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# GB

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

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### GB/T 275-2015

Replacing GB/T 275-1993

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## Rolling bearings - Fits

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## Foreword

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

This Standard replaces GB/T 275-1993 “Shaft and housing fits for rolling bearings”, and compared with GB/T 275-1993, the main technical changes are as follows:

- MODIFY the standard name (see cover and the first page of this Standard, and cover and the first page of 1993 edition);
- MODIFY the representation method for bearing tolerance grade code (see Clause 1 and Table 6 of this Standard, and Clause 1 and Table 6 of 1993 edition);
- REFINER and REORGANIZE the basic principles of fit selection (see Clause 3 of this Standard, and Clause 3 of 1993 edition);
- ADD the table of “Ferrule operation and bearing situations” (see Table 1);
- MODIFY the division criterion of the size of radial bearing loads (see Table 2 of this Standard, and Table 1 of 1993 edition);
- REFINER the examples in the table of the fits between radial bearings and shafts and bearing pedestal holes (see Table 3 and Table 4 of this Standard, and Table 2 and Table 3 of 1993 edition);
- MODIFY the reference marking symbols (see Figure 4 of this Standard, and Figure 4 of 1993 edition);
- DELETE the surface roughness code  $R_z$  and its values (see Table 7 of 1993 edition);
- ADD the geometrical tolerances of bearing pedestal holes with a diameter of 500 mm or more and the roughness of the fitting surface (see Table 7 and Table 8);
- MODIFY the nature of the annex; ADD the calculated value of the fits between radial bearings (excluding the tapered roller bearing) and bearing pedestal holes with a diameter of 500 mm or more (see Annex A of this Standard, and Annex A of 1993 edition);
- DELETE the calculated values of the fits between tapered roller bearings with a nominal diameter of 400 mm to 500 mm and shafts (see Table A.5 of 1993 edition).

This Standard is proposed by China Machinery Industry Federation.

The Standard is under the jurisdiction of National Technical Committee on Rolling Bearing of Standardization Administration of China (SAC/TC 98).

# Rolling bearings - Fits

## 1 Scope

This Standard specifies the basic principles and requirements for the selection of fits between rolling bearings (hereinafter referred to as “bearings”) and shafts and bearing pedestal holes under general working conditions.

NOTE: General working conditions refer to the conditions that the host machine has no special requirements for the rotation accuracy, operation stability, working temperature, etc.

The fits specified in this Standard apply to the following circumstances:

- a) the boundary dimension of the bearing complies with GB/T 273.1-2011, GB/T 273.2-2006, GB/T 273.3-2015, and the nominal diameter  $d \leq 500$  mm;
- b) the bearing tolerance complies with Class 0, 6(6X) in GB/T 307.1-2005;
- c) the bearing clearance complies with the N group in GB/T 4604.1-2012;
- d) the shaft is a solid or thick-walled steel shaft;
- e) the bearing pedestal is made of steel or cast iron.

This Standard does not apply to non-inner (outer) ring bearings and bearings for special purpose (such as aircraft frame bearings, instrument bearings, machine tool spindle bearings, etc.).

## 2 Basic principles of fit selection

### 2.1 Operating conditions

When the ferrule is rotated or swung facing the load direction, the interference fit shall be selected. When the ferrule is fixed facing the load direction, the clearance fit can be selected. When the load direction is difficult to determine, it is appropriate to choose interference fit.

**Table 1 Ferrule operation and bearing situation**

| Ferrule operation situation | Typical example | Schematic diagram | Ferrule load situation | Recommended fit |
|-----------------------------|-----------------|-------------------|------------------------|-----------------|
|-----------------------------|-----------------|-------------------|------------------------|-----------------|

## **2.4 Bearing clearance**

The use of interference fit will reduce the bearing clearance, so it shall inspect whether the bearing clearance after installation meet the use requirements, in order to correctly select the fit and the bearing clearance.

## **2.5 Temperature**

The temperature of bearings in operation is usually higher than the temperature of adjacent parts, resulting in looseness of the fit between bearing inner ferrules and shafts, and due to expansion, the outer ferrule may affect the axial movement of the bearing at the bearing pedestal. Therefore, the bearing shall be taken into account with the temperature difference between the shaft and the bearing pedestal and the heat flow.

## **2.6 Rotation accuracy**

For the occasion has a higher demand of rotation accuracy and operation stability, generally a clearance fit is not used. In improving the bearing tolerance class, the bearing fit parts shall also have a corresponding increase in accuracy.

NOTE: For the shafts fitted with Class 0, 6(6X) bearings, the dimension tolerance class is generally IT6, and the dimension tolerance class of bearing pedestal hole is generally IT7.

## **2.7 Construction and material of shafts and bearing pedestals**

For split-type bearing pedestals, the outer ferrule should not use interference fit. When the bearing is used for hollow shafts or thin-walled, light-alloy bearing pedestals, an interference fit tighter than that used for solid shafts or thick-walled steel or cast iron bearings shall be used.

## **2.8 Installation and disassembly**

The clearance fit is easier for installation and disassembly of bearings. For application occasion requires the interference fit and easy installation and disassembly, separable bearings or tapered bore bearings may be used.

## **2.9 Axial movement of floating bearings**

When the non-separable bearing is used for floating support, the fixed ferrule against the load direction shall be used as the floating ferrule, and a clearance fit or transition fit is selected.

# **3 Tolerance interval selection**

## **3.1 Radial bearings**

## Bibliography

- [1] GB/T 273.1-2011 Rolling bearings - Boundary dimensions, general plan - Part 1:  
Tapered roller bearings
- [2] GB/T 273.2-2006 Rolling bearings - Thrust bearings - Boundary dimensions,  
general plan
- [3] GB/T 273.3-2015 Rolling bearings - Boundary dimensions, general plan - Part 3:  
Radial bearings
- [4] GB/T 307.1-2005 Rolling bearings - Radial bearings - Tolerances
- [5] GB/T 4604.1-2012 Rolling bearings - Internal clearance - Part 1: Radial internal  
clearance for radial bearings

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Contact: Wayne Zheng, [Sales@ChineseStandard.net](mailto:Sales@ChineseStandard.net)

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

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