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# International Standard



# 6318

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## Measurement of roundness — Terms, definitions and parameters of roundness

*Mesurage de la circularité — Termes, définitions et paramètres de circularité*

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**Descriptors :** metrology, surface condition, roundness measurement, vocabulary.

## 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 6318 was prepared by Technical Committee ISO/TC 57, *Metrology and properties of surfaces*.

# Measurement of roundness — Terms, definitions and parameters of roundness

## Scope and field of application

This International Standard defines metrological terms used in the determination of deviations from roundness.

Figures 2 and 3 illustrate sequential steps involved in roundness measurement.

## Terms and definitions

### 1 General terms (surfaces, planes, axes)

**1.1 real surface:** A surface limiting the body separating it from the surrounding medium.

See figure 2.

**1.2 nominal axis of rotation:** The theoretically exact axis about which the spindle of a perfect instrument rotates.

**1.3 instantaneous axis of rotation:** The axis about which the spindle of an instrument actually rotates at any instant.

NOTE — The instantaneous axis of rotation may be continuously varying within the confines of the bearings.

**1.4 reference axis of rotation:** The mean of the instantaneous axes about which the spindle of an instrument rotates.

**1.5 instantaneous error of rotation:** The difference between the position of the instantaneous axis of rotation and the reference axis of rotation.

NOTE — Errors of rotation of the instrument may comprise radial, axial and tilt components.

**1.6 nominal plane of measurement:** A plane perpendicular to the nominal axis of rotation of the instrument.

**1.7 plane of measurement:** Plane perpendicular to the reference axis of rotation and passing through the point of contact of the detecting element of the instrument with the workpiece.

**1.8 direction of measurement:** The direction along which radial variations are determined. It substantially intersects the axis of rotation of the instrument and it generally lies in the plane of measurement.

**1.9 axis of workpiece:** A defined straight line about which the relevant part of the workpiece is considered to be round.

See figure 3.

NOTE — There may be several ways in which the axis can be defined, including:

- 1) A straight line such that the root mean square value of the distances from it of the defined centres of a representative number of cross-sections has a minimum value.
- 2) A straight line passing through the defined centres of two separated and defined cross-sections.
- 3) A straight line which passes through the defined centre of one defined cross-section and is perpendicular to a defined shoulder.
- 4) A straight line passing through two support centres — this axis is independent of the surface of the workpiece.
- 5) An axis of two coaxial surfaces of revolution just enclosing the surface irregularities of the workpiece.

**1.10 setting-up eccentricity:** The distance in the plane of measurement between the point of intersection therewith of the reference axis of rotation of the instrument and the defined centre of the workpiece profile.

**1.11 factor of amplification:** The ratio of the output value of the instrument to the displacement of the stylus in the direction of measurement.

## 2 Profiles

**2.1 real roundness profile:** The profile resulting from the intersection of the real surface of a round workpiece by a plane perpendicular to its defined axis. The concept encompasses every feature of the surface, however small it may be.