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

GB/T 1800.1-2020

Replacing GB/T 1800.1-2009; GB/T 1801-2009

**Geometrical product specifications (GPS) - ISO code system for
tolerances on linear sizes - Part 1: Basis of tolerances,
deviations and fits**

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1 Scope

This part of GB/T 1800 establishes the ISO code system for linear dimensional tolerances, which applies to the following types of dimensional elements.

- a) Cylindrical surface;
- b) Two opposite parallel surfaces.

This part defines the basic concepts and related terms of the ISO code system for linear dimensional tolerances, and provides options for selecting common Use the standardized method of tolerance zone code.

In addition, this section defines the basic terms for the coordination of two dimension elements that are not constrained by direction and position, and defines the "reference hole" and The principle of "reference axis" is explained.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 1800.2-2020 Product Geometric Technical Specification (GPS) Linear Dimension Tolerance ISO Code System Part 2. Standard Tolerance zone code and limit deviation table of holes and shafts (ISO 286-2.2010, MOD)

GB/T 38762.1 Product Geometric Technical Specification (GPS) Dimensional Tolerance Part 1. Linear Dimensions (GB/T 38762.1-2020, ISO 14405-1.2016, MOD)

GB/T 24637.1-2020 Geometric Technical Specifications for Products (GPS) General Concepts Part 1. Geometric Specifications and Inspection Models (ISO 17450-1.2011, MOD)

3 Terms and definitions

The following terms and definitions defined in GB/T 38762.1 and GB/T 24637.1 apply to this document.

3.1 Basic terminology

3.1.1 Dimensions Linear dimension element or angular dimension element.

[GB/T 24637.1-2020, definition 3.3.1.5] 3.1.1.1 Linear dimension element A dimension element with linear dimensions.

A geometric element with one or more essential characteristics, of which only one can be used as a variable parameter, and the other parameters are "single parameter family" And these parameters comply with monotonic inhibition.

[GB/T 24637.1-2020, definition 3.3.1.5.1]

Note 1. The size element can be a sphere, a circle, two straight lines, two opposite parallel faces, a cylinder, a ring, and so on. In the previous standard, Wedges and cones are considered dimensional elements, and no ring is mentioned.

Note 2. When there is more than one essential feature (such as a ring), there will be some constraints.

Note 3. The size element is particularly useful for expressing physical requirements, namely the smallest physical requirements (LMR) and the largest physical requirements (MMR).

Note 4. The diameter of the ball is the size of a linear dimension element, and the geometric element used to establish the dimension element is its skeleton element. For a sphere, the skeleton element is one point.

3.1.1.2 Angle dimension element Geometric elements belonging to the category of constant rotation, whose generatrix is nominally inclined at an angle not equal to 0° or 90° ; or belonging to a constant prismatic surface Category, the angle between two orientation elements is composed of two surfaces with the same shape.

[GB/T 24637.1-2020, definition 3.3.1.5.2]

Note. A cone and a wedge are angle dimension elements.

3.1.2 Nominal components The ideal constituent elements defined by the designer in the product technical documentation.

3.1.2.1 Nominal element The ideal elements defined by the designer in the product technical documentation.

[GB/T 24637.1-2020, definition 3.3.3]

Note 1. Nominal elements are defined in the product technical documents.

Note 2. Nominal elements can be finite or infinite. By default, it is limited.

3.1.2.2 Components The geometric elements belonging to the actual surface or surface model of the workpiece.

[GB/T 24637.1-2020, definition 3.3.5]

Note 1. The constituent elements are essentially defined, for example, the skin surface of the workpiece.

Note 2. For the specification statement, the geometric elements obtained from the surface model or separated from the actual surface of the workpiece should be defined. These elements are called "component elements".

It is a model of different physical parts of the workpiece, especially the contact part between the workpieces, each has a specific function.

Note 3. A component element can be identified by the following operations, for example.

---Separation of surface model;

---Separation of another component; or ---A combination of other components.

3.1.3 The internal dimension elements of the workpiece include non-cylindrical internal dimension elements.

3.1.4 Datum hole The hole selected as the datum in the base hole system fit.

Note 1. See 3.4.1.1.

Note 2. For this code system, the hole whose lower limit deviation is zero.

3.1.5 The external dimension elements of the workpiece include non-cylindrical external dimension elements.

3.1.6 Reference axis The axis selected as the datum in the base axis system fit.

Note 1. See 3.4.1.2.

Note 2. For this code system, that is, the axis whose upper limit deviation is zero.

3.2 Terms related to tolerance and deviation

3.2.1 Nominal size The size of the ideal shape element defined by the drawing specification.

see picture 1.

Note 1. The limit size can be calculated by applying the upper and lower limit deviations.

Note 2. In the past, it was called "basic size".

3.2.2 Actual size Fit the size of the component.

Note 1. GB/T 24637.1-2020 3.3.8 and 3.1.2.2 of this part respectively define "fitting elements" and "component elements".

Note 2. The actual size is obtained by measurement.

3.2.3 Limit size The allowable limit value of the size of the dimension element.

Note. In order to meet the requirements, the actual size is between the upper and lower limit sizes, including the limit size.

3.2.3.1 Upper limit size ULS The maximum allowable size of the size element is shown in Figure 1.

3.2.3.2 Lower limit size LLS The minimum size allowed for the size element.

see picture 1.

3.2.4 deviation The difference between a value and its reference value.

Note. For size deviation, the reference value is the nominal size, and a certain value is the actual size.

3.2.5 limit deviation The upper limit deviation and the lower limit deviation relative to the nominal size.

3.2.5.1 Upper limit deviation ES (for inner dimension elements)

es (for external dimension elements)

The algebraic difference of the upper limit size minus its nominal size.

see picture 1.

Note. The upper limit deviation is a signed value, which can be a negative, zero or positive value.

3.2.5.2 Lower limit deviation EI (for inner dimension elements)