

PD ISO/TS 13399-70:2016



BSI Standards Publication

Cutting tool data representation and exchange

Part 70: Graphical data layout — Layer
setting for tool layout

National foreword

This Published Document is the UK implementation of ISO/TS 13399-70:2016.

The UK participation in its preparation was entrusted to Technical Committee MTE/18, Tools tips and inserts for cutting applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

© The British Standards Institution 2016. Published by BSI Standards Limited 2016

ISBN 978 0 580 91241 2

ICS 25.100.01; 35.240.50

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 July 2016.

Amendments issued since publication

Date	Text affected
------	---------------

Cutting tool data representation and exchange —

Part 70: Graphical data layout — Layer setting for tool layout

*Représentation et échange des données relatives aux outils
coupants —*

*Partie 70: Disposition des données graphiques — Disposition en
couches des paramètres des outils*





COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	iv
Introduction	vi
1 Scope	1
2 Terms and definitions	1
3 Layer concept	4
4 Structure of the layers	5
4.1 General.....	5
4.2 Colouring of the layers.....	5
4.3 Grouping and definition of the layers.....	6
4.3.1 Grouping.....	6
4.3.2 Basic layer.....	6
4.3.3 Tool drawing (main view — function number 3.0.1).....	6
4.3.4 NC-Geometry (CUT, NOCUT — function number 3.0.2).....	8
4.3.5 Extended tool drawing (further views — function number 3.0.3).....	9
4.3.6 Multilingual (global drawing — function number 3.0.4).....	10
4.3.7 Tool reconditioning (supplier specific information — function number 3.0.5).....	12
4.3.8 Machine equipment layout (machining processes — function number 3.0.6).....	13
4.3.9 Drawing frame (multilingual and drawing space — function number 3.0.7).....	15
4.4 Determination of the layer properties.....	15
4.5 Rules of the layer concept.....	26
5 Data concept	27
5.1 Origin points and mating points.....	27
5.1.1 Rotationally symmetric cutting tool assembly.....	27
5.1.2 Non-rotationally symmetric cutting tool assembly.....	28
5.2 Rules for the Layer CUT and NOCUT.....	30
5.3 Rules for the concept of dimensioning.....	32
5.3.1 General.....	32
5.3.2 Cutting tool component.....	32
5.3.3 Cutting tool combination.....	33
Annex A (informative) Examples of the layer structure	34
Bibliography	49

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/TS 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 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 403: Creation and exchange of 3D models — Modelling of driven tool units* [Technical Specification]
- *Part 405: Creation and exchange of 3D models — Collets* [Technical Specification]
- *Part 406: Creation and exchange of 3D models — Modelling of connection interface* [Technical Specification]

The following parts are under preparation:

- *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 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 313: Creation and exchange of 3D models — Creation and exchange of 3D models — Burrs* [Technical Specification]
- *Part 314: Creation and exchange of 3D models — Creation and exchange of 3D models — Cartridges for indexable inserts* [Technical Specification]
- *Part 315: Creation and exchange of 3D models — Modelling of machine operated feed out tools* [Technical Specification]

Introduction

This part of ISO/TS 13399 defines the terms, properties and definitions of the layers of a computer-aided design. The purpose of this part of ISO/TS 13399 is to provide a reference layer setting to support the use of CAD-designs of tool graphics to be used for simulation and documentation of cutting tool components and assemblies. The basis of this part of ISO/TS 13399 is the common layer structure of the production facility graphic — better known as the BMG (building model generation) layer structure. Mainly, this concept was used and will be used for the graphical layout of cutting tools and their components within the 2D area. Examples of the layer structure are given in [Annex A](#).

Cutting tool data representation and exchange —

Part 70:

Graphical data layout — Layer setting for tool layout

1 Scope

This part of ISO/TS 13399 is intended to be used for the design of tool layouts for the simulation and the documentation of cutting tool components and cutting tool assemblies. This part of ISO/TS 13399 can be used in connection and correlation with other parts of ISO/TS 13399.

The main purpose of this layer structure is the graphical layout of cutting tool components and cutting tool assemblies to be used within tool pre-setting, NC programming and the simulation of processes, as well as for the design of the machining equipment layout.

The common concept of the BMG (building model generation) layer structure has been extended with more layer definitions for universal use. This part of ISO/TS 13399 is applicable for a new layout; old, existing data files are not updated to this level. The use of this part of ISO/TS 13399 in terms of change management of existing cutting tool layout is at the manufacturer's discretion.

The extent of the dimensioning is limited to the number of dimensions that are also populated within manufacturer's or distributor's catalogues. The manufacturer determines the level of details and is understood as tool specific.

As the 3D-simulation systems proceed with stock removal, it is differentiated between cutting and non-cutting tool components. Also, the data concept includes the rules of zero points and mounting points for non-rotating tools (lathe tools).

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

assembled tool

AT

tool components (also single parts and spare parts) that are arranged to an assembled tool to be able to run a computer-aided application

2.2

centre line

line that defines the axis of a rotational body or the symmetric axis of a feature

EXAMPLE Axis of a hole.

2.3

cladding contour

continuous line built from single lines which describes the outer contour of a complete tool or tool component that is relevant for collision purposes

2.4

colour index DXF

numerical value of a colour within the application of data transmission under the drawing exchange format DXF

Note 1 to entry: All CAx-systems interpret uniformly this colour index.