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

**Part 1:
Multilayer bearings materials**

*Paliers lisses — Essai de dureté des matériaux antifriction —
Partie 1: Matériaux multicouches pour paliers lisses*

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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 4384-1 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 third edition cancels and replaces the second edition ISO 4384-1:2000, 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: Multilayer bearings materials*
- *Part 2: Solid materials*

Plain bearings — Hardness testing of bearing metals —

Part 1: Multilayer bearings 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 copper and aluminium, manufactured by casting, sintering or bonding. It represents a supplement to the existing ISO publications on hardness testing and, therefore, includes only the extensions and restrictions to be observed compared to those publications.

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

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 6506-1, *Metallic materials — Brinell 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 shall be plane in accordance with ISO 6506-1.

Differing to ISO 6506-1, the thickness of the test piece shall be at least four times the depth of indentation.

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 Cu-alloys	≤ 0,20		Small load hardness testing ^b	18 to 24
	> 0,20	≤ 1,5	HBW 1/10	
	> 1,5		HBW 2,5/62,5/30	
Steel Al-alloys	≤ 0,20		Small load hardness testing ^b	
	> 0,20	≤ 1,5	HBW 1/5/30	
	> 1,5		HBW 2,5/31,25/30	
Steel	≤ 0,5		Small load hardness testing ^b	
	> 0,5		HBW 1/30	
^a EXAMPLE HBW 2,5/62,5/30 = Brinell hardness determined with a ball of 2,5 mm diameter and with a test force of 612,9 N applied for 30 s.				
^b Not mandatory determination.				

5 Test report

The test report shall include the following information:

- reference to this part of ISO 4384, i.e. ISO 4384-1;
- all details necessary for identification of the test sample;
- test conditions and result obtained;
- all operations not specified by this part of ISO 4384, or regarded as optional;
- details of any occurrence which might 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, are intended to be avoided, unless a reliable basis for the conversion can be obtained by comparison tests.

NOTE 2 Note 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 can indicate limits for such differences.