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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 18329.2-2023

Replacing GB/T 12948-1991

Plain bearings - Metallic multilayer plain bearings - Part 2: Destructive testing of bond for bearing metal layer thicknesses greater than or equal to 2 mm

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Table of Contents

Foreword

This document complies with the provisions of GB/T 1:1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents"

Drafting:

This document is Part 2 of GB/T 18329 "Sliding Bearings Multi-layer Metal Sliding Bearings": GB/T 18329 has been released with

Lower part:

---Part 1: Ultrasonic non-destructive testing of bonded quality of alloys with thickness >=0:5mm;

---Part 2: Destructive test of bonding strength for alloy thickness >= 2mm;

---Part 3: Non-destructive penetrant inspection;

---Part 4: Ultrasonic penetration non-destructive testing of bonded quality of alloys with thickness >=0:3mm:

This document replaces GB/T 12948-1991 "Destructive Test Method for Bimetal Bonding Strength of Sliding Bearings" and is consistent with

Compared with GB/T 12948-1991, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

a) Changed the "Terminology and Symbols" chapter (see Chapter 3, Chapter 2 of the:1991 edition);

b) Added the test principle of the method (see Chapter 4);

c) The requirements and diagrams of the test device have been changed (see 5:2, 4:3 of

the:1991 edition);

d) The requirements and illustrations of the specimens have been changed, and the processing steps of the specimens have been added (see 6:1, 3:2 of the:1991 edition);

e) The test procedure has been changed (see Chapter 7, 4:4 of the:1991 edition);

f) Changed the content of test result evaluation and test report (see Chapter 8, Chapter 5 and Chapter 7 of the:1991 edition);

g) Added a chapter "Applications in Quality Control and Process Qualification" (see Chapter 9):

This document is equivalent to ISO 4386-2:2019 "Sliding Bearings Multi-layer Metal Sliding Bearings Part 2: Alloy Thickness >= 2mm

Destructive test of bonding strength:

This document has made the following minimal editorial changes:

--- Move the variable units given in the main text of Chapter 5 to the symbol description of formula (1);

---The direction of the tensile force and the labeling of the specimen are added in Figure 1:

Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents:

Introduction

Sliding bearings are usually divided into single-layer and multi-layer sliding bearings according to the number of material layers: Multi-layer metal sliding bearings are used in large quantities and have a wide range of uses:

It is widely used in power machinery such as internal combustion engines and steam turbines:

For multi-layer metal sliding bearings, the bonding quality of the bearing alloy layer and the backing layer directly affects the bearing performance and reliability:

Firmness will cause the lining to peel off and cause early failure of the bearing, so combined with quality inspection is a very important quality control item:

In GB/T 18329 "Sliding Bearings Multi-layer Metal Sliding Bearings", the combined quality inspection of bearings includes non-destructive inspection and destructive inspection:

It is planned to consist of four parts:

---Part 1: Ultrasonic non-destructive testing of bonded quality of alloys with thickness >=0:5mm: The purpose is to provide alloy layer thickness greater than or equal to

The combined state of the alloy layer and backing layer of the 0:5mm multi-layer metal sliding bearing was qualitatively evaluated:

---Part 2: Destructive test of bonding strength of alloys with thickness >=2mm: The purpose is to provide alloy layer thickness greater than or equal to

Develop a destructive test method for the bonding strength of 2mm multi-layer metal sliding bearings to compare and study different processes and different

The effect of materials on bonding strength can also be used for bearing production control and process evaluation:

---Part 3: Non-destructive penetrant testing: The purpose is to develop a model for bearing bonding defects and sliding surface defects (i:e: surface discontinuities):

Non-destructive penetration test method, especially the internal chamfers of sliding bearings and their vicinity, counterface edges, oil holes, oil pockets, oil grooves, positioning lips, etc:

Around the structure and at the edges on both sides of the dovetail groove, due to the presence of uncertain reflected waves that affect the intensity of the penetrating wave, ultrasonic wireless detection cannot be used:

Destructive method detection can be solved by non-destructive penetration method:

---Part 4: Ultrasonic penetration non-destructive testing of bonded quality of alloys with thickness >=0:3mm: The purpose is to provide alloy layer thickness greater than or

A liquid immersion ultrasonic penetration testing method was developed for the bonding quality of multi-layer metal sliding bearings equal to 0:3mm for bearing backings and composites:

Qualitative evaluation of gold layer bonding quality:

Sliding bearings Multi-layer metal sliding bearings

Part 2: Bonding of alloys with thickness >= 2mm

Strength destructive test

1 Scope

This document describes a failure test method to determine the strength of the bearing alloy-backing bond: This document is applicable to bearings whose alloy layer base material is lead,

Multilayer plain bearings of tin, copper or aluminum: In order to make the measured alloy layer thickness greater than or equal to 2mm, the thickness of the unprocessed bearing alloy layer must be

A machining allowance of at least 1mm must be reserved:

This document applies to bearings with a backing material of steel, cast steel or copper alloy: It does not apply to bearings with a backing material of cast iron:

This document applies to thrust bearings of all sizes, as well as radial bearings with a backing inner diameter greater than or equal to 90mm:

This document can be used to compare and study the effects of different processes and materials on bonding strength: It can also be used for bearing production control and

Process assessment:

See ISO 4386-1 for ultrasonic non-destructive testing of bond quality for alloys with thickness greater than or equal to 2 mm:

2 Normative reference documents

This document has no normative references:

3 Terms and definitions

There are no terms or definitions to be defined in this document:

4 Principles

Perform tensile tests perpendicular to the joint surface: The bonding strength RCh is equal to the maximum test force Fmax and the bonding surface area A of the specimen (see Table 2):

Ratio, as shown in formula (1):

RCh=

Fmax

(1)

In the formula:

RCh ---bonding strength, unit is Newton per square millimeter (N/mm2);

Fmax---maximum test force, unit is Newton (N);

A ---Combining surface area, unit is square millimeter (mm2):

Note: The subscript "Ch" indicates that the test method was proposed by Chalmers:

5 Test equipment