



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 4249-2018

**Geometrical product specifications (GPS) -- Fundamentals --
Concepts, principles and rules**

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 4249-2009 "Geometrical product specifications (GPS) - Tolerancing principle". Compared with GB/T 4249-2009, the main technical changes in this Standard are as follows:

- deleted, added some terms and definitions (see Clause 3 of this Edition, Clause 3 of Edition 2009);
- moved the content of "Independent principle" to the clause of "Fundamental principle" (see 5.5 of this Edition, Clause 4 of Edition 2009);
- deleted tolerance (see Clause 5 of Edition 2009);
- deleted relevant requirements (Clause 6 of Edition 2009);
- deleted drawing marks of tolerance principle (Clause 7 of Edition 2009);
- added basic assumptions for reading specification on drawing (see Clause

4 of this Edition);

- added basic principle (see Clause 5 of this Edition);

-- added marking rules for default specification operator (see Clause 6 of this Edition);

-- added marking rules for specific default specification operator (see Clause

7 of this Edition);

-- added rules for expression in brackets (see Clause 8 of this Edition).

This Standard uses redrafting method to modify and adopt ISO 8015:2011

"Geometrical product specifications (GPS) -- Fundamentals -- Concepts, principles and rules".

Compared with ISO 8015:2011, there are technical differences in this Standard.

The terms involved in these differences have been marked by a vertical single line (-) at the margin of the outer margin. The corresponding technical differences and reasons are as follows:

-- for normative references, this Standard made adjustment for specific technical differences, so as to adapt to the technical conditions of China.

See Clause 2 "Normative references" for the adjustment. The specific adjustments are as follows:

- used GB/Z 24637.1 that identically adopts International standard to Geometrical product specifications (GPS) -

Fundamentals - Concepts, principles and rules

1 Scope

This Standard specifies the fundamental concepts, principles and rules that are valid for the creation, interpretation and application of all relevant standards, technical specifications and technical documents to product dimensions, geometrical product specifications (GPS) and inspections.

This Standard is applicable to the interpretation for GPS marks on all types of drawings.

"Drawing" referred in this Standard is a broad concept. It includes all documents that express workpiece specifications.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/Z 24637.1, Geometrical Product Specifications (GPS) - General concepts - Part 1: Model for geometrical specification and verification (GB/Z 24637.1-2009, ISO/TS 17450-1:2005, IDT)

GB/Z 24637.2, Geometrical Product Specifications (GPS) - General concepts - Part 2: Basic tenets, specifications, operators and uncertainties (GB/Z 24637.2-2009, ISO/TS 17450-2:2002, IDT)

ISO/IEC Guide 98-3:2008, Uncertainty of measurement - Guide to the expression of uncertainty in measurement (GUM:1995)

ISO/IEC Guide 99:2007, International vocabulary of metrology - Basic and general concepts and associated terms (VIM)

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/Z 24637.1, GB/Z 24637.2, ISO/IEC Guide 98-3:2008, ISO/IEC Guide 99:2007 as It is assumed that the interpretation for the tolerance limit is completely same with the interpretation for the functional limit.

4.4 Functional level of workpiece

It is assumed that the workpiece 100% meets the function within the tolerance limit; does not meet the function outside the tolerance limit.

5.1 Principle for adoption

Once it adopts one part of ISO GPS system in mechanical engineering product documents, it is equivalent to adopting the entire ISO GPS system, unless otherwise stated in the document, for example, "refer to other related

documents".

"Unless otherwise stated in the document" means that if the regional, national or enterprise standards referred are marked in the document, it shall use those standards. Do not adopt ISO GPS system to interpret the normative elements specified in the standard.

If it is unnecessary to adopt ISO GPS system, "noting method is according to GB/T 4249" may selectively mark within the title bar or near the title bar.

NOTE 1: The most common way to adopt ISO GPS system is to use one or more GPS specifications in drawing.

NOTE 2: ISO GPS system is an International standard issued by ISO/TC 213, see GB/T 20308.

NOTE 3: "Adopting the entire ISO GPS system" means that unless otherwise specified, if GPS fundamental standard and GPS comprehensive standard are adopted, then the reference temperature specified in GB/T 19765-2005 and the rules for determination specified in GB/T 18779.1 shall be adopted. The purpose of "principle for adoption" is to provide formal traceability for those GPS standards and rules.

5.2 Principle for hierarchy of GPS standard

ISO GPS system is hierarchical. Its standard variety, according to hierarchy, contains the following types:

- GPS fundamental standard;
- GPS comprehensive standard;
- GPS general standard;

5.4 Key element principle

One workpiece can be considered to be composed by many key elements that are limited by natural boundaries. Under the situation of default, each GPS specification of one key element applies to the entire key element. Each GPS specification that expresses the relationship between many key elements applies to many key elements. Each GPS specification is only applicable to one