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Plain bearings — Hydrodynamic plain tilting pad thrust bearings under steady-state conditions —

Part 2: Functions for calculation of tilting pad thrust bearings

Paliers lisses — Butées hydrodynamiques à patins oscillants fonctionnant en régime stationnaire —

Partie 2: Fonctions pour le calcul des butées à patins oscillants

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 8, *Calculation methods for plain bearings and their applications*.

This third edition cancels and replaces the second edition (ISO 12130-2:2013), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

— adjustment to ISO/IEC Directives, Part 2:2018;

— correction of typographical errors.

A list of all parts in the ISO 12130 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The functions of the following type are necessary for the calculation of oil-lubricated tilting pad thrust bearings in accordance with ISO 12130-1, assuming hydrodynamic conditions with full lubrication. They are based on the premises and boundary conditions specified therein. The values necessary for the calculation can be determined by means of the given formulae as well as from diagrams and tables. The formulae are approximations of the numerically determined values traced as curves in accordance with Reference [2]. The explanation of the symbols and examples for the calculation are included in ISO 12130-1.

On account of the premises laid down in ISO 12130-1:2001, Clause 3, g) and k), the following definitions are not applicable to the calculation of thrust bearings with centrally supported tilting pads ($a_F^* = 0{,}5$), which, under the premises indicated therein, have no hydrodynamic load-carrying capacity. For the determination of the characteristic values of such bearings, it is necessary to consider at least the deformations of the tilting pads which occur during operation. For example, References [3] and [4] can be compared.

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Plain bearings — Hydrodynamic plain tilting pad thrust bearings under steady-state conditions —

Part 2: Functions for calculation of tilting pad thrust bearings

1 Scope

This document specifies the derivation of mathematical functions to be applied when calculating tilting pad thrust bearings.

This document is not applicable to heavily loaded tilting pad thrust bearings.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Functions for the tilting pad thrust bearing

4.1 General

An explanation of the symbols is given in ISO 12130-1.

4.2 Characteristic value of load-carrying capacity

The characteristic value of load-carrying capacity, F^* is defined as a function of the relative bearing width, B/L, and the relative minimum lubricant film thickness, h_{min}/C_{wed}.

By substituting Formulae (2) to (5) into Formula (1), the approximate curves in Figure 1 are obtained (range of application: $0{,}2 \leq \frac{h_{min}}{C_{wed}} \leq 2$).

$$F^* = 5\left(\frac{h_{min}}{C_{wed}}\right)^2 \times \left[\ln\frac{1+\left(h_{min}/C_{wed}\right)}{h_{min}/C_{wed}} - \frac{2}{1+2\times\frac{h_{min}}{C_{wed}}}\right] \times \frac{A^* + B^*\left[1-\frac{1}{h_{min}/C_{wed}}\right] + C^*\left[1-\frac{1}{h_{min}/C_{wed}}\right]^2}{1+a\left[\frac{1}{B/L}\right]^2} \quad (1)$$

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