
**Plain bearings — Hardness testing of
bearing metals —**

**Part 2:
Solid materials**

Paliers lisses — Essai de dureté des matériaux antifriction —

Partie 2: Matériaux massifs

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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 4384-2 was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 2, *Materials and lubricants, their properties, characteristics, test methods and testing conditions*.

This second edition cancels and replaces the first edition (ISO 4384-2:1982), of which it constitutes a minor revision.

ISO 4384 consists of the following parts, under the general title *Plain bearings — Hardness testing of bearing metals*:

— *Part 1: Multilayer bearings materials*

— *Part 2: Solid materials*

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Plain bearings — Hardness testing of bearing metals —

Part 2: Solid materials

1 Scope

This International Standard specifies parameters for the hardness testing of solid materials for plain bearings made from cast and wrought copper and aluminium alloys by machining and forming their wrought products and ingots, and of tin-based ingots. It represents a supplement to existing International Standards on hardness testing and, therefore, includes only the extensions and restrictions for observation compared to those publications.

Owing to the heterogeneous structural composition of the majority of these bearing metals, a Brinell test is used.

2 Specimen

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The surface of the specimen in the test area shall be metallic bright and conditioned in such a way that a satisfactory measurement of the test impression is possible. During the preparation of the specimens, it shall be ensured that the material is not heated. [ISO 4384-2:2011](#)

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The testing of cast and wrought copper and aluminium alloys shall always be carried out on turned or filed and subsequently prepared surfaces, with the exception of hot-pressed parts.

If the manufacturing method permits, the specimens shall be carefully polished. In the case of lead and tin alloys with a roughness value of $R_t \leq 6 \mu\text{m}$, the polishing may be carried out with abrasive paper of grain size 240 and in the case of copper and aluminium alloys with a roughness value of $R_t \leq 4 \mu\text{m}$, with abrasive paper of grain size 320 and with a suitable lubricant.

3 Procedure

The test conditions shall be in accordance with Table 1.

Table 1 — Test conditions

Form and nature of bearing material	Thickness of bearing material mm	Test condition ^a	Test temperature °C
Bars, tubes based on Cu and Al	—	Preferably: HBW 2,5/62,5/10 Or, if the test surface is too small: HBW 1/10/10 In the case of cast alloys with larger porosity: HBW 5/250/10	18 to 24
Ingots based on Sn	>7	HBW 10/250/180	
Ingots based on Cu and Al	>7	HBW 10/1000/10	

^a EXAMPLE HBW 5/250/10 = Brinell hardness determined with a ball of 5 mm in diameter and with a test force of 2 452 N applied for 10 s.

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- [1] ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

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