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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 531.1-2008

**Rubber, vulcanized or thermoplastic -- Determination of
indentation hardness -- Part 1: Durometer method (Shore
hardness)**

(English Translation)

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Foreword

GB/T 531 Rubber Vulcanized or Thermoplastic - Determination of Indentation

Hardness, includes.

--- Part 1. Durometer Method (Shore Hardness);

--- Part 2. IRHD Pocket Meter Method.

This Part belongs to Part 1 of GB/T 531.

This Part equivalently adopts the international standard ISO 7619-1:2004 Rubber

Vulcanized or Thermoplastic - Determination of Indentation Hardness - Part 1.

Durometer Method (Shore Hardness).

For the benefit of use, the following editorial changes are made against the original ISO standard.

a) Use "this Part" to replace "this International Standard";

b) Use decimal point "." to replace the comma "," serving as the decimal point;

c) Delete the foreword of the international standard;

d) Delete the Footnote 1) of the Clause 2 in the original ISO standard; the Footnote

2) in 8.2, as well as the Footnote 3) in the Bibliography.

This Part replaced the Shore A, D Scale test methods in the GB/T 531-1999 Rubber - Determination of Indentation Hardness by Means of Pocket Hardness Meters; meanwhile add the AO, AM scale test methods. This Part excluded the IRHD Pocket Meter Method in the GB/T 531-1999 Rubber - Determination of Indentation Hardness by Means of Pocket Hardness Meters.

The major technical differences between this Part and GB/T 531-1999 are as follows.

- Add the AO scale for rubber in low hardness range (Clause 1 of this Edition);
- Add the AM scale for thin test piece (Clause 1 of this Edition);
- Describe the use of stand in details (4.3 of this Edition);
- Introduce the regulation on the pressure foot area (4.1.1 and 4.2.1 of this Edition);
- For vulcanized rubber or unknown type of rubber, change the retention time of spring test force from "1s" to "3s". Since the hardness value drops significantly in the first few seconds, it can give more accurate results (7.1 of 1999 Edition;

7.2 of this Edition);

- For the thermoplastic rubber, introduce 15s for the retention time of the spring test force. Because its hardness value decreases for a longer period of time against the vulcanized rubber; such time regulation is the same as that specified in ISO 868 [1] (7.2 of this Edition);
- Change the geometry tolerance of the indenter and the calibration tolerance of the spring test force; so that improve the accuracy of the durometer (4.1.2, 4.2.2,

8.1 of 1999 Edition; 4.1.2, 4.2.2, 4.4 of this Edition).

This Part was proposed by China Petroleum and Chemical Industry Association.

This Part shall be under the jurisdiction of Rubber Physics and Chemical Test Methods Subcommittee of National Technical Committee for Standardization of Rubber (SAC/TC 35/SC 2).

Chief drafting organization of this Part. Guangdong Provincial Institute of Metrology
Introduction.

Participating drafting organization of this Part. Shanghai Liuling Instrument Factory.

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Participating drafting staffs of this Part. Zuo Weizhong, and Yu Guoan.

The historical editions replaced by this Standard are as follows.

--- GB/T 531-1965, GB/T 531-1992, GB/T 531-1999.

1 Scope

This Part specifies a method for determining the indentation hardness (Shore hardness) of vulcanized or thermoplastic rubber using durometers with the following scales.

2 Normative References

The provisions in following documents become the provisions of this Part through reference in this Part. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Part, however, parties who reach an agreement based on this Part are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

3 Principle and Selection of Shore Durometer

The measurement principle of the shore durometer is to press the specific shape of indenter into the rubber sample under the specific conditions and form the indentation depth; then convert the indentation depth into the hardness value.

4 Apparatus

The Types A, D indenters shall be formed from a hardened steel rod with diameter of

1.25 mm ± 0.15 mm; their shapes are shown in Figures 1, 2, respectively. Type AO

indenter is the sphere with a radius of 2.5 mm ± 0.02 mm; its shape is shown in Figure

3.

5 Test Piece

The other dimensions of the test piece shall be sufficient to permit measurements at least 12 mm away from any edge for Shore Types A and D durometers, 15 mm away from any edge for Shore Type-AO, and 4.5 mm away from any edge for Type-AM, respectively.

6 Conditioning

Where practical, test pieces shall be conditioned immediately before testing for a minimum period of 1 h at the standard laboratory temperature in accordance with GB/T

2941 The same temperature shall be used throughout any single test or series of tests

intended to be comparable.

7 Procedure

Apply a spring test force in accordance with 4.3.3 sufficient only to obtain firm contact between the pressure foot and the test piece; after that, take the reading at the specified time.

Make five measurements of hardness at different positions on the test piece; then take the average value. For Shore Type-A, Type-D and Type-AO durometers, the interval for any two different positions shall be at least 6 mm; while for the Shore Type-AM durometer, the interval shall be at least 0.8mm.

8 Calibration and Checking

Press the Shore Type-A durometer against a flat piece of glass and adjust the reading on the scale to give 100 IRHD. Use a set of standard rubber blocks covering the hardness range approx. 30 IRHD to 90 IRHD to calibrate it.

9 Test Report

The test report shall include the following information.

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