

INTERNATIONAL STANDARD

**ISO
16792**

First edition
2006-12-15

Technical product documentation — Digital product definition data practices

Documentation technique de produits — Données de définition d'un produit



Reference number
ISO 16792:2006(E)

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 16792 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*.

Introduction

Every effort was made during the preparation of this International Standard — adapted from ASME Y14.41:2003 — to apply existing requirements developed for two-dimensional (2-D) presentation equally to the output from three-dimensional (3-D) models. Where new Geometrical Product Specification (GPS) rules have proved essential, these have been drafted with a view to their being equally applicable to both 2-D and 3-D. Therefore, in order to maintain the integrity of a single system, these new rules are being incorporated in the relevant existing ISO standards for cross-reference. Application examples have been included where, due to the specific requirements of 3-D modelling, additional guidance was deemed beneficial.

It is recognised that there is a need to support drawings in conjunction with 3-D models now and for the foreseeable future. This need has been addressed in this International Standard through the definition of the two methods for documenting digital models and specification of requirements to ensure that the information in a data set is consistent between the model and the drawing.

The figures in this International Standard are intended only as illustrations to aid the user in understanding the practices elaborated in the text. In some cases, figures show a level of detail as needed for emphasis; in others, they are only complete enough to illustrate a concept or facet thereof. The absence of figures has no bearing on the applicability of the specified requirement or practice.

In order to comply with the requirements of this International Standard, actual data sets will need to meet the content requirements set forth in its text.

Most figures are illustrations of models in a 3-D environment. Figures illustrating drawings in digital format include a border.

Text in uppercase letters used in the figures are intended to appear in digital product definition data, or data sets; while that in lowercase letters is for information only and is not intended to appear in data sets.

Technical product documentation — Digital product definition data practices

1 Scope

This International Standard specifies requirements for the preparation, revision and presentation of digital product definition data, hereafter referred to as data sets. It supports two methods of application: model-only, and model and drawing in digital format. Its structure presents requirements common to both methods followed by clauses providing for any essential, differing requirements for each method. Additionally, its use in conjunction with computer aided design (CAD) systems could assist in the progression towards improved modelling and annotation practices for CAD and engineering disciplines, as well as serving as a guideline for IT engineers.

The aspects specified in this International Standard refer mainly, but not exclusively, to requirements that differ or are additional to those provided in existing, related standards. Where no such requirements are identified, it is safe to assume that the appropriate existing ISO standards are instead applicable.

2 Normative references

The following referenced documents are indispensable for the application 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 31-0:1992, *Quantities and units — Part 0: General principles*

ISO 128 (all parts), *Technical drawings — General principles of presentation*

ISO 129-1:2004, *Technical drawings — Indication of dimensions and tolerances — Part 1: General principles*

ISO 286 (all parts), *ISO system of limits and fits*

ISO 406, *Technical drawings — Tolerancing of linear and angular dimensions*

ISO 1101:2004, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 1302, *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

ISO 2692, *Technical drawings — Geometrical tolerancing — Maximum material principle*

ISO 2768-1:1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 3098-0:1997, *Technical product documentation — Lettering — Part 0: General requirements*

ISO 3098-5:1997, *Technical product documentation — Lettering — Part 5: CAD lettering of the Latin alphabet, numerals and marks*

ISO 5456 (all parts), *Technical drawings — Projection methods*

ISO 5457:1999, *Technical product documentation — Sizes and layout of drawing sheets*

ISO 5458, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Positional tolerancing*

ISO 5459:1981, *Technical drawings — Geometrical tolerancing — Datums and datum-systems for geometrical tolerances*

ISO 7083, *Technical drawings — Symbols for geometrical tolerancing — Proportions and dimensions*

ISO 7200:2004, *Technical product documentation — Data fields in title blocks and document headers*

ISO 8015:1985, *Technical drawings — Fundamental tolerancing principles*

ISO 11442:2006, *Technical product documentation — Document management*

ISO 12944 (all parts), *Paints and varnishes — Corrosion protection of steel structures by protective paint systems*

ISO 14660-1:1999, *Geometrical Product Specifications (GPS) — Geometrical features — Part 1: General terms and definitions*

ISO 16016:2000, *Technical product documentation — Protection notices for restricting the use of documents and products*

ISO 82045-2:2004, *Document management — Part 2: Metadata elements and information reference model*

3 Terms and definitions

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

3.1

annotation

dimension(s), tolerance(s), note(s), text or symbol(s) visible without any manual or external manipulation

3.2

annotation plane

conceptual plane containing annotation

NOTE 1 It is desirable that annotation planes intersect or be coincident with a model feature.

NOTE 2 The plane is “conceptual” because it is not physically shown as geometry on the model but is provided to replace the drawing media.

3.3

assembly model

model in which the product described is an assembly of two or more items

3.4

associated entities

portion of a product definition to which annotation pertains

3.5

associated group

user-defined set of related digital elements

3.6**associativity**

established relationship between digital elements

3.7**attribute**

dimension, tolerance, note, text or symbol required to complete the product definition or model feature of the product that is not visible but available upon querying the model

3.8**data**

information represented in a formal manner suitable for communication, interpretation or processing by human beings or computers

3.9**datum system**

ordered list of two or three datums, which can be single or common

NOTE 1 See ISO 5459:1981.

NOTE 2 This can be considered as a partial or complete datum system.

3.10**design model**

portion of the data set that contains model and supplemental geometry

3.11**digital element**

geometric element, model feature, group of model features, annotation, associated group or attribute that exists in a data set

3.12**digital element identifier**

label or name used to specify a unique digital element

3.13**direction dependent tolerance**

tolerance that invokes a zone of parallel lines or curves

3.14**flagnote**

note that is located with the general notes but applies only at specific areas or points on the model or drawing

3.15**geometric element**

graphic entity used in a data set

EXAMPLE Representation of geometric feature as defined in ISO 14660-1, representation of models coordinate system, or representation of crosshatching.

3.16**hard copy**

printed or plotted copy of all or part of a data set

3.17**installation model**

model in which the product described is an installation, showing parts or assemblies and a partial or complete representation of the installation site

3.18

management data

data required for the release, control and storage of product definition data as well as other relevant engineering data

3.19

model

combination of design model, annotation and attributes that describes a product

3.20

model coordinate system

representation of a Cartesian coordinate system in a product definition data set

3.21

model geometry

geometric elements in product definition data which represent designed product

3.22

model feature

model geometry that represents a physical portion of a part

3.23

model value

numerical value derived by querying the model that quantifies the form and spatial relationships of the geometry composing a design model or assembly of models to the precision (number of decimal places) of the computer system

3.24

product definition data

data elements required to completely define a product

3.25

product definition data set

collection of one or more computer file(s) that discloses (directly or by reference), by means of graphic or textual presentations, or combinations of both, the physical and functional requirements of a product

3.26

screen dump

hard copy of a displayed image

3.27

query

means of interrogating a digital element or the relationship between digital elements

3.28

represented line element

supplemental geometry line or curve segment indicating the orientation of a direction-dependent tolerance

3.29

resolved dimension

model value that is rounded off to the number of decimal places required for the design

3.30

saved view

stored and retrievable specific orientation and a magnification factor of a model

3.31

special character

character not included in the set of letters A–Z, a–z, numerals and punctuation symbols



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