
Cutting tool data representation and exchange —

Part 71: Graphical data layout — Creation of documents for standardized data exchange: Graphical product information

Représentation et échange des données relatives aux outils coupants —

Partie 71: Format des données graphiques — Création de documents pour l'échange de données normalisées: Informations graphiques des produits

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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).

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).

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

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

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 the 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 70: Graphical data layout — Layer settings for tool layout* [Technical Specification]
- *Part 71: Graphical data layout — Creation of documents for the standardized data exchange — Graphical product information* [Technical Specification]
- *Part 72: Creation of documents for the standardized data exchange — Definition of properties for drawing header and their XML-data exchange* [Technical Specification]
- *Part 80: Creation and exchange of 3D models — Overview and principles* [Technical Specification]
- *Part 100: Definitions, principles and methods for reference dictionaries* [Technical Specification]
- *Part 150: Usage guidelines* [Technical Specification]
- *Part 201: Creation and exchange of 3D models — Regular inserts* [Technical Specification]

- *Part 202: Creation and exchange of 3D models — Irregular inserts* [Technical Specification]
- *Part 203: Creation and exchange of 3D models — Replaceable inserts for drilling* [Technical Specification]
- *Part 204: Creation and exchange of 3D models — Inserts for reaming* [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]
- *Part 303: Creation and exchange of 3D models — Solid end mills* [Technical Specification]
- *Part 304: Creation and exchange of 3D models — Solid milling cutters with arbor hole* [Technical Specification]
- *Part 307: Creation and exchange of 3D models — End mills for indexable inserts* [Technical Specification]
- *Part 308: Creation and exchange of 3D models — Milling cutters with arbor hole for indexable inserts* [Technical Specification]
- *Part 309: Creation and exchange of 3D models — Tool holders for indexable inserts* [Technical Specification]
- *Part 311: Creation and exchange of 3D models — Solid reamers* [Technical Specification]
- *Part 312: Creation and exchange of 3D models — Reamers for indexable inserts* [Technical Specification]
- *Part 401: Creation and exchange of 3D models — Converting, extending and reducing adaptive items* [Technical Specification]
- *Part 405: Creation and exchange of 3D models — Collets* [Technical Specification]

The following parts are under preparation:

- *Part 305: Creation and exchange of 3D models — Modular tooling systems with adjustable cartridges for boring* [Technical Specification]
- *Part 310: Creation and exchange of 3D models — Turning tools with carbide tips* [Technical Specification]
- *Part 315: Creation and exchange of 3D models — Modelling of machine operated feed out tools* [Technical Specification]

Introduction

This part of ISO 13399 defines the terms, properties and definitions of the drawing frame and drawing content of a computer-aided design. The purpose of this part of ISO 13399 is to provide a common way of an electronic data exchange of graphical product information. However, the aim is the simplified communication during the phase of documentation — namely on the basis of 2D drawings.

Within the 2D drawing, the aim is to separate the proper product description (2D graphic) from the users specific presentation (drawing header). Most of the design orders are forced to use the individual drawing frames of the users. Therefore, a big portion of the design expenditure is used for the creation of the documentation and not for the proper problem solution.

Drawings are the most important communicative devices of a producing company. Besides the description of complex workpiece geometries, most cases are requests for correspondent documentation, e.g. to support NC-programming or production facilities.

This part of ISO 13399 defines a standardized data exchange format for documentation. Therefore, the effort for maintenance of the documentation is reduced because the product drawing of the supplier or manufacturer is merged automatically into the individual drawing frames of the end users. This concept provides advantage for both supplier/manufacturer and end user, since the particular template is centrally maintained once only.

To support a standardized electronic product data exchange, the content of drawing headers have been examined by means of their common basic elements and the applicability. The identified data fields have been consolidated and may be used for a universal application because of a unified definition of their attributes. Thus, in a defined use case, the graphical product description (2D graphic) and the descriptive data of the product (content of the drawing header) can be merged and filed as a complete drawing documentation.

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Cutting tool data representation and exchange —

Part 71:

Graphical data layout — Creation of documents for standardized data exchange: Graphical product information

1 Scope

This part of ISO 13399 determines the elements to be used for the creation of 2D documentation. The individual parts of documentation are drawing content, geometrical data, drawing frame and drawing header data as shown in [Figure 1](#).

The standardization of drawing formats, e.g. drawing frame, structure of the bill of material, are out of the scope of this part of ISO 13399. Furthermore, it is intended to standardize the data exchange of the product documentation.

This part of ISO 13399 specifies a common way for the basic principles for the creation of product documentation that contain the following:

- definitions and identifications of the elements of a product documentation;
- definitions and identifications of the internal structure of the product documentation;
- definitions and identifications of those elements and features that are necessary to show the protection notices and the copyrights of the originator of the document.

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

- layer settings as defined in ISO/TS 13399-70;
- structure of the data exchange file using extensible mark-up language (XML);
- applications where these standard data may be stored or referenced;
- concept of the classification of cutting tool data and their properties;
- concept of the design of 2D drawings for cutting tools;
- concept of the design of 3D models for cutting tools;
- application data for the use of those cutting tools;
- information about the reconditioning of cutting tools;
- information about additional application and usage data (e.g. coolant supply).

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/TS 13399-70, *Cutting tool data representation and — Part 70: Graphical data layout — Layer setting for tool layout*

ISO/TS 13399-72, *Cutting tool data representation and exchange — Part 72: Creation of documents for the standardized data exchange — Definition of properties for drawing header and their XML-data exchange*

3 Fundamental system description

The way of creating 2D cutting tool documentation and the necessary elements are given in [Figure 1](#). In this part of ISO 13399, the defined procedure for the creation of documentation is applicable for standard and custom solution tools.

In principle, cutting tool documentation consists of four main elements. These elements are shown in [Figure 1](#).

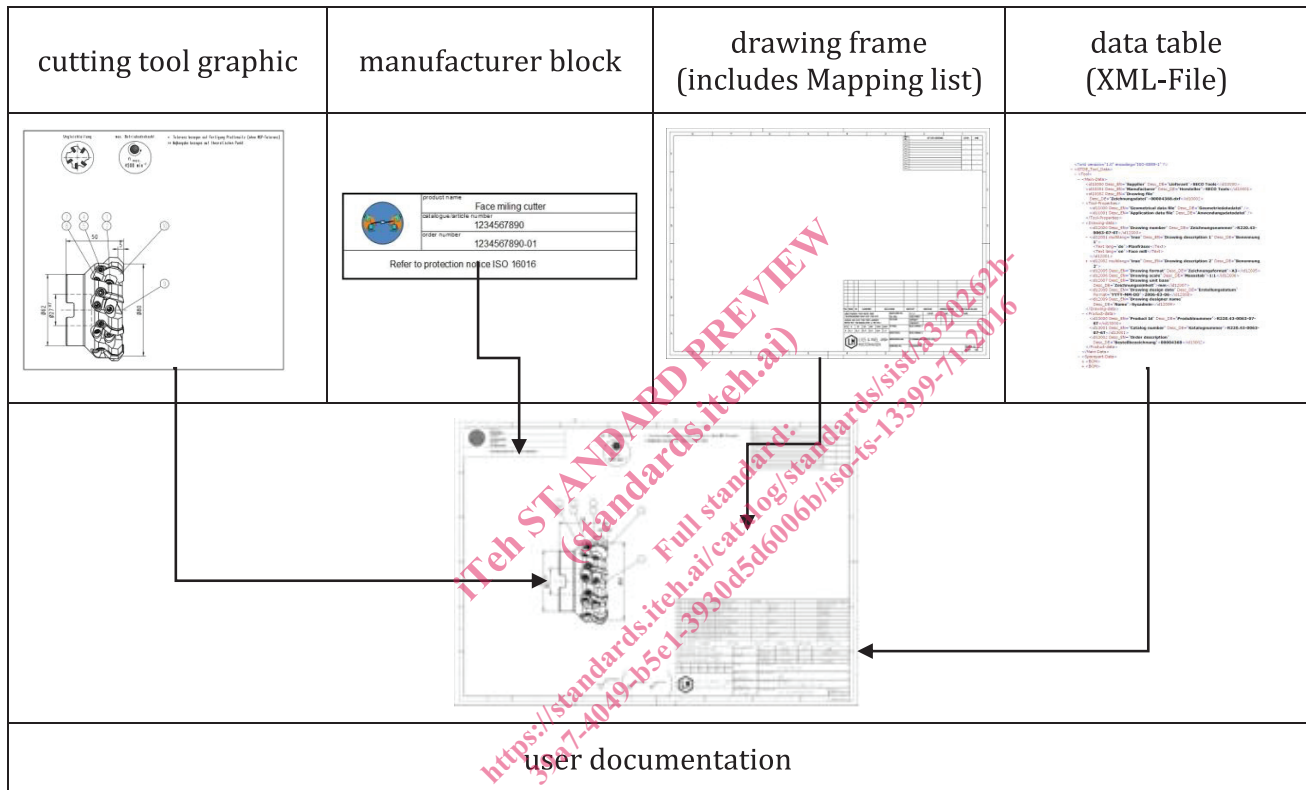


Figure 1 — System for the creation of a 2D documentation

4 Definition of the drawing elements

4.1 Drawing frame

The design of the drawing frame shall follow the definitions given in ISO/TS 13399-70. The drawing frame shall consists of the following:

- the definition of the content;
- the position of the custom-specific drawing header date, including the organizational data;
- the layout of the bill of material;
- the definition of the available drawing area.

4.2 Graphic of the cutting tool

The manufacturer shall create the cutting tool layout. The structure and design shall follow the rules according to ISO/TS 13399-70. The content of the drawing shall be positioned automatically into the drawing frame during the creation of the documentation.

4.3 Manufacturer/supplier block

The layout and content of the header data of the manufacturer/supplier are defined in this part of ISO 13399. This block shall set the copyright and shall be part of any cutting tool documentation, if custom-specific drawing headers are used. Position and direction may vary according to customer's demand of the 2D documentation.

4.4 Data table

The data table shall contain all parametric information in XML format that are relevant for the creation of the 2D cutting tool documentation. The prime data are

- bill of material, and
- information with reference to the user.

4.5 Mapping list

The mapping list shall contain the logic assignment of the neutral master classification to the data fields and their valid values, which are defined in the drawing frame and the manufacturer block. The positions of the place holders of the data fields that allow an individual and automatic positioning of the entries of the data table are primarily defined in the mapping list.

The mapping list shall be created for every drawing frame.

5 Structure and layout of the drawing elements

5.1 Drawing frame

The drawing frame shall be designed in accordance with ISO/TS 13399-70 and filed as DXF. This format supports an automated configuration of the 2D cutting tool documentation. The drawing frame contains the following header elements which are also defined with its position:

- drawing header with user block;
- revision block;
- bill of material;
- blank space for the 2D graphic.

The user shall determine the layout and the content of the drawing frame. The design shall follow the definitions published in ISO/TS 13399-70. Based on these rules, the drawing frame shall be uploaded on a data medium.

5.2 Tool graphic

The tool manufacturer shall provide the tool graphic with the format DXF code AC1015. The layer settings shall follow the specification according to ISO/TS 13399-70.