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Rolling bearings -- Bearings for railway wagon

滚动轴承 铁路货车轴承

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Rolling bearings -- Bearings for railway wagon

1 Scope

This document specifies the coding method, structural type, overall dimensions, technical requirements, test methods, inspection rules, marks, rust-proof packaging and storage of rolling bearings for railway wagon.

This document applies to the manufacture of rolling bearings for railway wagon used at speeds not exceeding 160 km/h.

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/T 272, *Rolling bearings -- Identification code*

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

GB/T 699-2015, *Quality carbon structure steels*

GB 1922-2006, *Petroleum solvents for paints and cleaning*

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 2829-2002, *Sampling procedures and tables for periodic inspection by attributes (apply to inspection of process stability)*

GB/T 3203-2016, *Carburizing steels for bearing*

GB/T 4199, *Rolling bearings -- Tolerances -- Definitions*

GB/T 5213-2019, *Cold rolled low carbon steel sheet and strip*

GB/T 6930, *Rolling bearings -- Vocabulary*

GB/T 7811, *Rolling bearings -- Symbols for physical quantities*

GB/T 8597-2013, *Rolling bearings -- Rust proof packaging*

A steel plate stamping sealing part fixed on the outer ring of the bearing, combined with the oil seal and the seal seat to form a space for storing grease.

NOTE: It is used to prevent grease leakage or foreign matter intrusion, suitable for 352226X2-2RZ bearings.

3.2 seal wear ring

Located on the outside of the end face of the inner ring of the bearing, it is a ring-shaped part fixed on the axle and combined with the oil seal and sealing cover to form a space for storing grease.

NOTE: It is used to prevent grease leakage or foreign objects from entering.

3.3 oil seal

An annular sealing part composed of a metal frame and rubber.

NOTE: It is used to prevent grease leakage or foreign objects from entering.

3.4 seal assembly

An assembly consisting of a sealing cover, an oil seal and a sealing seat.

NOTE: It is used to prevent grease leakage or foreign matter intrusion, suitable for 352226X2-2RZ bearings.

4 Symbols

The symbols given in GB/T 7811 apply to this document.

5 Coding method

5.1 The coding method for rolling bearings for railway wagon (hereinafter referred to as "bearings") shall comply with the provisions of GB/T 272. The bearing post-code may also be abbreviated, using one English letter to represent the meaning of multiple post-codes, such as "A" and "B" to represent changes in structural type.

5.2 Non-standard bearing codes are determined by the manufacturer.

Example: X197726 bearing.

Where: X - manufacturer code; 19 - structure code; 7 - type code; 7 - diameter series code; 26 - inner diameter code, $d = 130$ mm.

8.11 Appearance quality

8.11.1 The working and matching surfaces of rollers and rings before phosphating shall not have burns, soft spots or decarburization. They shall also not have defects such as burrs, scratches, stains, dents, rust, bumps, etc.

8.11.2 The connection between the bearing inner ring and seal seat assembly chamfer and the inner cylindrical surface shall be smooth and without sharp edges.

8.11.3 The appearance quality of the cage shall comply with the requirements of TB/T 3567-2021.

8.11.4 The appearance quality of the oil seal shall comply with the requirements of TB/T 3419-2015.

8.12 Others

8.12.1 The seal cover, seal seat, oil seal and seal assembly of the bearing shall be pressed with a special mold. After pressing, the bearing shall be intact and undamaged and meet the requirements of the product drawing.

8.12.2 If the user has other technical requirements for bearings, they can negotiate with the manufacturer to determine them.

9 Test methods

9.1 Inspection of materials and heat treatment

The chemical composition, non-metallic inclusions, mechanical properties and other requirements of the carburized bearing steel used to manufacture the rings shall be inspected in accordance with the provisions of GB/T 3203-2016. The quality requirements after heat treatment shall be inspected in accordance with the provisions of JB/T 8881-2020.

The chemical composition, non-metallic inclusions and other requirements of high carbon chromium bearing steel used to manufacture rollers shall be inspected in accordance with the provisions of GB/T 18254-2016. The quality requirements after heat treatment shall be inspected in accordance with the provisions of GB/T 34891-2017.

9.2 Tolerance measurement

The measurement of bearing size tolerance and rotation accuracy shall comply with the provisions of GB/T 307.2-2005.

9.3 Measurement of axial clearance

10.2 Type inspection

10.2.1 Bearings shall be subject to type inspection in any of the following situations:

- a) When a new product is finalized;
- b) When there are major changes in design, materials, processes, etc. that may affect product quality and performance;
- c) When a product is discontinued for more than one year and production is resumed.

10.2.2 Type inspection items and sampling numbers shall be in accordance with the provisions of Table 12.

10.2.3 The products for type inspection shall be selected from the same batch of products that have passed the factory inspection. The exit-factory inspection items shall be re-inspected first, and the bench test shall be carried out after the re-inspection is passed. In the bench test assessment, each batch of tests shall be carried out in accordance with the provisions of GB/T 2829-2002. A sampling plan shall be selected. The sample size shall be in accordance with the provisions of Table 12. The qualified judgment number is 0. The unqualified judgment number is 1.

11 Marks

11.1 Mark the following at intervals on the circumference of the groove on the outer surface of the bearing outer ring: bearing model, trademark (or manufacturer code), year and month of production (the first two digits are the year, the last two digits are the month), and production sequence number (arranged in six Arabic numerals). The manufacturer may also add internal information or necessary external information.

Example: The marks on the groove on the outer surface of the outer ring are shown in Figure 4.

11.2 Marks shall be evenly distributed on the back of the inner ring: bearing model, trademark (or manufacturer code), production year and month (the first two digits are the year, the last two digits are the month), material batch number (arranged in three-digit Arabic numerals).

Example: The marks on the back of the inner ring are shown in Figure 5.

11.3 To increase the traceability of bearings, it is advisable to use the DMC two-dimensional code mark. The marking requirements are determined by the user and the manufacturer.

11.4 Other requirements for marking shall comply with the provisions of GB/T 24605-2009.

8	Cleaning fluid (No. 5 solvent oil in accordance with GB 1922-2006)	Several
9	Anhydrous ethanol	Several
10	Other common tools	1 set

A.2.2 Preparation for testing

A.2.2.1 The cleanliness test shall be conducted in a clean, well-ventilated test room with safety facilities. The dust falls per unit area W_0 in the test room for 24 consecutive hours shall not exceed 80 mg/m^2 .

A.2.2.2 Operators shall wear clean work clothes, work shoes and hats, and wash their hands.

A.2.2.3 All cleaning tools and containers shall be cleaned.

A.2.2.4 The cleaning solution used shall be filtered through a membrane.

A.2.2.5 Place the filter flat in the cleaning solution and soak for 10 min. After taking it out, wait for the cleaning solution to evaporate and then place it in a $100^\circ\text{C} \pm 5^\circ\text{C}$ oven to dry for 60 min. After taking it out, place it in a dryer to cool for 30 min. Then weigh it (m_1) for use (weigh twice with an analytical balance. The difference shall not be greater than 0.4 mg).

A.2.3 Measurement of dust falls in the test room

A.2.3.1 Determine the test points based on the area of the test room. When the area is less than 100 m^2 , select one test point. When the area is between $100 \text{ m}^2 \sim 300 \text{ m}^2$, select two test points at the same time. When the area is greater than 300 m^2 , select three test points at the same time. The distance between two test points shall not be less than 5 m.

A.2.3.2 Clean the dust receiving plate with cleaning fluid and then clean it with anhydrous ethanol.

A.2.3.3 Place the dust collecting plate on the operating table at the testing point in the testing room and record the start time.

A.2.3.4 After 24 h, place the sampled dust receiving plate into a cleaning liquid container. Scrub it three times with a brush. Rinse it twice with new cleaning liquid. Collect the cleaning liquid.

A.2.3.5 Filter the cleaning liquid through a filter.

A.2.3.6 Place the filter screen containing impurities in a drying oven at $100^\circ\text{C} \pm 5^\circ\text{C}$ and dry for 60 min. After taking it out, place it in a dryer and cool it for 30 min. Then weigh the mass of the filter screen m^2 (weigh twice with an analytical balance, the difference shall not be greater than 0.4 mg).

A.2.4 Measurement of bearing cleanliness

Annex B

(normative)

Ultrasonic testing of bearing outer rings

B.1 Testing personnel

Personnel engaged in ultrasonic testing shall obtain an ultrasonic testing qualification certificate of Level 2 or above as specified in GB/T 9445-2015.

B.2 Equipment and instruments

B.2.1 Ultrasonic detector

B.2.1.1 The operating frequency range of the ultrasonic detector shall be at least 1 MHz~10 MHz. Other performance indicators shall comply with the provisions of JB/T 10061.

B.2.1.2 The real-time sampling frequency of the digital ultrasonic detector hardware shall be no less than 100 MHz.

B.2.2 Probe

The specification is 5N5×5FG10 dual crystal straight probe or dual crystal straight probe with similar technical indicators. If a probe with similar technical indicators is used, the technical indicators shall be verified and it can only be used after passing the review.

B.2.3 Coupling medium

B.2.3.1 Engine oil, grinding fluid or other suitable coupling medium shall be used.

B.2.3.2 The same coupling medium shall be used when adjusting detection sensitivity, calibrating instruments and performing ultrasonic testing operations.

B.2.4 Test block for ultrasonic sensitivity of bearing outer ring

B.2.4.1 The material and heat treatment status of the bearing outer ring ultrasonic sensitivity test block (hereinafter referred to as the test block) are the same as those of the bearing ring being tested.

B.2.4.2 Before machining, the test block shall be subjected to ultrasonic testing with a sensitivity of $\phi 0.5$ mm flat bottom hole. No defect reflection wave shall appear inside the test block.

B.2.4.3 The surface roughness of the test block detection surface shall not be greater

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