

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

ICS 77.040.10; 77.160

National foreword

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The UK participation in its preparation was entrusted to Technical Committee ISE/65, Sintered metal components, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
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Summary of pages

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

*Matériaux métalliques frittés, à l'exclusion des métaux-durs —
Détermination de la dureté apparente et de la microdureté*



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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.

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ISO 4498 was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*, Subcommittee SC 3, *Sampling and testing methods for sintered metal materials (excluding hardmetals)*.

This first edition of ISO 4498 cancels and replaces: ISO 4498-1:1990, and ISO 4498-2:1981.

Introduction

Sintered metal materials generally have a porous structure. Therefore, they can be understood as composite metal/pore materials. That is why this International Standard describes two procedures to determine their hardness:

- Procedure 1 for the macro hardness (this is the apparent hardness);
- Procedure 2 for the micro hardness (this is the hardness of the metallic phase only).

Tests in Procedure 1 determine Vickers, Brinell and/or Rockwell macrohardnesses — their acronyms are: HV, HB, and HR. These tests determine the apparent hardness (macrohardness) of the materials because indentations generally include both the solid phase and a number of pores. The usual test forces applied to an indenter are from 10 N to 2 000 N.

The apparent hardness value is often used as an expression of the mechanical strength of the material as a whole; it is usually lower than that of a solid material of the same composition and metallurgical condition. However, this does not imply that the functional characteristics (for example wear resistance) are necessarily inferior to those of an equivalent full-density material.

The apparent hardness is a macrostructural property. It characterises the material taken as a whole.

Tests in Procedure 2 determine the Vickers and/or Knoop microhardnesses of the material — their acronyms are: HV_a , HK_a ¹⁾. The usual test forces applied to an indenter are from 0,147 N to 1,960 N for Vickers, and 0,981 N for Knoop.

The microhardness is a microstructural property used to control chemical composition, heat treatment or surface treatment. For these purposes, it is necessary to ensure that hardness test indentations are small enough not to include any visible pores, but only the solid phase.

1) Where a is the test load, in kilograms.