



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 25178-701:2010

Geometrical product specifications (GPS) -  
Surface texture: Areal - Part 701:  
Calibration and measurement standards  
for contact (stylus) instruments (ISO  
25178-701:2010)

## I.S. EN ISO 25178-701:2010

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<i>This document replaces:</i>	<i>This document is based on:</i> EN ISO 25178-701:2010	<i>Published:</i> 1 July, 2010
This document was published under the authority of the NSAI and comes into effect on: 7 July, 2010		ICS number: 17.040.20
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ICS 17.040.20

English Version

**Geometrical product specifications (GPS) - Surface texture:  
Areal - Part 701: Calibration and measurement standards for  
contact (stylus) instruments (ISO 25178-701:2010)**

Spécification géométrique des produits (GPS) - État de  
surface: Surfacing - Partie 701: Étalonnage et étalons de  
mesure pour les instruments à contact (à palpeur) (ISO  
25178-701:2010)

Geometrische Produktspezifikation (GPS) -  
Oberflächenbeschaffenheit: Flächenhaft - Teil 701:  
Kalibrierung und Normale für berührend messende Geräte  
(mit Taster) (ISO 25178-701:2009)

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## **Foreword**

This document (EN ISO 25178-701:2010) 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of an identical text or by endorsement, at the latest by January 2011, and conflicting national standards shall be withdrawn at the latest by January 2011.

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I.S. EN ISO 25178-701:2010

# INTERNATIONAL STANDARD

**ISO**  
**25178-701**

First edition  
2010-07-01

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

Part 701:

### **Calibration and measurement standards for contact (stylus) instruments**

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

*Partie 701: Étalonnage et étalons de mesure pour les instruments à  
contact (à palpeur)*



Reference number  
ISO 25178-701:2010(E)

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Published in Switzerland



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 25178-701 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

ISO 25178 consists of the following parts, under the general title *Geometrical product specifications (GPS) — Surface texture: Areal*:

- *Part 2: Terms, definitions and surface texture parameters*
- *Part 3: Specification operators*
- *Part 6: Classification of methods for measuring surface texture*
- *Part 7: Software measurement standards*
- *Part 601: Nominal characteristics of contact (stylus) instruments*
- *Part 602: Nominal characteristics of non-contact (confocal chromatic probe) instruments*
- *Part 603: Nominal characteristics of non-contact (phase-shifting interferometric microscopy) instruments*
- *Part 701: Calibration and measurement standards for contact (stylus) instruments*

The following parts are under preparation:

- *Part 604: Nominal characteristics of non-contact (coherence scanning interferometry) instruments*
- *Part 605: Nominal characteristics of non-contact (point autofocusing) instruments*

## 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 chain link 6 of the chains of standards on areal surface texture.

For more detailed information of the relation of this standard to the GPS matrix model, see Annex C.

This part of ISO 25178 concerns the areal surface texture measuring instruments for which it defines

- the systematic errors linked with main metrological characteristics of the instrument if they are not given by the manufacturer,
- the calibration operation mode,
- the analysis of the results for the assessment of the potential errors, and
- the decision rules for corrective actions.

It allows the evaluation of the part of the measurement uncertainty which is linked with the metrological characteristics of the instrument and which influences the assessment of areal surface texture parameters.

These metrological characteristics are verified by testing the instrument with the measurement standards defined hereafter or with the measurement standards described in ISO 5436-1 and ISO 5436-2, and with complementary standards like optical flats.

The aim is to assess the errors in the corrected X, Y and Z quantities by using material measurement standards having simple geometry (i.e. optical flat, sphere, etc.) for which

- the uncertainty is lower than for surface texture standards,
- their characteristics are independent of the surface texture parameters.

The calibration procedure reports on the status of the measurement equipment. Depending on the report, the user can decide to perform the corrective actions or to alert the equipment manufacturer.

The method is as follows:

- a) assessment of the errors on the fundamental corrected quantities X, Y and Z;
- b) assessment of the uncertainty due to the mathematical algorithms used for filtering and for computation of parameters, checked with the help of software measurement standards as defined in ISO 5436-2 and ISO 25178-7.

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