BS EN ISO 6506-1:2014

BSI Standards Publication

Metallic materials — Brinell hardness test

Part 1: Test method

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National foreword

This British Standard is the UK implementation of EN ISO 6506-1:2014. It supersedes BS EN ISO 6506-1:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/101/5, Indentation hardness testing.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Foreword

This document (EN ISO 6506-1:2014) has been prepared by Technical Committee ISO/TC 164 “Mechanical testing of metals” in collaboration with Technical Committee ECISS/TC 101 “Test methods for steel (other than chemical analysis)” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2015, and conflicting national standards shall be withdrawn at the latest by March 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 6506-1:2005.

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Endorsement notice

The text of ISO 6506-1:2014 has been approved by CEN as EN ISO 6506-1:2014 without any modification.

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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.

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).

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The committee responsible for this document is ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 3, *Hardness testing*.

This third edition cancels and replaces the second edition (ISO 6506-1:2005), which has been technically revised.

ISO 6506 consists of the following parts, under the general title *Metallic materials — Brinell hardness test*:

— *Part 1: Test method*

— *Part 2: Verification and calibration of testing machines*

— *Part 3: Calibration of reference blocks*

— *Part 4: Table of hardness values*

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INTERNATIONAL STANDARD ISO 6506-1:2014(E)

Metallic materials — Brinell hardness test —

Part 1:
Test method

1 Scope

This part of ISO 6506 specifies the method for the Brinell hardness test for metallic materials. It is applicable to both fixed location and portable hardness testing machines.

For some specific materials and/or products, particular International Standards exist (e.g. ISO 4498) and make reference to this International Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4498, *Sintered metal materials, excluding hardmetals — Determination of apparent hardness and microhardness*

ISO 6506-2:2014, *Metallic materials — Brinell hardness test — Part 2: Verification and calibration of testing machines*

ISO 6506-3:2014, *Metallic materials — Brinell hardness test — Part 3: Calibration of reference blocks*

ISO 6506-4, *Metallic materials — Brinell hardness test — Part 4: Table of hardness values*

3 Principle

An indenter (tungsten carbide composite ball with diameter, D) is forced into the surface of a test piece and, after removal of the force, F, the diameter of the indentation, d, left in the surface is measured.

The Brinell hardness is proportional to the quotient obtained by dividing the test force by the curved surface area of the indentation. The indentation is assumed to take the shape of the unloaded ball indenter, and its surface area is calculated from the mean indentation diameter and the ball diameter, using the formula given in Table 1.

4 Symbols and abbreviated terms

4.1 See Figure 1 and Table 1.

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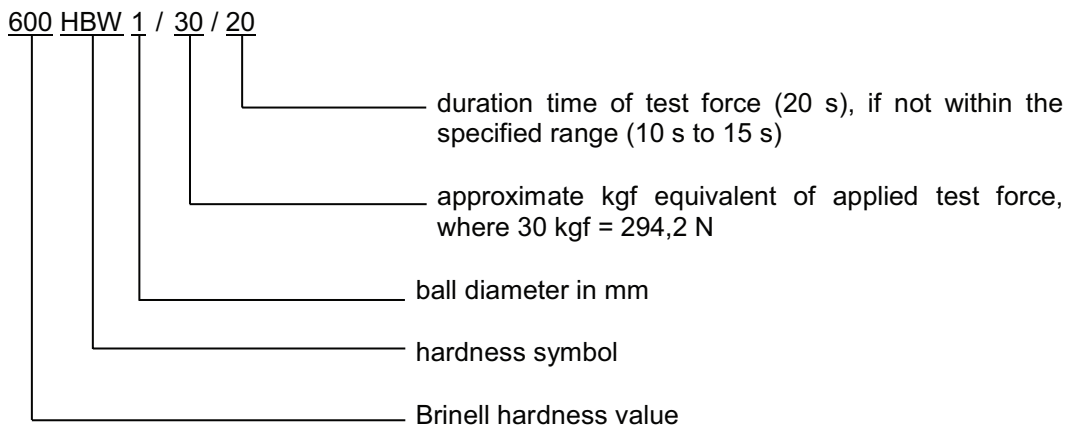
Table 1 — Symbols and abbreviated terms

Symbol/ abbreviated term	Definition	Unit
D	Diameter of the ball	mm
F	Test force	N
d	Mean diameter of the indentation $d = \frac{d_1 + d_2}{2}$	mm
d_1, d_2	Indentation diameters measured at approximately 90°	mm
h	Depth of indentation $h = \frac{D}{2}\left(1 - \sqrt{1 - \frac{d^2}{D^2}}\right)$	mm
HBW	Brinell hardness $= \text{constant (see Note)} \times \frac{\text{Test force}}{\text{idealized surface area of indentation}}$ $\text{HBW} = 0{,}102 \times \frac{2F}{\pi D^2\left(1 - \sqrt{1 - \frac{d^2}{D^2}}\right)}$	
$0{,}102 \times F/D^2$	Force-diameter index	
NOTE constant $= 0{,}102 \approx \frac{1}{9{,}806\,65}$, where 9,806 65 is the conversion factor from kgf to N.		

4.2 The following is an example of the designation of Brinell hardness, HBW.

EXAMPLE



NOTE In former editions of this International Standard, when use of a steel ball was permitted, the Brinell hardness was denoted by HB or HBS.

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