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

GB/T 18329.4-2021

**Plain bearings - Metallic multilayer plain bearings - Part
4: Non-destructive ultrasonic transmission testing of bond of
thickness greater than or equal to 0.3 mm**

滑动轴承 多层金属滑动轴承 第4部分: 合金厚度 $\geq 0.3\text{mm}$ 的结合质量超声穿透无损检测

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Foreword

GB/T 18329 "Multilayer Metal Sliding Bearings for Sliding Bearings" is divided into the following 4 parts.

1. Ultrasonic non-destructive testing of bond strength;
2. Destructive test of bond strength of alloy thickness $\geq 2\text{mm}$;
3. Non-destructive penetration inspection;
4. Ultrasonic penetration non-destructive testing of the bonding quality of alloy thickness $\geq 0.3\text{mm}$. This part is Part 4 of GB/T 18329. This section was drafted in accordance with the rules given in GB/T 1.1-2009. This part was proposed by China Machinery Industry Federation. This part is under the jurisdiction of the National Sliding Bearing Standardization Technical Committee (SAC/TC236). Drafting organizations of this section. Hefei Bolin New Materials Co., Ltd., China Machinery Productivity Promotion Center, Shanghai Institute of Materials, Yantai Dafeng Bearing Co., Ltd., Chengdu Shengsanqiang Railway Fittings Co., Ltd., Changzhou Ultrasonic Electronics Co., Ltd., Jinhua Chengkai Alloy Material Co., Ltd. Company, Taiyuan Heavy Industry Co., Ltd. Oil Film Bearing Branch, Hubei Anda Precision Industry Co., Ltd., Yixing Huanyu Bearing Manufacturing Co., Ltd. Company, Zhejiang Changsheng Sliding Bearing Co., Ltd., Zhejiang Shuangfei Oilless Bearing Co., Ltd., Zhejiang Xianfeng Auto Parts Co., Ltd. This part is explained by the National Technical Committee for Standardization of Sliding Bearings. Multi-layer metal sliding bearings Part
4. Alloy thickness $\geq 0.3\text{mm}$ Combined quality ultrasonic penetration non-destructive testing

1 Scope

GB/T 18329.4-2021 is the Chinese national standard on plain bearings - metallic multilayer plain bearings - part 4: non-destructive ultrasonic transmission testing of bond of thickness greater than or equal to 0.3 mm, in the field of mechanical systems and components. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 9 March 2021 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 October 2021. Classification: ICS 21.100.10, CCS J12. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This part of GB/T 18329 specifies the test method for determining the bonding quality between the bearing alloy and the backing by the liquid immersion ultrasonic penetration method. This section specifies the evaluation of the receiving probe placed on the outside of the backing to receive the penetrating wave emitted by the transmitting probe inside the alloy layer method. If the transmitting probe is outside and the receiving probe is inside, the signal processing method is the same. This part is applicable to flangeless bearings and

bushings with alloy layer thickness $\geq 0.3\text{mm}$ and inner diameter $\geq 40\text{mm}$ with copper backing and steel backing, as well as alloy layer The combined quality inspection of thrust flange with copper back and steel back and flat guide rail type rectangular sliding bearing with thickness $\geq 0.3\text{mm}$. Cast iron backing bearings Refer to this section. Due to the inner chamfer at both ends of the sliding bearing and its vicinity, the edge of the facing surface, the oil hole, the oil pocket, the oil groove, the positioning lip and other structures, as well as the dovetail groove There are uncertain reflection waves on the edges of both sides, which affect the intensity of the penetration waves, so this method is not suitable for the detection of such areas. These parts Refer to GB/T 18329.3 for the evaluation method of bonding quality between backing and alloy layer. This section only makes a qualitative evaluation of the quality of the combination of the bearing backing and the alloy layer. The penetration wave height of ultrasonic passing through the backing and alloy bonding surface As a basis for evaluating the quality of the combination.

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 reference documents, the latest version (including all amendments) is applicable to this document.

GB/T 9445 Qualification and certification of non-destructive testing personnel

GB/T 18329.3 Sliding Bearings Multilayer Metal Sliding Bearings Part

3 Symbols and abbreviations

The symbols and abbreviations given in Table 1 apply to this document. Table

6 Personnel qualifications

The personnel who perform ultrasonic testing according to this part shall be qualified and certified in accordance with GB/T 9445, and obtain the relevant industrial doors of ultrasonic testing. Class qualification level certificate.

7 Testing procedures

7.1 Workpiece surface requirements The surface of the workpiece to be inspected must not have local depressions and protrusions that affect the inspection; the surface roughness of the alloy layer and the backing surface $R_a \leq 3.2\mu\text{m}$; safety The surface roughness of the mounting surface $R_a \leq 6.3\mu\text{m}$; the workpiece to be inspected should be cleaned and wiped.

7.2 Testing system debugging

7.2.1 According to the requirements of Appendix A, enter the relevant parameters of the comparison test block.

7.2.2 Place the comparison test block that meets the requirements of

5.3 on the workpiece positioning device.

7.2.3 According to the thickness of the test block, adjust the opposite transmitting and receiving probes so that the focus falls on the bonding layer and keep the probes perpendicular to the test block.

7.2.4 Adjust the starting positions of the two probes so that their movement strokes are at least half the probe diameter at both ends of the bearing width B.

7.2.5 Adjust the instrument gain or attenuation so that the penetration wave height $h=80\%H$ (see Figure 3) in the best combined area, which is the detection sensitivity.

7.2.6 Automatically scan the artificial defect position of $\phi 2\text{mm}$ in the comparison test block, h should be $\leq 40\%H$ (see Figure 4).

Note. For different types of testing equipment, the maximum limit value of h selected through negotiation between the supplier and the buyer can also be used as the basis for defect judgment.

7.2.7 Automatically scan and compare the test block three times, and print the inspection record. The area indication error of each type II artificial defect (type II hole) should meet The provisions of 5.4.3.

7.3 Product testing

7.3.1 Installation of the inspected workpiece Remove the comparison test block and replace it with the product to be inspected. If it is a bearing product, it should be installed in pairs, and according to the free elastic tensor, the two ends should be opposite to each other. Keep approximately equal gaps between them, so that the surface of the inspected workpiece is basically a perfect circle.

7.3.2 Workpiece scan Start the inspection system equipment to drive the coordinated movement of the inspected workpiece and the probe to scan the workpiece to ensure 100% coverage of the inspected surface. The scanning parameters are as follows:

a) When the workpiece is rotating, the probe moves continuously or intermittently in the axial direction of the workpiece, and the scanning overlap width is greater than or equal to the focus of the probe. 20% of zone width or beam diameter.

b) When the workpiece is moving in a straight line, the probe will make a transverse intermittent movement parallel to the surface of the workpiece after the workpiece has completed a longitudinal stroke, and the scanning will be repeated. Stack width $\geq 20\%$ of