
International Standard



4498/2

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**Sintered metal materials, excluding hardmetals —
Determination of apparent hardness —
Part 2 : Case-hardened ferrous materials, surface enriched
by carbon or carbon and nitrogen**

iTeh STANDARD PREVIEW

*Matériaux métalliques frittés à l'exclusion des métaux-durs — Détermination de la dureté apparente — Partie 2 : Matériaux
ferreux durcis en surface par enrichissement superficiel en carbone ou carbone et azote*

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[ISO 4498-2:1981](#)

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Descriptors : powder metallurgy, sintered products, tests, mechanical tests, hardness tests, sampling, test specimen conditioning.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4498/2 was developed by Technical Committee ISO/TC 119, *Powder metallurgy*, and was circulated to the member bodies in November 1980.

It has been approved by the member bodies of the following countries:

Bulgaria	India	Spain
Canada	Italy	Sweden
China	Korea, Rep. of	Switzerland
Czechoslovakia	Poland	United Kingdom
France	Romania	USA
Germany, F.R.	South Africa, Rep. of	USSR

No member body expressed disapproval of the document.

Sintered metal materials, excluding hardmetals — Determination of apparent hardness — Part 2 : Case-hardened ferrous materials, surface enriched by carbon or carbon and nitrogen

1 Scope and field of application

This Part of ISO 4498 specifies methods of hardness testing the surfaces of sintered metal materials which have been heat treated in such a way that the hardness is not uniform in the section to a depth of 5 mm below the surface. It therefore applies to materials in which the hardness is obtained essentially by surface enrichment by carbon or by carbon and nitrogen, for example by carburizing, carbonitriding, nitrocarburizing or sulphidizing.

2 References

ISO/R 146, *Verification of Vickers hardness testing machines.*

ISO/R 1024, *Rockwell superficial hardness test (N and T scales) for steel.*

ISO 6507/1, *Metallic materials — Hardness test — Vickers test — Part 1 : HV 5 to HV 100.*¹⁾

3 Principle

Determination of the apparent hardness of a test piece by one of the following two methods :

- a) Vickers hardness test, using a test force of 49,03 N (HV 5);

NOTE — If the effective case-depth is small, a test force of 9,807 N (HV 1) may be used by agreement between the parties.

- b) Rockwell superficial hardness test, using a test force of 147,1 N (HR 15 N).

NOTE — If the apparent surface hardness is high, a test force of 294,2 N (HR 30 N) may be used, but only after agreement between parties.

The choice of test method shall be subject to agreement between the parties.

4 Apparatus

The apparatus shall be as described in ISO/R 1024 in the case of Rockwell hardness testing. Apparatus for Vickers hardness testing is described in ISO/R 146.

5 Sampling and preparation of test pieces

5.1 Since the apparent hardness of a sintered material is affected by density, which can vary in different zones of the part, the position of the hardness indentations, for the purpose of quality control, shall be agreed between the parties.

5.2 The sintered metal surface shall be clean, smooth and flat in order to obtain well-defined hardness indentations. This requirement is particularly important when determining Vickers hardness. It is generally found sufficient to clean the surface with a suitable solvent. Alternatively, the surface may be lightly polished provided that laboratory measurements have shown that the influence of such polishing is insignificant.

NOTE — This polishing may be carried out, for example, by using metallographic paper or 6 µm diamond paste.

6 Test requirements

6.1 The Rockwell hardness test shall be carried out in accordance with ISO/R 1024. The Vickers hardness test will form the subject of ISO 6507/1.

6.2 The hardness shall be determined in the specified zone of the test piece, making a number of indentations either by the Vickers HV 5 test method or by the Rockwell superficial HR 15 N test method.

6.3 When determining Vickers hardness, an indentation shall be disregarded if it does not have clearly defined corners.

6.4 Five acceptable indentations shall be made and the corresponding hardness values calculated (or simply read in the case of the Rockwell hardness test). The lowest hardness value shall be discarded.

7 Expression of results

Report the arithmetical mean of the four determinations retained (see 6.4), rounded to the nearest whole number.

Hardness values shall not be converted from one scale to another.

1) At present at the stage of draft.

8 Test report

The test report shall include the following information :

- a) reference to this International Standard;
- b) all details necessary for the identification of the test sample and of the test zone;
- c) the result obtained, followed by the appropriate symbol and test conditions in accordance with ISO 6507/1 or ISO/R 1024;
- d) all operations not specified in this International Standard, or regarded as optional;
- e) details of any occurrence which may have affected the result.

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