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

Part 3: Guide values for the calculation of thrust pad bearings

Paliers lisses — Butées hydrodynamiques à patins géométrie fixe fonctionnant en régime stationnaire —

Partie 3: Paramètres opérationnels admissibles pour le calcul des butées à segments

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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 second edition cancels and replaces the first edition (ISO 12131-3:2001), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

— adjustments have been made to ISO/IEC Directives, Part 2:2018;

— typographical errors have been corrected.

A list of all parts in the ISO 12131 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

In order to achieve that pad thrust, bearings calculated in accordance with ISO 12131-1 are sufficiently reliable in operation, it is necessary that the calculated operational parameters h_{min}, T_B or T_2 and $\overline{p}$ do not fall below or exceed the guide values h_{lim}, T_{lim} and $\overline{p}_{lim}$.

For limiting cases at high specific loads and/or high rotational frequencies, more accurate calculations are necessary taking into consideration thermal, elastic, hydrodynamic and/or turbulence effects.

The guide values represent limiting values in the tribological system plain bearing unit which are dependent on geometry and technology. These are empirical values which still give sufficient reliability in operation even when subjected to slight disturbing influences (see ISO 12131-1:2020, Clause 5).

The empirical values given can be modified for specific fields of application.

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

Part 3: Guide values for the calculation of thrust pad bearings

1 Scope

This document specifies guide values for avoiding damage to thrust-pad bearings in service.

The explanation of the symbols as well as examples for calculation are given in ISO 12131-1.

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 Guide values for avoiding damage caused by wear

To achieve minimum wear and low susceptibility to failure, full lubrication of the plain bearing unit is aimed at taking into account the minimum permissible lubricant film thickness h_{lim}. The lubricant should be free from dirt as this may result in increasing wear, scoring and local overheating which would impair the correct functioning of the plain bearing. If necessary, the lubricant shall be filtered.

The minimum lubricant film thickness, $h_{lim,tr}$, as a characteristic value for the transition into mixed lubrication (see ISO 12131-1:2020, 6.7) can be determined in accordance with Reference [6] using Formula (1).

$$h_{lim,tr} = \sqrt{\frac{D \times Rz}{3\,000}} \tag{1}$$

where

D is the mean sliding diameter, in mm;

Rz is the average peak to valley roughness height of thrust collar.

This simple formula takes into account that in general machining, tolerances increase with increasing size of the work piece.

As in this case, however, the machining method and the actual condition of the machine tools have a great influence, the value $h_{lim,tr}$ calculated on this basis is of only limited information value.

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