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

GB/T 43324-2023

**Foil bearings - Performance of hydrodynamic gas thrust
bearings - Testing of static load capacity, bearing torque,
friction coefficient and lifetime**

箔片轴承 气体动压止推轴承性能 静态承载能力、摩擦力矩、摩擦因数和寿命测试

(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 equivalent to ISO 22423:2019 "Foil Bearing Foil Thrust Bearing Performance Testing Static Load Capacity, Friction Moment, Friction Factor and Life Test":

This document has made the following minimal editorial changes:

---Change the name of the standard to "Foil Bearing Gas Dynamic Pressure Thrust Bearing Performance Static Load Capacity, Friction Torque, Friction Factor and life span test":

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

Rotating machinery (such as turbines, generators, compressors, pumps and other mechanical equipment) usually needs to be designed for high speed and miniaturization:

Improve: Foil gas dynamic pressure bearings for turbomachinery by adaptive air (or gas) generation between two relatively moving surfaces the film works, and the compressed gaseous lubricating medium between the rotating shaft or moving parts and the foil surface forms a high pressure, separating the two relatively moving surfaces:

open and provide carrying capacity: Use the surrounding air (or gas) as the lubrication medium, eliminating the need to provide lubricating oil to the traditional auxiliary lubrication system needs: Compared with turbomachinery supported by rolling bearings, mechanical products supported by foil gas dynamic pressure bearings greatly reduce the risk of the weight, complexity and maintenance costs are reduced, and the $dm \cdot n$ speed limit of the rolling bearing is eliminated (dm is the average diameter of the inner and outer diameter of the bearing, n is rotation rate), allowing the shaft to operate at higher rotational speeds:

Foil bearing gas dynamic pressure thrust bearing performance Static load carrying capacity, friction moment, Friction factor and life test

1 Scope

This document describes performance testing methods and results comparison methods for foil gas dynamic thrust bearings, which are lubricated by air (gas):

The lubricating medium is supported by the gas dynamic pressure formed by the rotation of the rotating shaft, without the need for lubricating oil: The test methods given in this document are intended to test and evaluate the static load carrying capacity, friction torque, friction factor and service life of the foil gas dynamic pressure thrust bearing are evaluated, and the results obtained under different test conditions are Compare the test results: Static load-carrying capacity test results may vary depending on the testing equipment:

2 Normative reference documents

This document has no normative references:

3 Terms and definitions

The following terms and definitions apply to this document:

Thrust plate thrustrunner;runner Opposite the surface of the top foil, a circular disk connected to the rotating shaft:

Note: In order to form a gas film between the thrust plate surface and the top foil surface, the thrust plate surface needs to be processed smooth enough:

takeoff

The dynamic pressure of the gas between the thrust plate (3:1) and the top foil ensures that the thrust plate and top foil start to separate a certain distance apart during the operating phase:

clearance

Minimum distance between thrust plate (3:1) and top foil:

Bearing friction torque bearingtorque Torque caused by friction between the thrust plate (3:1) and the top foil due to rotation:

Note: See 7.3 for bearing friction torque test:

load load

loadcapacity the load that the bearing can bear under steady-state conditions:

initial load the load (3:5) exerted on the rotating system in the initial stage:

Note: The initial load should be less than the static load capacity and the load used to determine the bearing life, see 7.4 and 9.2: