BS EN ISO 12180-2:2011

BSI Standards Publication

Geometrical product specifications (GPS) — Cylindricity

Part 2: Specification operators

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The UK participation in its preparation was entrusted to Technical Committee TDW/4, Technical Product Realization.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Spécification géométrique des produits (GPS) - Cylindricité - Partie 2: Opérateurs de spécification (ISO 12180-2:2011)

Geometrische Produktspezifikation (GPS) - Zylindrizität - Teil 2: Spezifikationsoperatoren (ISO 12180-2:2011)

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Foreword

This document (EN ISO 12180-2:2011) 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of an identical text or by endorsement, at the latest by October 2011, and conflicting national standards shall be withdrawn at the latest by October 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 12180-2:2011 has been approved by CEN as a EN ISO 12180-2:2011 without any modification.

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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 12180-2 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This first edition of ISO 12180-2 cancels and replaces ISO/TS 12180-2:2003, which has been technically revised.

ISO 12180 consists of the following parts, under the general title *Geometrical product specifications (GPS) — Cylindricity*:

— *Part 1: Vocabulary and parameters of cylindrical form*

— *Part 2: Specification operators*

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Introduction

This part of ISO 12180 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 3 of the chain of standards on form of a surface (independent of a datum).

The ISO/GPS Masterplan given in ISO/TR 14638 gives an overview of the ISO/GPS system of which this part of ISO 12180 is a part. The fundamental rules of ISO/GPS given in ISO 8015 apply to this part of ISO 12180 and the default decision rules given in ISO 14253-1 apply to specifications made in accordance with this part of ISO 12180, unless otherwise indicated.

For more detailed information on the relationship of this part of ISO 12180 to other standards and the GPS matrix model, see Annex C.

This part of ISO 12180 specifies the specification operators according to ISO 17450-2 for cylindricity of integral features.

At the time of publication of this part of ISO 12180, ISO/TC 213 has not been able to reach consensus on defaults for filter undulation per revolution (UPR), probe tip radius and method of association (reference cylinder). This means that it is necessary for a cylindricity specification to explicitly state which values are intended for use with these specification operations in order for it to be unique.

Consequently, if a specification does not explicitly state which values are to be used for one or more of these operators, the specification is ambiguous (see ISO 17450-2) and a supplier can use any value for the operator(s) not specified when proving conformance.

Extracting data always involves applying a certain filtering process. An additional filtering of the extracted data might or might not be applied. This additional filter can be a mean line filter (Gaussian, spline, wavelet, etc.) or a non-linear filter (e.g. morphological filter). The type of filtering influences the definition of cylindricity and the specification operators and, therefore, needs to be stated unambiguously.

NOTE 1 Stylus filtering is not sufficient on its own to smooth a profile. In certain circumstances, it can create spurious high-frequency content, thus giving incorrect values. To correct this, a longwave pass filter is employed. A Gaussian filter is used, since this is the state-of-the-art in International Standards. This filter has some shortcomings, e.g. it can distort, rather than eliminate some roughness features and it can distort, rather than transmit correctly some waviness features. It is envisioned that new filters under development within ISO provide better solutions for several of these issues.

NOTE 2 If a smaller tip radius than the one specified is used for a given cut-off length, the resulting measured value is generally higher. This effect is usually insignificant. If a larger tip radius is used, the resulting measured value is generally lower. The amount of change is heavily dependent on the surface measured.

NOTE 3 The measuring force of 0 N is chosen to eliminate effects of elastic deformation of the workpiece from the specification operator. On metal surfaces with adequate thickness, the effect of normally occurring measuring forces is negligible.

NOTE 4 Aliasing and other problems during extraction (see Annex A) due to the higher harmonic content of the skin model, in the roundness and straightness directions, can cause specification uncertainty.

This part of ISO 12180 is not intended to disallow any means of measuring cylindricity.

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