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International Standard



4291

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Methods for the assessment of departure from roundness — Measurement of variations in radius

Méthodes d'évaluation des écarts de circularité — Mesurage des variations de rayon

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4291 was prepared by Technical Committee ISO/TC 57, *Metrology and properties of surfaces*.

Methods for the assessment of departure from roundness — Measurement of variations in radius

1 Scope and field of application

This International Standard specifies a method for determining departures from roundness by measuring variations in radius by means of contact (stylus) instruments.

It establishes

- a) types of instruments and general requirements;
- b) recommendations for the use of instruments;
- c) procedures for calibration of instruments and verification of their characteristics.

This International Standard applies to the assessment of the departures from ideal roundness of a workpiece through the medium of a profile transformation, obtained under reference conditions, expressed with respect to any one of the following centres :

- a) centre of the least squares circle;
- b) centre of the minimum zone circle;
- c) centre of the minimum circumscribed circle;
- d) centre of the maximum inscribed circle.

Each of these centres may have its own particular application. The position of the least squares centre can be calculated from a simple explicit equation given in annex F.

Departures from roundness of the measured profile, procedure, calibration and determination of systematic errors of rotation are dealt with in annexes A to D, respectively. Annex E gives rules for plotting and reading polar graphs.

NOTES

- 1 Profile transformation is defined in ISO 6318.
- 2 Reference conditions include the stylus, frequency limitations of an electric wave filter (if used), permissible eccentricity of the graphical or

digital representation of the profile (generally 7 % to 15 % of its mean radius, see annex E), the position of the measured section or sections relative to some feature of the workpiece.

2 Reference

ISO 6318, *Measurement of roundness — Terms, definitions and parameters of roundness.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 6318 apply.

4 Instruments

4.1 Instrument types and general requirements

Instruments of the stylus type employed for the determination of departures from ideal roundness may be of one of two types :

- a) a stylus and transducer rotating round a stationary workpiece;
- b) a rotating workpiece engaged by a stationary stylus and transducer.

According to the nature of the output information, instruments for the measurement of roundness fall into two groups :

- a) profile recording;
- b) with direct display of the values of the parameters.

Both groups may be combined in one instrument.

Stylus instruments should comply with the requirements of 4.1.1 to 4.1.3.