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Plain Bearing - Nickel Alloy Self-lubricated Bearing Material Specifications

滑动轴承　镍合金自润滑轴承材料技术条件

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Plain Bearing - Nickel Alloy Self-lubricated Bearing Material Specifications

1 Scope

This Standard stipulates the structural features, technical requirements and test methods of nickel alloy self-lubricated bearing material.

This Standard is applicable to nickel alloy self-lubricated bearing material (hereinafter referred to as bearing material).

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 223.69 *Iron, Steel and Alloy - Determination of Carbon Contents - Gas-volumetric Method after Combustion in the Pipe Furnace*

GB/T 231.1 *Metallic Materials - Brinell Hardness Test - Part 1: Test Method*

GB/T 5121.1 *Methods for Chemical Analysis of Copper and Copper Alloys - Part 1: Determination of Copper Content*

GB/T 5121.5 *Methods for Chemical Analysis of Copper and Copper Alloys - Part 5: Determination of Nickel Content*

GB/T 5121.9 *Methods for Chemical Analysis of Copper and Copper Alloys - Part 9: Determination of Iron Content*

GB/T 5121.10 *Methods for Chemical Analysis of Copper and Copper Alloys - Part 10: Determination of Tin Content*

GB/T 6462 *Metallic and Oxide Coatings - Measurement of Coating Thickness - Microscopical Method*

3 Material Structure

3.1 Bearing Material

Bearing material is constituted of backing layer and lining layer. The backing layer is

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4.5 Bonding Strength

The bonding strength between lining layer and backing layer is requested to be more than 50 N/mm^2.

4.6 Appearance Quality

Backing is the natural color of steel plate; lining layer is bright gray. It shall manifest bright color and luster under visual inspection; solid lubricants shall be evenly distributed. There shall be no scratches or drag marks that might affect the usage.

5 Test Methods

5.1 Test of Lining Layer Thickness

Conduct the test in accordance with the stipulations in GB/T 6462. Under the circumstance that magnification is 70 times, measure the thinnest point in a field of view.

5.2 Chemical Composition Analysis

Carbon content in backing shall be determined in accordance with the method stipulated in GB/T 223.69. The chemical composition of sintered metal alloy in the lining layer shall be determined in accordance with the methods stipulated in GB/T 5121.1, GB/T 5121.5, GB/T 5121.9 and GB/T 5121.10.

5.3 Hardness Test

Test conditions are: HBW2.5/62.5; ambient temperature: 18 °C ~ 24 °C. Test method shall comply with the stipulations in GB/T 231.1.

5.4 Compression Deformation Test

5.4.1 Test equipment

The test shall be conducted on compression testing machine or other pressure loading mechanisms.

The working surface of the pressing plate shall be flat and polished; the hardness of the pressing plate shall be not lower than 55 HRC.

5.4.2 Sample preparation

This test adopts rectangular samples, with the sample size of: 15 mm × 10 mm × 5 mm. The geometric accuracy requirement of the samples shall comply with the stipulations in Figure 2.

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5.5.3 Requirements of grinding part

The material of grinding part shall be 45 Steel; hardness: 43 HRC ~ 47 HRC; roughness: *Ra*0.8 μm.

5.5.4 Lubrication

Before the test begins, thoroughly smear No.2 lithium base lubricating grease on the friction surface of the sample. During the test process, do not lubricate the sample.

5.5.5 Test method

Adopt constant speed and load test; test time shall be: 34 h (reciprocate for around 65,000 times); ambient temperature: 18 °C ~ 24 °C; extreme temperature: 100 °C; load: 10 kN (5 N/mm^2); average speed: 7 m/min; stroke: 110 mm ± 10 mm. When one of the following circumstances emerges, the test shall be terminated in advance, products shall be determined as disqualified:

a) Temperature reaches the stipulated extreme value;

b) Friction factor exceeds the limit value.

Through computer, print the friction factor and temperature curve that varies with the time.

5.5.6 Friction and wear determination method

Before the test begins, use wall thickness micrometer to measure the thickness of the sample in over 4 points; take the arithmetic mean value. After the test is terminated, wait till the sample cools down to room temperature, then, measure the wear part of the sample in over 4 points; take the arithmetic mean value. The thickness difference before and after the wear shall be the wear extent.

5.6 Shear Test of Bonding Strength between Lining and Backing Layer

5.6.1 Sample preparation

Take bearing material, process it in accordance with Figure 5. During the processing, do not damage the backing layer.

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