PD ISO/TS 13399-60:2014

BSI Standards Publication

Cutting tool data representation and exchange

Part 60: Reference dictionary for connection systems

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National foreword

This Published Document is the UK implementation of ISO/TS 13399-60:2014. It supersedes DD ISO/TS 13399-60:2007 which is withdrawn.

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TECHNICAL SPECIFICATION

ISO/TS 13399-60

Second edition
2014-02-15

Cutting tool data representation and exchange —

Part 60: Reference dictionary for connection systems

Représentation et échange des données relatives aux outils coupants —

Partie 60: Dictionnaire de référence pour les systèmes de connexion

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Foreword

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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

This second edition cancels and replaces the first edition (ISO/TS 13399-60:2007), which has been technically revised. The following are the main changes:

— subclauses for connection interface features have been added in 5.2;

— Clause 6 has been revised.

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

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

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

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

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

— *Part 5: Reference dictionary for assembly items* [Technical Specification]

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

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

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

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

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

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

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The following parts are under preparation:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Introduction

This part of ISO 13399 defines the terms, properties, and definitions for connection systems of cutting tools with defined cutting edges. The purpose of this part of ISO 13399 is to provide a reference dictionary to support the use of the general information model in ISO 13399-1.

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

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

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

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

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

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

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

— the data dictionary defined in the ISO 13584 series.

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

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

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

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

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

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

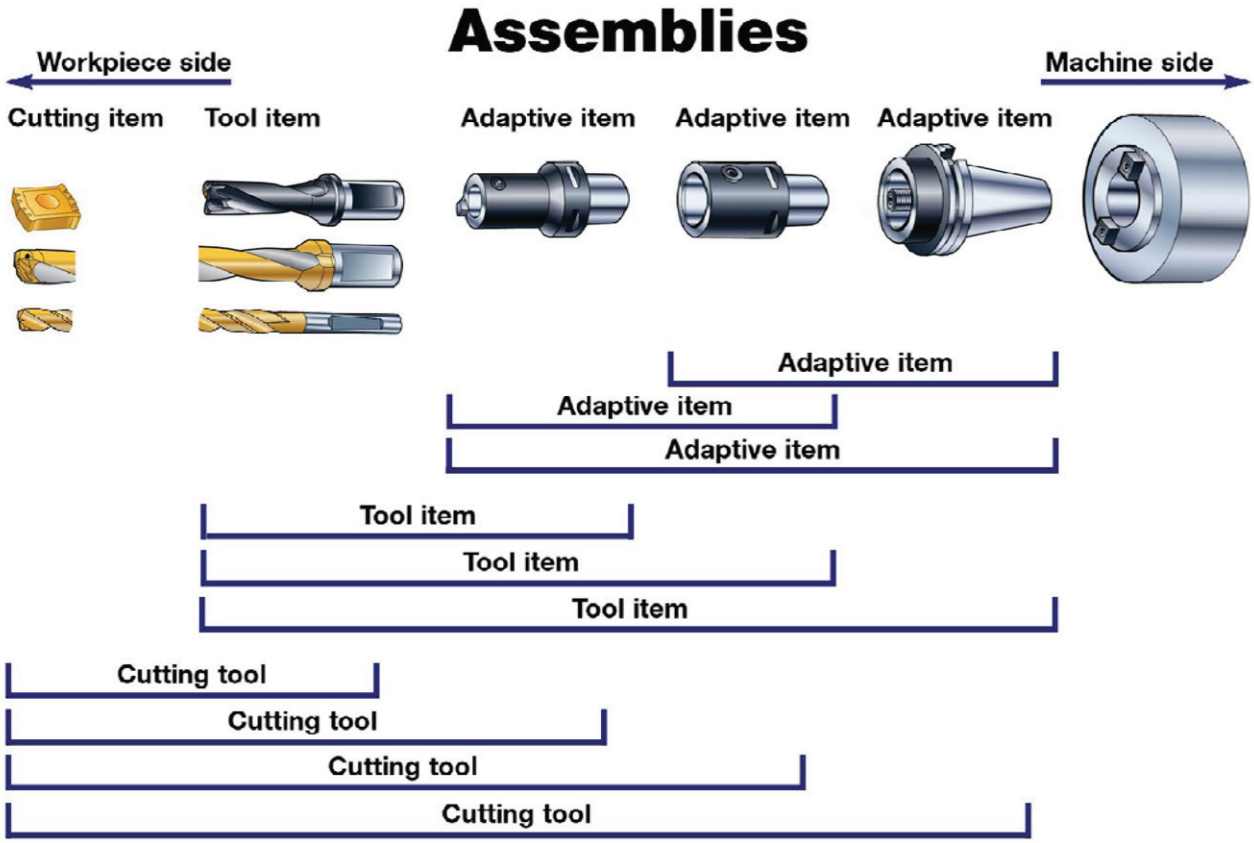

Figure 1 — Example of different types of assemblies of items

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

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

— adding new properties to existing classes,

— adding new classes and their properties,

— managing the status of those properties and classes, and

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

The secretariat of this Maintenance Agency has been assigned to:

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by the ISO Technical Management Board.

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

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

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Cutting tool data representation and exchange —

Part 60: Reference dictionary for connection systems

1 Scope

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

This part of ISO 13399 specifies a reference dictionary and the structure of interface codes containing:

— definitions and identifications of the classes of connection systems, with an associated classification scheme;

— definitions and identifications of the data element types that represent the properties of connection systems;

— definitions and identifications of domains of values for describing the above data element types;

— definitions and structure of the value entry of the properties of interface codes that are already defined in this International Standard;

— rules for the structure of these properties to be able to communicate between systems.

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

Definitions and identifications of dictionary entries are defined by means of standard data that consist of instances of the EXPRESS entity data types defined in the common dictionary schema, resulting from a joint effort between ISO/TC 184/SC 4 and IEC SC3D, and in its extensions defined in ISO 13584-24 and ISO 13584-25.

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

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

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

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

— one implementation method by which the standard data defined in this part of ISO 13399 can be exchanged.

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

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

— specialized or expert knowledge on the design and use of cutting tools;

— rules to determine what information should be communicated;

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

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

— information model for cutting tools;

— definitions of classes and properties for cutting items;

— definitions of classes and properties for tool items;

— definitions of classes and properties for assembly items;

— definitions of classes and properties for reference systems and common concepts.

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

NOTE 3 The definitions of classes and properties for cutting items, tool items, adaptive items, and assembly items are provided in ISO/TS 13399-2, ISO/TS 13399-3, ISO/TS 13399-4, and ISO/TS 13399-5, respectively.

NOTE 4 The definitions of classes and properties for reference systems and common concepts of general application are defined in ISO/TS 13399-50.

2 Normative references

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

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

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

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

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

3 Terms and definitions

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

NOTE The main collection of the terms and their definitions that relate to adaptive items and their properties is provided in Annexes B to D.

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

[SOURCE: ISO 13584-24:2003]

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

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

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3.3
chip
material removed from a workpiece by a cutting process

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

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

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

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

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

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

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

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

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

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

3.8
data type
domain of values

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

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

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

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

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

3.11
entity data type
representation of an entity

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3.12
entity instance
named unit of data that represents a unit of information within the class defined by an entity

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

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

3.13
family of products
set of products represented by the same characterization class

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

3.15
implementation method
means for computers to process or exchange data

3.16
information
facts, concepts, or instructions

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

3.17
information model
formal model of a bounded set of facts, concepts, or instructions to meet a specific requirement

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

3.18
machine side
identification of a direction pointing towards the machine

3.19
machined surface
surface produced by the action of a cutting tool

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

3.20
ontology
explicit and consensual specification of concepts of an application domain independent of any use of these concepts

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

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

3.21
property
defined parameter suitable for the description and differentiation of products

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

3.22
simple family of items
set of items in which each item can be described by the same group of properties

[SOURCE: ISO 13584-42:1998, 3.1.3]

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3.23
visible property
property that has a definition meaningful in the scope of a given characterization class, but that does not necessarily apply to the various products belonging to this class

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

3.24
workpiece
object on which a cutting action is performed

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

3.25
workpiece side
identification of a direction pointing towards the workpiece

4 Abbreviated terms

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

BSU basic semantic unit

DET data element type

5 Representation of the ontology concepts as dictionary entries

5.1 General

In 5.2, a concept in the ontology is identified by a name in lowercase characters. The name of a class that represents the concept in the dictionary is identified by bold, lowercase characters with multiple words linked by an underscore character.

EXAMPLE "connection interface feature" is the name of a concept in the ontology. **connection interface feature** is the identifier of the class in the dictionary that represents the concept.

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

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

5.2 connection interface feature

connection_interface_feature is a generic family of those parts of a tool item or assembly item that form a coupling to another tool item or assembly item or machine tool. Definitions and further sub-division of these classes can be found in Annex C.

connection_interface_feature has the following subclasses:[1)]

— **ABS_System_Komet**;

1) The identifications for some of these entities are derived from commercial trade names and company names that may be protected. Their use in this part of ISO 13399 is justified by their being in common use with no accepted generic alternatives. This information is given for the convenience of users of this part of ISO 13399 and does not constitute an endorsement by ISO of these products.

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— **AIF_Adjustable_Interface_Dihart**;

— **AWN_Prisma_connection_Schwanog**;

— **BFA_drill_chuck_connection**;

— **BKA_boring_head_connection**;

— **BKC_boring_head_connection_Coromant**;

— **BKI_boring_head_connection_Iscar**;

— **BRP_Bridgeport_connection**;

— **BTS_Block_Tool_System_Coromant**;

— **BUF_boring_and_chamfer_system**;

— **CBC_Coromant_Bridge_Connection**;

— **CCB_Coromant_CoroBore**;

— **CCM_Coromant_Cap_Mounting**;

— **CCS_Coromant_Capto_system**;

— **CDB_Coromant_Duobore**;

— **CFB_Coromant_Fine_Boring**;

— **CKB_Kaiser_bore_connection**;

— **CKS_Kaiser_shank_connection**;

— **CMS_Coromant_Modular_Serrated_mounting**;

— **CUD_Coromant_U-drill_connection**;

— **FCM_Flexible_Coupling_Modular_system**;

— **FDA_milling_arbor_connection**;

— **FLC_flange_connection_Coromant**;

— **FLK_flange_connector_Kennametal**;

— **FTS_Flexible_Tooling_System_Kennametal**;

— **GMS_Graflex_Modular_System_SECO**;

— **GRL_Granlund_connection**;

— **HEE_HE-/HF-system_EMUGE**;

— **HFS_head_fitting_system_Mapal**;

— **HSK_hollow_taper_shank**;

— **HSZ_hollow_cylindrical_shank**;

— **HTS_deep_drilling_system**;

— **ICF_Iscar_clickfit_system**;

— **IMB_modular_connection_system_Iscar**;

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— **IMC_Iscar_metal_cutting_connection**;

— **KKG_stub_taper**;

— **KKH__ISO_cartridge_mounting**;

— **KMB_Kennametal_ModBore_system**;

— **KMC_Kennametal_cartridge_mounting**;

— **KMM_Kennametal_Micro_system**;

— **KMT_KM-UTS_system_Kennametal/Widia**;

— **KRS_Kennametal_Romicron_system**;

— **KVT_KV_system_Kennametal**;

— **MBS_Multi_Blade_System_Coromant**;

— **MCS_modular_cartridge_system_Kennametal**;

— **MEG_metric_taper**;

— **MKG_Morse_taper**;

— **MVS_modular_connection_system_Wohlhaupter**;

— **NCT_Novex-NC-Tools_Walter**;

— **PMC_prismatic_connection_Coromant**;

— **PMD_prismatic_connection_standard**;

— **PMI_prismatic_connection_Iscar**;

— **PMK_prismatic_connection_Kennametal**;

— **PMS_prismatic_connection_SECO**;

— **RFX_Rotaflex_system_Widia**;

— **SAI_screw_connection_Iscar**;

— **SAC_screw_connection_Coromant**;

— **SBA_SBA-system_Komet**;

— **SCA_SECO_cartridge_mounting**;

— **SCR_SECO_crownlock_connection**;

— **SKG_Steep_taper**;

— **SMM_SECO_minimaster**;

— **SMS_SECO_modular_serrated_connection**;

— **SPK_holding_arbor**;

— **SRT_SECO_R_shank**;

— **STH_automotive_shank**;

— **SWB_quick_change_connection**;

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— **SZB_collet_shortened_design_Biax**;

— **SZC_collet_connection_Coromant**;

— **SZD_collet_connection_standard**;

— **SZE_collet_connection_Erikson**;

— **SZP_collet_Eminent_–_Perman**;

— **SZR_collet_KSF_Roehm**;

— **SZS_collet_Steinel_Bohrmaster**;

— **URM_Urma_connection**;

— **UTS_UTS_Widia**;

— **VAS_Variant_System_Coromant**;

— **VKT_rectangular_connection**;

— **VLS_Varilock_System_Coromant**;

— **ZYL_cylindrical_shank_connection**;

— **ZYV_VDI_shank**.

6 Properties for connection interface feature

6.1 General

The properties that are applicable to the items defined in Clause 5 are defined in Annex D, where the association of a property with a class is also specified. In the compilation of the dictionary, all properties are visible properties at the root class of the dictionary and are made applicable properties at the class level where they apply. The names of properties that can be applicable to connection interface feature, with their identification codes (BSU), are shown in Table 1. The order of the names in Table 1 should be read in rows from left to right.

NOTE 1 The value domains for properties are specified in ISO/TS 13399-100.

NOTE 2 The BSU can be made unique by the addition of the code for the supplier of the dictionary as a prefix to the identification code.

EXAMPLE The unique BSU for **clamping length** would be: 0112/1///13399__2-71EBAF896BE9A for version two of the dictionary.

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Table 1 — Property names and identification codes

Property name	Identification code (BSU)
clamping length	71EBAF896BE9A
clamping length maximum	71ED6E54B15C4
clamping length minimum	71EBB339ED2BD
connection bore depth	71EAC48CAD407
connection code machine side	71D102AE3B252
connection code workpiece side	71D102AE8A5A9
connection size code	71FC193318002
connection unit basis	71ED6E16D5978
coolant supply property	71EBB342CC751
form type	71EBBE32903BD
side	71EBDBF130AE6

Other properties and/or feature classes than the properties that are listed in Table 1 shall be needed to get the string of the interface code created automatically in a computer-sensitive way. The properties

— connection code machine side (CCMS),

— connection code workpiece side (CCWS), and

— insert interface code (IIC)

for making a connection between adaptive items or tool items shall be used for the ability to mount a replaceable cutting item on to a tool item.

6.2 Definition of the structure of connection interface code

The structure of both the connection code machine side and connection code workpiece side is the same. The code shall consist of four symbols if no range of the connection is defined and of eight symbols if a range of possible connections is applied. Connection code designed with 4 symbols is 14 digits and that with 8 symbols is 28 digits long.

The basic structure of the connection interface code is shown in Table 2.

Table 2 — Basic structure of the connection interface code

Symbol	①	②	③	④
Preferred name	connection interface feature class	connection unit base precision	connection size code	connection tolerance class
Preferred symbol		CUBP	CZC	TCDCON
Number of digits	5	1	4	4

Symbol ①: identifies the type and variant of the connection either on the machine side or on the workpiece side. For a connection, the symbol ① shall be same on e.g. the machine side of the tool item and the workpiece side of the adaptive item.

Symbol ②: identifies the precision of the size of a connection. The precision is dependent on the unit base of the connection whether the connection has a metric dimension or an imperial dimension or a coded dimension.

The letter symbol for the precision of the size of a connection is shown in Table 3.

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Table 3 — Letter symbol for the precision of the size of a connection

Letter symbol	Description
F	metric range for dimensions 0 mm – 9,999 mm
G	metric range for dimensions 10,00 mm – 99,99 mm
H	metric range for dimensions 100,0 mm – 999,9 mm
M	old entry for the metric dimension designation
R	imperial range for dimensions 0,000 1 inch – 0,999 9 inch
S	imperial range for dimensions 1,000 inch – 9,999 inch
T	imperial range for dimensions 10,00 inch – 99,99 inch
N	old entry for the imperial dimension designation
C	coded design has no unit base (e. g. Morse taper, Steep taper, Polygonal taper shank) representing the size in 1/10 of the value

Symbol ③: identifies the size code of a connection. Property CZC shall be used to fill this symbol.

Examples of coded dimensions based on symbol ② are shown in Tables 4 to 6.

Table 4 — Examples of coded metric dimensions based on symbol ②

Description	Symbol ②	Size code	Dimension
Code "F" for metric range of dimensions from 0,001 mm to 9,999 mm designated in 1/1 000	F	0001	0,001
	F	0210	0,21
	F	8010	8,01
	F	9999	9,999 87[a]
Code "G" for metric range of dimensions from 10,00 mm to 99,99 mm designated in 1/100	G	1000	10
	G	1687	16,875
	G	5050	50,5
	G	9999	99,995
Code "H" for metric range of dimensions from 100,0 mm to 999,9 mm designated in 1/10	H	1000	100
	H	1024	102,4
	H	2145	214,55
	H	9999	999,9

[a] Sizes shall not be rounded, but cut off.

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Table 5 — Examples of coded imperial dimensions based on symbol ②

Description	Symbol ②	Size code	Dimension
Code "R" for imperial range of dimensions from 0,000 1 inch to 0,999 9 inch designated in 1/10 000	R	0393	0,039 3
	R	1875	0,187 5 (3/16)
	R	2500	0,25 (1/4)
	R	9999	0,999 9
Code "S" for imperial range of dimensions from 1,000 inch to 9,999 inch designated in 1/1 000	S	1000	1
	S	1015	1,015 625[a] (1 1/64)
	S	2500	2,5
	S	9999	9,999
Code "T" for imperial range of dimensions from 10,00 inch to 99,99 inch designated in 1/100	T	1025	10,25
	T	2525	25,25
	T	5600	56
	T	9999	99,99

[a] Sizes shall not be rounded, but cut off.

Table 6 — Examples of coded non-unit dimensions based on symbol ② "C"

Size code	Symbol ① connection interface feature class				
	CCS01 (ISO 26623)	HSK01 (ISO 12164-1)	KMT01 (ISO 26622)	MKG (ISO 296)	SKG10 (ISO 7388-1)
0000				0	
0010				1	
0020				2	
0030				3	
0040				4	
0050				5	
0060				6	
0250		25			
0300					30
0320	3	32	32		
0400	4	40	40		40
0450					45
0500	5	50	50		50
0600					60
0630	6	63	63		
0650					65
0700					70
0800	8	80	80		
1000	10	100	100		
1250		125			
1600		160			

Symbol ④: identifies the ISO tolerance class of a connection. The first two digits identify the position and the second two digits identify the grade of the tolerance zone; all four digits shall represent the ISO tolerance class. If the position is represented with only one letter, the second digit shall be filled with

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the "DOLLAR SIGN" ("$" – ASCII (hex)-code: 0024) and tolerance grades less than 10 shall be filled with a leading ZERO (0).

EXAMPLE The ISO tolerance class "h7" shall be coded with "h$07"; the ISO tolerance class "js13" shall be coded with "js13"; the ISO tolerance class "H11" shall be coded with "H$11".

For the representation of connection with a range of dimension or tolerances, the connection code shall be structured as shown in Table 7.

Table 7 — Structure of the connection interface code representing ranges

Symbol ①	Symbol ②	Symbol ③	Symbol ④	Symbol ⑤	Symbol ⑥	Symbol ⑦	Symbol ⑧
connection interface feature class	connection unit base precision	connection size code	connection tolerance class	connection interface feature class	connection unit base precision	connection size code	connection tolerance class
	CUBP	CZC	TCDCON		CUBP	CZC	TCDCON
5	1	4	4	5	1	4	4

6.3 Representation of connection interface code

6.3.1 General

The connection interface code shall be applied on the machine side as well as on the workpiece side.

A "DOLLAR SIGN" ($) shall represent that this digit of the code is not used; an "ASTERISK" ("*"– ASCII (hex)-code: 002A) shall represent that any letter or number is allowed.

6.3.2 Connection code machine side (CCMS)

On the machine side, a range of the connection shall not be applied. Two cases for a connection code machine side are possible.

Case 1 - connection code without defined ISO tolerance class

In case of not showing the coded tolerance class, symbol 4 shall be represented by four "DOLLAR SIGN"s.

EXAMPLE The connection code for a "hollow taper shank type A" (ISO 12164-1) of size 32 shall be created as "HSK01C0320$$$$".

Case 2 - connection code with defined ISO tolerance class

If it shall be necessary to show a tolerance class, the tolerance class shall be coded as described with symbol ④.

EXAMPLE The connection code for a "straight cylindrical shank type A" with diameter of 25 mm and tolerance class h7 shall be created as "ZYL01G2500h$07".

6.3.3 Connection code workpiece side (CCWS)

On the workpiece side, the connection code with a range can be applied. Three cases are possible on workpiece side.

Case 1 - "exact match" of the connection

For the designation of a connection without defined ISO tolerance class, the connection code on machine side of the item to be connected shall be taken into consideration.

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If the connection code of the item to be connected shows the “DOLLAR SIGN”s, the connection code on workpiece side shall also have the “DOLLAR SIGN”s.

EXAMPLE The connection code workpiece side for a “polygonal taper interface with flange contact” of size 4 shall be created as “CCS01C0400$$$$”.

If the connection code of the item to be connected indicates a tolerance class, the connection code on workpiece side shall have asterisks (*) in symbol 4.

EXAMPLE The connection code workpiece side for a “straight cylindrical hole” with a diameter of 25 mm and no indicated tolerance class shall be created as “ZYL01G2500****”.

Case 2 - connection with a range of dimension

The connection on workpiece side shall represent that connections on machine side of other items between a defined range of dimension can be mounted.

EXAMPLE 1 The connection on workpiece side shall be able to mount “straight cylindrical shanks type A” with diameters from 16,00 mm to 18,50 mm. The connection code shall be designated with “ZYL01G1600****ZYL01G1850****”.

EXAMPLE 2 A drill chuck is able to hold straight cylindrical shanks between 3,00 mm and 13,00 mm. The code shall be designated with “ZYL01F1000****ZYL01G1300****”.

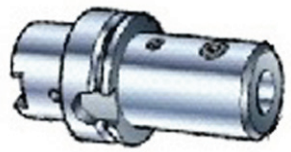
Case 3 - connection with range of tolerances

The connection on workpiece side allows mounting the machine side connections with the same size but with different tolerance classes.

EXAMPLE 3 The connection on workpiece side shall be able to mount “cylindrical shanks with 2° inclined clamping surface” of diameter 20 within the tolerance class h7 or closer. The code shall be designated as “ZYL13G2000h$00ZYL13G2000h$07”.

6.3.4 Examples of connection interface codes

EXAMPLE 1 Exact match between adaptive item and tool item.

			
CCWS	**CCMS**		

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End mill holder - type Weldon connection diameter 16 mm CCWS: ZYL10G1600****	**Solid end mill** Weldon shank 16 mm h6 CCMS: ZYL10G1600h$06	☺	
	End mill Weldon shank 20 mm h6 CCMS: ZYL10G**20**00h$06	☹	
	Drill Whistle Notch shank 16 mm h6 CCMS: ZYL**13**G1600h$06	☹	

EXAMPLE 2 Match of size range between adaptive item and tool item.

CCWS	**CCMS – CCWS**	**CCMS**		
Collet chuck for collet size ER20 CCWS: SZD02C0200$$$$	**ER collet** CCMS: SZD02C0200$$$$ CCWS: metric ZYL01G1200****ZYL01G1300****	**Ball nose end mill** straight cylindrical shank 12 mm h7 CCMS: ZYL01G1200h$07	☺	
		Drill straight cylindrical shank 12,8 mm h6 CCMS: ZYL01G1280h$06	☺	
		Drill straight cylindrical shank 11 mm h6 CCMS: ZYL01G**11**00h$06	☹	
CCWS		**CCMS**		
Drill chuck clamping range: 1 mm – 13 mm CCWS: ZYL01F1000****ZYL01G1300****		**Solid carbide drill** straight cylindrical shank 14 mm CCMS: ZYL01G**14**00h$06	☹	

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	Solid carbide drill straight cylindrical shank 6 mm CCMS: ZYL01F6000h$06	☺	
	Solid carbide drill straight cylindrical shank 10,5 mm CCMS: ZYL01G1050h$06	☺	

EXAMPLE 3 Match of tolerance range between adaptive item and tool item.

CCWS	**CCMS**		
Collet for hydraulic chuck for shank diameter 12 mm ISO tolerance h7 or closer CCWS: ZYL01G1200h$00ZYL01G1200h$07	**Solid end mill** straight shank 12 mm h6 CCMS: ZYL01G1200h$06	☺	
	Solid drill straight shank 12 mm h5 CCMS: ZYL01G1200h$05	☺	
	Grooving boring bar straight boring bar shank 12 mm CCMS: ZYL22G1200**$$$$**	☹	

Figure 2 — Example of tolerance range match between adaptive item and tool item

6.4 Representation of insert interface code

6.4.1 General

The structure of the insert interface code is defined and shall be used mandatory without any modifications. Insert interface codes based on national standards that are already in use can be compatible with the symbols 2 to 8.

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The insert interface code consists of 12 symbols. The significance of the symbols constituting the designation is as follows.

① Letter symbol identifying	source of code	(6.4.2)
② Letter symbol identifying	insert shape 1	(6.4.3)
③ Letter symbol identifying	insert shape 2	(6.4.4)
④ Number symbol identifying	insert size 1	(6.4.5)
⑤ Number or letter symbol identifying	insert size 2	(6.4.6)
⑥ Number symbol identifying	lower limit of radius	(6.4.7)
⑦ Number symbol identifying	insert mounting style	(6.4.8)
⑧ Letter symbol identifying	hand of insert	(6.4.9)
⑨ Letter symbol identifying	clamping surface	(6.4.10)
⑩ Letter symbol identifying	insert configuration 1	(6.4.11)
⑪ Letter symbol identifying	insert configuration 2	(6.4.12)
⑫ Number symbol identifying	upper limit of radius	(6.4.13)

EXAMPLE 1 insert interface code on cutting item with corner radius – ISO-designated square insert with normal clearance angle 0° cutting edge length 12,7 mm, cutting edge height 4,76 mm, corner radius 0,8 mm, cylindrical fixing hole, neutral handed, flat clamping surface

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
ISO$	S	N	12	04	08	2	N	A	$	$	08

EXAMPLE 2 insert interface code on cutting item with wiper – ISO-designated triangle insert with normal clearance angle 15°, cutting edge length 16,49 mm, cutting edge height 3,97 mm, no corner radius, partly cylindrical fixing hole 70° to 90° countersunk, right-handed, non-flatted clamping surface, cutting edge angle 90°, wiper clearance angle 20°

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
ISO$	T	D	16	T3	$$	4	R	B	P	E	$$

EXAMPLE 3 insert interface code on cutting item with wiper and corner radius – ISO-designated parallelogramm-shaped 85° insert with normal clearance angle 11°, cutting edge length 16,49 mm, cutting edge height 5,56 mm, corner radius 1,2 mm, partly cylindrical fixing hole 40° to 60° countersunk on one side, right-handed, non-flatted clamping surface, cutting edge angle 75° wiper clearance angle 15°

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
ISO$	A	P	16	05	12	3	R	B	E	D	12

EXAMPLE 4 insert interface code on tool item for inserts with corner radius – ISO-designated square insert with normal clearance angle 0°, cutting edge length 12,7 mm, cutting edge height 4,76 mm, for max corner radius 1,2 mm, cylindrical fixing hole, neutral handed, flat clamping surface

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①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
ISO$	S	N	12	04	00	2	N	A	$	$	12

6.4.2 Symbol for source of code – reference ①

The symbol (reference ①) is a four-digit long character string. For ISO-designated insert according to ISO 1832, the symbol for the source of code is

ISO$

For manufacturer's specific inserts, the code is based on DIN V 4000-100, where a company code for manufacturer is maintained.

EXAMPLE

— **DOR$** Dormer

— **IS$$** ISCAR

— **KH$$** Kennametal

— **SO$$** SECO TOOLS AB

— **SV$$** Sandvik Coromant

— **WR$$** Walter AG

All manufacturer not listed shall request a unique code to be able to meet the requirement of this International Standard. Codes that are less than four digits shall be completed by means of adding postfix "DOLLAR SIGNS" ($).

6.4.3 Symbol for insert shape 1 – reference ②

If the source of code (reference ①) is "ISO$", the insert shape 1 shall be designated as shown in Table 8. The letter symbol is in accordance to ISO 1832, 4.1, Table 1.

Manufacturer's specific insert shape shall be designated to manufacturer's discretion, but it is allowed to use the letter symbols in Table 8, if replaceable cutting items meet the definitions of ISO insert shape.

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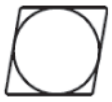
Table 8 — Insert shape 1

Type of insert	Letter symbol	Description	Insert included angle	Figure
Equilateral and equiangular	H	hexagonal	120°	
	O	octogonal	135°	
	P	pentagonal	108°	
	S	square	90°	
	T	triangular	60°	
Equilateral but non-equiangular	C D E M V	rhombic	80° 55° 75° 86° 35°	
	W	trigon	80°	
Non-equilateral and equiangular	L	rectangular	90°	
Non-equilateral and non-equiangular	A B K	parallelogram-shaped	85° 82° 55°	
Round	R	round	–	

The length of the symbol shall be one digit of character string.

6.4.4 Symbol for insert shape 2 – reference ③

If the source of code (reference ①) is “ISO$”, the insert shape 2 shall be designated as shown in Table 9. The letter symbol is in accordance to ISO 1832, 4.2, Table 2.

Manufacturer’s specific insert shape shall be designated to manufacturer’s discretion, but it is allowed to use the letter symbol in Table 9, if replaceable cutting items meet the definitions of ISO normal clearance.

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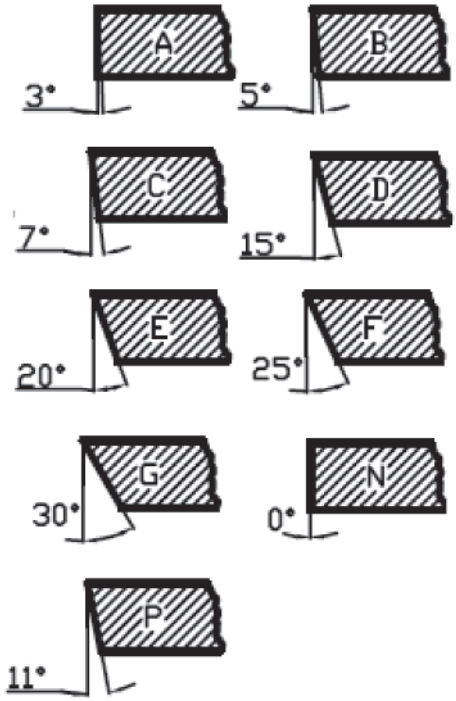
Table 9 — Insert shape 2

Letter symbol	Clearance angle	Figure
A	3°	
B	5°	
C	7°	
D	15°	
E	20°	
F	25°	
G	30°	
N	0°	
P	11°	
O or X	other	

The length of the symbol shall be one digit of character string.

6.4.5 Symbol for insert size 1 – reference ④

If the source of code (reference ①) is "ISO$", the insert size 1 shall be designated as shown in Table 10. The number symbol is in accordance to ISO 1832, 4.5, Table 7 and Table A.1

The length of the symbol shall be two digits of character string.

Manufacturer's specific insert size shall be designated to manufacturer's discretion, but it is allowed to use the symbol given in Table 10, if replaceable cutting items meet the metric definitions of ISO insert size.

Table 10 — Insert size 1

Diameter of inscribed circle		Symbol for insert size 1 (reference ④) for insert shape 1 (reference ②)															
		H	O	P	S	T	C	D	E	M	V	W	L	A	B	K	R
mm	inch																
3,97	5/32	–	–	–	03	06	–	04	–	–	06	02	–	–	–	–	–
4,76	3/16	–	–	–	04	08	04	05	04	04	08	L3	–	–	–	–	–
5,56	7/32	–	–	–	05	09	05	06	05	05	09	03	–	–	–	–	–
6,00		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	06
6,35	1/4	03	02	04	06	11	06	07	06	06	11	04					06
7,94	5/16	04	03	05	07	13	08	09	08	07	13	05					07
8,00		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	08
9,525	3/8	05	04	07	09	16	09	11	09	09	16	06					09

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Table 10 *(continued)*

Diameter of inscribed circle		Symbol for insert size 1 (reference ④) for insert shape 1 (reference ②)															
		H	O	P	S	T	C	D	E	M	V	W	L	A	B	K	R
10,00		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10
12,00		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12
12,7	1/2	07	05	09	12	22	12	15	13	12	22	08					12
15,875	5/8	09	06	11	15	27	16	19	16	15	27	10					15
16,00		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16
19,05	3/4	11	07	13	19	33	19	23	19	19	33	13					19
20,00		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20
25,00		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	25
25,4	1	14	10	18	25	44	25	31	26	25	44	17					25
31,75	1 1/4	18	13	23	31	54	32	38	32	31	54	21					31
32,00		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	32

6.4.6 Symbol for insert size 2 – reference ⑤

If the source of code (reference ①) is “ISO$”, the insert size 2 shall be designated as shown in Table 11. The number symbol is in accordance to ISO 1832, 4.6, Table 8 and Table B.1 with the additions of the number symbols “L4”, “L5”, “L6”, “T6”, and “D2”.

The length of the symbol shall be two digits of character string.

Manufacturer’s specific insert size shall be designated to manufacturer’s discretion, but it is allowed to use the symbol given in Table 11, if replaceable cutting items meet the metric definitions of ISO insert thickness.

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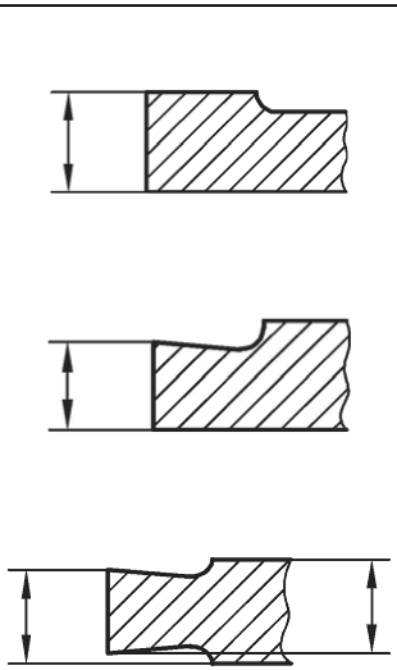
Table 11 — Insert size 2

Insert thickness		Symbol for insert size 2 (reference ⑤)	Figure
mm	inch		
1,59	1/16	01	
1,98	5/64	T1	
2,38	3/32	02	
3,18	1/8	03	
3,97	5/32	T3	
4,00	–	L4[a]	
4,76	3/16	04	
5,00	–	L5[a]	
5,56	7/32	05	
6,00	–	L6[a]	
6,35	1/4	06	
6,50	–	T6[a]	
7,94	5/16	07	
8,00	–	08	
9,525	3/8	09	
10,00	–	10	
12,00	–	D2[a]	
12,70	1/2	12	

[a] Additional symbols – not covered in ISO 1832.

6.4.7 Symbol for lower corner radius – reference ⑥

If the source of code (reference ①) is "ISO$", the lower corner radius shall be designated as shown in Table 12. The number symbol is in accordance to ISO 1832, 4.7, Table 9 cases 1a) and 3).

For replaceable inserts, the nominal corner radius shall be used for symbol ⑥, which designates the lower corner radius. If the interface code on tool items shall be designated, the lower corner radius shall describe the least radius of the replaceable cutting item that can be mounted on to the tool item without any interference with the workpiece.

The length of the symbol shall be two digits of character string.

Manufacturer's specific corner configuration shall be designated to manufacturer's discretion, but it is allowed to use the symbol given in Table 12, if replaceable cutting items meet the metric definitions of ISO rounded corner configuration.

To supplement the designation for round inserts, the following shall be indicated:

— 00 (zero-zero), if the diameter is converted from an inch value;

— M0, if the diameter is a metric one.

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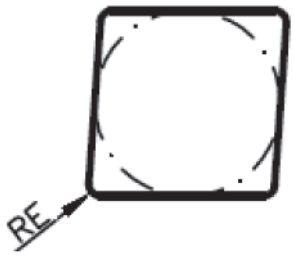
Table 12 — Lower corner radius

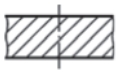
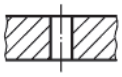
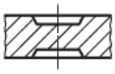
Lower corner radius		Symbol for lower corner radius (reference ⑥)	Figure
mm	inch		
0,00	0,00	00	
0,10	0,003 9	01	
0,20	0,007 9	02	
0,40	0,015 8	04	
0,80	0,031 5	08	
1,20	0,047 2	12	
1,60	0,063 0	16	
2,00	0,078 7	20	
2,40	0,094 5	24	
3,20	0,126 0	32	

6.4.8 Symbol for insert mounting style – reference ⑦

The entry for this symbol is based on the property "insert mounting style code" with its preferred symbol IFS.

It is a one-digit non-quantitative integer type as shown in Table 13.

Table 13 — Insert mounting style

Symbol for insert mounting style (reference ⑦)	Figure	Description
0	–	None of the listed below
1		Without fixing hole
2		Cylindrical fixing hole
3		Partly cylindrical, 40° – 60° countersink on one or two sides
4		Partly cylindrical, 70° – 90° countersink on one or two sides
5		Notch clamping
6		Convex prismatic cross section
7		Concave prismatic section

6.4.9 Symbol for hand of insert – reference ⑧

The entry for this symbol is based on the property "insert hand" with its preferred symbol IH.

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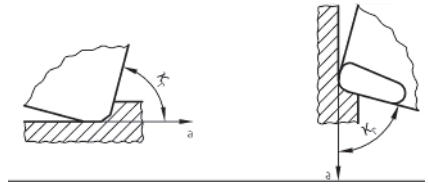
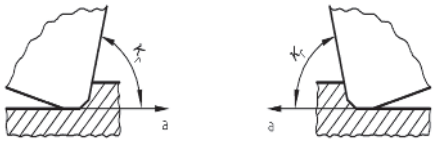
If the source of code (reference ①) is "ISO$", the values of the symbol are mandatory as based on ISO 1832, 5.3, Table 11.

It is a one-digit non-quantitative code type as shown in Table 14.

Table 14 — Insert hand

Symbol for insert hand (reference ⑧)	Corner type	Application of the insert	Figure
R	Right-hand insert	For non-equilateral and non-equiangular inserts and for all inserts with asymmetrical corners and/or asymmetrical chip breaker, permitting the use of the insert in only one direction of the feed motion	
L	Left-hand insert		
N	Neutral insert	For all inserts with symmetrical corners and symmetrical chip breaker, permitting the use of the insert in both directions of the feed motion	
a Direction of feed motion.			

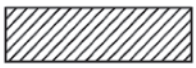
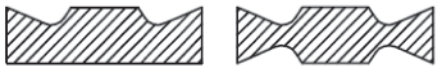
6.4.10 Symbol for clamping surface – reference ⑨

If the source of code (reference ①) is "ISO$", the clamping surface shall be designated as shown in Table 15. This symbol shall help to distinguish if e.g. a clamp used for a flat, non-waved surface is needed or such one that is able to clamp replaceable cutting items with chip breaker.

The length of the symbol shall be one digit of character string.

Manufacturer's specific clamping surfaces shall be designated to manufacturer's discretion, but it is allowed to use the symbol given in Table 15.

Table 15 — Clamping surface

Symbol for clamping surface (reference ⑨)	Surface type	Figure
A	Flat surface	
B	Non-flatted surface	

6.4.11 Symbol for insert configuration 1 – reference ⑩

If the source of code (reference ①) is "ISO$", the insert configuration 1 shall be designated as shown in Table 16. The number symbol is in accordance to ISO 1832, 4.7, Table 9 case 2) for cutting edge angle κ_r.

The length of the symbol shall be one digit of character string.

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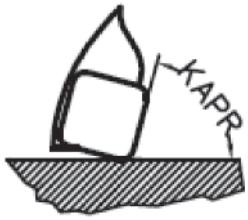
Manufacturer's specific corner configuration 1 shall be designated to manufacturer's discretion, but it is allowed to use the symbol given in Table 16, if replaceable cutting items meet the definitions of ISO wiper edges designation.

Table 16 — Insert configuration 1

Symbol for insert configuration 1 (reference ⑩)	Cutting edge angle	Figure
A	45°	
D	60°	
E	75°	
F	85°	
G[b]	0°	
H[a]	107,5°	
J[a]	93°	
K[b]	15°	
L[a]	95°	
M[a]	50°	
N[a]	62,5°	
P	90°	
U[b]	117,5°	
V[a]	72,5°	
W[b]	30°	
Z	Any other	

[a] Symbol in accordance to ISO 5610-1.

[b] Symbol based on cutting edge angles defined in ISO 5610 but given other letters, because of duplicate designation.

6.4.12 Symbol for insert configuration 2 – reference

If the source of code (reference ①) is "ISO$", the insert configuration 2 shall be designated as shown in Table 17. The number symbol is in accordance to ISO 1832, 4.7, Table 9 case 2) for wiper edge normal clearance angle α_n.

The length of the symbol shall be one digit of character string.

Manufacturer's specific corner configuration 2 shall be designated to manufacturer's discretion, but it is allowed to use the symbol given in Table 17, if replaceable cutting items meet the definitions of ISO wiper edge designation.

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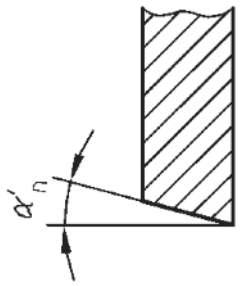
Table 17 — Insert configuration 2

Symbol for insert configuration 2 (reference ⑩)	Wiper edge normal clearance angle	Figure
A	3°	
B	5°	
C	7°	
D	15°	
E	20°	
F	25°	
G	30°	
N	0°	
P	11°	
Z	Any other	

6.4.13 Symbol for upper corner radius – reference

If the source of code (reference ①) is "ISO$", the upper corner radius shall be designated as shown in 6.4.7, Table 12. The number symbol is in accordance to ISO 1832, 4.7, Table 9 cases 1a) and 3).

If the interface code on replaceable inserts shall be designated, the upper corner radius shall be the nominal radius as the same entry as for the lower corner radius. If the interface code on tool items shall be designated, the upper corner radius shall describe the largest radius of the replaceable cutting item that can be mounted on to the tool item without any interference with the workpiece.

The length of the symbol shall be two digits of character string.

Manufacturer's specific corner configuration shall be designated to manufacturer's discretion, but it is allowed to use the symbol given in Table 12, if replaceable cutting items meet the metric definitions of ISO rounded corner configuration.

To supplement the designation for round inserts, the following shall be indicated:

— 00 (zero-zero), if the diameter is converted from an inch value;

— M0, if the diameter is a metric one.

6.4.14 Indication of special signs

The "DOLLAR SIGN" ($ - ASCII (hex)-code: 0024) shall only be allowed on symbols 6, 10, 11, and 12. It describes that on this position, no value shall be present.

If the $-sign is on symbol 6, symbols 10 and 11 shall have an entry and on symbol 12, $-signs are also mandatory.

If the $-sign is on symbol 10, the symbols 6 and 12 shall have an entry and on symbol 11, a $-sign is also mandatory.

The "ASTERISK" (* - ASCII (hex)-code: 002A) shall only be allowed on symbols 6, 10, 11, and 12 and shall only be used for insert interface codes on tool items.

If the *-sign is on symbol 6, any entries according to 6.4.7, Table 12 or manufacturer's specification or the $-sign are allowed.

If the *-sign is on symbol 10, any entries according to 6.4.11, Table 16 or manufacturer's specification or the $-sign are allowed.

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If the *-sign is on symbol 11, any entries according to 6.4.12, Table 17 or manufacturer's specification or the $-sign are allowed.

If the *-sign is on symbol 12, any entries according to 6.4.7, Table 12 or manufacturer's specification or the $-sign are allowed.

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Annex A
(normative)

Information object registration

A.1 Document identification

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

{iso technical specification 13399 part (60) version (2)}

is assigned to this part of ISO 13399.

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

A.2 Dictionary identification

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

{iso technical specification 13399 part (60) version (2) object (2) connection interface (2)}

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Annex B
(informative)

Classification table

Table B.1 below shows the classification structure of the generic families in the dictionary with an expanded structure for the class of connection interface feature. The purpose of the table is to show the relationships between the classes related to connection interface feature and the other classes in the ISO 13399 series.

NOTE Annex C contains the full definition of all the classes that are relevant to connection interface feature. Definitions of reference systems that are used in the definition of some properties can be found in ISO/TS 13399-50.

Table B.1

Classification structure	Parent	BSU
cutting tool library	Root	71CE7A72B6DA7
adaptive item type	71CE7A72B6DA7	71EAD37F18F34
adjustment	71CE7A72B6DA7	71ED884159C90
assembly item type	71CE7A72B6DA7	71CE7A795C05C
bolt hole circle	71CE7A72B6DA7	71E02520881F1
connection interface feature	71CE7A72B6DA7	71DF8C37D9115
ABS System Komet	71DF8C37D9115	71ED66AC44D48
variant 01 of ABS System Komet	71ED66AC44D48	71EF07EABDA7A
variant 02 of ABS System Komet	71ED66AC44D48	71EF07EB0646B
AIF AdjusTable Interface Dihart	71DF8C37D9115	71EF0BAE19FE3
variant 01 of AIF AdjusTable Interface Dihart	71EF0BAE19FE3	71EF0BAE384FA
AWN Prisma connection Schwanog	71DF8C37D9115	71EF0BAE640B8
variant 01 of AWN Prisma connection Schwanog	71EF0BAE640B8	71EF0BAE84362
BFA drill chuck connection	71DF8C37D9115	71ED66B6D07DD
variant 01 of BFA drill chuck connection	71ED66B6D07DD	71EF07FF67B22
variant 02 of BFA drill chuck connection	71ED66B6D07DD	71EF07FF8342C
variant 03 of BFA drill chuck connection	71ED66B6D07DD	71EF07FF9A5F1
BKA boring head connection	71DF8C37D9115	71ED66AC8B274
variant 01 of BKA boring head connection	71ED66AC8B274	71EF07F476F41
variant 02 of BKA boring head connection	71ED66AC8B274	71EF07F4BD4DB
variant 03 of BKA boring head connection	71ED66AC8B274	71EF07F4EADA0
variant 04 of BKA boring head connection	71ED66AC8B274	71EF07F50A5F7
variant 05 of BKA boring head connection	71ED66AC8B274	71EF07F53004D
variant 06 of BKA boring head connection	71ED66AC8B274	71EF07F54F030
BKC boring head connection Coromant	71DF8C37D9115	71ED66B62F072
variant 01 of BKC boring head connection Coromant	71ED66B62F072	71EF08001A258
BKI boring head connection ISCAR	71DF8C37D9115	726F560758ED1
variant 01 of BKI boring head connection ISCAR	726F560758ED1	726F560846C2B
BRP Bridgeport connection	71DF8C37D9115	71ED66B6EEC90

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Table B.1

Classification structure	Parent	BSU
variant 01 of BRP Bridgeport connection	71ED66B6EEC90	71EF0804A302F
BTS Block Tool System Coromant	71DF8C37D9115	71ED66B0A4FC6
variant 01 of BTS Block Tool System	71ED66B0A4FC6	71EF0804C4329
BUF boring and chamfer system	71DF8C37D9115	71EF0BAEE28FC
variant 01 of BUF boring and chamfer system	71EF0BAEE28FC	71EF0BAF5FE3B
CBC Coromant Bridge Connection	71DF8C37D9115	71EF0BB8284F3
variant 01 of CBC Coromant bridge connection	71EF0BB8284F3	71EF0BB840816
CCB Coromant CoroBore	71DF8C37D9115	71EF0BB5F2859
variant 01 of CCB Coromant Corobore	71EF0BB5F2859	71EF0BB61BF20
variant 02 of CCB Coromant Corobore	71EF0BB5F2859	71EF0BB6E82EB
CCM Coromant Cap Mounting	71DF8C37D9115	71EF0BB70F7C7
variant 01 of CCM Coromant Cap Mounting	71EF0BB70F7C7	71EF0BB71801D
CCS Coromant Capto System	71DF8C37D9115	71ED66B709CAF
variant 01 of CCS Coromant Capto System	71ED66B709CAF	71EF0804EB914
variant 02 of CCS Coromant Capto System	71ED66B709CAF	721A8AA7F043E
variant 03 of CCS Coromant Capto System	71ED66B709CAF	721A8AA82F15E
variant 04 of CCS Coromant Capto System	71ED66B709CAF	721A8AAC340AF
CDB Coromant Duobore	71DF8C37D9115	71FACDBFF369F
variant 01 of CDB Coromant Duobore	71FACDBFF369F	71FACDC0554A1
variant 02 of CDB Coromant Duobore	71FACDBFF369F	71FACDC1144DE
CFB Coromant Fine Boring	71DF8C37D9115	71EF0BB74011A
variant 01 of CFB Coromant Fine Boring	71EF0BB74011A	71EF0BB74922A
variant 02 of CFB Coromant Fine Boring	71EF0BB74011A	71EF0BB763D01
variant 03 of CFB Coromant Fine Boring	71EF0BB74011A	71EF0BB775C8C
CKB Kaiser bore connection	71DF8C37D9115	71EF0BB792410
variant 01 of CKB Kaiser bore connection	71EF0BB792410	71EF0BB7BEFEC
CKS Kaiser shank connection	71DF8C37D9115	71EF0BB7DFCAE
variant 01 of CKS Kaisernshank connection	71EF0BB7DFCAE	71EF0BB804A8A
CMS Coromant Modular Serrated mounting	71DF8C37D9115	71EF080049770
variant 01 of CMS Coromant Modular Serrated system	71EF080049770	71EF080072664
variant 02 of CMS Coromant Modular Serrated system	71EF080049770	71EF08045D1DC
CUD Coromant U-drill connection	71DF8C37D9115	71FACDC80C1ED
variant 01 of CUD Coromant U-drill connection	71FACDC80C1ED	71FACDC87FE41
FCM Flexible Coupling Modular system	71DF8C37D9115	71ED66ACB787C
variant 01 of FCM Flexible Coupling Modular system	71ED66ACB787C	71EF07F5962C7
variant 02 of FCM Flexible Coupling Modular system	71ED66ACB787C	71EF07F5CC5E9
FDA milling arbor connection	71DF8C37D9115	71ED66ACCAECB
variant 01 of FDA milling arbor	71ED66ACCAECB	71EF07F616F76
variant 02 of FDA milling arbor	71ED66ACCAECB	71EF07F6D9E5E
variant 03 of FDA milling arbor	71ED66ACCAECB	71EF07FB0C25D
variant 11 of FDA milling arbor	71ED66ACCAECB	71EF07FB3EFA1
variant 12 of FDA milling arbor	71ED66ACCAECB	71EF07FB6287C
variant 13 of FDA milling arbor	71ED66ACCAECB	71EF07FB984BB

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Table B.1

Classification structure	Parent	BSU
variant 21 of FDA milling arbor	71ED66ACCAECB	71EF07FBDC4EF
variant 22 of FDA milling arbor	71ED66ACCAECB	71EF07FC1A78F
variant 23 of FDA milling arbor	71ED66ACCAECB	71EF07FC4228F
FLC flange connection Coromant	71DF8C37D9115	71EF0BB934E10
variant 01 of FLC flange connection Coromant	71EF0BB934E10	71EF0BB94B9C4
FLK flange connector Kennametal	71DF8C37D9115	71ED66B162A10
variant 02 of FLK flange connection Kennametal	71ED66B162A10	71EF08050689D
variant 03 of FLK flange connection Kennametal	71ED66B162A10	71EF0BB99721C
variant 04 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBE406B1
variant 05 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBE6A270
variant 06 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBE88271
variant 07 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBEA15EE
variant 08 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBEBE60D
variant 09 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBEE8C20
variant 10 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBEFDE0D
variant 11 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBF1AD8C
variant 12 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBF43055
variant 13 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBF4C436
variant 14 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBF67333
variant 15 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBF7F75A
variant 16 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBF9869E
variant 17 of FLK flange connection Kennametal	71ED66B162A10	71EF0BBFBD19F
FTS Flexible Tooling System Kennametal	71DF8C37D9115	71ED66B653708
variant 01 of FTS Flexible Tooling System Kennametal	71ED66B653708	71EF0BBFDAEA7
GMS Graflex Modular System SECO	71DF8C37D9115	71ED66AD18B20
variant 01 of GMS Graflex modular system	71ED66AD18B20	71EF07FC94651
GRL Granlund connection	71DF8C37D9115	71ED66AD3543F
variant 01 of GRL Granlund connection	71ED66AD3543F	71EF07FD3C287
HEE HE-/HF-system EMUGE	71DF8C37D9115	71EF0BC1B193C
variant 01 of HEE HE-/HF system EMUGE	71EF0BC1B193C	71EF0BC26EC04
HFS head fitting system Mapal	71DF8C37D9115	71EF0BC29E34D
variant 01 of HFS head fitting system Mapal	71EF0BC29E34D	71EF0BC2B94A3
HSK hollow taper shank	71DF8C37D9115	71ED66B71F0A5
variant 01 of HSK hollow taper shank	71ED66B71F0A5	71EF0BC00EF7A
variant 02 of HSK hollow taper shank	71ED66B71F0A5	71EF0BC053A2A
variant 03 of HSK hollow taper shank	71ED66B71F0A5	71EF0BC085D25
variant 04 of HSK hollow taper shank	71ED66B71F0A5	71EF0BC0CCD59
HSZ hollow cylindrical shank	71DF8C37D9115	71ED66AD7B0D9
variant 01 of HSZ hollow cylindrical shank	71ED66AD7B0D9	71EF07FD7F301
variant 02 of HSZ hollow cylindrical shank	71ED66AD7B0D9	71EF0BC790F48
variant 03 of HSZ hollow cylindrical shank	71ED66AD7B0D9	71EF0BC7E4010
HTS deep drilling system	71DF8C37D9115	71ED66ADA5674
variant 01 of HTS deep drilling system Kennametal	71ED66ADA5674	71EF0BC823EAA

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Table B.1

Classification structure	Parent	BSU
variant 02 of HTS deep drilling system Kennametal	71ED66ADA5674	71EF0BC8D1F91
ICF Iscar clickfit system	71DF8C37D9115	726F5608CC522
variant 01 of ICF system Iscar	726F5608CC522	726F560D0D2B0
IMB modular connection system Iscar	71DF8C37D9115	726F560D5E250
variant 01 of IMB system Iscar	726F560D5E250	726F560DBC5E5
IMC Iscar metal cutting connection	71DF8C37D9115	726F560F8625F
variant 01 of IMC Iscar metal cutting connection	726F560F8625F	726F560FBE036
variant 01 of IMC Iscar metal cutting connection	726F560F8625F	726F561002713
variant 01 of IMC Iscar metal cutting connection	726F560F8625F	726F56104AB8C
KKG stub taper	71DF8C37D9115	71EF0BC91557B
variant 01 of KKG stub taper	71EF0BC91557B	71EF0BC9214D1
variant 02 of KKG stub taper	71EF0BC91557B	71EF0BC949990
KKH ISO cartridge mounting	71DF8C37D9115	71ED66B17CDFB
variant 01 of KKH ISO cartridge mounting	71ED66B17CDFB	71EF0BC984FAA
KMB Kennametal ModBore system	71DF8C37D9115	71ED66B65F546
variant 01 of KMB ModBore System Kennametal	71ED66B65F546	71EF0BC9FBDB7
variant 02 of KMB ModBore System Kennametal	71ED66B65F546	71EF0BCA2A5E6
KMC Kennametal connection	71DF8C37D9115	71ED66B19A2E0
variant 02 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F685CEF
variant 03 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F6CC58B
variant 04 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F6E4567
variant 05 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F6F9430
variant 06 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F71619F
variant 07 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F730A50
variant 08 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F74607B
variant 09 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F75CACB
variant 10 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F773A6B
variant 11 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F78E88A
variant 12 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F7AF2F3
variant 13 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F7D7E43
variant 14 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F7F009F
variant 15 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F8038C3
variant 16 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F810899
variant 17 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F826471
variant 18 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F84D9E8
variant 19 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F858DB9
variant 20 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F86F70F
variant 21 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F884E83
variant 22 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F89C4E9
variant 23 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F8B170D
variant 24 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F8BCB2D
variant 25 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F8D168B
variant 26 of KMC Kennametal cartridge mounting	71ED66B19A2E0	71EF16F91618D

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Table B.1

Classification structure	Parent	BSU
KMM Kennametal Micro system	71DF8C37D9115	71EF16F97D172
variant 01 of KMM Kennametal Micro system	71EF16F97D172	71EF16F9A3BAE
variant 02 of KMM Kennametal Micro system	71EF16F97D172	71EF16F9BF2B6
KMT KM-UTS system Kennametal/Widia	71DF8C37D9115	71ED66B74D6DF
variant 01 of KMT KM-UTS system Kennametal/Widia	71ED66B74D6DF	71EF16F9D45A6
variant 02 of KMT KM-UTS system Kennametal/Widia	71ED66B74D6DF	71EF16FA26760
variant 03 of KMT KM-UTS system Kennametal/Widia	71ED66B74D6DF	71EF16FE1F4DB
variant 04 of KMT KM-UTS system Kennametal/Widia	71ED66B74D6DF	71EF16FE2A60C
KRS Kennametal Romicron system	71DF8C37D9115	71ED66B983935
variant 01 of KRS Kennametal Romicron System	71ED66B983935	71EF16FE6C4DD
variant 02 of KRS Kennametal Romicron System	71ED66B983935	71EF16FE88AAB
KVT KV system Kennametal	71DF8C37D9115	71ED66B999EED
variant 01 of KVT KV system Kennametal	71ED66B999EED	71EF16FEBD7E4
variant 02 of KVT KV system Kennametal	71ED66B999EED	71EF16FED3D33
MBS Multi Blade System Coromant	71DF8C37D9115	71EF16FEFE0AF
variant 01 of MBS Multi Blade	71EF16FEFE0AF	71EF16FF1EB17
MCS modular cartridge system Kennametal	71DF8C37D9115	71ED66B1C3A98
variant 01 of MCS modular cartridge system Kennametal	71ED66B1C3A98	71EF16FF5C435
variant 02 of MCS modular cartridge system Kennametal	71ED66B1C3A98	71EF16FF75F49
variant 03 of MCS modular cartridge system Kennametal	71ED66B1C3A98	71EF16FF96879
variant 04 of MCS modular cartridge system Kennametal	71ED66B1C3A98	71EF16FFA94C6
MEG metric taper	71DF8C37D9115	71ED66B9B5DB8
variant 10 of MEG metric taper	71ED66B9B5DB8	71EF1E87A1AFC
variant 11 of MEG metric taper	71ED66B9B5DB8	71EF1E87C88D7
variant 12 of MEG metric taper	71ED66B9B5DB8	71EF1E87D60B5
variant 13 of MEG metric taper	71ED66B9B5DB8	71EF1E87FABF2
variant 20 of MEG metric taper	71ED66B9B5DB8	71EF1E88337E1
variant 21 of MEG metric taper	71ED66B9B5DB8	71EF1E884C33B
variant 22 of MEG metric taper	71ED66B9B5DB8	71EF1E886526B
variant 23 of MEG metric taper	71ED66B9B5DB8	71EF1E887AC99
variant 30 of MEG metric taper	71ED66B9B5DB8	71EF1E88A9D3B
variant 31 of MEG metric taper	71ED66B9B5DB8	71EF1E88D832F
variant 32 of MEG metric taper	71ED66B9B5DB8	71EF1E88F44A3
variant 33 of MEG metric taper	71ED66B9B5DB8	71EF1E89126E9
variant 40 of MEG metric taper	71ED66B9B5DB8	71EF1E8940F72
variant 41 of MEG metric taper	71ED66B9B5DB8	71EF1E895BA49
variant 42 of MEG metric taper	71ED66B9B5DB8	71EF1E8983142
variant 43 of MEG metric taper	71ED66B9B5DB8	71EF1E899E483
MKG Morse taper	71DF8C37D9115	71ED66B9CF5A0
variant 10 of MKG Morse taper	71ED66B9CF5A0	71EF1E89BDD01
variant 11 of MKG Morse taper	71ED66B9CF5A0	71EF1E89EB4C2
variant 12 of MKG Morse taper	71ED66B9CF5A0	71EF1E8A033CA
variant 13 of MKG Morse taper	71ED66B9CF5A0	71EF1E8A1AACC

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Classification structure	Parent	BSU
variant 20 of MKG Morse taper	71ED66B9CF5A0	71EF1E8A38E35
variant 21 of MKG Morse taper	71ED66B9CF5A0	71EF1E8E2EE7E
variant 22 of MKG Morse taper	71ED66B9CF5A0	71EF1E8E4A3B4
variant 23 of MKG Morse taper	71ED66B9CF5A0	71EF1E8E797B3
variant 30 of MKG Morse taper	71ED66B9CF5A0	71EF1E8E931E0
variant 31 of MKG Morse taper	71ED66B9CF5A0	71EF1E8EADB27
variant 32 of MKG Morse taper	71ED66B9CF5A0	71EF1E8ECB31A
variant 33 of MKG Morse taper	71ED66B9CF5A0	71EF1E8EF27D8
variant 40 of MKG Morse taper	71ED66B9CF5A0	71EF1E8F157CF
variant 41 of MKG Morse taper	71ED66B9CF5A0	71EF1E8F42243
variant 42 of MKG Morse taper	71ED66B9CF5A0	71EF1E8F6F981
variant 43 of MKG Morse taper	71ED66B9CF5A0	71EF1E8F8B318
MVS modular connection system Wohlhaupter	71DF8C37D9115	71ED66AE75E58
variant 01 of MVS modular connection system Wohlhaupter	71ED66AE75E58	71EF1E8FB6234
NCT Novex-NC-Tools Walter	71DF8C37D9115	71ED66B9F6D76
variant 01 of NCT Novex-NC-Tools Walter	71ED66B9F6D76	71EF1E8FFD738
PMC prismatic connection Coromant	71DF8C37D9115	71EF1E9030508
variant 01 of PMC prismatic connection Coromant	71EF1E9030508	71EF1E906A58B
variant 02 of PMC prismatic connection Coromant	71EF1E9030508	71EF1E9082FF5
variant 04 of PMC prismatic connection Coromant	71EF1E9030508	71EF1E90F24F5
variant 07 of PMC prismatic connection Coromant	71EF1E9030508	71EF1E91159E3
PMD prismatic connection standard	71DF8C37D9115	71ED66B1DF8E1
variant 01 of PMD prismatic connection standard	71ED66B1DF8E1	71EF1E915B0BD
PMI prismatic connection Iscar	71DF8C37D9115	726F560E00E29
variant 01 of PMI prismatic connection Iscar	726F560E00E29	726F560E46BC2
PMK prismatic connection Kennametal	71DF8C37D9115	71ED66B5E2C68
variant 01 of PMK prismatic connection Kennametal	71ED66B5E2C68	71EF1E918967F
PMS prismatic connection SECO	71DF8C37D9115	71EF1E91D5D4F
variant 01 of PMS prismatic connection SECO	71EF1E91D5D4F	71EF1E91EFA2F
RFX Rotaflex system Widia	71DF8C37D9115	71ED66ADD852B
variant 01 of RFX Rotaflex system Widia	71ED66ADD852B	71EF2242723DD
SAC screw connection Coromant	71DF8C37D9115	71EF2242B4D39
variant 01 of SAC screw connection Coromant	71EF2242B4D39	71EF22434D3F1
variant 02 of SAC screw connection Coromant	71EF2242B4D39	71EF2243668E1
variant 03 of SAC screw connection Coromant	71EF2242B4D39	71EF224379DA9
SAI screw connection Iscar	71DF8C37D9115	726F560E9DD9B
variant 01 of SAI screw connection Iscar	726F560E9DD9B	726F560EE02D1
variant 02 of SAI screw connection Iscar	726F560E9DD9B	726F560F2A767
SBA SBA-system Komet	71EF2242B4D39	71EF2242CDE99
variant 01 of SBA SBA-system Komet	71EF2242CDE99	71EF224394D8C
SCA SECO cartridge mounting	71DF8C37D9115	71EF2242E8099
variant 01 of SCA SECO cartridge mounting	71EF2242E8099	71EF2243AFA09
variant 02 of SCA SECO cartridge mounting	71EF2242E8099	71EF2243CB404

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Classification structure	Parent	BSU
variant 03 of SCA SECO cartridge mounting	71EF2242E8099	71EF2243E36FF
SCR SECO crownlock connection	71DF8C37D9115	71EF224302CF7
variant 01 of SCR SECO crownlock connection	71EF224302CF7	71EF2247CCF24
SKG Steep taper	71DF8C37D9115	71ED66BA0F1F7
variant 10 of SKG Steep taper	71ED66BA0F1F7	71EF224817F39
variant 11 of SKG Steep taper	71ED66BA0F1F7	71EF2248594F2
variant 16 of SKG Steep taper	71ED66BA0F1F7	71EF2248775E3
variant 17 of SKG Steep taper	71ED66BA0F1F7	71EF22489E8A3
variant 20 of SKG Steep taper	71ED66BA0F1F7	71EF2248B8EAB
variant 21 of SKG Steep taper	71ED66BA0F1F7	71EF2248CF17E
variant 26 of SKG Steep taper	71ED66BA0F1F7	71EF2248DA3F5
variant 27 of SKG Steep taper	71ED66BA0F1F7	71EF22490384F
variant 30 of SKG Steep taper	71ED66BA0F1F7	71EF22492256B
variant 31 of SKG Steep taper	71ED66BA0F1F7	71EF224948944
variant 36 of SKG Steep taper	71ED66BA0F1F7	71EF2249532BC
variant 37 of SKG Steep taper	71ED66BA0F1F7	71EF224979825
variant 40 of SKG Steep taper	71ED66BA0F1F7	71EF224996880
variant 41 of SKG Steep taper	71ED66BA0F1F7	71EF2249B2AF9
variant 46 of SKG Steep taper	71ED66BA0F1F7	71EF2249D9BD8
variant 47 of SKG Steep taper	71ED66BA0F1F7	71EF224A0E1FD
variant 50 of SKG Steep taper	71ED66BA0F1F7	71EF224A4275A
variant 51 of SKG Steep taper	71ED66BA0F1F7	71EF224A59B6E
variant 56 of SKG Steep taper	71ED66BA0F1F7	71EF224A70519
variant 57 of SKG Steep taper	71ED66BA0F1F7	71EF224A8BA27
SMM SECO minimaster	71DF8C37D9115	71EF224AAA436
variant 01 of SMM SECO minimaster	71EF224AAA436	71EF224ADA70A
SMS SECO modular serrated connection	71DF8C37D9115	71EF224ABDBD9
variant 01 of SMS SECO modular serrated connection	71EF224ABDBD9	71EF224AEF279
SPK holding arbor	71DF8C37D9115	71ED66ADFAA9B
variant 01 of SPK holding arbor	71ED66ADFAA9B	71EF25FA05521
variant 02 of SPK holding arbor	71ED66ADFAA9B	71EF25FA3739C
variant 03 of SPK holding arbor	71ED66ADFAA9B	71EF25FA830B8
variant 04 of SPK holding arbor	71ED66ADFAA9B	71EF25FAAB512
variant 05 of SPK holding arbor	71ED66ADFAA9B	71EF25FADB60F
variant 06 of SPK holding arbor	71ED66ADFAA9B	71EF25FAF655C
variant 07 of SPK holding arbor	71ED66ADFAA9B	71EF25FB14928
variant 08 of SPK holding arbor	71ED66ADFAA9B	71EF25FB3DCEC
variant 09 of SPK holding arbor	71ED66ADFAA9B	71EF25FB6D150
variant 10 of SPK holding arbor	71ED66ADFAA9B	71EF25FB8DE89
variant 11 of SPK holding arbor	71ED66ADFAA9B	71EF25FBB4F22
variant 12 of SPK holding arbor	71ED66ADFAA9B	71EF25FC1BBDA
SRT SECO R2 shank	71DF8C37D9115	71EF25FC490BF
variant 01 of SRT SECO R2 shank	71EF25FC490BF	71EF25FC62677

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Classification structure	Parent	BSU
STH automotive shank	71DF8C37D9115	71ED66AE29B8D
variant 01 of STH automotive shank	71ED66AE29B8D	71EF25FCB20D6
SWB quick change connection	71DF8C37D9115	71ED66AE588FA
variant 01 of SWB quick change connection	71ED66AE588FA	71F8F4AAB6B82
SZB collet shortened design Biax	71DF8C37D9115	71EF2955BD8F5
variant 01 of SZB collet shortened design Biax	71EF2955BD8F5	71F8F4ACA903C
SZC collet connection Coromant	71DF8C37D9115	71EF2955D5933
variant 01 of SZC collet connection Coromant	71EF2955D5933	71F8F4AD0700A
variant 02 of SZC collet connection Coromant	71EF2955D5933	71F8F4AD0A9D3
SZD collet connection standard	71DF8C37D9115	71ED66BA26E2E
variant 01 of SZD collet connection standard	71ED66BA26E2E	71F8F4ADCFB28
variant 02 of SZD collet connection standard	71ED66BA26E2E	71F8F4ADDFD29
variant 03 of SZD collet connection standard	71ED66BA26E2E	71F8F4ADE49F6
variant 04 of SZD collet connection standard	71ED66BA26E2E	71F8F4ADE904D
variant 11 of SZD collet connection standard	71ED66BA26E2E	71F8F4ADF72B3
variant 12 of SZD collet connection standard	71ED66BA26E2E	71F8F4ADFB413
variant 13 of SZD collet connection standard	71ED66BA26E2E	71F8F4ADFFFF9
SZE collet connection Erikson	71DF8C37D9115	71EF2955F7771
variant 03 of SZE collet connection Erikson	71EF2955F7771	71F8F4AEABB7A
variant 04 of SZE collet connection Erikson	71EF2955F7771	71F8F4AEBB269
SZP collet Eminent-Perman	71DF8C37D9115	71EF29560D5F6
variant 01 of SZP collet Eminent-Perman	71EF29560D5F6	71F8F4AFC5115
SZR collet KSF Roehm	71DF8C37D9115	71EF2956256D4
variant 01 of SZR collet KSF Roehm	71EF2956256D4	71F8F4B457636
SZS collet Steinel Bohrmaster	71DF8C37D9115	71EF29563BB7E
variant 01 of SZS collet Steinel Bohrmaster	71EF29563BB7E	71F8F4B475442
variant 02 of SZS collet Steinel Bohrmaster	71EF29563BB7E	71F8F4B479EA2
variant 03 of SZS collet Steinel Bohrmaster	71EF29563BB7E	71F8F4B47DB96
URM Urma connection	71DF8C37D9115	71EF2956584ED
variant 01 of URM Urma connection	71EF2956584ED	71F8F4B4A6D29
UTS UTS Widia	71DF8C37D9115	71EF29566E0D4
variant 01 of UTS UTS Widia	71EF29566E0D4	71F8F4B4C5B9A
VAS Variant System Coromant	71DF8C37D9115	71ED66AEA108B
variant 01 of VAS Variant System Coromant	71ED66AEA108B	71F8F4B4DF852
VKT rectangular connection	71DF8C37D9115	71ED66B5FAE04
variant 01 of VKT rectangular connection	71ED66B5FAE04	71F8F4B51A785
VLS Varilock System Coromant	71DF8C37D9115	71ED66AEBC779
variant 01 of VLS Varilock System Coromant	71ED66AEBC779	71F8F4B4F1367
ZYL cylindrical shank connection	71DF8C37D9115	71ED66AF2175B
variant 01 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B5348DB
variant 03 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B5390AF
variant 04 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B53E3D2
variant 10 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B54FA0D

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Classification structure	Parent	BSU
variant 11 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B554639
variant 13 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B56465A
variant 14 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B56A63D
variant 15 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B56FE57
variant 16 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B57F583
variant 17 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B5853C1
variant 18 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B58A106
variant 19 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B597D0B
variant 20 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B5ACE12
variant 21 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B5B212B
variant 22 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B5B7D42
variant 23 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B5C5EC2
variant 24 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B5D1A6B
variant 50 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B82CEDE
variant 53 of ZYL cylindrical shank connection	71ED66AF2175B	71F8F4B832F8A
ZYV VDI shank	71DF8C37D9115	71ED66AF4BEFE
variant 01 of ZYV VDI shank	71ED66AF4BEFE	71F8F4B863718
variant 02 of ZYV VDI shank	71ED66AF4BEFE	71F8F4B87213D
coolant supply	71CE7A72B6DA7	71DF8C3C065EB
cutting item feature	71CE7A72B6DA7	71DD6C82F72DA
cutting item type	71CE7A72B6DA7	71D1AA6C8FC75
cutting operation	71CE7A72B6DA7	71DFF83D21D50
cutting tool	71CE7A72B6DA7	71CE7A7A5038B
flange	71CE7A72B6DA7	71EC5A767182E
keyway	71CE7A72B6DA7	71DF5C026BCE7
locking mechanism	71CE7A72B6DA7	71EBAB85BB5FA
reference system	71CE7A72B6DA7	71CF2968F7A9E
runout axial	71CE7A72B6DA7	71EDD2B84143C
runout radial	71CE7A72B6DA7	71EDD2B858274
tool item feature	71CE7A72B6DA7	71DD70376771D
tool item type	71CE7A72B6DA7	71E01A004C775
tool thread external	71CE7A72B6DA7	71FC1D22BF4CD
tool thread internal	71CE7A72B6DA7	71FC1D25097D7

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