INTERNATIONAL STANDARD

ISO 4384-1

Second edition
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Plain bearings — Hardness testing of bearing metals —

Part 1: Compound materials

Paliers lisses — Essai de dureté des matériaux antifriction —

Partie 1: Matériaux multicouches

Reference number
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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 3.

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 part of ISO 4384 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4384-1 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 4384-1:1982), which has been technically revised.

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

— *Part 1: Compound materials*

— *Part 2: Solid materials*

Plain bearings — Hardness testing of bearing metals —

Part 1: Compound materials

1 Scope

This part of ISO 4384 specifies parameters for the hardness testing of compound materials for plain bearings made from steel and bearing metal with bearing metals based on lead, tin, copper and aluminium, manufactured by casting, sintering or plating. It represents a supplement to the existing ISO publications on hardness testing and therefore includes only the extensions and restrictions to be observed as compared to those publications.

The measuring method applied depends on the bearing metal layer thickness, its hardness and its structure.

Owing to the heterogeneous structural composition of the majority of these bearing metals, a Brinell test is preferred. The Vickers test should be used in the case of very small layer thicknesses.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO 4384. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 4384 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method.*

3 Specimen

The surface of the specimen in the test area shall be bright metallic 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.

The test surface may be plane or curved. See ISO 6507-1 concerning correction factors for cylindrical surfaces.

4 Procedure

The test conditions shall be as given in Table 1.

Table 1 — Test conditions

Compound material	Layer thickness of bearing material mm		Test conditions [a]	Test temperature °C
Steel Pb-alloys Sn-alloys	⩽ 0,2		Small load hardness testing [b]	18 to 24
	> 0,2	⩽ 1,5	HB 1/1	
	> 1,5	⩽ 4	HB 2,5/15,625/30	
	> 4	⩽ 7	HB 5/62,5/30	
	> 7		HB 10/250/30	
Steel CuPbSn-alloys Al-alloys	⩽ 0,25		Small load hardness testing [b]	
	> 0,25	⩽ 1,5	HB 1/5/30	
	> 1,5		HB 2,5/31,25/30	
Steel	⩽ 0,5		Small load hardness testing [b]	
	> 0,5		HB 1/30	

[a] EXAMPLES

HB 5/62,5/30 indicates a Brinell hardness reading determined using a ball of 5 mm diameter and a test force of 612,9 N applied for 30 s.

HB shall be differentiated thus:

HBS, with a steel ball;

HBW, with a hardmetal ball.

[b] Non-mandatory determination.

5 Test report

The test report shall include the following information:

a) reference to this part of ISO 4384, i.e. ISO 4384-1;

b) all details necessary for identification of the test sample;

c) test conditions and result obtained;

d) all operations not specified by this part of ISO 4384, or regarded as optional;

e) details of any occurrence which may have affected the result.

NOTE 1 There is no general process of accurately converting Brinell hardness into other scales of hardness or into tensile strength. These conversions therefore should be avoided, unless a reliable basis for the conversion can be obtained by comparison tests.

NOTE 2 It should be noted that for anisotropic materials, for example those which have been heavily cold-worked, there will be a difference between the lengths of the two diameters of the indentation. The specification for the product may indicate limits for such differences.

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