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Plain bearings — Spray nozzle type directed lubrication for tilting pad bearings

Titre manque

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Foreword

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This document was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 7, *Special types of plain bearings*.

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

These days, rotating machines such as turbines, generators, compressors, pumps, etc. tend to be increasing in speed and reducing in size. Bearings used in such machines can cause large power losses, which not only degrades machine performance but also results in the associated cooling system being larger in size. Directed lubrication type bearings can reduce the power loss significantly. They are energy-saving bearings that can simplify facilities and improve plant efficiency.

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Plain bearings — Spray nozzle type directed lubrication for tilting pad bearings

1 Scope

Directed lubrication is an advanced technology that is capable of reducing the power loss and improving the performance of tilting pad type bearings. Unlike flooded lubrication, where the bearing components remain permanently submerged in an oil filled housing, with directed lubrication the components are not submerged and the oil is delivered from an external source directly to the working surfaces of the tilting pads after which it falls freely away to be drained from the bottom of the housing. There are several alternative methods of realising the benefits of directed lubrication in tilting pad bearing designs. As an example, this document specifies a spray nozzle type directed lubrication system where lubricant is supplied to each pad through nozzles mounted between the pads in tilting pad thrust and journal bearings. The design concept of this type of lubrication is described.

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 Symbols and abbreviated terms

For the purposes of this document, the following symbols apply.

Table 1 — Symbols and units

Symbol	Explanation	Unit
B_{tc}	Thrust collar width	m
c_p	Specific heat capacity of lubricant	J/(kg·K)
D_d	Diameter of discharge oil hole	m
d_h	Hole diameter of nozzle	m
K_Q	Coefficient of oil flow rate	1
n_h	Number of holes per nozzle	1
n_n	Number of nozzles per bearing	1
P	Power loss	W
p_{en}	Oil supply pressure	Pa
Q	Total oil flow rate	m^3/s
Q_n	Oil flow rate per nozzle	m^3/s
ΔT	Oil temperature rise	K
ρ	Density of lubricant	kg/m^3

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