

SVENSK STANDARD

SS-EN ISO 25178-70:2014

Fastställt/Approved: 2014-04-16
Publicerad/Published: 2014-06-24
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 17.040.20

Geometrisk produktspecifikation (GPS) – Ytstruktur: Arealmätning – Del 70: Fysiska ytstrukturnormaler (ISO 25178-70:2014)

Geometrical product specification (GPS) – Surface texture: Areal – Part 70: Material measures (ISO 25178-70:2014)

This preview is downloaded from www.sis.se. Buy the entire standard via <https://www.sis.se/std-101657>

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

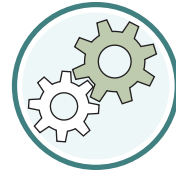
Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Europastandarden EN ISO 25178-70:2014 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 25178-70:2014.

The European Standard EN ISO 25178-70:2014 has the status of a Swedish Standard. This document contains the official version of EN ISO 25178-70:2014.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Mätteknik GPS och Ytstruktur, SIS/TK 507/AG 6.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

EN ISO 25178-70

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2014

ICS 17.040.20

English Version

**Geometrical product specification (GPS) - Surface texture: Areal
- Part 70: Material measures (ISO 25178-70:2014)**

Spécification géométrique des produits (GPS) - État de surface: surfacique - Partie 70: Mesures matérialisées (ISO 25178-70:2014)

Geometrische Produktspezifikation (GPS) - Oberflächenbeschaffenheit: Flächenhaft - Teil 70: Maßverkörperungen (ISO 25178-70:2014)

This European Standard was approved by CEN on 27 December 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents		Page
Foreword		iv
Introduction		v
1 Scope		1
2 Normative references		1
3 Terms and definitions		1
4 General		2
5 Requirements for the material measures		2
6 Types of material measures		3
7 Profile material measures		4
7.1 Type PPS: Periodic sinusoidal shape		4
7.2 Type PPT: Periodic triangular shape		5
7.3 Type PPR: Periodic rectangular shape		6
7.4 Type PPA: Periodic arcuate shape		6
7.5 Type PGR: Groove, rectangular		7
7.6 Type PGC: Groove, circular		8
7.7 Type PRO: Irregular profile		9
7.8 Type PCR: Circular irregular profile		10
7.9 Type PRI: Prism		11
7.10 Type PRB: Razor blade		11
7.11 Type PAS: Approximated sinusoidal shape		12
7.12 Type PCS: Contour standard		13
7.13 Type PDG: Double groove		14
8 Areal material measures		15
8.1 Type AGP: Grooves, perpendicular		15
8.2 Type AGC: Grooves, circular		15
8.3 Type ASP: Hemisphere		16
8.4 Type APS: Plane-sphere		17
8.5 Type ACG: Cross grating		18
8.6 Type ACS: Cross sinusoidal		19
8.7 Type ARS: Radial sinusoidal		19
8.8 Type ASG: Star-shape grooves		20
8.9 Type AIR: Irregular		21
8.10 Type AFL: Flat plane		22
8.11 Type APC: Photochromic pattern		22
9 Material measure certificate		23
Annex A (normative) Requirements for measurements		24
Annex B (informative) Equivalence table for material measure names		25
Annex C (informative) Evaluation of a spacing measurand on an areal instrument		26
Annex D (informative) Irregular measurement standards		28
Annex E (informative) Relationship to the GPS matrix model		31
Bibliography		33

Foreword

This document (EN ISO 25178-70:2014) has been prepared by Technical Committee ISO/TC 213 “Dimensional and geometrical product specifications and verification” in collaboration with Technical Committee CEN/TC 290 “Dimensional and geometrical product specification and verification” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2014, and conflicting national standards shall be withdrawn at the latest by August 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 25178-70:2014 has been approved by CEN as EN ISO 25178-70:2014 without any modification.

Introduction

This part of ISO 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 6 of the chains of standards on areal surface texture, roughness profile, waviness profile and primary profile.

The ISO GPS Masterplan given in ISO/TR 14638 gives an overview of the ISO GPS system of which this document is a part. The fundamental rules of ISO GPS given in ISO 8015 apply to this document. The default decision rules given in ISO 14253-1 apply to specifications made in accordance with this document, unless otherwise stated.

For more detailed information of the relation of this standard to the GPS matrix model, see [Annex E](#).

This part of ISO 25178 introduces material measures that can be used for periodic verification and adjustment of areal surface texture instruments.

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

Part 70: Material measures

1 Scope

This part of ISO 25178 specifies the characteristics of material measures used for the periodic verification and adjustment of areal surface texture measurement instruments.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3274:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments*

ISO 10012, *Measurement management systems — Requirements for measurement processes and measuring equipment*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 25178-2, *Geometrical product specifications (GPS) — Surface texture: Areal — Part 2: Terms, definitions and surface texture parameters*

ISO 25178-601, *Geometrical product specifications (GPS) — Surface texture: Areal — Part 601: Nominal characteristics of contact (stylus) instruments*

ISO/IEC Guide 99:2007, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3274, ISO 25178-2, ISO 25178-601, ISO/IEC Guide 99 and the following apply.

3.1

material measure

<surface texture> dedicated manufactured workpiece intended to reproduce or supply, in a permanent manner during its use quantities of one or more given kinds, each with an assigned quantity value

Note 1 to entry: The indication of a material measure is its assigned quantity value.

Note 2 to entry: A material measure can be a measurement standard.

Note 3 to entry: A material measure is sometimes called calibration sample, calibration specimen, calibration standard, standard artefact, physical measurement standard or physical standard.

[SOURCE: ISO/IEC Guide 99:2007, 3.6, modified — A domain has been added and the definition modified. The examples are not reproduced.]

4 General

A material measure can be used for two different purposes:

- calibration of the metrological characteristics, followed by assessment of the measurement uncertainty;
- user adjustment of the instrument, which establishes corrections of the measured quantities.

Both purposes depend on the metrological characteristics of the material measures (see the ISO 25178-700 series).

The material measures presented in this part of ISO 25178 are suitable for both purposes; nevertheless, they have been especially designed for the assessment and correction of systematic errors. This is due to the fact that the characteristics of those material measures permit the calibration of coordinates such as x , y and z through the assessment and verification of adjustment coefficients C_x , C_y and C_z (see the ISO 25178-600 series).

These material measures are not intended to separate the errors introduced by the instrument from those due to the filtering and computation algorithms. The algorithms can be tested using software measurement standards (see ISO 5436-2, ISO 25178-71 and ISO 25178-72).

Most of the material measures presented below permit the verification and the correction of the squareness between X and Y drive units on areal instruments.

The measurement method and the characteristics of the material measure shall be supplied by the manufacturer of the material measure.

In ISO 25178-2, each term is followed by its parameter (abbreviated term), then its symbol. Whereas abbreviated terms can contain multiple letters, symbols consist only of a single letter with subscripts as needed. For these terms, symbols are used in the equations shown in this document. The reason for this differentiation is to avoid misinterpretation of compound letters as an indication of multiplication between quantities in equations. The parameters (abbreviated terms) are used everywhere else in this document as well as in product documentation, drawings and data sheets.

5 Requirements for the material measures

The design characteristics of material measures shall be compatible with the considered application. See also [Annex A](#).

The material characteristics of the material measure shall not significantly affect the measurement carried out on it.

The real integral surface of a standard shall have a scale limitation specified and features outside this limitation shall be considered not to affect the measurement.

Examples of such features are:

- flatness deviation of the real integral surface of the standard;
- form deviation of the groove(s) (i.e. for PGR, PGC, PDG, AGP, AGC, etc.);
- groove bottom radius (i.e. for PGC, PCS, PDG, AGP, AGC, etc.);
- form deviation of the flanks of the triangles (i.e. for PPT, PCS, PDG, AGP, etc.);
- parallelism errors between grooves (i.e. for PDG, AGP, etc.);
- squareness between grooves (i.e. for AGP, etc.);
- local slope at any point (when using an optical instrument);

- bisector of the groove(s) or the triangles (line, plane or cylinder), which shall be nominally perpendicular to the reference plane of the standard;
- reflectivity of the surface (when using an optical instrument);
- hardness of the material (when using a stylus instruments);
- refractive index of the material;
- colour of the material.

The measurement standards should be uniquely identified. Serial number, type and nominal values of the measurands are recommended to be engraved on the standard and/or standard's casing.

6 Types of material measures

The different types of material measures covered by this part of ISO 25178 are given in [Table 1](#) and [Table 2](#).

NOTE 1 The prefix P is used for the profile material measures type.

NOTE 2 The prefix A is used for the areal material measures type.

[Annex B](#) gives the equivalence between names defined in other standards (e.g. ISO 5436-1 and ISO 25178-701).

Table 1 — Types of profile material measures

Type	Name
PPS	Periodic sinusoidal shape
PPT	Periodic triangular shape
PPR	Periodic rectangular shape
PPA	Periodic arcuate shape
PGR	Groove, rectangular
PGC	Groove, circular
PRO	Irregular profile
PCR	Circular irregular profile
PRI	Prism
PRB	Razor blade
PAS	Approximated sinusoidal shape
PCS	Contour standard
PDG	Double groove