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Interested committees:

Title: Draft BS ISO 24351 Technical product documentation (TPD) - General requirements of the construction of three-dimensional models for mechanical products.

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Introduction

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For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 24351

Technical product documentation (TPD) - General requirements of the construction of three-dimensional models for mechanical products

*Documentation technique de produits (DTP) — Exigences
générales de construction des modèles en trois dimensions pour
les produits mécaniques*

ICS: 01.110; 35.240.10

ISO/TC 10/SC 6

Secretariat: **SAC**

Voting begins on:
2025-06-05

Voting terminates on:
2025-08-28

This document is circulated as received from the committee secretariat.

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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Three-dimensional modelling	4
4.1 Classification of three-dimensional digital model	4
4.2 Composition of three-dimensional digital model	4
4.3 General requirements for three-dimensional modelling	4
4.3.1 The naming principle of three-dimensional digital model files	4
4.3.2 Requirements of software setup for three-dimensional modelling	5
4.3.3 Classification of modelling features	5
4.4 General process and requirements for part modelling	7
4.4.1 Common parts	7
4.4.2 Specific parts	9
4.5 General process and requirements for assembly modelling	9
4.5.1 Assembly modelling Process of assembly modelling	9
4.5.2 General requirements for assembly modelling	9
4.5.3 Specific requirements for assembly modelling	10
5 Requirements for model checking	10
5.1 Basic principles of model checking	10
5.2 Basic content of model checking	11
6 Requirements for model release	11
6.1 Basic principles of model release	11
6.2 Basic content of model release	11
6.3 Use of the released model	11
7 Requirements for model management	11
7.1 Model data management	11
7.2 Technical status management	12
Annex A (informative) Common feature parameters	13
Annex B (informative) General process of part modelling	23
Annex C (informative) Requirements of standard parts and outsourcing parts for modelling	24
Annex D (informative) Design process for bottom-up assembly modelling	25
Annex E (informative) Design process for top-down assembly modelling	26
Bibliography	27

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 10, *Technical product documentation*, Subcommittee SC 6, *Mechanical engineering documentation*.

The standard has been elaborated mainly to be implemented within the mechanical engineering industry. However, it could also be used within other fields.

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.

Introduction

With the rapid development of digital manufacturing technology and the in-depth promotion and application of CAD technology in manufacturing enterprises, the design pattern of mechanical products is gradually evolved from drawings and objects based to three-dimensional model based. This kind of change makes the three-dimensional model gradually replace the two-dimensional engineering drawing, which becomes the source of mechanical product definition information and an important basis in each stage of the product life cycle.

As the core part of the digital product definition data set, the design model is the carrier of product information transmission according to the model based definition (MBD). Its integrity, accuracy, precision, exchangeability and reusability have become key factors influencing the quality of product definitions and data sharing and exchange. However, due to the lack of support from relevant standards, most companies still have confusion and obstacles in building three-dimensional design models.

Therefore, in order to solve the normativeness of model construction, this proposal starts from the characteristics of three-dimensional geometrical model and data integration needs, and gives the terms and definitions as well as the general requirements for modelling, model checking and model release involved in three-dimensional modelling for mechanical products, so as to ensure the correct understanding of mechanical product technical information and the exchange and sharing of data between different CAD software platforms, between different designers and between different manufacturing enterprises in a three-dimensional environment, improve the quality, efficiency and model reuse rate of three-dimensional modelling and reduce or avoid uncoordinated problems.

Technical product documentation (TPD) - General requirements of the construction of three-dimensional models for mechanical products

1 Scope

This document specifies the general requirements involved in three-dimensional modelling for mechanical products, including the terms and definitions, the general process and requirements for modelling, requirements for model checking and model release.

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 10209, *Technical product documentation — Vocabulary — Terms relating to technical drawings, product definition and related documentation*

ISO 11442, *Technical product documentation — Document management*

ISO 16792, *Technical product documentation — Digital product definition data practices*

ISO 17450-1, *Geometrical product specifications (GPS) — General concepts — Part 1: Model for geometrical specification and verification*

ISO 17599, *Technical product documentation (TPD) — General requirements of digital mock-up for mechanical products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10209 and the following apply.

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 <https://www.electropedia.org/>

3.1

three-dimensional modelling

process of establishing *three-dimensional digital model* (3.2) of the whole product or parts by three-dimensional CAD software

3.2

three-dimensional digital model

3D digital model

set of nominal *geometrical features* (3.3) defined with their sizes when it is applicable, and defined between them with orientation, and location constraints, and engineering material information, and the set of one or more conditions defining the possible states of use

3.3

geometrical feature

point, line, surface, volume or a set of these items

Note 1 to entry: The non-ideal surface model is a particular type of geometrical feature, corresponding to the infinite set of points defining the interface between the workpiece and its surroundings.

Note 2 to entry: A geometrical feature can be an ideal feature or a non-ideal feature, and can be considered as either a single feature or a compound feature.

[SOURCE: ISO 17450-1:2011, 3.3]

3.4

modelling feature

set of nominal geometrical features with a given topological relationship that are combined with corresponding functions and operations

3.5

sketch feature

Nominal outline defined in a plane, representing a section of a modelling feature

Note 1 to entry: An associated solid model can be automatically updated when the sketch feature is modified.

3.6

Sketch plane

Plane in which a sketch feature is defined

3.7

extrude feature

modelling feature that is generated by a continue translation of a sketch feature perpendicularly to its definition plane with a starting value and ending value of translation

Note 1 to entry: The range between the starting value and the ending value corresponds to the length of the extrude feature.

3.8

revolved feature

modelling feature that is generated by a continue revolution of a sketch feature around to a straight line (considered as the axis of revolution) included in the sketch plane with a starting angular value and ending angular value of translation, defined in a perpendicular plane to the straight line and the sketch plane

Note 1 to entry: The angular values are defined in a perpendicular plane to the straight line and to the sketch plane from the intersecting straight line of the sketch plane.

Note 2 to entry: The sketch feature should be defined only one side of the axis of revolution.

3.9

sweep feature

Modelling feature that is generated by a continue moving along to a specified path of any point of the outline of the attached sketch feature

3.10

loft feature

modelling feature that is generated by a continue smoothing between two or more sketch features

Note 1 to entry: The smoothing is established from a specified path going through the specified situation points of two or more sketch features and from a distance function. This last one is defined as a polar function for any perpendicular section plane to the path feature as an interpolation function of distances defined from the path and the points of the several sketch features. This interpolation is to be specified, e.g linear Bezier, polynomial of degree n, etc.

3.11

hole feature

Internal modelling feature generated by a Boolean subtraction operation of an external modelling feature from an initial modelling feature, which is a set of one or more modelling features

Note 1 to entry: The parametrized elements of an hole feature, are dimensional parameters of the external modelling feature used to generate the hole feature and the orientation and location constraint between the external modelling feature and the initial modelling feature.

3.12

rib feature

external modelling feature that is generated by a Boolean addition operation of an external modelling feature from an initial modelling feature, which is a set of one or more modelling features

Note 1 to entry: The parametrized elements of an rib feature, are dimensional parameters of the external modelling feature used to generate the rib feature and the orientation and location constraint between the external modelling feature and the initial modelling feature.

Note 2 to entry: A rib feature is used commonly to rigidify the structure of a part.

3.13

thread feature

modelling feature that is generated by helicoidal moving of a sketch feature, with its parameters are defined through a codification of a thread

Note 1 to entry: The codification of a thread defines the number of threads (1 by default), the pitch, the pitch diameter, the dimensions of the sketch feature, the direction of rotation (right by default or left).

3.14

round feature

modelling feature which replaces any set of two local line segments of two adjacent features closed to a sharp edge by a circular line segment which is tangent to the two adjacent features

Note 1 to entry: A sharp edge is defined between two perpendicular straight lines in a common perpendicular plane, existing locally between two tangential planes at the common boundary of two adjacent modelling features.

3.15

chamfer feature

modelling feature which replaces any set of two local line segments of two adjacent features closed to an edge by a straight line segment which is inclined from the two adjacent features and locate from the initial intersection point

Note 1 to entry: An edge is defined between two non-parallel straight lines in a common perpendicular plane, existing locally between two tangential planes at the common boundary of two adjacent modelling features

3.16

shell feature

modelling feature which removing geometry to form a hollow shape of a specified thickness and direction

3.17

draft feature

modelling feature that is created on a surface or series of surfaces on a geometry to create inclined or sloped faces

3.18

hierarchical tree of assembly model

collection of information that is expressed in a tree form and that embody the hierarchical relationship of the assembly model