
**Geometrical product specifications
(GPS) — Matrix model**

Spécification géométrique des produits (GPS) — Modèle de matrice



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This first edition of ISO 14638 cancels and replaces ISO/TR 14638:1995.

ISO 14638 has been revised from the earlier ISO/TR 14638 document with the aim of clarifying the text and the definitions, in order to improve the usability of the document, and to revise the matrix where developments in ISO GPS have made this necessary.

The main changes are as follows:

- The category of Global GPS standards has been removed, as it was not clearly distinguished from either fundamental or general GPS standards. Standards which were formerly classified as global GPS standards have either been withdrawn, or can be categorized as fundamental or general GPS standards.
- The headings formerly used to describe the different chains in the matrix have been reduced.
 - The headings for 'form of a line (independent of a datum)' and 'form of a surface (independent of a datum)' have been replaced with a single heading of 'form'.
 - The headings for 'form of a line dependent on a datum' and 'form of a surface dependent on a datum' have been removed, because these are covered under orientation and location.
 - The heading for 'datums' has been removed from the matrix, because datums are not geometrical properties. [Clause 4](#) now explains how the ISO GPS standard for datums is covered in the ISO GPS matrix model.
 - The headings for 'circular run-out' and 'total run-out' have been amalgamated into a single heading of 'run-out'.
 - The three chains for 'roughness profile', 'waviness profile' and 'primary profile' have been replaced with a single entry for 'profile surface texture'.

- The heading for 'angle' has been removed, as angles are covered under the headings of 'size' and 'distance'.
- The heading for 'radius' has been removed, as this is covered under the headings of 'distance' and 'form'.
- The heading for 'edges' has been removed, as edges are not a geometrical property.
- An additional category of general GPS standards for areal surface texture has been added.
- An additional chain link for conformance and non-conformance has been added.
- The chain links have been given descriptive titles and are lettered. The chain link numbers used previously have been removed.
- The GPS matrix now appears in only a single format for fundamental and general GPS standards.
- The lists of GPS standards has been removed from this document. An up-to-date list of ISO/TC 213 standards is maintained at the following location on the ISO website: http://www.iso.org/iso/home/store/catalogue_tc/catalogue_tc_browse.htm?commid=54924&published=on
- A diagram showing a version of the matrix populated with references to individual ISO standards has been removed from this document. An online version of the matrix, with facilities to interrogate it, now appears on the ISO/TC 213 website at <http://isotc213.ds.dk/>, where it can be kept up-to-date.
- The rules which were formerly listed for the preparation of ISO GPS standards have been redrafted as a bulleted list of principles and recommendations.
 - The 'rule of unambiguity' has been re-written as the first principle in the list.
 - The 'rule of totality' has been removed, as it was not a rule but an aspiration.
 - The 'rule of complementarity' has been removed because its meaning was not clear.
 - The second principle has been added to avoid conflict between different GPS standards, which was the intention behind the former 'rule of complementarity'.
- A third recommendation has been added, specifying the format of an informative annex which will appear in all future GPS standards produced by ISO/TC 213. The annex explains how the individual GPS standard fits into the GPS matrix.

Introduction

Geometrical Product Specification (ISO GPS) is the system used to define the geometrical requirements of workpieces in engineering specifications, and the requirements for their verification.

ISO GPS standards are the responsibility of ISO/TC 213. ISO GPS standards are used in conjunction with other standards for Technical Product Documentation (TPD), which is the responsibility of ISO/TC 10, to produce Technical Product Specifications (TPS).

This International Standard provides an overview of the structure of the ISO GPS system.

The fundamental rules of ISO GPS given in ISO 8015 apply to this standard and the default decision rules given in ISO 14253-1 apply to specifications made in accordance with this standard, unless otherwise indicated.

Geometrical product specifications (GPS) — Matrix model

1 Scope

This International Standard is a fundamental ISO GPS standard. It explains the concept of Geometrical Product Specification (ISO GPS), and provides a framework to illustrate how current and future ISO GPS standards address the requirements of the ISO GPS system.

The framework is intended to be of use to users of ISO GPS standards, by illustrating the extent of the scope of the different standards, and showing how they relate to each other.

The framework is also used for structuring the development of standards for GPS by technical committee ISO/TC 213.

The full set of standards comprising the ISO GPS system is listed on the ISO/TC 213 website at http://www.iso.org/iso/home/store/catalogue_tc/catalogue_tc_browse.htm?commid=54924&published=on. Where relevant standards and documents are available from sources other than ISO/TC213, these may also be listed, although any such listing does not intend to be complete and exhaustive.

2 Concept

ISO GPS is a system which is used to describe certain workpiece characteristics through some of the different stages of its life cycle (design, manufacture, inspection, etc.).

ISO GPS is concerned with geometrical properties such as size, location, orientation, form, surface texture, etc.

Nine geometrical properties are identified in the ISO GPS system. Additional geometrical properties may be added in the future. The properties are:

- size;
- distance;
- form;
- orientation;
- location;
- run-out;
- profile surface texture;
- areal surface texture;
- surface imperfections.

The ISO GPS standards relating to each of these nine geometrical properties are grouped together in a series of nine categories of standards (see 3.3). Each category may be further sub-divided into a number of more specific elements, and each of these specific elements identifies a chain of standards.

For example, 'size' is a geometrical property category. Size can then be subdivided into 'size of cylinders', 'size of cones', 'size of spheres', etc., each of which corresponds to a chain of standards.

Angles are covered within the properties of size and distance, and radii are covered within the properties of distance and form.