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

GB/T 39693.4-2025

Replacing GB/T 531.1-2008

**Rubber, vulcanized or thermoplastic - Determination of
hardness - Part 4: Indentation hardness by durometer method
(Shore hardness)
(English Translation)**

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 4 of GB/T 39693, "Determination of Hardness of Vulcanized or Thermoplastic Rubber". GB/T 39693 has been issued.

The following parts were laid out.

---Part 1: Introduction and Guide;

---Part 2: International Hardness of Rubber (10IRHD~100IRHD);

---Part 3: Determination of Hardness at a Fixed Test Force using the Ultra-Low Rubber Hardness (VLRH) Scale;

---Part 4: Determination of indentation hardness using the Shore hardness tester method;

---Part 5: Determination of indentation hardness using a portable rubber hardness tester;

---Part 6: IRHD method for determining the apparent hardness of rubber rollers;

---Part 7: Shore Hardness Test for Apparent Hardness of Rubber Rollers;

---Part 8: Zhao's Hardness (P)

---Part 9: Calibration and Verification of Hardness Testers this document replaces GB/T 531.1-2008 "Test Method for Indentation Hardness of Vulcanized Rubber or Thermoplastic Rubber - Part 1: Shore Hardness".

Compared with GB/T 531.1-2008, the main technical changes in the "Shore Hardness Test Method" are as follows, apart from structural adjustments and editorial modifications.

a) Added instructions on precision when using the stent (see 6.3.1);

- b) A new provision has been added stipulating that the minimum time interval between vulcanization and testing should be 16 hours (see Chapter 8);
- c) Added specific instructions on selecting test times and methods for determining test times for unknown materials (see 9.2);
- d) The requirement for the number of measurements has been changed; for known materials, the number of measurements has been reduced from 5 to 3 (see 9.3, 7.3 of the 2008 edition);
- e) The relevant provisions for standard rubber blocks have been changed (see 10.2, 8.2 of the 2008 edition);
- f) Added methods for representing experimental results [see Chapter 12 d)].

This document is equivalent to ISO 48-4:2018 "Determination of hardness of vulcanized or thermoplastic rubbers - Part 4: Using Shore hardness testers".

Shore hardness method for determining indentation hardness.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Rubber and Rubber Products (SAC/TC35).

Introduction

GB/T 39693, "Determination of Hardness of Vulcanized Rubber or Thermoplastic Rubber," aims to establish a standard for determining the hardness of vulcanized rubber or thermoplastic rubber.

The experimental method is proposed to consist of nine parts.

---Part 1: Introduction and Guidelines. This section aims to introduce various aspects of hardness testing for vulcanized or thermoplastic rubbers and to define hardness...

The terminology and definitions used in the testing provide guidance for the appropriate selection of hardness testing methods.

---Part 2: International Hardness of Rubber (10 IRHD~100 IRHD). The purpose is to specify the hardness of vulcanized rubber or thermoplastic rubber.

International Hardness (IRHD) testing method.

---Part 3: Determination of test force hardness using the Very Low Rubber Hardness (VLRH) scale. The purpose is to specify the hardness of vulcanized rubber or thermoplastic rubber.

A method for determining the hardness of rubber under constant test force using an ultra-low rubber hardness (VLRH) scale.

---Part 4: Determination of indentation hardness using the Shore hardness tester (Shore hardness). The purpose is to specify the indentation hardness of vulcanized rubber or thermoplastic rubber.

The method for determining indentation hardness using the Shore hardness tester (Shore hardness).

---Part 5: Determination of indentation hardness using a portable international hardness tester for rubber. The purpose is to specify the indentation hardness of vulcanized or thermoplastic rubbers.

A method for determining indentation hardness using a portable international rubber hardness tester.

---Part 6: IRHD Method for Determining the Apparent Hardness of Rubber Rollers. The purpose is to specify the IRHD method for vulcanized or thermoplastic rubber.

Method for determining the apparent hardness of rubber rollers.

---Part 7: Shore Hardness Test for Apparent Hardness of Rubber Rollers. The purpose is to specify the Shore hardness of vulcanized rubber or thermoplastic rubber for use.

A method for determining the apparent hardness of rubber rollers using a hardness meter.

---Part 8: Zhao's Hardness (P) Zhao's hardness (P)

---Part 9: Calibration and Verification of Hardness Testers. The purpose is to establish calibration and verification procedures for various rubber hardness testers.

Determination of hardness of vulcanized rubber or thermoplastic rubber Part 4: Shore Hardness Test Determine the indentation hardness Warning 1. Users of this document should have practical experience working in a formal laboratory. This document does not cover all possible safety hazards.

Problem. Users are responsible for taking appropriate safety and health measures and ensuring compliance with relevant national regulations.

Warning 2---Some steps outlined in this document may involve the use or generation of certain wastes, which may pose a hazard to the local environment.

The relevant documents should include appropriate provisions for safe operation and disposal of waste after use.

1 Scope

This document describes a method for determining the indentation hardness (Shore hardness) of vulcanized or thermoplastic rubber using a Shore hardness tester with the following scale.

---Scale A is applicable to rubber with a standard hardness range;

---D scale is applicable to rubbers with a high hardness range;

---AO scale is suitable for rubber and sponge in the low hardness range;

---AM scale is suitable for thin rubber samples with normal hardness range.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated references are listed below.

Only the version corresponding to this date applies to this document; for undated references, the latest version (including all amendments) applies to this document.

ISO 48-9 Determination of hardness of vulcanized or thermoplastic rubbers - Part 9: Calibration and validation of hardness testers Note. GB/T 39693.9-2021 Determination of hardness of vulcanized or thermoplastic rubber-Part 9: Calibration and validation of hardness testers (ISO 48-9.

2018, IDT)

ISO 23529 General procedures for specimen preparation and conditioning in physical testing methods for rubber.

Note: GB/T 2941-2025 General procedures for specimen preparation and conditioning in physical testing of rubber (ISO 23529:2016, IDT)

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.

4 Principles

Under a specified test force, a pressure needle of a specified size is pressed into a rubber sample to form an indentation depth, and then the indentation depth is converted into a hardness value.