SLOVENSKI STANDARD
SIST ISO/DIS 7146-2:2008

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Drsni leģaji - Tekoļ inski sloj kovinskih leģajev - Izrazi in znaļ ilnosti poģkodb - 2. del: Kavitacijske poģkodbe in ukrepi za njihovo prepreļ evanje

Plain bearings - Appearance and characterization of damage to metallic hydrodynamic bearings - Part 2: Cavitation erosion and its countermeasures

Paliers lisses - Aspect et caractérisation de l'endommagement des paliers métalliques à couche lubrifiante fluide - Partie 2: Érosion de cavitation et sa contre-mesure

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ICS:

21.100.10	Drsni ležaji	Plain bearings

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Fluid film metallic plain bearings — Description and characterization of damage —

Part 2: Cavitation erosion and its countermeasures

Paliers lisses métalliques à couche lubrifiante fluide — Description et caractérisation des détériorations —

Partie 2: Érosion de cavitation et sa contre-mesure

(Revision of ISO 7146:1993)

ICS 21.100.10

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Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

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Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 7146-2 was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 2, *Materials and lubricants, their properties, characteristics, test methods and testing conditions.*

ISO 7146 consists of the following parts, under the general title *Plain bearings — Fluid film metallic bearings — Terms and characteristics of damage*:

— *Part 1: General*

— *Part 2: Cavitation erosion and its countermeasures*

Introduction

In practice, damage to a bearing may often be the result of several mechanisms operating simultaneously. The damage may result from improper assembly or maintenance or from faulty manufacture of the bearing, its housing or the counterface against which it operates. In some instances, damage may be caused by a design compromise made in the interests of economy or from unforeseen operating conditions. It is the complex combination of design, manufacture, assembly, operation, maintenance and possible reconditioning which often causes difficulty in establishing the primary cause of damage.

In the event of extensive damage or destruction of the bearing, the evidence is likely to be lost, and it will then be impossible to identify how the damage came about.

In all cases, knowledge of the actual operating conditions of the assembly and the maintenance history is of the utmost importance.

The classification of bearing damage established in this International Standard is based primarily upon the features visible on the running surfaces and elsewhere, and consideration of each aspect is required for reliable determination of the cause of bearing damage.

Since more than one process may cause similar effects on the running surface, a description of appearance alone is occasionally inadequate in determining the cause of damage. In such cases, the operating conditions have to be considered.

Cavitation erosion dealt with in ISO 7146-1 is treated in this ISO 7146-2 in more details.

Fluid film metallic plain bearings — Description and characterization of damage —

Part 2:
Cavitation erosion and its countermeasures

1 Scope

This part of ISO 7146 defines, describes and classifies the characteristics of damage occurring in service in hydrodynamically lubricated metallic plain bearings due to cavitation erosion, together with possible countermeasures. It will assist in understanding of the various characteristic damages which may occur.

For the purpose of this International Standard, the term “damage to plain bearings” or “bearing damage” includes all changes in appearance occurring on the bearing surface during operation that adversely affect the performance of the bearing.

Consideration is restricted to damages which have a well-defined appearance and which can be attributed to particular causes with a high degree of certainty. Various appearances are illustrated with photographs and diagrams.

2 Normative references

The following referenced documents are indispensable for the application 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 4378-1:1997, *Plain bearings — Terms, definitions and classification — Part 1: Design, bearing materials and their properties*

ISO 4378-2:1983, *Plain bearings — Terms, definitions and classification — Part 2: Friction and wear*

ISO 4378-3:1983, *Plain bearings — Terms, definitions and classification — Part 3: Lubrication*

ISO 7146-1:xxxx, *Plain bearings — Fluid film metallic bearings — Terms and characteristics of damage — Part 1: General*

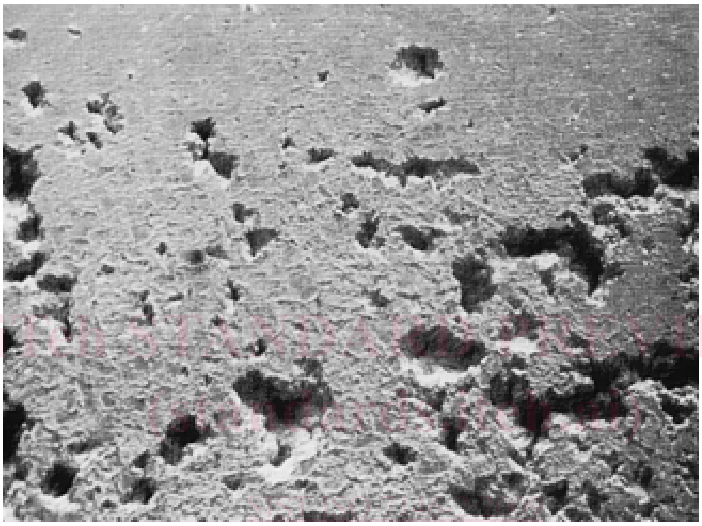
3 Terms and definitions

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

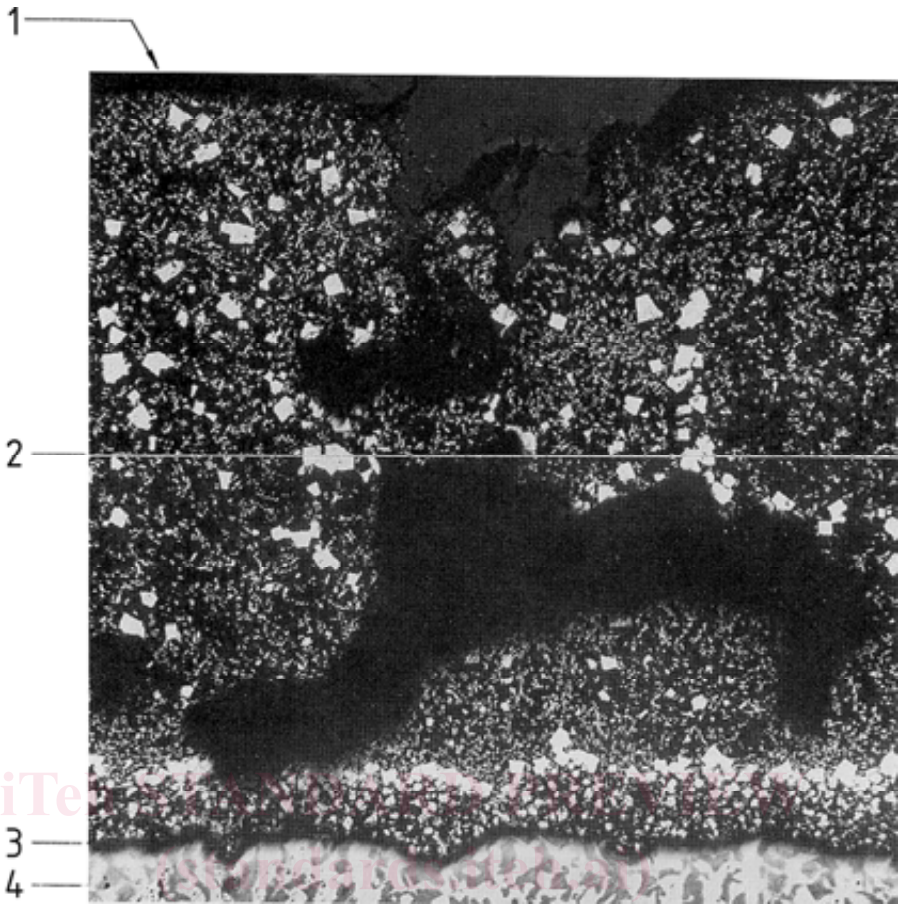
4 Cavitation erosion

4.1 Mechanism of cavitation erosion

Cavitation erosion is a damage of surface of a solid body in liquid caused by implosion (violent inward collapse) of cavities or vaporous bubbles. When the static pressure in the liquid is decreased under the vapor pressure of the liquid at a given temperature, evaporation occurs and vaporous bubbles are generated in the liquid. This phenomenon is called “cavitation”. When these cavities encounter higher pressure because they have flowed to a place of higher pressure or the pressure at the place of cavitation has increased in the meantime, they condense instantaneously and implode, causing a very high and local pressure and high temperature in the liquid. It can lead, after repeated implosion, to a “cavitation erosion” on the surface of the solid body near the place of implosion.



a) View at magnification: x 1



b) Cross-section at magnification: x 45 (etched)

Key

1 Sliding surface
2 Bearing metal (tin-based)
3 Bonding area
4 Steel backing