DRAFT AMENDMENT ISO 1101/DAmd 1

ISO/TC **213** Secretariat: **DS**

Voting begins on: **2004-06-25**

Voting terminates on: **2004-11-25**

Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out

AMENDMENT 1: Representation of specifications in the form of a 3D model

Spécification géométrique des produits (GPS) — Tolérancement géométrique — Tolérancement de forme, orientation, position et battement

AMENDEMENT 1: Représentation des spécifications sous forme d'un modèle 3D

ICS 01.100.20; 17.040.10

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Foreword

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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.

Amendment 1 to ISO 1101:2004 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

Introduction

In the current ISO standards dealing with GPS, only 2D drawing indications are standardized.

The main issue of this amendment is to provide a possibility to take 3D representations as a basis for contracts and exchanges between suppliers and purchasers instead of 2D drawings. One of the advantages is especially to avoid duplication and consistencies management of data (2D and 3D) for companies which have chosen to work on the basis of a 3D master model.

The use of current ISO standards requires to take into account the plane of projection of 2D drawings; then it is necessary to find an equivalence for this one in 3D: the "annotation plane" developed in this amendment. This annotation plane is only a matter for the nominal model: it is a 100% substitute for the paper plane.

Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out

AMENDMENT 1: Representation of specifications in the form of a 3D model

1 Scope

This amendment to ISO/FDIS 1101:2004 is aimed to deal with 3D representation of geometrical tolerancing.

NOTE The figures contained in this amendment are 2D pictures representing 3D models and specifications

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/TS 17450-1: —[1] *Geometrical product specification and verification – General concepts – Part 1 : Model for geometric specification and verification*

ISO 1101:— [1] *Geometrical product specification and verification – Geometrical tolerancing – Tolerancing of form, orientation, location and run-out*

ISO 16792:— [2] *Technical product documentation – Digital product definition data practices*

3 Amendment to ISO 1101

3.1 Introduction

6th paragraph: to be replaced by the following:

All figures in this International standard for the 2D drawing indications have been drawn in first angle projection with dimensions and tolerances in millimetres. It should be understood that third angle projection and other units of measurement could have been used equally well without prejudice to the principles established. For all figures giving tolerancing examples in 3D, dimensions and tolerances are the same as that shown in ISO 1101.

3.2 Clause 3

Add a new definition as follows:

1) To be published

2) Under DIS enquiry

3.2
annotation plane
conceptual plane containing annotations that either perpendicularly intersects, or is coincident with one or more feature(s) of the nominal model

[ISO 16792:xxxx]

NOTE 1 This plane can also contribute to define the direction of the tolerance zone and/or to define the extracted (actual) lines and/or to define the outline in case of "all around" specification.

NOTE 2 Conceptual plane is issued from family of planes (see 19.2 and 19.3).

3.3 Clause 4

Note of the subclause 4.1: delete "*on a drawing*"

3.4 Clause 5

— Table 2: change "*datum feature indication*" by "*datum feature indication and/or annotation plane*"

— Table 2: change "*clause 9 and ISO 5459*" by "*For datum feature indications, clause 9 and ISO 5459. For annotation plane indication, Clause 19*".

— Table 2: add a new line as follows:

Complementary requirement for 3D annotation	⫽ B ⊥ B ≡ B	*Clause 19*

3.5 Clause 6

Add a new subclause as follows:

6.5 *If required, indications qualifying the direction of the tolerance zone and/or the extracted (actual) line shall be written after the tolerance frame:*

— 0,1 ⫽ B

3.6 Clause 7

— Modify the 1st indent as follows: "*In 2D annotation, on the outline of the feature ...*";

— Add a 2nd indent as follows: "*In 3D annotation, on the feature itself or on an extension line in the continuation of the feature (but clearly separated from the dimension line) when the tolerance refers to the line or surface itself (see Figures 10(3D) and 11(3D)); the arrow may be placed on a leader line pointing to the surface (see Figure 12(3D))*";

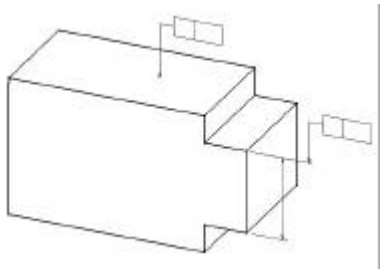


Figure 10(3D)

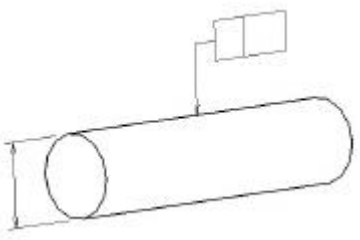


Figure 11(3D)

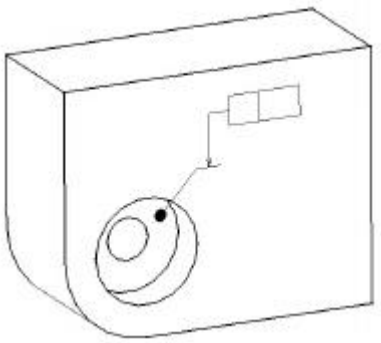
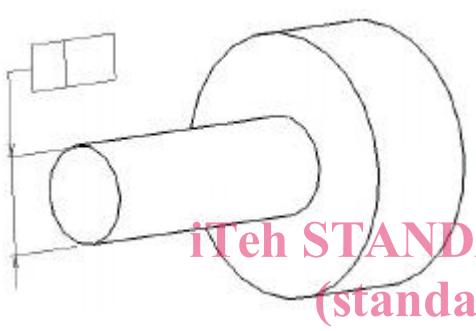


Figure 12(3D)

— Add 2 figures in 3D annotation : Figures 14(3D) and 15(3D);



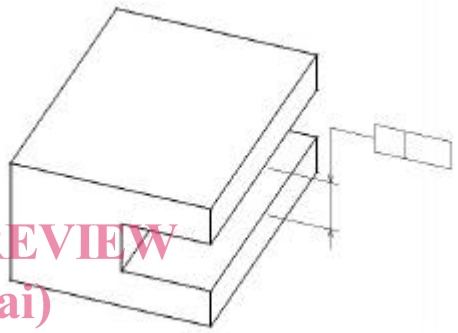


Figure 14(3D)

Figure 15(3D)

— Modify the note as follows: *"When the toleranced feature is a line, a further indication can be needed to control the orientation, see for example Figure 89 for 2D and Figure 89(3D) for 3D".*

3.7 Subclause 9.3

— Modify the 1st indent as follows: "*In 2D annotation, on the outline of the feature …*";

— Add a 2nd indent as follows: "*In 3D annotation, on the feature itself or on an extension line in the continuation of the feature (but clearly separated from the dimension line) when the datum is the line or surface shown (see Figure 29(3D)); the datum triangle may be placed on a leader line pointing to the surface (see Figure 30(3D))*";

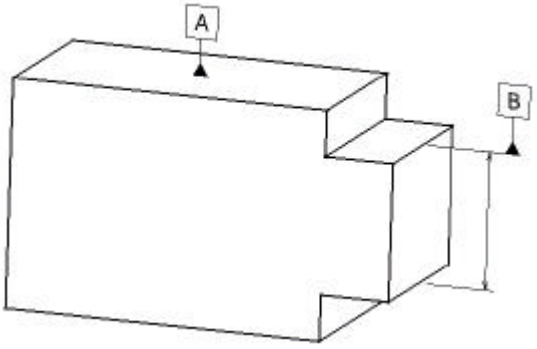


Figure 29(3D)

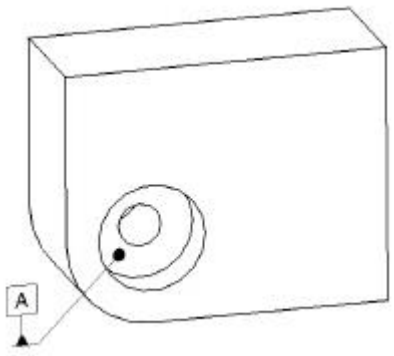


Figure 30(3D)

— Add 3 figures in 3D annotation : Figures 31(3D), 32(3D) and 33(3D);

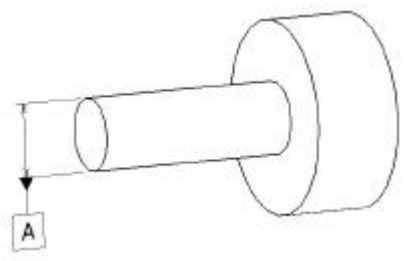


Figure 31(3D)

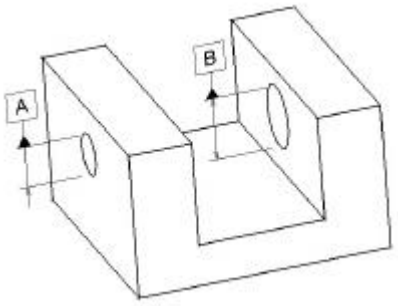


Figure 32(3D)

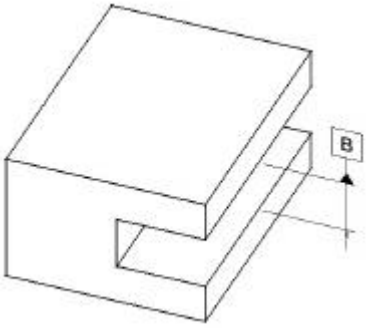


Figure 33(3D)

3.8 Subclause 9.4

— Add 1 figure in 3D annotation : Figure 34(3D).

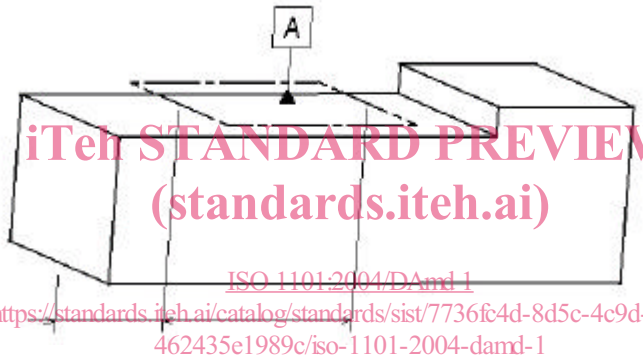


Figure 34(3D)

3.9 Clause 10

— Subclause 10.1, modify the 1st sentence as follows: "*In 2D annotation, if a profile characteristic is applied …*";

— Subclause 10.1, add a 2nd paragraph as follows: "*In 3D annotation, if a profile characteristic is applied to the entire outline of the cross-sections (intersection between the annotation plane required and the surface) or if it is applied to the entire surface represented by the outline, it shall be indicated by using the symbol "all around" (see Figures 38(3D) and 39(3D)). This indication does not involve the entire workpiece, but only the surfaces represented by the defined outline and identified by the tolerance indication (see Figures 38(3D) and 39(3D)).*

NOTE In some complex cases, it may be necessary to indicate the surfaces involved by the outline by a long and a wide long dashed dotted line corresponding to the intersection between the annotation plane required and the surfaces

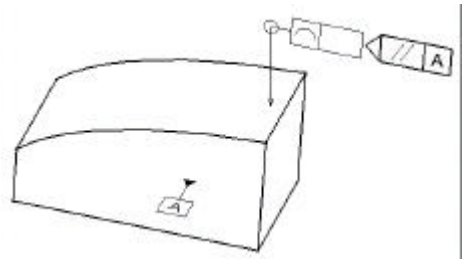


Figure 38(3D)

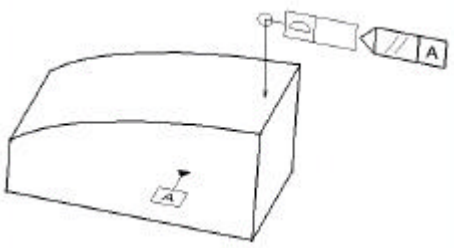


Figure 39(3D)

3.10 Clause 18

— Add a 2nd paragraph as follows:

The following examples are presented in the way below:

— *The symbol,*

— *The definition of the tolerance zone,*

— *The indication and explanation in 2D,*

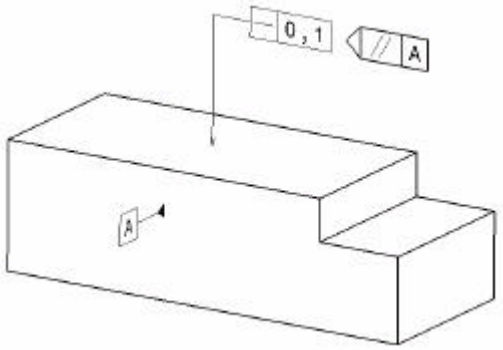
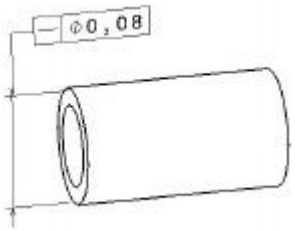
— *The indication and explanation in 3D.*

Symbol	Definition of the tolerance zone	Indication and explanation	
		in 2D	in 3D
1st column of ISO/FDIS 1101:2004	2nd column of ISO/FDIS 1101:2004	3rd column of ISO/FDIS 1101:2004	New column detailed below : number of subclauses unchanged according to ISO/FDIS 1101:2004

COMMENT TO THE MEMBER BODIES

1° The aim of the 4th column of Clause 18 of ISO/FDIS 1101:2004, developed in this amendment, is only to apply in 3D the current examples given in 2D, and not to change the technical meaning of the geometrical tolerancing. The single difference with the wording of the 3rd column of ISO/FDIS 1101:2004 is the use of annotation plane in 3D.

2° Even if ISO/TC10 standards mostly apply for 2D, 3D should use as much as possible the corresponding rules from 2D. The current figures are not fully in line with these 2D rules. The consistency will have to be ensured during DIS ballot, especially the axis and the arrows.

			Indication and explanation in 3D
	18.1 Straightness tolerance		
			Any extracted (actual) line on the upper surface, parallel to the annotation plane in which the indication is shown, shall be contained between two parallel straight lines 0,1 apart.  **Figure 58(3D)** Any extracted (actual) generating line on the cylindrical surface shall be contained between two parallel planes 0,1 apart. NOTE The definition for an extracted generating line has not been standardized.
—			  **Figure 60(3D)** The extracted (actual) median line of the cylinder to which the tolerance applies shall be contained within a cylindrical zone of diameter 0,08.  **Figure 62(3D)**