

SVENSK STANDARD

SS-EN ISO 25178-71:2017



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Geometrisk produktspecifikation (GPS) – Ytstruktur: Arealmätning – Del 71: Kalibrering via mjukvara (ISO 25178-1:2017)

Geometrical product specifications (GPS) – Surface texture: Areal – Part 71: Software measurement standards (ISO 25178-1:2017)



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Denna standard ersätter SS-EN ISO 25178-71:2012, utgåva 1.

The European Standard EN ISO 25178-71:2017 has the status of a Swedish Standard. This document contains the official version of EN ISO 25178-71:2017.

This standard supersedes the Swedish Standard SS-EN ISO 25178-71:2012, edition 1.

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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 06.

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EUROPEAN STANDARD

EN ISO 25178-71

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

Geometrical product specifications (GPS) - Surface texture:
Areal - Part 71: Software measurement standards (ISO
25178-1:2017)

Spécification géométrique des produits (GPS) - État de
surface: Surfamique - Partie 71: Étalons logiciels (ISO
25178-1:2017)

Geometrische Produktspezifikation (GPS) -
Oberflächenbeschaffenheit: Flächenhaft - Teil 71:
Software-Normale (ISO 25178-1:2017)

This European Standard was approved by CEN on 6 August 2017.

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.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN ISO 25178-71:2017) 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 April 2018, and conflicting national standards shall be withdrawn at the latest by April 2018.

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Endorsement notice

The text of ISO 25178-71:2017 has been approved by CEN as EN ISO 25178-71:2017 without any modification.

SS-EN ISO 25178-71:2017 (E)**Introduction**

This document is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO 14638). It influences the chain link G of the chains of standards on profile and areal surface texture.

The ISO/GPS Masterplan given in ISO 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 and the default decision rules given in ISO 14253-1 apply to specifications made in accordance with this document, unless otherwise indicated.

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

This document is concerned with software gauges (Type S1) and reference software (Type S2). It also defines the SDF file format for Type S1 software gauges.

The surface data file (SDF) format is already used by the industry, in particular, by instrument manufacturers and academia. The SDF file format as defined in this document is a standardized sub-set of the possibilities included in the SDF file format as initially defined in the European Surfstand project and EUR15178. It is envisaged that the SDF file format could evolve (as more experience in its usage and future requirements are identified) later in a version 2.0 with additional fields and possibilities.

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

Part 71: Software measurement standards

1 Scope

This document defines Type S1 and Type S2 software measurement standards (etalons) for verifying the software of measuring instruments. It also defines the file format of Type S1 software measurement standards for the calibration of instruments for the measurement of surface texture by the areal method as defined in the areal surface texture chain of standards, chain link G.

NOTE Throughout this document, the term “softgauge” is used as a substitute for “software measurement standard Type S1”.

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 5436-2, *Geometrical product specifications (GPS) — Surface texture: Profile method; Measurement standards — Part 2: Software measurement standards*

ISO 16610 (all parts), *Geometrical product specifications (GPS) — Filtration*

ISO 17450-2, *Geometrical product specifications (GPS) — General concepts — Part 2: Basic tenets, specifications, operators, uncertainties and ambiguities*

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

ISO 25178-3, *Geometrical product specifications (GPS) — Surface texture: Areal — Part 3: Specification operators*

ISO/IEC Guide 98-1, *Uncertainty of measurement — Part 1: Introduction to the expression of uncertainty in measurement*

ISO/IEC Guide 99, *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 5436-2, ISO 16610 (all parts), ISO 17450-2, ISO 25178-2, ISO 25178-3, ISO/IEC Guide 98-1 and ISO/IEC Guide 99 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

SS-EN ISO 25178-71:2017 (E)

3.1 software measurement standard
reference data or reference software intended to reproduce the value of a measurand with known specification uncertainty in order to verify the software used to calculate the value of a measurand

3.2 CHAR[n]
array of n ASCII characters

3.3 BYTE
1-byte (8-bit) representation of an ASCII character

3.4 UINT16
2-byte representation of an unsigned integer

Note 1 to entry: Unsigned integers have a minimum value of 0 and a maximum value of 65 535.

Note 2 to entry: The less significant bytes are stored in lower memory addresses; the more significant bytes are stored in higher memory addresses.

3.5 INT16
2-byte representation of a signed integer

Note 1 to entry: Short integers have a minimum value of -32 768 and a maximum value of 32 767.

Note 2 to entry: The less significant bytes are stored in lower memory addresses; the more significant bytes are stored in higher memory addresses.

3.6 INT32
4-byte representation of a signed integer

Note 1 to entry: Long integers have a minimum value of -2 147 483 648 and a maximum value of 2 147 483 647.

Note 2 to entry: The less significant bytes are stored in lower memory addresses; the more significant bytes are stored in higher memory addresses.

3.7 DOUBLE
8-byte representation of a real number consisting of a sign bit, an 11-bit binary exponent, and a 52-bit mantissa, plus the implied high-order 1 bit

Note 1 to entry: Normalized double precision floating point numbers have a range of $\pm[1 + (1 - 2^{-52})] \cdot 2^{1\ 023} \approx \pm 1,797\ 693\ 134\ 862\ 315\ 7 \cdot e^{308}$. The smallest value is $2,225\ 073\ 858\ 507\ 201\ 4 \cdot e^{-308}$.

Note 2 to entry: The less significant bytes are stored in lower memory addresses; the more significant bytes are stored in higher memory addresses.

Note 3 to entry: See IEEE 754-2008 for binary floating-point arithmetic.

4 Type S software measurement standards**4.1 General**

These measurement standards are designed to verify the measuring instrument's software (i.e. filter algorithms, parameter calculation, etc.).

The content of a measurement standard shall be considered a scale limited surface (i.e. an S-F surface or an S-L surface). No part of the content of a measurement standard shall be considered form and thus,

no form removal shall be undertaken on a measurement standard prior to presenting it to the software being tested.

4.2 Type S1, reference data

This type of measurement standard is a computer data file that contains a digital representation of a scale limited surface in a suitable recording medium.

Type S1 reference data are used to test software by inputting them as data into the software under test/calibration and comparing the results from the software under test with the certified results from the calibration certificate of the softgauge.

NOTE The certified results for mathematically designed synthetic data can often be calculated directly without the need for certification by Type S2 measurement standards.

4.3 Type S2, reference software

These measurement standards are reference software. Reference software consists of traceable computer software against which software in a measuring instrument can be compared.

NOTE 1 Traceable here means a traceable chain of comparisons, with uncertainty, back to a mathematically designed synthetic data set whose results can be calculated directly.

Type S2 reference software are used to test software by inputting a common data set into the software under test/calibration and the reference software and comparing the results from the software under test with the certified results from the reference software. Reference software values shall be traceable.

NOTE 2 Type S2 measurement standards can also be used to certify Type S1 reference data.

5 File format for Type S1 reference data

5.1 General

The file extension of this file protocol is SDF. The file protocol for the softgauge is divided into three separate sections or records. For implementation of the ASCII and BINARY representations of an SDF data format, see [Annex A](#).

NOTE For the purposes of this document, a right-handed coordinate system is assumed (see ISO 25178-2). Looking from the top, the first point in the data file is in the top left corner.

5.2 Record 1 — Header

5.2.1 General

The header contains general information about each specific measurement. The record is composed of various “fields” in which the information is coded.

The BINARY format consists of fixed length fields defined in [Table 1](#).

Except for the version number, the ASCII format, for the header, consists of a series “keyword = value of field” where the keyword is the ASCII field name given in [Table 1](#).

5.2.2 Version number

The version of a softgauge file format is an array of eight characters formatted the following way: “aISO-1.0” for the ASCII file format or “bISO-1.0” for the BINARY file format. Future evolutions of this format will modify the version number, such as “-2.0”.