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

GB/T 18325.1-2025

Replacing GB/T 18325.1-2001

**Plain bearings - Bearing fatigue - Part 1: Plain bearings in test
rigs and in applications under conditions of hydrodynamic
lubrication**

滑动轴承 轴承疲劳 第1部分：流体动压润滑条件下试验台和实际应用的滑动轴承
(English Translation)

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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 1 of GB/T 18325 "Sliding Bearings - Bearing Fatigue". GB/T 18325 has already published the following parts.

---Part 1: Sliding bearings in test benches and practical applications under hydrodynamic lubrication conditions;

---Part 2: Cylindrical Specimen Testing of Metal Bearing Materials;

---Part 3: Flat-strip testing of multilayer metal bearing materials;

---Part 4: Testing of bearing bushes made of multilayer metal bearing materials.

This document replaces GB/T 18325.1-2001 "Sliding bearings - Test chamber and practical applications of sliding bearings under hydrodynamic lubrication conditions".

Compared with GB/T 18325.1-2001, the main technical changes in "Fatigue Strength under Load" are as follows, except for structural adjustments and editorial modifications.

a) The test method was changed (see 5.2, 4.2 of the 2001 edition);

b) Added warnings (see 6.2.1).

This document is equivalent to ISO 7905-1:2021 "Sliding bearings - Fatigue of bearings - Part 1: Test benches under hydrodynamic lubrication conditions".

And sliding bearings in practical applications.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on

Standardization of Sliding Bearings (SAC/TC236).

Introduction

As a key component in the mechanical field, the fatigue performance of sliding bearings directly determines the reliability, operational safety, and service life of equipment.

Fatigue testing, as a core method for evaluating the performance of sliding bearings, is of irreplaceable importance.

This document aims to standardize fatigue testing methods for sliding bearings under hydrodynamic lubrication conditions, and to improve the method of assessing bearing liner stress by unifying the approach.

To improve the comparability of test results from different test benches, clarify the influence of dynamic loads and lubrication conditions on fatigue, and provide a basis for the dynamic load-bearing capacity of sliding bearings.

This provides a basis for determining factors such as the relationship between fatigue limit stress and the number of cycles, ensuring the reliability and accuracy of test results, thereby promoting industry technology.

Improved skill level.

GB/T 18325 "Sliding Bearings - Fatigue Testing" consists of four parts, which together form a complete standard system for fatigue testing of sliding bearings.

---Part 1: Sliding bearings in test benches and practical applications under hydrodynamic lubrication conditions;

---Part 2: Cylindrical Specimen Testing of Metal Bearing Materials;

---Part 3: Flat Belt Testing of Multilayer Metal Bearing Materials;

---Part 4: Testing of bearing bushes made of multilayer metal bearing materials.

Sliding Bearing Fatigue Part 1: Hydrodynamic Pressure Sliding bearings in test benches and actual applications under lubrication conditions

1 Scope

This document specifies a method for improving the comparability of test results by assessing bearing liner stresses that lead to fatigue (see Appendix A).

Similar assessments are required in practical applications. Since the stress is caused by the pressure generated by the hydrodynamic lubrication film, a thorough and complete evaluation is necessary.

Specify the operating and lubrication conditions for the bearing. In addition to dynamic load,

dimensions, and operating characteristics, the following requirements should also be specified for the fatigue system.

a) Under dynamic load conditions, the minimum thickness of the bearing oil film varies with time and location, but it is necessary to ensure that the bearing does not become saturated with oil during operation.

The lubrication can lead to localized overheating or shearing.

b) Under dynamic loads, the circumferential and axial pressure distributions change over time.

c) The resulting bearing liner stress is a function of time and location, especially the maximum alternating stress.

In addition, bearing fatigue can also be affected by mixed lubrication, wear, fouling, tribochemical reactions, and other effects, thus leading to fatigue problems.

This complicates the issue. Therefore, this document is limited to fatigue tests where the bearing surface is completely separated from the lubricating oil film.

This document applies to oil-lubricated cylindrical bearings operating under fully hydrodynamic lubrication conditions in test benches and real-world applications. This includes double-metal bearings.

Dynamic load conditions of metal and multilayer bearings.

Note: Different application requirements have driven the development of various bearing test benches. If the lubrication conditions of the test bench are not defined in detail, the test results of different test benches will vary.

The results are neither comparable nor applicable in practice. Even when testing the same material on different test benches, the results may differ.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

1) ISO 4287 is obsolete. The content referenced in ISO 21920-2:2021 is not technically different from that referenced in ISO 4287.

ISO 7902-1 Hydrodynamic radial sliding bearings under steady-state conditions - Cylindrical bearings - Part 1: Calculation procedures (Plainbearing) Note. GB/T

21466.1-2025 Sliding bearings - Hydrodynamic radial cylindrical bearings under steady-state conditions - Part 1: Calculation procedures (ISO 7902-1.

2020, MOD)

ISO 7902-2 Hydrodynamic radial sliding bearings under steady-state conditions - Cylindrical bearings - Part 2: Used in calculation programs Note. GB/T 21466.2-2025 Sliding bearings - Hydrodynamic radial cylindrical bearings under steady-state conditions - Part 2: Characteristic values (ISO 7902-2.

2020, MOD)

ISO 7902-3 Hydrodynamic radial sliding bearings under steady-state conditions - Cylindrical bearings - Part 3: Permissible operating parameters (Hydro-Note. GB/T 21466.3-2025 Sliding bearings - Hydrodynamic radial cylindrical bearings under steady-state conditions - Part 3: Permissible operating parameters (ISO 7902-3:2020, MOD) ISO 21920-2:2021) Geometry Product Specification (GPS) Surface Texture. Contour Method Part 2: Terms, Definitions and Surface Texture