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Plain bearings — Hydrostatic plain journal bearings with drainage grooves under steady-state conditions —

Part 1: Calculation of oil-lubricated plain journal bearings with drainage grooves

Paliers lisses — Paliers lisses radiaux hydrostatiques avec rainures d'écoulement fonctionnant en régime stationnaire —

Partie 1: Calcul pour la lubrification des paliers lisses radiaux avec rainures d'écoulement

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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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Contents

Page

Foreword ..... **iv**

Introduction ..... **v**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Symbols **1**

5 Bases of calculation and boundary conditions **4**

6 Method of calculation **6**

6.1 General 6
6.2 Load-carrying capacity 6
6.3 Lubricant flow rate and pumping power 8
6.4 Frictional power 9
6.5 Optimization 10
6.6 Temperatures and viscosities 11
6.7 Minimum pressure in recesses 11

Annex A (informative) **Description of the approximation method for the calculation of hydrostatic plain journal bearings** **13**

Annex B (informative) **Example of calculation according to the method given in Annex A** **23**

Bibliography **31**

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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 document 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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The committee responsible for this document is 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 12167-1:2016), which has been technically revised.

The main changes are as follows:

— subclause titles have been added;

— symbols have been corrected and added in Table 1;

— calculation values in Annex B have been corrected;

— adjustments have been made according to ISO/IEC Directives, Part 2:2021;

— typographical errors have been corrected.

A list of all parts in the ISO 12167 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

Hydrostatic bearings use external lubrication to support pressure on the bearings; thus, they are less prone to wear and tear, run quietly, and have a wide useable speed, as well as high stiffness and damping capacity. These properties also demonstrate the special importance of plain journal bearings in different fields of application such as in machine tools.

Basic calculations described in this document may be applied to bearings with different numbers of recesses and different width/diameter ratios for identical recess geometry.

Oil is fed to each bearing recess by means of a common pump with a constant pumping pressure (system p_{en} = constant) and through preceding linear restrictors, e.g. capillaries.

In this document, only bearings with oil drainage grooves between the recesses are taken into account. As compared to bearings without oil drainage grooves, this type needs higher power with the same stiffness behaviour.

Equivalent calculation procedures that enable operating conditions to be estimated and checked against acceptable conditions may also be used.

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Plain bearings — Hydrostatic plain journal bearings with drainage grooves under steady-state conditions —

Part 1: Calculation of oil-lubricated plain journal bearings with drainage grooves

1 Scope

This document specifies the calculation procedures to calculate and assess a given bearing design, as well as to design a bearing as a function of some optional parameters. This document contains the design of the required lubrication system including the calculation of the restrictor data.

This document applies to hydrostatic plain journal bearings under steady-state conditions.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12167-2:2021, *Plain bearings — Hydrostatic plain journal bearings with drainage grooves under steady-state conditions — Part 2: Characteristic values for the calculation of oil-lubricated plain journal bearings with drainage grooves*

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Symbols

Symbols and units are defined in Table 1.

Table 1 — Symbols

Symbol	Term	Unit
a	Inertia factor	1
A_{lan}	Land area	m^2
A^*_{lan}	Relative land area	1
A_{p}	Recess area	m^2
b	Width perpendicular to the direction of flow	m

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