DRAFT INTERNATIONAL STANDARD

ISO/DIS 1

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Geometrical product specifications (GPS) — Standard reference temperature for the specification of geometrical and dimensional properties

Spécification géométrique des produits (GPS) — Température normale de référence pour la spécification géométrique des produits et vérification

ICS: 17.040.01

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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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.

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

ISO 1 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This third edition cancels and replaces the second edition (ISO 1:2002), which has been technically revised.

Specifically, the following points have changed:

— the standard reference temperature definition has been included, consequently, the title, introduction and scope, has been changed

— the general definition of reference temperature has been included

Annex A and B are for information only.

Introduction

This International Standard is a geometrical product specification (GPS) standard and is to be regarded as a global GPS Standard (see ISO/TR 14638[1]). For more detailed information on the relationship of this International Standard to other standards and the GPS matrix model, see Annex B.

The definitions of the units of length and temperature were determined and adopted by the International Committee of Weights and Measures (CIPM) under the authority of the Convention of the Metre. These definitions are published in the *Procès-verbaux* of the CIPM [2],[3],[4].

The unit of *length*, the meter, is independent of *temperature*. The current definition of the meter is based on the distance light travels in vacuum during a specified amount of time. However, a physical object is subject to thermal expansion and consequently its geometrical and dimensional properties are dependent on its temperature. A reference temperature value specifies a specific temperature that allows the geometrical and dimensional properties of a physical object to be unambiguously stated.

Geometrical product specifications (GPS) — Standard reference temperature for the specification of geometrical and dimensional properties

1 Scope

This International Standard specifies the standard reference temperature value for the specification of geometrical and dimensional properties.

2 Terms and Definitions

2.1
reference temperature
temperature of an object, having a uniform temperature, specified as part of the definition of a geometrical or dimensional requirement

Note 1 to entry: Note to entry: The specification of a geometrical or dimensional property is typically given in technical product documentation, e.g. on an engineering drawing or in a CAD file.

2.2
reference temperature value
specified temperature value for a reference temperature

2.3
standard reference temperature value
internationally agreed-upon reference temperature value

Note 1 to entry: Note to entry: In prior editions of the ISO 1 standard the term "standard reference temperature" is defined as its assigned numerical value, i.e. 20 °C. In this edition the reference temperature is given a more general definition (§ 2.1) and the assignment of a value is separately addressed (§ 3). This distinction allows (if required) the specification of different reference temperature values to different geometrical or dimensional properties on a workpiece.

3 Standard reference temperature value for the specification of geometrical and dimensional properties

The standard reference temperature value for the specification of geometrical and dimensional properties is fixed at 20 °C.

NOTE The standard reference temperature value of 20 °C does not prevent a different reference temperature from being used if needed, provided it is explicitly stated as part of the specification of a geometrical or dimensional property.

Annex A
(informative)

Use of the reference temperature specification

Specifying geometrical and dimensional requirements at a single temperature value can raise questions since (1) the functional requirements of any physical workpiece must include other temperatures, and since (2) verification cannot physically occur at an exact, uniform temperature.

Regarding that workpiece functional requirements must include other temperatures, it is important to note that a designer typically specifies not only the requirements on the geometric and dimensional properties of the workpiece (usually at the standard reference temperature value), but also separate requirements on the material properties of the workpiece. Combining the knowledge of how a specified material behaves under different temperature conditions together with the specified geometric and dimensional properties at a single temperature can allow a designer to ensure a part will meet geometric and dimensional functional requirements over various temperature conditions.

Regarding the issue that any geometrical or dimensional verification will inevitably occur at temperature conditions different than a single reference temperature, an adequate correction for that difference is necessary. (See, for example, ISO Guide 99, 2.3, Note 3[5]). Furthermore, it is necessary that the lack of knowledge of the exact correction be reflected appropriately in the measurement uncertainty (See, for example, ISO Guide 98-3, 3.3.2 b[6]).

Annex B
(informative)

Relation to the GPS matrix model

B.1 General

For full details about the GPS matrix model, see ISO/TR 14638.

B.2 Information about this International Standard and its use

This International Standard is used whenever GPS specifications for workpieces and measuring equipment are given. It constitutes the basis for the evaluation of measurement uncertainty.

B.3 Position in GPS matrix model

This International Standard is a global GPS standard, which influences all links in all chains of standards in the general GPS matrix, as shown in Table B.1.

Table B.1 — Position in the GPS matrix model

	Global GPS standards						
	General GPS standards						
	Chain link number	**1**	**2**	**3**	**4**	**5**	**6**
	Size						
	Distance						
	Radius						
	Angle						
	Form of line independent of datum						
	Form of line dependent of datum						
	Form of surface independent of datum						
Fundamental GPS standards	Form of surface dependent of datum						
	Orientation						
	Location						
	Circular run-out						
	Total run-out						
	Datums						
	Roughness profile						
	Waviness profile						
	Primary profile						
	Surface imperfections						
	Edges						