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Cutting tool data representation and exchange —

Part 406: Creation and exchange of 3D models — Modelling of connection interface

Représentation et échange des données relatives aux outils coupants —

Partie 406: Création et échanges de modèles 3D — Conception d'interfaces de connexion

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Foreword

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

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

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 29, *Small tools*.

A list of all parts in the ISO 13399 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document defines the concept, terms and definitions of how to design simplified 3D models of connection interfaces for the design of cutting tools that can be used for NC-programming, simulation of the manufacturing processes and the determination of collision within machining processes. It is not intended to standardize the design of the cutting tool itself.

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 the ISO 13399 series include, but are not limited to, everything between the workpiece and the machine tool. Information about inserts, solid tools, assembled tools, adaptors, components and their relationships can be represented by this document. The increasing demand for providing the end user with 3D models for the purposes defined above is the basis for the development of this series of International Standards.

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

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/TC 3/SC 3D, *Product properties and classes and their identification*, and in its extensions defined in ISO 13584-24 and ISO 13584-25.

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Cutting tool data representation and exchange —

Part 406:
Creation and exchange of 3D models — Modelling of connection interface

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1 Scope

This document defines the concept of how to design the connection interfaces for adaptive and tool items, limited to any kind of standardized connections, together with the usage of the related properties and domains of values.

This document specifies the requirements of simplified 3D models for data exchange of connection interface.

Not all dimensions given in this document are defined in the ISO 13399 series.

The following are outside the scope of this document:

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

— concept of 3D models for cutting tools;

— concept of 3D models for cutting items;

— concept of 3D models for other connection interfaces not being described in the scope of this document;

— concept of 3D models for adaptive items;

— concept of 3D models for assembly items and auxiliary items.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 296, *Machine tools — Self-holding tapers for tool shanks*

ISO 239, *Drill chuck tapers*

ISO 3338 (all parts), *Cylindrical shanks for milling cutters*

ISO 5414-1, *Tool chucks (end mill holders) with clamp screws for flatted cylindrical shank tools — Part 1: Dimensions of the driving system of tool shanks*

ISO 5414-2, *Tool chucks (end mill holders) with clamp screws for flatted cylindrical shank tools — Part 2: Connecting dimensions of chucks and designation*

ISO 6462, *Face and shoulder milling cutters with indexable inserts — Dimensions*

ISO 7388 (all parts), *Tool shanks with 7/24 taper for automatic tool changers*

ISO 9270-1, *7/24 taper spindle noses for automatic tool changers — Part 1: Dimensions and designation of spindle noses of forms S and SF*

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ISO 9270-2, *7/24 taper spindle noses for automatic tool changers — Part 2: Dimensions and designation of spindle noses of forms J and JF*

ISO 9766, *Drills with indexable inserts — Cylindrical shanks with a parallel flat*

ISO 10649-1, *Cutter arbors with parallel key and tenon drive — Part 1: General dimensions*

ISO 10897, *Collets for tool holders with taper ratio 1:10 — Collets, holders, nuts*

ISO 10889 (all parts), *Tool holders with cylindrical shank*

ISO 12164-1, *Hollow taper interface with flange contact surface — Part 1: Shanks — Dimensions*

ISO 12164-2, *Hollow taper interface with flange contact surface — Part 2: Receivers — Dimensions*

ISO 12164-3, *Hollow taper interface with flange contact surface — Part 3: Dimensions of shanks for stationary tools*

ISO 12164-4, *Hollow taper interface with flange contact surface — Part 4: Dimensions of receivers for stationary tools*

ISO 15488, *Collets with 8 degree setting angle for tool shanks — Collets, nuts and fitting dimensions*

ISO/TS 13399-80, *Cutting tool data representation and exchange — Part 80: Creation and exchange of 3D models — Overview and principles*

ISO/TS 13399-401, *Cutting tool data representation and exchange — Part 401: Creation and exchange of 3D models — Converting, extending and reducing adaptive items*

ISO 26622-1, *Modular taper interface with ball track system — Part 1: Dimensions and designation of shanks*

ISO 26622-2, *Modular taper interface with ball track system — Part 2: Dimensions and designation of receivers*

ISO 26623-1, *Polygonal taper interface with flange contact surface — Part 1: Dimensions and designation of shanks*

ISO 26623-2, *Polygonal taper interface with flange contact surface — Part 2: Dimensions and designation of receivers*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Abbreviated terms

DCONMS	connection diameter machine side
DM	polygonal diameter according to ISO 26623-1
DF	flange diameter
DIX	maximum body diameter according to the ISO 12164 series
MXA	X-axis of the MCS coordinate system

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