SIST

SLOVENSKI STANDARD
oSIST prEN ISO 25178-607:2017

01-junij-2017

Specifikacija geometrijskih veličin izdelka (GPS) - Tekstura površine: ravna - 607. del: Imenske značilnosti nekontaktnih instrumentov (konfokalna mikroskopija) (ISO/DIS 25178-607:2017)

Geometrical product specifications (GPS) - Surface texture: Areal - Part 607: Nominal characteristics of non-contact (confocal microscopy) instruments (ISO/DIS 25178-607:2017)

Spécification géométrique des produits (GPS) - État de surface: Surfacique - Partie 607: Caractéristiques nominales des instruments sans contact (microscopie confocale) (ISO/DIS 25178-607:2017)

Ta slovenski standard je istoveten z: **prEN ISO 25178-607**

ICS:

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

oSIST prEN ISO 25178-607:2017 **en,fr,de**

DRAFT INTERNATIONAL STANDARD

ISO/DIS 25178-607

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

Voting begins on: **2017-03-31** Voting terminates on: **2017-06-22**

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

Part 607: **Nominal characteristics of non-contact (confocal microscopy) instruments**

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

Partie 607: Caractéristiques nominales des instruments sans contact (microscopie confocale)

ICS: 17.040.20

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 25178-607:2017(E)

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

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

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

Introduction

This document is a Geometrical Product Specification (GPS) standard and is to be regarded as a general GPS standard (see ISO/TR 14638). It influences the chain link F of the chain of standards on areal surface texture and profile 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 the 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 D.

This document describes the metrological characteristics of confocal microscopes designed for the measurement of surface topography maps.

For detailed information on the confocal microscopy technique, see Annex A and Annex B.

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 confocal microscopy. 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 607:
Nominal characteristics of non-contact (confocal microscopy) instruments

1 Scope

This document describes the influence quantities and instrument characteristics of confocal microscopy (CM) systems for areal measurement of surface topography.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 25178-600:2016 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/

3.1
confocal microscopy
(CM)
measurement method wherein the localization of optically sectioned images during an axial scan through the focus of a microscope's objective provides a means to determine an areal surface topography image

Note 1 to entry: See also a description for confocal microscopy [ISO 25178-6:2010, 3.3.6].

Note 2 to entry: Confocal microscopes produce optically sectioned images by restricting the illumination onto the sample and through the detection system by means of a pattern and scanning the aforementioned pattern in-plane to fill the image (see also Figure B.1).

Note 3 to entry: Illumination and detection patterns could be one or several points, slits, or any order of structures, that effectively reduces the illuminated area of the surface. The geometry of these patterns influences the evaluation of the sectioned images and has direct influence on the metrological characteristics of the instrument.

Note 4 to entry: The difference between a confocal point sensor and a confocal microscope is defined by the in-plane scanning scheme. In the confocal microscope one or multiple parallel working light paths scan the surface. This is realized with various optical elements. In contrast the single point confocal probe scans only one point on the sample at a time by moving either the sample or the probe. A single point confocal chromatic probe arrangement is described in ISO 25178-602:2010, Annex B.

Note 5 to entry: Table 1 compiles alternative terms that conform at least in part to the above definition.

Table 1 — Examples of alternative terms sometimes used for confocal microscope

Acronym	Term
ICM	Imaging confocal microscope
LSCM	Laser scanninga confocal microscope (see also A.2)
CLSM	Confocal laser scanninga microscope (same method as LSCM)
CSLM	Confocal scanning laser microscope (same method as LSCM)
LSM	Laser scanning microscope (same method as LSCM)a
DSCM	Disc scanning confocal microscope (see also A.3)
PACM or PAM	Programmable array confocal microscope or programmable array microscope (see also A.4)
MSCM	Microdisplay scanning confocal microscope (same method as PACM)
RSOM	Real-time scanning optical microscope
CSOM	Confocal scanning optical microscope

[a] The term, “laser scanning microscope,” has also been used to refer to laser-based scanning probes with height sensors, such as triangulation or dynamic focus, which are different from the confocal methods described here.

3.2
illumination pattern
arrangement of single or repetitive structures placed on a conjugate image position of the microscope’s objective (typically the field diaphragm position), restricting the illuminated parts on the sample

Note 1 to entry: The illumination pattern can be a single pinhole, equally spaced pinholes on a grid, slits, parallel slits, or any other pattern that effectively reduces the amount of illuminated area.

3.3
detection pattern
arrangement of single or repetitive structures placed on a conjugate image position of the microscope’s objective, blocking the out-of-focus light reflected from the surface and from previously illuminated parts

Note 1 to entry: The illumination and detection patterns need not have the same geometry.

3.4
optical sectioning strength
degree to which a confocal microscope rejects out of focus light

Note 1 to entry: The optical sectioning strength depends on the *numerical aperture* (see ISO 25178-600:2016, 3.3.6) of the objective.

Note 2 to entry: The optical sectioning strength depends on both the size and shape of individual features and on the arrangement of features in both the illumination and detection patterns.

3.5
in-plane scanning
mechanical or optical displacement of the illumination and/or detection patterns to fulfill an optical section image

Note 1 to entry: Annex A describes the principle of in-plane scanning for typical confocal arrangements.

3.6
axial scan
mechanical or optical displacement between the sample under inspection and the imaging optics

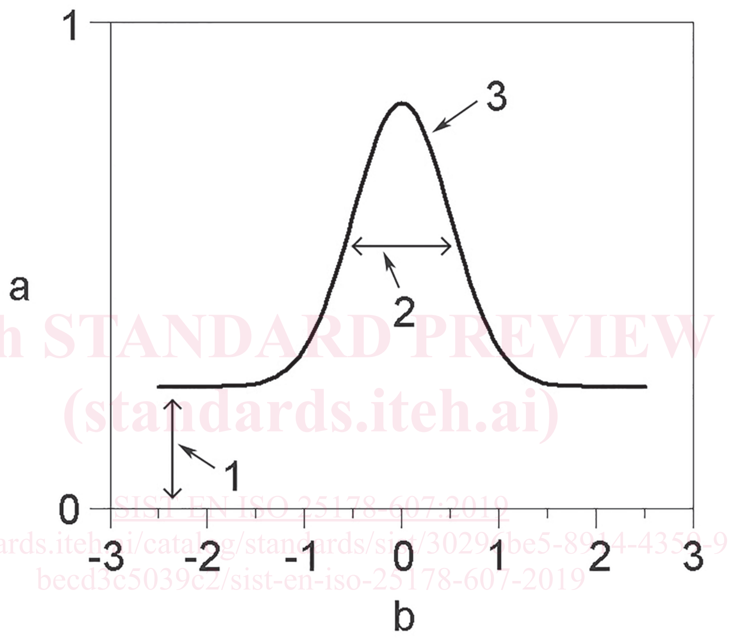
Note 1 to entry: The imaging optics is nominally parallel to the axial scan axis of the microscope.

3.7
axial scan length
total range traveled by the CM axial scan, usually the total displacement between the sample and the microscope's objective translated along its optical axis during data acquisition

Note 1 to entry: This parameter may be limited by the overall range of the axial scanner but is generally a parameter chosen by the operator taking account of the height range of the surface topography.

3.8
axial response
signal recorded for an individual image point of the confocal image as a function of the axial scan position

Note 1 to entry: See Figure 1.



Key

a normalized detector signal

b z (µm)

1 background offset

2 full width at half maximum

3 axial response

Figure 1 — Schematic axial response signal

3.9
full width at half maximum
FWHM
region of the axial response symmetrical to the maximum peak where the signal falls to one-half of the maximum peak signal

Note 1 to entry: The FWHM is used as a metric (or estimator) of the thickness of the optically sectioned slice.

3.10
maximum signal position
position of the axial scan where the amplitude of the axial response is maximum

