SLOVENSKI STANDARD
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Geometrical product specifications (GPS) - Surface texture: Areal - Part 606: Design and characteristics of non-contact (focus variation) instruments (ISO/DIS 25178-606:2025)

Geometrische Produktspezifikation (GPS) - Oberflächenbeschaffenheit: Flächenhaft - Teil 606: Aufbau und Merkmale von berührungslos messenden Geräten (Fokusvariation) (ISO/DIS 25178-606:2025)

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Part 606: Design and characteristics of non-contact (focus variation) 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).

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For an explanation of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This second edition cancels and replaces the first edition (ISO 25178:606:2015), which has been technically revised.

The main changes are as follows:

— adoption of the new structure of the series ISO 25178-60x documents;

— extension to focus variation using fixed pattern illumination.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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 F of the chain 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 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 other standards and the GPS matrix model, see Annex C.

This document includes normative terms and definitions relevant to the focus variation method for the measurement of areal surface topography. The informative Annex A briefly summarizes focus variation measurement instruments and methods to clarify the normative definitions and to provide a foundation for informative Annex B, which describes common sources of errors and their relation to the metrological characteristics of focus variation.

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 focus variation. This document is not intended to establish priority for any intellectual property, nor does it imply a license to proprietary technologies described herein.

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

Part 606: Design and characteristics of non-contact (focus variation) instruments

1 Scope

This document specifies the design and characteristics of focus variation 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 profiling measurements as well.

This document deals with focus variation without pattern illumination or with fixed pattern illumination. The methods using varying pattern illumination during the measurement are excluded from this document.

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 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 following terms and definitions 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
focus variation
FV
measurement method whereby the sharpness of a series of surface images that is acquired during an axial scan in an optical instrument is used to measure the surface topography

Note 1 to entry: In this document, surface image is an image of a surface obtained by capturing the reflected light from the surface with or without a fixed pattern illumination.

Note 2 to entry: In this document, sharpness is a quantity of the surface image calculated by the neighbourhood information indicating best focus. Other names for sharpness are for example contrast.

Note 3 to entry: Focus variation without fixed pattern illumination only works on optically rough surfaces [ISO 25178-600:2019, 3.4.5]. If fixed pattern illumination is used, optically smooth surfaces [ISO 25178-600:2019, 3.4.4] can also be measured.

3.2
focus variation sensor
device that converts the height of points on the surface into signals during measurement using the focus variation method

3.3
axial scan
mechanical or optical displacement between the sample under inspection and the imaging optics

Note 1 to entry: The optical axis of the imaging optics is nominally parallel to the axial scan axis of the microscope.

[SOURCE: ISO 25178-607:2019, 3.5, Note 1 to entry modified with "imaging optics" replaced by "optical axis of the imaging optics".]

3.4
focus variation measurement algorithm
algorithm for analysing the variation of focus in order to calculate the scan positions where each point is best in focus

3.5
focus information
measure to quantify the degree of focus based on image sharpness at a specific lateral position in the surface image and at a specific *axial scan* (3.3) position

3.6
focus information curve
signal recorded for a specific lateral position of the surface image as a function of the *axial scan* (3.3) position

Note 1 to entry: See Figure 1.

Note 2 to entry: The surface is located at the *axial scan* (3.3) position of the maximum of the focus information curve (see key c in Figure 1).

Note 3 to entry: To improve the resolution in *axial scan* (3.3) direction the maximum of a fitted curve can be used instead of key c in Figure 1.