
**Specifikacija geometrijskih veličin izdelka - Tekstura površine: ploskovna - 601.
del: Konstrukcije in značilnosti kontaktnih (s tipalom) instrumentov (ISO/DIS 25178-601:2023)**

Geometrical product specifications (GPS) - Surface texture: Areal - Part 601: Design and characteristics of contact (stylus) instruments (ISO/DIS 25178-601:2023)

Geometrische Produktspezifikation (GPS) - Oberflächenbeschaffenheit: Flächenhaft - Teil 601: Aufbau und Merkmale von berührend messenden Geräten (mit Taster) (ISO/DIS 25178-601:2023)

Spécification géométrique des produits (GPS) - État de surface: Surfaique - Partie 601: Conception et caractéristiques des instruments à contact (à stylet) (ISO/DIS 25178-601:2023)

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17.040.20	Lastnosti površin	Properties of surfaces
17.040.40	Specifikacija geometrijskih veličin izdelka (GPS)	Geometrical Product Specification (GPS)

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Part 601:

Design and characteristics of contact (stylus) instruments

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This second edition cancels and replaces the first edition (ISO 25178-601:2010), which has been technically revised and cancels and replaces ISO 3274, whose contents have been revised and incorporated into this document and others, see [Annex C](#) for more information.

The main changes compared to the previous edition are as follows:

- the general metrological characteristics for areal-topography measuring method are specified in ISO 25178-600 and are no longer part of this document.
- [Annex B](#) has been completely revised
- the nominal characteristics of a contact stylus instrument have been transferred from ISO 3274 to this document.

A list of all parts in the ISO 25178 series can be found on the ISO website.

Introduction

This part of ISO 25178 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 F of the chains of standards on profile and areal surface texture.

The ISO/GPS matrix model given in ISO 14638 gives an overview of the ISO/GPS system of which this part of ISO 25178 is a part. The fundamental rules of ISO/GPS given in ISO 8015 apply to this part of ISO 25178 and the default decision rules given in ISO 14253-1 apply to the specifications made in accordance with this part of ISO 25178, unless otherwise indicated.

For more detailed information of the relation of this part of ISO 25178 to other standards and the GPS matrix model, see [Annex D](#).

This document includes normative terms and definitions relevant to contact stylus instruments for the measurement of areal surface topography. The informative [Annex A](#) briefly summarizes contact stylus instruments and its methods to clarify the normative definitions and to provide a foundation for informative [Annex B](#), which describes common sources of uncertainty and their relation to the metrological characteristics of contact stylus instruments.

The stylus instrument for the profile method was previously defined in ISO 3274. Based on this, ISO 25178-601 was published in 2010. Since this is the more modern instrument standard and stylus instruments for the profile method and the surface method differ only in the presence of a Y-axis (drive unit y), this edition of ISO 25178-601 replaces not only the previous version of ISO 25178-601 but also ISO 3274:1996 (and the Technical Corrigendum of 1998), see [Annex C](#) for more details.

NOTE Portions of this document, particularly the informative sections, describe patented systems and methods. This information is provided only to assist users in understanding the operating principles of contact stylus instruments. This document is not intended to establish priority for any intellectual property, nor does it imply a license to proprietary technologies described herein.

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

Part 601: Design and characteristics of contact (stylus) instruments

1 Scope

This document describes the design, the metrological characteristics, and the nominal characteristics of contact stylus instruments for areal measurement of surface topography. Because surface profiles can be extracted from areal surface topography data, the methods described in this document can be applied to profile measurements as well.

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 10360-1, *Geometrical Product Specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 1: Vocabulary*

ISO 25178-600:2019, *Geometrical product specifications (GPS) — Surface texture: Areal — Part 600: Metrological characteristics for areal topography measuring methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the normative references apply.

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

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

3.1

contact stylus instrument

measuring instrument that explores surfaces using a *stylus* (3.5) that physically moves along the surface to acquire a representation of the surface and provide the data for further computation (analytics)

Note 1 to entry: The method of using a contact stylus instrument is defined in ISO 25178-6, and is called “contact stylus scanning”

Note 2 to entry: See [Figure 2](#) for an information flow concept diagram for a contact stylus instrument

3.2

probing system

<surface texture> component of the instrument consisting of a *probe* (3.3), a *stylus* (3.5) and an *optional stylus changing interface* (3.7)

Note 1 to entry: See [Figure A.1](#) for examples of probing systems.

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3.3

probe

<surface texture> device that generates the signals during *scanning* (3.4)

Note 1 to entry: In earlier standards, "transducer" was a separate term and a part of the probe.

3.4

scanning

<surface texture> moving the probe over the surface to be measured while the *stylus tip* (3.6) contacts the surface

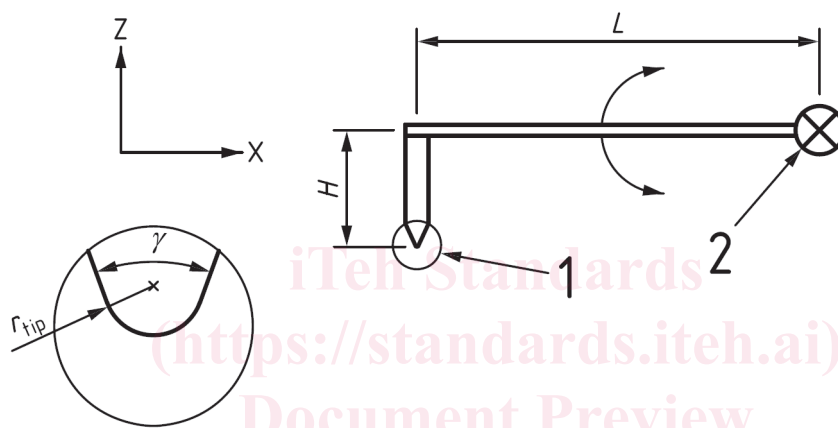
3.5

stylus

<surface texture> mechanical device consisting of a *stylus tip* (3.6) and a probe arm

Note 1 to entry: For coordinate measuring machines, the term "shaft" is used instead of "probe arm", see ISO 10360-1:2000, 4.1.

Note 2 to entry: A typical stylus is shown in [Figure 1](#). Other designs are also used e.g., flexures, linear probes, etc.



Key

1 stylus tip

2 pivot

L length of the probe arm

H height of the probe arm

r_{tip} tip radius

γ cone angle of the tip

Figure 1 — Characterization of the typical stylus

3.6

stylus tip

<surface texture> element that consists of a nominally right, circular cone of defined cone angle and of a nominally spherical tip of defined radius

3.7

stylus changing interface

<surface texture> element that enables the change of the stylus

3.8

areal reference guide

component(s) of the instrument that generate(s) the reference surface, in which the probing system moves relative to the surface being measured according to a theoretically exact trajectory

Note 1 to entry: In the case of *x*- and *y*-scanning areal surface texture measuring instruments, the areal reference guide establishes a *reference surface* [ISO 25178-2:2021, 3.1.10]. It can be achieved through the use of two linear and perpendicular *reference guides* [ISO 3274:1996, 3.3.2] or one reference surface guide.