

insert thickness **s** S

distance between the bottom and the cutting edge of a replaceable cutting item

NOTE See Figures E.1, E.2, E.8 to E.11, E.16, E.19 and F.1 to F.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AA6635E76-1 round insert

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DD700BC8BE2-1 ball nosed profile

71DDA089C8D1E-1 specific profile insert

71CE7A9FB11C3-1 **1** **NR2 S..3.3**

simple real measure mm

insert width **w1** W1

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

NOTE See Figures E.9, E.10, E.14, E.19.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA489FD6E-1 nonequilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DD700BC8BE2-1 ball nosed profile

71DDA089C8D1E-1 specific profile insert

71DD701175021-1 **1** **X1**

simple Boolean

interrupted edge **iep** IEP

possession by a cutting item of an interrupted cutting edge

71DD6C8B86265-1 = cutting edge identity

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DD700BE1D04-1 drilling profile

71DDA089C8D1E-1 specific profile insert

71CE7AA0972DB-1 **1** **NR2 S..3.3**

simple real measure

m-dimension **m** M

distance between the nominal inscribed circle and the corner of an insert that has the primary included angle

ISO 1832

NOTE This property is defined for different shapes of regular inserts in ISO 1832. See Figures E.1, E.3, E.5, E.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AE11B8B77-1 equilat nonequiang

71CE7AA05C819-1 **1** **NR2 S..3.3**

simple real measure mm

m2-dimension **m2** M2

distance between the nominal inscribed circle and the corner of an insert that has the secondary included angle

NOTE 1 This is used only for regular inserts with the ISO identifiers C, E and M.

NOTE 2 See Figure E.4.

ISO 1832

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AE11B8B77-1 equilat nonequiang

71E037863978B-1 **1** **NR2 S..3.3**

level min real measure mm

overall length minimum **oln** OLN

minimum allowed length of an item after regrinding

NOTE Applies to both cutting items and tool items.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA6C8FC75-1 cutting item type

71CEAEBEAB020-1 **1** **NR2 S..3.3**

simple real measure deg

profile angle lh **pal** PAL

angle measured in the XY-plane in a positive direction (counter-clockwise/anticlockwise) between a plane parallel to the Y-axis and the left-hand cutting edge of the profile of a cutting item

NOTE 1 Applies to irregular inserts.

NOTE 2 The term is *profile angle left hand*. See Figures F.3, F.5 to F.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71CEAEBED837E-1 **1** **NR2 S..3.3**

simple real measure deg

profile angle rh **par** PAR

angle measured in the XY-plane in a negative direction (clockwise) between a plane parallel to the Y-axis and the right-hand cutting edge of the profile of a cutting item

NOTE The term is *profile angle right hand*. See Figures F.3, F.5 to F.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71CEAEBFEF1B4-1 **1** **NR2 S..3.3**

simple real measure mm

profile distance ex **pdx** PDX

distance measured in the XY-plane from the profile point of a threading insert to the side of the insert that is parallel to the YZ-plane.

NOTE 1 Only applicable to laid-down triangular threading inserts.

NOTE 2 See Figures E.12 to E.14, E.16 and F.2 to F.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71CEAEC0139BB-1 **1** **NR2 S..3.3**

simple real measure mm

profile distance ey **pdy** PDY

distance measured in the XY-plane from the profile point of a threading insert to a plane parallel to the XZ-plane that passes through the theoretical sharp corner of the sides of the insert.

NOTE 1 Only applicable to laid-down triangular threading inserts.

NOTE 2 See Figures E.12 to E.14, to E.16 and F.6 to F.9.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71CEAEBF0C234-1 **1** **NR2 S..3.3**

simple real measure deg

profile included angle **pna** PNA

angle subtended by the cutting edges of an irregular insert

NOTE Mainly applies to threading profiles. See Figures E.12 to E.14, E.16 and F.7 to F.9.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71DD700C151B5-1 threading profile

71E019EBAE1B1-1 **1** **NR2 S..3.3**

simple real measure mm

profile radius **prfrad** PRFAD

radius of curvature of a cutting profile

71DF8C5D91804-1 **1** **X 17**

simple string

profile specification **prspc** PRSPC

identifier for formal definition of the shape of a working face or cutting profile

71CEAEBDE5798-1 **1** **NR1 S..2**

simple non-quantitative integer

profile style code **pfs** PFS

identifier for the profile of an irregular insert

1 = rectangular groove

10 = full rounded groove

2 = rectangular one side full inclined groove

3 = triangular groove

4 = rectangular groove 1 or 2, one side chamfered

5 = rectangular groove 1 or 2, both sides chamfered

6 = trapezoid groove

7 = trapezoid groove with curved top flat

8 = trapezoid groove full rounded

9 = triangular full rounded groove

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71DD9D00193A7-1 **1** **NR2 S..3.3**

simple real measure deg

relief angle **ra** RA

angle measured in the XY-plane between a plane parallel to the Y-axis and the relief edge of the profile of a cutting item

NOTE A relief edge is a non-cutting portion of a profile.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BC8BE2-1 ball nosed profile

71CE7E6520B87-1 **1** **NR2 S..3.3**

simple real measure deg

relief angle lh **ral** RAL

angle measured in the XY-plane in a negative direction (clockwise) between a plane parallel to the Y-axis and the left-hand relief edge of the profile of a cutting item

NOTE 1 A relief edge is a non-cutting portion of a profile.

NOTE 2 Applies to irregular inserts. The term is *relief angle left hand*. See Figures F.1, F.2, F.4, F.5, F.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71CE7E6569AB5-1 **1** **NR2 S..3.3**

simple real measure deg

relief angle rh **rar** RAR

angle measured in the XY-plane in a positive direction (counter-clockwise/anticlockwise) between a plane parallel to the Y-axis and the right-hand relief edge of the profile of a cutting item

NOTE 1 A relief edge is a non-cutting portion of a profile.

NOTE 2 Applies to irregular inserts. The term is *relief angle right hand*. See Figures F.1 to F.5, F.10.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700BFD9B9-1 grooving parting profile

71DD7011A3D86-1 **1** **X1**

simple Boolean

rounded corner **rcp** RCP

possession of a corner with a constant radius

71DD6C8802580-1 = corner identity

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1	equilat equiang
71D1AA489FD6E-1	nonequilat nonequiang
71D1AE11B8B77-1	equilat nonequiang
71D1AE120D96E-1	nonequilat equiang
71DD700BE1D04-1	drilling profile
71DD700BFD9B9-1	grooving parting profile
71DD700C151B5-1	threading profile
71DDA089C8D1E-1	specific profile insert

71CEAEC02FEBD-1 **1** **NR2 S..3.3**

simple real measure deg

taper gradient **tg** TG

inclination of a tapered thread

NOTE See Figure E.14.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1	threading profile

71D1A69F60053-1 **1** **X 17**

simple string

thread form type **thft** THFT

identifier for the kind of thread form produced by a cutting item

NOTE Examples could include: M, API, NPT, UN, etc.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1	threading profile

71DF5BE65F86F-1 **1** **NR2 S..3.3**

simple real measure mm

thread height actual **hc** HC

distance along the axis of symmetry of the thread cutting profile from the actual cutting edge to the point where a normal to this axis meets the cutting profile at the maximum usable cutting edge length

NOTE See Figure F.12.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71DF5BE617131-1 **1** **NR2 S..3.3**

simple real measure mm

thread height difference **hb** HB

distance along the axis of symmetry of the thread cutting profile from the theoretical sharp point to the actual cutting edge

NOTE See Figure F.12.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71DF5BE5BCEBE-1 **1** **NR2 S..3.3**

simple real measure mm

thread height theoretical **ha** HA

distance along the axis of symmetry of the thread cutting profile from the theoretical sharp point to the point where a normal to this axis meets the cutting profile at the maximum usable cutting edge length

NOTE See Figure F.12.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71CEAEC08D4B0-1 **1** **NR2 S..3.3**

simple real measure mm

thread pitch **tp** TP

distance between adjacent equivalent cutting points

NOTE See Figures E.14, E.15, E.18.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71DF154936C1D-1 **1** **X 17**

simple string

thread pitch diam limit **tpdlt** TPDLT

identifier for the tolerance limits on the pitch diameter of a thread

NOTE The term is *thread pitch diameter limit*.

71D1A6A283836-1 **1** **NR2 S..3.3**

level max real measure mm

thread pitch maximum **tpx** TPX

maximum thread pitch that a cutting item can produce

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71D1A6A247E1F-1 **1** **NR2 S..3.3**

level min real measure mm

thread pitch minimum **tpn** TPN

minimum thread pitch which a cutting item can produce

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71CEAEC114603-1 **1** **X 1**

simple non-quantitative code

thread profile type **tpt** TPT

identifier for how much of the profile of a threading insert is used

F = full profile

P = partial profile

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71D1A6A16E6ED-1 **1** **X 3**

simple non-quantitative code

thread type **ttp** TTP

identifier for whether a thread is internal or external

EXT = external thread

INT = internal thread

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71E02C65BB9DA-1 **1** **NR2 S..3.3**

simple real measure mm

threading length **thl** THL

length of that portion of a tool item or cutting item that can be used to produce a thread

71D1AE0A79DEF-1 **1** **X1**

simple Boolean

threading profile **thpf** THPF

possession of a threading profile by a cutting item

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DDA089C8D1E-1 specific profile insert

71D1A6AAC8707-1 **1** **NR2 S..3.3**

simple real

threads per inch **tpi** TPI

number of threads in a one inch length of a threaded work piece that can be produced by a cutting item

NOTE This is a property of a cutting item. See Figure E.18.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71D1A6AB8F739-1 **1** **NR2 S..3.3**

level max real

threads per inch maximum **tpix** TPIX

maximum number of threads in a one inch length of a threaded workpiece that can be produced by a cutting item

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71D1A6AB6FB19-1 1 NR2 S..3.3

level min real

threads per inch minimum tpin TPIN

minimum number of threads in a one inch length of a threaded workpiece that can be produced by a cutting item

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71CE7AA1E3D75-1 1 X 1

simple non-quantitative code

tipped cutting edge code tce TCE

identifier for the style and the numbers of modified cutting edges composed of materials other than the main body of the cutting item

A = tipped — one sided — one corner

B = tipped — one sided — two corners

C = tipped — one sided — three corners

D = tipped — one sided — four corners

E = full face — two sided

F = full face — one sided

G = tipped — one sided — five corners

H = tipped — one sided — six corners

J = tipped — one sided — eight corners

K = tipped — two sided — one corner

L = tipped — two sided — two corners

M = tipped — two sided — three corners

N = tipped — two sided — four corners

P = tipped — two sided — five corners

Q = tipped — two sided — six corners

R = tipped — two sided — eight corners

S = solid

T = tipped — full thickness — one corner

U = tipped — full thickness — two corners

V = tipped — full thickness — three corners

W = tipped — full thickness — four corners

X = tipped — full thickness — five corners

Y = tipped — full thickness — six corners

Z = tipped — full thickness — eight corners

ISO 1832

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1	equilat equiang
71D1AA489FD6E-1	nonequilat nonequiang
71D1AE11B8B77-1	equilat nonequiang
71D1AE120D96E-1	nonequilat equiang
71DD700BE1D04-1	drilling profile
71DD700BFD9B9-1	grooving parting profile
71DD700C151B5-1	threading profile
71DDA089C8D1E-1	specific profile insert

71CE7AA215888-1 **1** **X 1**

simple non-quantitative code

tolerance class insert **tcins** TCINS

identifier for the tolerances of the inscribed circle, the insert thickness and the m-dimension on a replaceable cutting item

E = insert tolerance class E

A = insert tolerance class A

B = insert tolerance class B

C = insert tolerance class C

D = insert tolerance class D

F = insert tolerance class F

G = insert tolerance class G

H = insert tolerance class H

J = insert tolerance class J

K = insert tolerance class K

L = insert tolerance class L

M = insert tolerance class M

N = insert tolerance class N

P = insert tolerance class P

U = insert tolerance class U

ISO 1832

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AA6635E76-1 round insert

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DF153FA5F85-1 1 X 17

simple string

tolerance class thread tctr TCTR

identifier for the tolerances of a thread

71CEAEBF8A68E-1 **1** **NR1 S..4**

simple integer

tooth count **nt** NT

number of teeth per cutting edge on a threading insert

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD700C151B5-1 threading profile

71CED03C97AAB-1 **1** **NR2 S..3.3**

simple real measure gm

weight of item **wt** WT

force exerted by the mass of an item

71CED022114EC-1 **1** **X1**

simple Boolean

wiper edge **wep** WEP

possession of a wiper edge on a cutting item.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71D1AA486FF89-1 equilat equiang

71D1AA489FD6E-1 nonequilat nonequiang

71D1AE11B8B77-1 equilat nonequiang

71D1AE120D96E-1 nonequilat equiang

71DDA089C8D1E-1 specific profile insert

71CE7AA249F88-1 **1** **NR2 S..3.3**

simple real measure mm

wiper edge length **bs** BS

measure of the length of a wiper edge of a cutting item

NOTE See Figures E.1, E.5, E.8.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9A21689-1 wiper edge

71CE7AA2E50BE-1 **1** **NR2 S..3.3**

simple real measure mm

wiper edge radius **bsr** BSR

measure of the radius of a curved wiper edge

NOTE See Figure E.1.

Visible class:

71CE7A72B6DA7-1 cutting tool library

Applicable classes:

71DD6C9A21689-1 wiper edge

Annex E
(informative)

Illustrations of properties

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

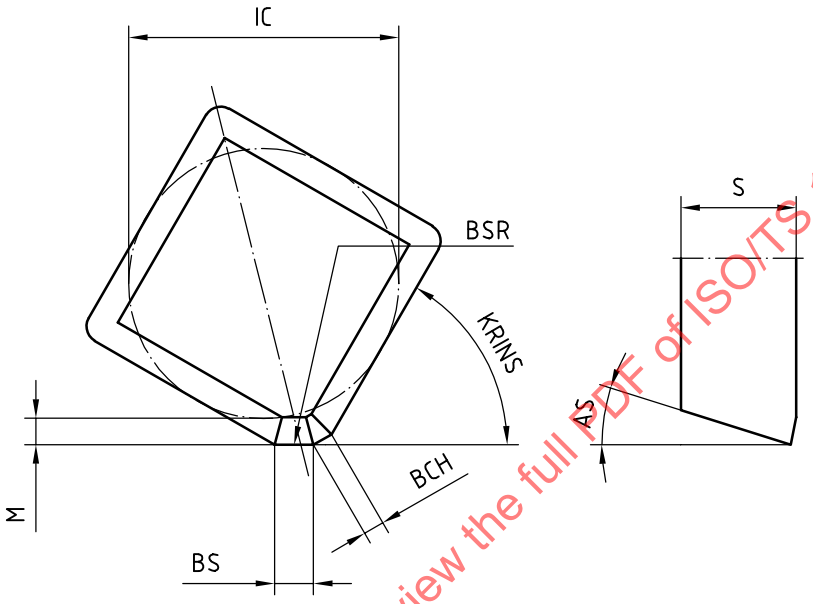

Figure E.1

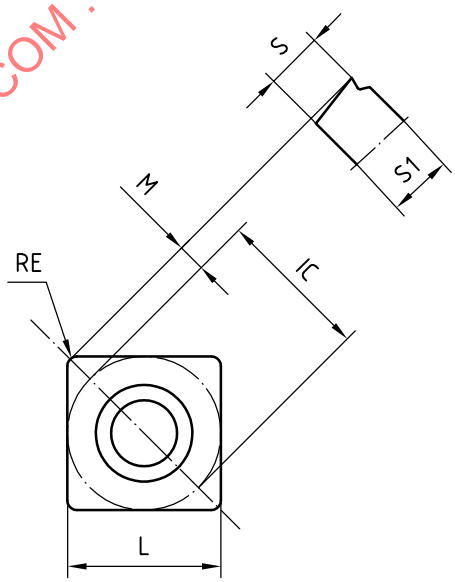

Figure E.2

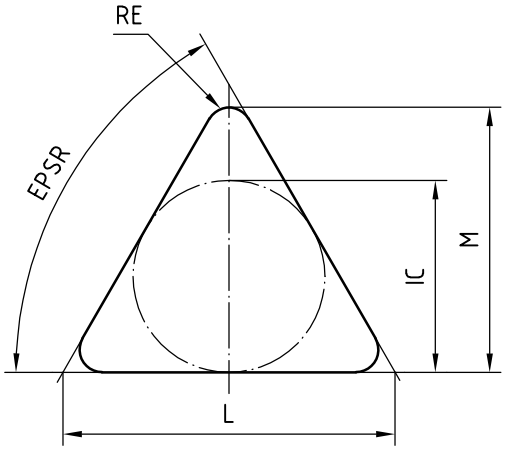

Figure E.3

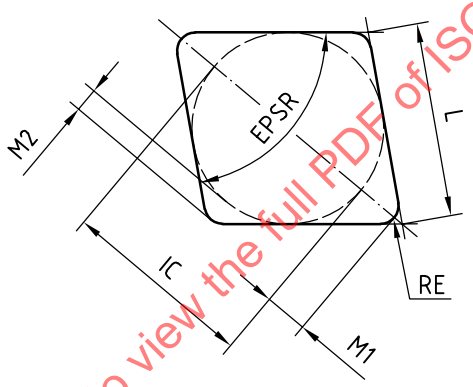

Figure E.4

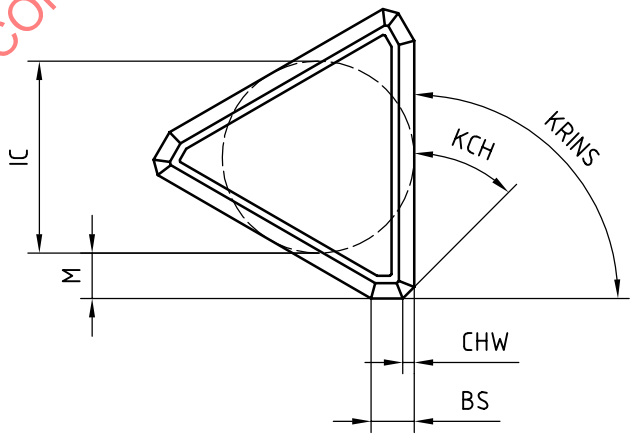

Figure E.5

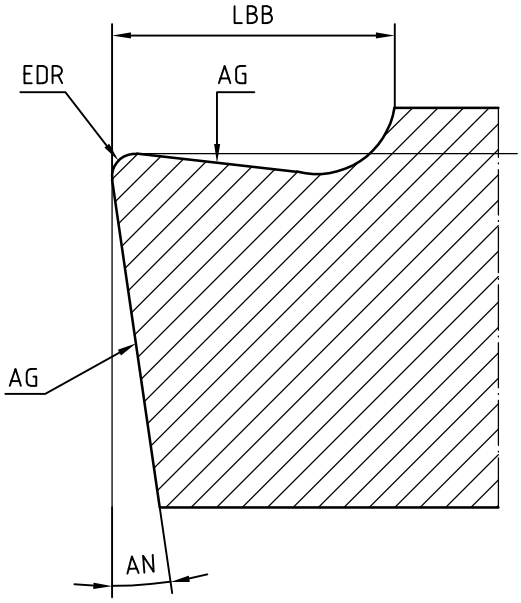

Figure E.6

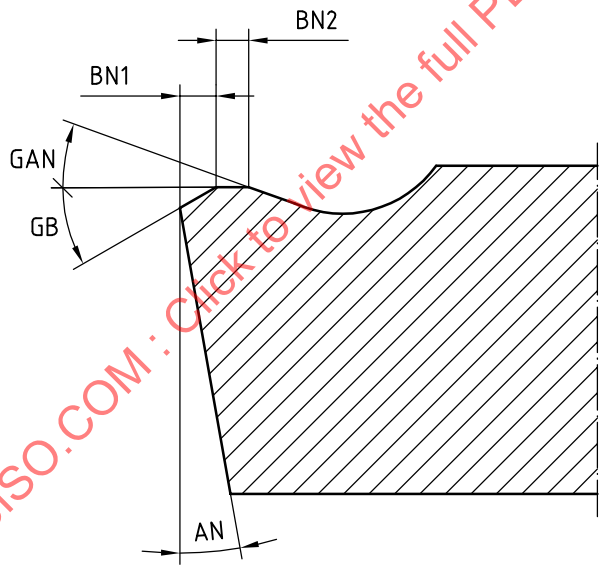

Figure E.7