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

**GB/T 304.1-2017**

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**Spherical plain bearings - Classification**

关节轴承 分类

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### Foreword

GB/T 304 "Spherical plain bearings" is divided into four parts. -- GB/T 304.1 Spherical plain bearings - Classification; -- GB/T 304.2 Spherical plain bearings- Identification code; -- GB/T 304.3 Spherical plain bearings - Fits; -- GB/T 304.9 Spherical plain bearings - General technical regulations. This part is the first part of GB/T 304. This part was drafted in accordance with the rules given in GB/T 1.1-2009. This part replaces GB/T 304.1-2002 "Spherical plain bearings - Classification". Compared with GB/T304.1-2002, the main technical changes are as follows: -- Refine the classification of rod-end spherical plain bearings (see 4.3); -- Add the classification of combining form of friction auxiliary materials on sliding surfaces (see 4.5); -- Add the classification of units indicated by size and tolerance (see 4.6); -- Integrate the description of commonly-used structure and structural characteristics of part of maintenance-lubrication-type spherical plain bearings; add commonly-used maintenance-lubrication-type bearing structures, such as SIBJ---type, SABJ---type, SGFW(SGFEW)---ES-type, SFW(SFEW)---ES-type, SIRN---ES-type, SIGW(SIGEW)---ES-type, SIQ---ES-type, SIA---ES-type ; revise part of structure diagram (see Table 1, Table 1 of 2002 version); -- Delete the following bearing structure types, such as GE---F2-type, GE---FSA-type, GE---F1H-type, GEEW---ET, GEEW---ET-2RS-type (see Table 2 of 2002 version); -- Integrate the description of commonly-used structure and structural characteristics of part of maintenance-free self-lubricating spherical plain bearings; add commonly-used maintenance-free self-lubricating bearing structures, such as GEM (GEEM)---ET-2RS, GE---HT-type, SIBJ---C-type, SABJ---C-type; revise part of structure diagram (see Table 2, Table 2 of 2002 version); Spherical plain bearings - Classification

### 1 Scope

China's national classification standard for spherical plain bearings, and the current edition of GB/T 304.1, replacing the 2002 edition. It specifies the method by which spherical plain

bearings are classified and sets out the structure types of the bearings in common use, and it applies to the classification management of spherical plain bearing products. A spherical plain bearing is a bearing without rolling elements: an inner ring with a convex spherical outer surface sliding directly inside an outer ring with a matching concave one. It accommodates misalignment and oscillating or slow swinging motion under very high load, which is why it appears in aircraft control linkages, hydraulic cylinder ends, suspension and steering joints, construction machinery and large hinged structures - applications where a rolling bearing would be too large, too fragile or unable to tolerate the angular movement. Because the two rings slide directly on one another, the material pairing on the sliding surface is the single most consequential design choice in the whole bearing, and it is one of the six axes on which this part classifies. The others are the load direction and nominal contact angle, the ring and seam construction, the rod-end form, whether the bearing needs relubrication in service or is self-lubricating, and the way size and tolerance are represented. The 2017 revision refines the classification of rod-end bearings, adds the classification by friction pair material combination and by the units used for size and tolerance, consolidates the descriptions of common structures, introduces a number of newer maintenance-lubrication and maintenance-free structure types, and deletes several obsolete ones. Issued on 1 November 2017 and in force since 1 May 2018.

This part of GB/T 304 specifies the classification method of spherical plain bearings and the structure type of commonly-used spherical plain bearings. This part applies to the classification management of spherical plain bearing products.

## 2 Normative references

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

GB/T 3944 Spherical plain bearings - Vocabulary

## 3 Terms and definitions

The terms and definitions defined in GB/T 3944 apply to this document.

## 4 Structure type classification of spherical plain

4.1 According to the difference of load direction or nominal contact angle, the spherical plain bearings can be divided into.

a) Radial bearing - It is the spherical plain bearing which is mainly used to bear radial load. The nominal contact angle is  $0^\circ \leq \tau \leq 30^\circ$ . According to the different nominal contact angles, they can be divided into. 1) Radial contact spherical plain bearing - It is the spherical plain bearing with nominal contact angle  $\tau = 0^\circ$ . It is suitable to bear radial load,

at the same time it can bear axial load in any direction; 2) Angular contact radial spherical plain bearing - It is the spherical plain bearing with nominal contact angle  $0^\circ < \alpha \leq 30^\circ$ . It is suitable to bear the combination of radial load and axial load acting simultaneously. -- Internal thread rod-end spherical plain bearing. the rod-end shank is internal thread straight rod; -- External thread rod-end spherical plain bearing. the rod-end shank is external thread straight rod; -- Rod-end joints equipped with welded seat. the rod-end shank is flange seat, square seat or cylindrical seat with positioning pin, which is fixed to the end of the rod by welding; -- Rod-end spherical plain bearing equipped with locking seat. the internal thread of the rod-end shank is grooved and equipped with locking device.

4.4 According to whether it needs re-lubrication and maintenance when it is working, spherical plain bearings can be divided into.

- a) Maintenance-lubrication-type spherical plain bearing;
- b) Maintenance-free self-lubricating spherical plain bearing.

4.5 According to the combination mode of friction auxiliary materials on sliding surface, spherical plain bearings can be divided into.

- a) Steel/steel spherical plain bearing;
- b) Steel/copper alloy spherical plain bearing;
- c) Steel/PTFE compound spherical plain bearing;
- d) Steel/PTFE fabric spherical plain bearing;
- e) Steel/reinforced plastic spherical plain bearing;
- f) Steel/zinc-based alloy spherical plain bearing.

4.6 According to the representation unit of dimension and tolerance unit, spherical plain bearings can be divided into.

- a) Metric system (meter) spherical plain bearing;