INTERNATIONAL STANDARD

ISO 4384-2

Third edition
2022-01

Plain bearings — Hardness testing of bearing metals —

Part 2: Solid materials

Paliers lisses — Essai de dureté des matériaux antifriction —
Partie 2: Matériaux massifs

Reference number
ISO 4384-2:2022(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Specimen **1**
5 Procedure **2**
Bibliography **3**

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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 2, *Materials and lubricants, their properties, characteristics, test methods and testing conditions*.

This third edition cancels and replaces the second edition (ISO 4384-2:2011), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Clause 2 "Normative references" has been introduced;

— additional requirements and explanations have been added in Clause 5 "Procedure".

A list of all parts in the ISO 4384 series can be found on the ISO website.

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.

Plain bearings — Hardness testing of bearing metals —

Part 2: Solid materials

1 Scope

This document 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, of their wrought products and ingots, and of tin-based ingots. This document is 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 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 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

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

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology 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/

4 Specimen

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 indentation is possible. During the preparation of the specimens, it shall be ensured that the material is not heated.

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 ground. In the case of lead and tin alloys with a total height of roughness profile of $R_t \leq 6$ µm according to ISO 4287, the grinding may be carried out with abrasive paper of grain size P 240 and in the case of copper and aluminium alloys with a roughness value of $R_t \leq 4$ µm, with abrasive paper of grain size P 320 and with a suitable lubricant.

5 Procedure

The test conditions shall be in accordance with Table 1.

Table 1 — Test conditions according to ISO 6506-1

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 10/1 000/10	

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.

For materials exhibiting strong anisotropy the position within the bearing and the orientation of the specimen used for the hardness test shall be agreed between the customer and supplier.

Provision should be made for suppliers and customers to select alternative combinations of indenter diameter, load and duration if those defined in the table will result in too large or too small indentations. For instance, ingots based on Cu with high Pb content would result in very large indents if HBW 10/1 000/10 was used as mandated in Table 2. With agreement between customer and supplier other test conditions may be employed if those stated cannot be employed for the material in question.

Bibliography

ISO 6344-1, *Coated abrasives — Grain size analysis — Part 1: Grain size distribution test*