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Plain bearings — Bearing fatigue —

Part 2:
Test with a cylindrical specimen of a metallic bearing material

Paliers lisses — Fatigue des paliers —

Partie 2: Essai d'éprouvettes cylindriques de métal antifriction

Reference number
ISO 7905-2:1995(E)

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.

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.

International Standard ISO 7905-2 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 7905 consists of the following parts, under the general title *Plain bearings — Bearing fatigue*:

— *Part 1: Plain bearings in test rigs and in applications under conditions of hydrodynamic lubrication*

— *Part 2: Test with a cylindrical specimen of a metallic bearing material*

— *Part 3: Test on plain strips of a metallic multilayer bearing material*

— *Part 4: Tests on half-bearings of a metallic multilayer bearing material*

Annex A of this part of ISO 7905 is for information only.

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Plain bearings — Bearing fatigue —

Part 2:
Test with a cylindrical specimen of a metallic bearing material

1 Scope

This part of ISO 7905 specifies a method for the determination of the endurance limit in fatigue of bearing materials alone (not attached to steel backing).

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 7905. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7905 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 468:1982, *Surface roughness — Parameters, their values and general rules for specifying requirements.*

3 Test specimens

The test specimens shall be cylindrical and in accordance with figure 1.

Dimensions in millimetres

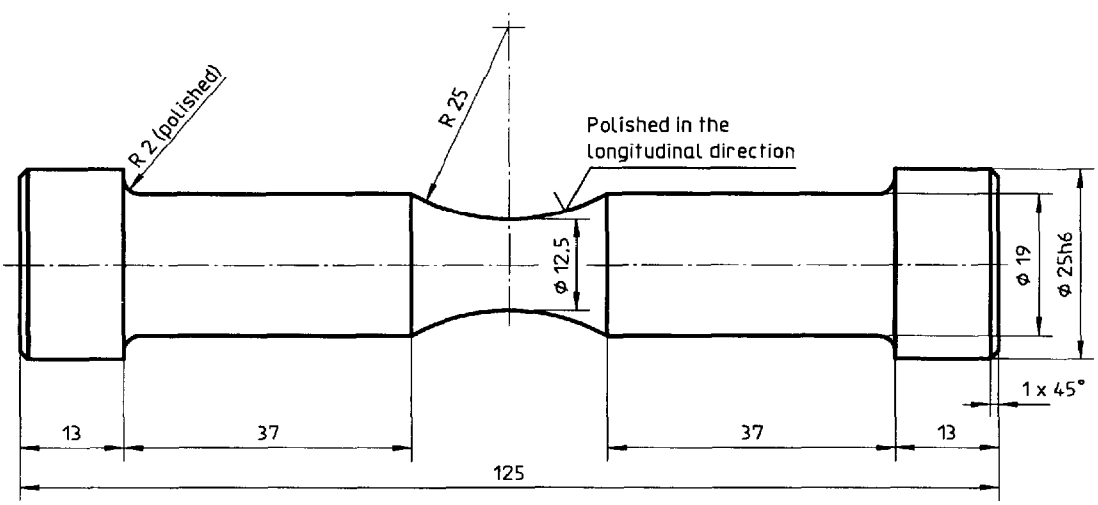

Figure 1 — Specimen dimensions

The bearing material and the surface finish of the test specimen shall be representative of the manufacturing sequence used in producing bearings. Care should be taken before and during testing not to damage the surface mechanically or by corrosion. The roughness of the surface shall be $R_z < 6$ µm (in accordance with ISO 468). The deficiency of this test method lies in the absence of possible residual stress associated with the bearing manufacturing process and that the metallurgical structure may differ significantly from that of a thin layer applied to the steel backing of a bearing.

4 Test method

The ultimate number of stress cycles is 5×10^7. The fatigue strength for finite life shall be recorded commencing at 10^7 cycles. The test frequency shall have a range of 50 Hz to 80 Hz. In order to abridge the testing duration and to enhance the statistical estimate of fatigue life, several test rigs may be run simultaneously.

5 Evaluation and presentation of test results

The endurance limit stresses should be presented in the form of σ_{el}-N curves at predetermined temperature (± 2 °C) against a detailed description of the bearing material. Normally σ_{el}-N curve testing is terminated for practical considerations at 50×10^6 stress cycles. The endurance limit stress may be quoted at a specified number of cycles, e.g. 3×10^6, 10×10^6, 25×10^6 or 50×10^6. A specimen without failure during fatigue testing to a specified endurance should be identified in the report. Due to the scatter of test results normally experienced and the statistical nature of the fatigue limit, it is recommended that the results be evaluated on the basis of a statistical method.

Another presentation of the endurance limit stress may be effected by means of the Haigh diagram which plots stress amplitude against mean stress. Metallographic examination will provide detailed evidence of the damage mechanism, corrosive attack and diffusion resulting from thermal effects.

Annex A
(informative)

Bibliography

[1] ISO 3548:1978, *Plain bearings — Thin-walled half bearings — Dimensions, tolerances and methods of checking.*

[2] ISO 4378-1:1983, *Plain bearings — Terms, definitions and classification — Part 1: Design, bearing materials and their properties.*

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Descriptors: bearings, plain bearings, tests, fatigue tests.

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