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**Rolling bearings - Roller bearings for automotive
transmissions**

滚动轴承 汽车变速箱用滚子轴承

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Rolling bearings - Roller bearings for automotive transmission

1 Scope

This document specifies the identification code, structure type, overall dimensions, technical requirements, inspection rules, marking and anti-rust packaging of roller bearings for automotive transmission; describes the corresponding detection methods.

This document applies to the manufacture of roller bearings for automotive transmission (hereinafter referred to as "bearings").

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in the text. Among them, for dated references, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies to this document.

GB/T 272-2017 Rolling bearings - Identification code

GB/T 274-2023 Rolling bearings - Chamfer dimension - Maximum values

GB/T 283-2021 Rolling bearings - Cylindrical roller bearings - Boundary dimensions

GB/T 297-2015 Rolling bearings - Tapered roller bearings - Boundary dimensions

GB/T 307.1-2017 Rolling bearings - Radial bearings - Geometrical product specifications (GPS) and tolerance values

GB/T 307.2-2005 Rolling bearings - Measuring and gauging principles and methods

GB/T 307.3-2017 Rolling bearings - General technical regulations

GB/T 959.1-2017 Specifications for retaining rings - Circlips

GB/T 2828.1-2012 Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

GB/T 4199-2003 Rolling bearings - Tolerances - Definitions

8.1.1.1 Solid rings should be made of high carbon chromium bearing steel in accordance with GB/T 18254-2016; their heat treatment quality shall comply with GB/T 34891-2017. The ring surface can also be treated by nitriding, carbonitriding and other heat treatment processes; its heat treatment quality shall comply with JB/T 7363-2023 or product drawings.

8.1.1.2 Tapered roller bearing rings can also be made of low carbon alloy steels such as 15CrMo and 20CrMo in accordance with GB/T 3077-2015. After carburizing heat treatment, its heat treatment quality shall comply with JB/T 8881-2020.

8.1.1.3 The drawn rings of drawn outer ring cylindrical roller bearings should be made of low carbon alloy steels such as 15CrMo and 20CrMo in accordance with GB/T 3077-2015. After carburizing and carbonitriding heat treatment, the heat treatment quality shall comply with the provisions of JB/T 7363-2023.

8.1.2 Rolling elements

The rolling elements should be made of high carbon chromium bearing steel in accordance with GB/T 18254-2016; the heat treatment quality shall comply with the provisions of GB/T 34891-2017.

8.1.3 Cage

The cage can be made of engineering plastics or metal. When the cage is made of engineering plastics, its material shall comply with the provisions of JB/T 7048-2011; when the cage is made of low carbon steel, its material shall comply with the provisions of GB/T 28268-2012; it may also be made of other materials with equivalent or better performance. When the cage is made of copper alloy material, its material shall comply with the provisions of the product drawing.

8.1.4 Elastic lock ring

The elastic lock ring should be made of materials that comply with the provisions of Table 1 in GB/T 959.1-2017; its heat treatment and related properties shall comply with the provisions of GB/T 959.1-2017.

8.2 Tolerance

8.2.1 Bearing tolerance

8.2.1.1 The tolerance of the bearing shall not be lower than the provisions of the ordinary grade tolerance in GB/T 307.1-2017.

8.2.1.2 The tolerance of the outer diameter E_w of the roller set of RN and RND cylindrical roller bearings shall be ${}^0_{-0.015}$ mm.

8.12 Appearance quality

The working surface of the bearing shall not have cracks, rust, obvious bumps.

8.13 Life

8.13.1 After the conventional life test of the bearing, the ratio -- of the test value of its rated life to the basic rated life L_{10t}/L_{10h} shall not be less than 2. If the user has special requirements, it can also be determined by negotiation with the manufacturer.

8.13.2 The life of the bearing bench simulation test shall meet the requirements of the corresponding vehicle model.

8.13.3 The durability life of the actual vehicle bearing shall meet the requirements of the corresponding vehicle model.

8.14 Others

8.14.1 The technical conditions of the matching between shaft and the bearing seat and the bearing hole are shown in Appendix A.

8.14.2 Other technical requirements shall comply with the provisions of GB/T 307.3-2017 and JB/T 10336-2017.

8.14.3 When the user has other requirements for the bearing, it can be negotiated with the manufacturer.

9 Testing methods

9.1 Measurement of tolerances

The measurement of bearing tolerances shall be in accordance with the provisions of GB/T 307.2-2005.

9.2 Inspection of roller sag

9.2.1 The roller sag can be replaced by the maximum and minimum values of the inner and outer diameters of the roller group with a stop gauge before the bearing is assembled.

9.2.2 For cylindrical roller bearings without outer rings or with detachable outer rings,

9.3 Chamfer detection

The chamfer detection method shall comply with the provisions of GB/T 307.2-2005.

9.4 Measurement of rolling surface shape

The measurement method of the rolling surface shape of the bearing can refer to the measurement method of the crowned roller in GB/T 4661-2015.

9.5 Measurement of surface roughness

The measurement method of the bearing surface roughness shall comply with the provisions of JB/T 7051-2006.

9.6 Measurement of clearance

9.6.1 Radial clearance

The measurement method of the radial clearance of the bearing shall comply with the provisions of GB/T 25769-2010.

9.6.2 Axial clearance

9.6.2.1 The measurement of the axial clearance of the NUP cylindrical roller bearing is shown in Figure 18. During the measurement, the end face of the outer ring of the bearing is pressed tightly; then the measuring load Q (100 N) is alternately applied to the inner ring of the bearing with uniform force, so that the inner ring of the bearing moves up and down along the loading direction. The difference between the average values of the two positions read from the indicator is the axial clearance value.

9.6.2.2 The measurement method of the axial clearance of double-row tapered roller bearings shall comply with the provisions of JB/T 8236-2023, or according to the user's requirements.

the plug gauge to keep it still; rotate the ring gauge for several cycles; check the rotation flexibility of the bearing.

9.11.5 HKN type bearings

First press the bearing into the ring gauge (ring gauge size = bearing outer diameter D - N_6 lower deviation value); then insert the plug gauge (plug gauge size = F_w lower deviation value - 0.015 mm) into the bearing (already pressed into the ring gauge), so that the axis of the bearing (together with the ring gauge and plug gauge) is in the horizontal direction; fix the plug gauge to keep it still; rotate the ring gauge for several cycles; check the rotation flexibility of the bearing.

9.11.6 30000, R 30000, 350000 R type bearings

Support the back of the inner ring of the bearing; keep the inner ring of the bearing still; rotate the outer ring (R 30000 type bearing is the standard outer ring) for several cycles; check the rotation flexibility of the bearing.

9.12 Inspection of appearance quality

Visually inspect under a diffuse light or use special equipment to inspect.

9.13 Life test

9.13.1 The bearing fatigue life test method shall comply with the provisions of GB/T 24607-2023.

9.13.2 The bearing gearbox bench simulation life test shall comply with the user's requirements.

9.13.3 The bearing actual vehicle endurance life test shall comply with the user's requirements.

10 Inspection rules

10.1 Exit-factory inspection

The bearing shall be inspected and qualified by the quality inspection department of the manufacturer and attached with a certificate of conformity before it can be exit-factory. The sampling items for exit-factory inspection shall be in accordance with the provisions of Table 16 (cylindrical roller bearings) and Table 17 (tapered roller bearings). The sampling shall be in accordance with the provisions of GB/T 2828.1-2012. The normal inspection one-time sampling plan shall be adopted; the general

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