



**International
Standard**

ISO 8838

**Plain bearings — Water-lubricated
plain bearing materials**

Paliers lisses — Matériaux de paliers lisses lubrifiés à l'eau

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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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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 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.

Introduction

Water-lubricated bearings are widely used in fields such as submersible pumps, marine stern tubes, hydroelectric generator turbines, water treatment equipment, water valves and rolling equipment for steelmaking.

Water-lubricated plain bearings are used for the following conditions or reasons:

- a) oil or greases cannot be used due to equipment usage conditions;
- b) there is plenty of water available as a lubricant around the equipment;
- c) even if water for lubrication leaks, it does not pollute the environment like oil or grease.

However, when using water as a lubricant, it is necessary to take the following into account:

- water freezes at 0 °C or below and becomes vapor at 100 °C or above, at normal pressure, therefore losing load carrying capacity;
- water has low viscosity in comparison with oil;
- water cannot support a high load because the increase in viscosity that occurs in oil lubrication (elastohydrodynamic lubrication: EHL) when it is under high pressure cannot be expected in water.
- water does not have the ability that oil and grease have to prevent corrosion on shafts and bearings.

While water-lubricated plain bearings have been used in various fields around the world and the water that is used as a lubricant has its own specific features differing from oil, there have been no International Standards that apply to water-lubricated plain bearings thus far.

Plain bearings — Water-lubricated plain bearing materials

1 Scope

This document specifies requirements for the selection and use of water-lubricated plain bearing materials used in different equipment and plants under various lubrication conditions, such as

- fluid-film lubrication condition,
- mixed lubrication condition, and
- condition comprising a non-lubrication condition which shifts to a fluid-film lubrication condition.

In addition, this document also specifies requirements for mating (shaft) material, the lubrication method and for items to consider during the design of water-lubricated plain bearing materials.

The water used as a lubricant is pure water, tap water, river water or seawater. This document does not apply to the water solution of chemicals, refrigerants, liquid fuels, etc.

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 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*

ISO 4378-1, *Plain bearings — Terms, definitions, classification and symbols — Part 1: Design, bearing materials and their properties*

ISO 4378-2, *Plain bearings — Terms, definitions, classification and symbols — Part 2: Friction and wear*

ISO 4378-3, *Plain bearings — Terms, definitions, classification and symbols — Part 3: Lubrication*

ISO 8044, *Corrosion of metals and alloys — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1043-1, ISO 4378-1, ISO 4378-2, ISO 4378-3 and ISO 8044 apply.

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 <https://www.electropedia.org/>