DRAFT INTERNATIONAL STANDARD ISO/DIS 25178-1

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

Voting begins on **2013-01-24** Voting terminates on **2013-06-24**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Geometrical product specifications (GPS) — Surface texture: Areal —

Part 1: Indication of surface texture

Spécification géométrique des produits (GPS) — État de surface: Surfacique —

Partie 1: Indication des états de surface

ICS 17.040.20

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

Contents

Page

Foreword iv
Introduction v
2 Normative references 1
3 Terms and definitions 1
4 Graphical symbols for the indication of areal surface texture 1
5 Composition of complete graphical symbol for areal surface texture 3
5.1 General 3
5.2 Positions of surface texture requirements 3
6 Indication of areal surface parameters 4
6.1 Definition of the tolerance 4
6.2 Definition of the parameter 5
6.3 Indication of manufacturing method or related information 5
6.4 Indication of surface lay 5
6.5 Indication of machining allowance 5
6.6 Position on drawings and other technical product documentation 5
6.7 Proportions and dimensions of graphical symbols 5
6.8 Orientation of the evaluation area 5
7 Coordinate system 6
8 Digital product definition data 6
Annex A (normative) Proportions and dimensions of graphical symbols 8
A.1 General requirements 8
A.2 Proportions 8
A.3 Dimensions 10
Annex B (informative) Indications for unambiguous control of surface functions 11
Annex C (informative) Examples of indication of areal surface texture requirements 14
Annex D (informative) Recommended procedures for indication of annotation planes 18
Annex E (normative) ISO special specification elements for areal surface texture 21
E.1 Filter symbols 21
E.2 Nesting indices 22
E.3 Association symbols 22
Annex F (informative) Relation to the GPS matrix 24
F.1 General 24
F.2 Information of this standard and its use 24
F.3 Position in the GPS matrix model 25
F.4 Related international standards 25
Bibliography 26

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 25178-1 was prepared by Technical Committee ISO/TC 213, Dimensional and geometrical product specifications and verification.

ISO 25178 consists of the following parts, under the general title *Geometrical product specifications (GPS) — Surface texture: Areal*:

— *Part 1: Indication of surface texture*[1)]

— *Part 2: Terms, definitions and surface texture parameters*

— *Part 3: Specification operators*

— *Part 6: Classification of methods for measuring surface texture*

— *Part 70: Physical measurement standards* [1)]

— *Part 71: Software measurement standards* [1)]

— *Part 72: Software measurement standards-XML File format*[1)]

— *Part 601: Nominal characteristics of contact (stylus) instruments*

— *Part 602: Nominal characteristics of non-contact (confocal chromatic probe) instruments*

— *Part 603: Nominal characteristics of non-contact (phase shifting interferometric microscopy) instruments*[1)]

— *Part 604: Nominal characteristics of non-contact (coherence scanning interferometry) instruments*[1)]

— *Part 605: Nominal characteristics of non-contact (point autofocus) instruments*[1)]

— *Part 606: Nominal characteristics of non-contact (focus variation) instruments*[1)]

— *Part 701: Calibration and measurement standards of contact (stylus) instruments*[1)]

[1)] *To be published*

Introduction

This part of ISO/TS 25178 is a Geometrical Product Specification standard and is to be regarded as a General GPS standard (see ISO/TR 14638). It influences the chain link 1 of the chains of standards on areal surface texture.

For more detailed information of the relation of this standard to the GPS matrix model, see annex F.

This part of ISO 25178 develops the indication of areal surface texture

Geometrical product specifications (GPS) – Surface texture:Areal – Part 1: Indication of surface texture

1 Scope

This part of ISO 25178 specifies the rules for indication of areal surface texture in technical product documentation (e.g. drawings, specifications, contracts, reports) by means of graphical symbols.

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 1101:2012, *Geometrical Product Specifications (GPS) – Geometrical tolerancing – Tolerances of form, orientation, location and run-out*

ISO 1302:2002, *Geometrical Product Specifications (GPS) – Indication of surface texture in technical product documentation*

ISO 14406, *Geometrical product specifications (GPS) – Extraction*

ISO 16792, *Technical Product Documentation – Digital product definition data practices*

ISO 25178-2: 2012, *Geometrical Product Specifications (GPS) – Surface texture : Areal - Terms and definitions*

ISO 25178-3: 2012, *Geometrical Product Specifications (GPS) – Surface texture : Areal – Specification operators*

3 Terms and definitions

For the purpose of this International Standard the terms and definitions given in ISO 1101, ISO 1302, ISO 14406, ISO 16792, ISO 25178-2 and ISO 25178-3 apply.

4 Graphical symbols for the indication of areal surface texture

Requirements for areal surface texture are indicated on technical product documentation by graphical symbols, each having its own significant meaning. The symbols used are equal to the ones defined in ISO 1302, clause 4. To identify that the requirement is areal surface texture the letter "A" is added to the symbols.

Basic graphical symbol, Figure 1.

Expanded graphical symbol - Removal of material required, Figure 2.

Expanded graphical symbol – Removal of material not permitted, Figure 3.

Complete graphical symbol – Figure 4.

Graphical symbol for “all surfaces around a workpiece outline” – Figure 5.

Figure 1 — Basic graphical symbol for areal surface texture

Figure 2 — Expanded graphical symbol indicating removal of material required

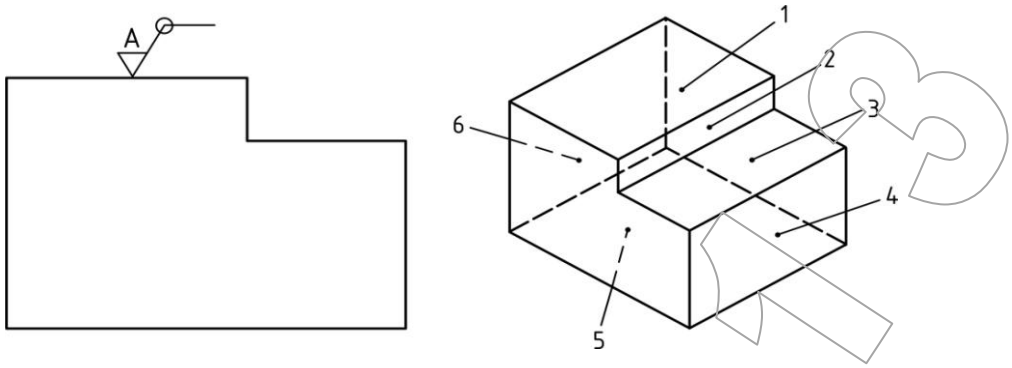
Figure 3 — Expanded graphical symbol indicating removal of material not permitted

a) Any manufacturing process permitted

b) Material shall be removed

c) Material shall not be removed

Figure 4 — Complete graphical symbol



NOTE The outline on the drawing represents the six surfaces shown on the 3 D-representation of the workpiece (the front and rear surfaces not included).

Figure 5 — Areal surface requirement for all six surfaces represented by outline on workpiece

5 Composition of complete graphical symbol for areal surface texture

5.1 General

In order to ensure that an areal surface texture requirement is unambiguous, it is necessary, in addition to the indication of both a surface texture parameter and its numerical value, to specify additional requirements (e.g. type of scale limitation, transmission band, type of filters, manufacturing process, surface lay and possible machining allowances). It may also be necessary to set up requirements for several different surface texture parameters in order that the surface texture requirements ensure unambiguous functional properties of the surface.

5.2 Positions of surface texture requirements

The mandatory positions of the various surface texture requirements in the complete graphical symbol are shown in Figure 6.

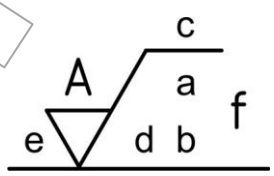


Figure 6 — Positions of surface texture requirements in the complete graphical symbol

The complementary surface texture requirements in the form of

- surface texture parameters
- numerical values, and
- transmission band

shall be located at the specific positions in the complete graphical symbol in accordance with the following.

a) Position a – Single surface texture requirement

Indicate in order the type of specification limit, the type of scale limited surface and its nesting indices, the areal surface texture parameter designation with its limit value and last other non-defaults.

Generally the different parts of the indication are separated by a single space but to avoid misinterpretation, a double space (double blank) shall be inserted between the parameter designation and the limit value. The parameter designation with its limit value shall also be contained within oblique strokes (/).

For more information on the contents of position "a", see ISO 1302, clause 6, and Annex B.

EXAMPLE S-L 0,025-0,8/Sz 6,8 (minimum content example with mandatory indication of type of scale-limited surface and its nesting indices)

b) Position a and b – Two or more surface texture requirements

Indicate the first surface texture requirement at position “a” as in a). Indicate the second surface texture requirement at position “b”. If a third requirement or more is to be indicated, the graphical symbol is to be enlarged accordingly in the vertical direction, to make room for more lines. The positions “a” and “b” are to be moved upwards when the symbol is enlarged, see also ISO 1302 clause 6.

c) Position c – Manufacturing method

Indicate the manufacturing method, treatment, coatings or other requirements for the manufacturing process etc. To produce the surface, for example, turned, ground, plated, see also ISO 1302, clause 7.

d) Position d – Surface lay and direction

Indicate the symbol of the required surface lay and the orientation, if any, of the surface lay, for example, “=”, “X”, “M”, see also ISO 1302, clause 8.

e) Position e – Machining allowance

Indicate the required machining allowance, if any, as a numerical value given in millimetres, see also ISO 1302, clause 9.

f) Position f – Annotation plane

Indicate one or two annotation planes, see also Annex D.

6 Indication of areal surface parameters

6.1 Definition of the tolerance

In the normal case two conditions are given:

- Type of tolerance, Upper or lower limit, designations U or L;
- Type of scale-limited surface, S-F or S-L, as defined in ISO 25178-2, clauses 3.1.5 and 3.1.6.

In the normal case the upper limit is specified. The designation “U” is then an implicit default and can be left out. For some parameters where there is no normal case, i.e. material ratio parameters and feature parameters, it is recommended always to use the designations U or L. See also ISO 1302, clause 6.6.

If not otherwise specified the parameter value indicated is the largest or smallest value allowed.

For bilateral tolerances see clause 5.2 b).

6.2 Definition of the parameter

The chosen surface texture areal parameter value shall be supplemented with the information necessary for a correct and unambiguous measuring result.

In the normal case three types of information are given:

- Upper or lower tolerance, filters and nesting indexes;
- Parameter and parameter value;
- Non-defaults.

For examples see Annex B.

NOTE The order of the information items follows in principle the order found in ISO 1302 for profile parameters.

NOTE Default information found in ISO 25178-2 and -3 is normally not explicitly specified.

NOTE Every areal surface texture parameter has its own default control elements and information requirements for specification of non-default elements as given in ISO25178-3.

NOTE For filter designations, see Annex E.

6.3 Indication of manufacturing method or related information

See ISO 1302, clause 7.

6.4 Indication of surface lay

See ISO 1302, clause 8.

6.5 Indication of machining allowance

See ISO 1302, clause 9.

6.6 Position on drawings and other technical product documentation

See ISO 1302, clause 11.

6.7 Proportions and dimensions of graphical symbols

See Annex A.

6.8 Orientation of the evaluation area

The position and orientation of the symbol, as exemplified in ISO 1302, clause 11, determine the orientation of the evaluation area, see also ISO 25178-3, clause 4.2.1.1.

This is a difference from the procedure for profile evaluation where it is stipulated that measurement direction is chosen as the one expected to give the largest value for the assessed parameter, normally found perpendicular to any dominant surface lay, see also ISO 4288.