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SIST ISO 3274:2001

01-julij-2001

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Geometrical Product Specifications (GPS) -- Surface texture: Profile method -- Nominal characteristics of contact (stylus) instruments

Spécification géométrique des produits (GPS) -- État de surface: Méthode du profil -- Caractéristiques nominales des appareils à contact (palpeur)

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INTERNATIONAL STANDARD

ISO 3274

Second edition
1996-12-01

Geometrical Product Specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments

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Spécification géométrique des produits (GPS) — État de surface: Méthode du profil — Caractéristiques nominales des appareils à contact (palpeur)

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Reference number
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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.

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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International Standard ISO 3274 was prepared jointly by Technical Committees ISO/TC 57, *Metrology and properties of surfaces*, Subcommittee SC 1, *Geometrical parameters — Instruments and procedures for measurement of surface roughness and waviness*, ISO/TC 3, *Limits and fits*, and ISO/TC 10, *Technical drawings, product definition and related documentation*, Subcommittee SC 5, *Dimensioning and tolerancing*.

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This second edition of ISO 3274 cancels and replaces the first edition (ISO 3274:1975) as well as ISO 1880:1979, which have been technically revised.

In particular it takes into account the nominal characteristics of contact (stylus) instruments and their technical development. Modern instruments use phase-correct filters according to ISO 11562.

Annexes A, B, C and D of this International Standard are for information only.

Introduction

This International Standard is a Geometrical Product Specification (GPS) standard and is to be regarded as a *General GPS standard* (see ISO/TR 14638). It influences chain link 5 of the chain of standards for roughness profile, waviness profile and primary profile.

For more detailed information of the relation of this standard to other standards and the GPS matrix model, see annex C.

Filters for profile meters according to ISO 3274:1975 were realized as a series connection of two analog RC filters. This led to considerable phase shifts in the transition of the profile and therefore to asymmetrical profile distortions. The influence of this distortion on the parameters *Ra* and *Rz* are normally negligible if the sampling lengths (cut-off wavelength) according to ISO 4288:1985 are used. Therefore, analog instruments according to ISO 3274:1975 or instruments using 2RC filters may be used for assessment of *Ra* and *Rz* (see annex A). However, for other parameters the distortion is relevant.

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Geometrical Product Specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments

1 Scope

This International Standard defines profiles and the general structure of contact (stylus) instruments for measuring surface roughness and waviness, enabling existing International Standards to be applied to practical profile evaluation. It specifies the properties of the instrument which influence profile evaluation and it provides the basics of the specification of contact (stylus) instruments (profile meter and profile recorder).

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NOTES

1 A data sheet dealing with characteristics of contact (stylus) instruments to be completed by the instrument makers is under preparation and will be introduced in a future standard on calibration procedures.

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2 The relationships between the waviness cut-off λf, tip radius and waviness cut-off ratio are under consideration and will be added to this International Standard as an amendment.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4287:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters.*

ISO 4288:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture.*

ISO 5436:1985, *Calibration specimens — Stylus instruments — Types, calibration and use of specimens.*

ISO 11562:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Metrological characteristics of phase correct filters.*

ISO 12085:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Motif parameters.*

ISO 13565-1:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method; Surfaces having stratified functional properties — Part 1: Filtering and overall measuring conditions.*

ISO 13565-2:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method; Surfaces having stratified functional properties — Part 2: Height characterization using the linear material ratio curve.*

ISO 13565-3:—[1], *Geometrical Product Specifications (GPS) — Surface texture: Profile method; Surfaces having stratified functional properties — Part 3: Height characterization using the material probability curve.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 Profiles

3.1.1 traced profile: Locus of the centre of a stylus tip which features an ideal geometrical form (conical with spherical tip) and nominal dimensions with nominal tracing force, as it traverses the surface within the intersection plane.

NOTE — This is the profile from which all other profiles defined in this International Standard are derived.

3.1.2 reference profile: Trace on which the probe is moved within the intersection plane along the guide.

NOTE — The shape of the reference profile is the practical realization of a theoretical exact profile. Its nominal deviations depend on the deviations of the guide as well as on external and internal disturbances..

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3.1.3 total profile: Digital form of the traced profile relative to the reference profile, with the vertical and horizontal coordinates assigned to each other.

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NOTE — The total profile is characterized by the vertical and horizontal digital steps.

3.1.4 primary profile: Total profile after application of the short wavelength filter, λs.

NOTES

1 The primary profile represents the basis for digital profile processing by means of a profile filter and calculation of the profile parameters according to ISO 4287. It is characterized by the vertical and horizontal digital steps which may be different from those of the total profile.

2 The best fit least squares form of the type indicated in the specification is not part of the primary profile and should be excluded before filters are applied. For a circle, the radius should also be included in the least squares optimization and not held fixed to the nominal value.

3 The nominal form is removed before the primary profile is obtained.

3.1.5 residual profile: Primary profile obtained by tracing an ideally smooth and flat surface (optical flat).

NOTE — The residual profile is composed of the deviations of the guide, external and internal disturbances, as well as deviations in profile transmission. The determination of the causes of the deviations is not normally possible without special equipment and a suitable environment.

3.2 stylus instrument: Measuring instrument which explores surfaces with a stylus and acquires deviations in the form of a surface profile, calculates parameters and can record the profile (see figure 1).

NOTE — The diagram as shown represents only the essential operators required in a theoretically exact measuring system. The specific inter-relationship of operators may be subject to design considerations. Therefore figure 1 should not be considered as the only form of theoretically exact configuration.

1) To be published.

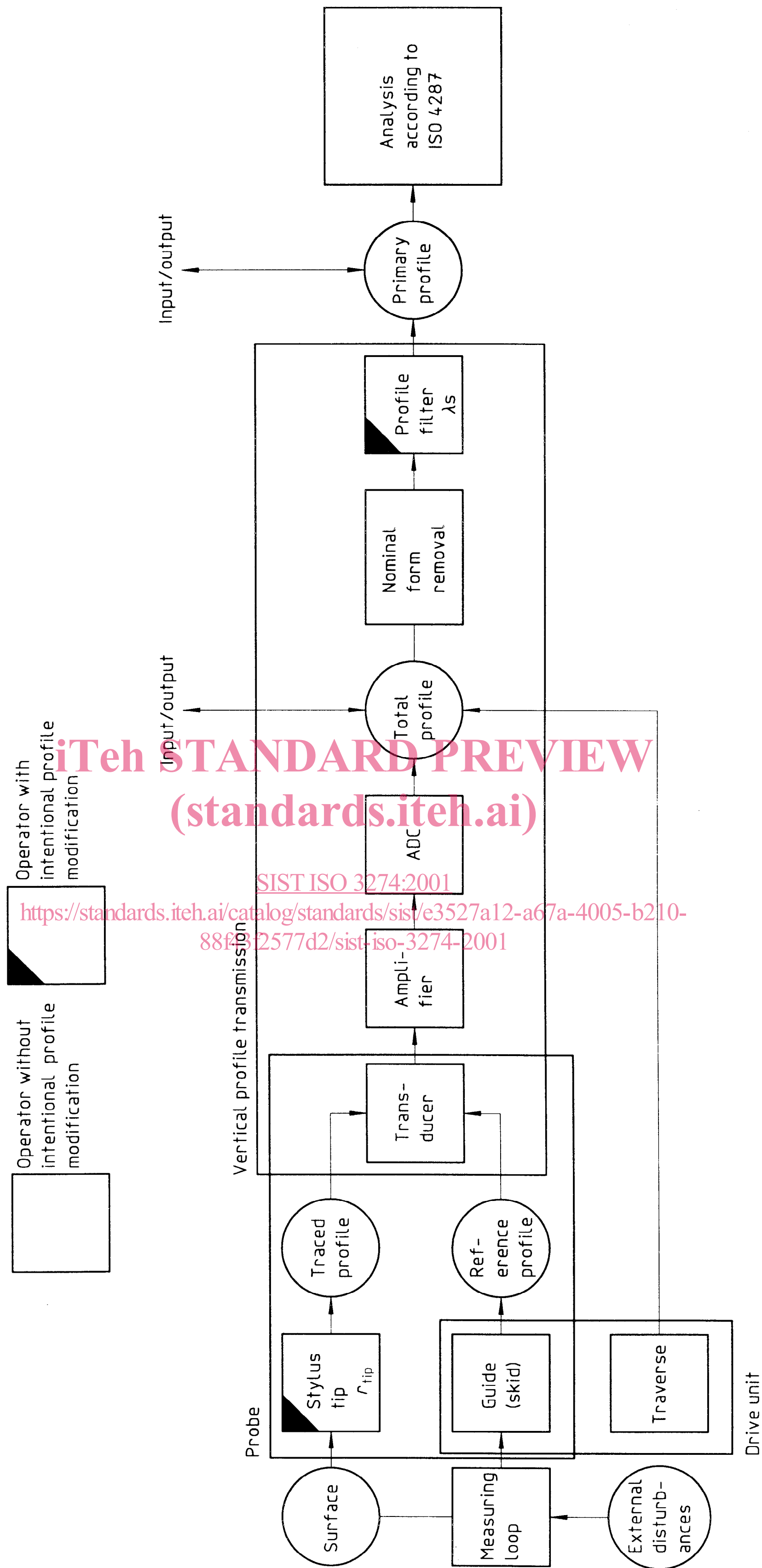

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Figure 1 — Schematic representation of a stylus instrument