

ICS 83.060
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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 39693.5-2025

Replacing GB/T 531.2-2009

**Rubber, vulcanized or thermoplastic - Determination of
hardness - Part 5: Indentation hardness by IRHD pocket meter
method**

(English Translation)

Issued on: August 29, 2025

Implemented on: March 1, 2026

Issued by: State Administration for Market Regulation

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Foreword

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

This document is Part 5 of GB/T 39693, "Determination of Hardness of Vulcanized or Thermoplastic Rubber". GB/T 39693 has already published the following parts.

- 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 531.2-2009 "Test method for indentation hardness of vulcanized rubber or thermoplastic rubber - Part 2: Portable..." Compared with GB/T 531.2-2009, the main technical changes in the "International Hardness Tester Method for Rubber" are as follows, apart from structural adjustments and editorial modifications.
 - a) A new type of presser foot in a circular shape has been added (see 5.1.1);
 - b) Increased requirements for sample preparation (see 6.1);

- c) The regulations for instrument calibration have been changed (see 9.1, 8.1 in the 2009 edition);
- d) The requirements and time intervals for verification using standard rubber blocks have been changed (see 9.2, 8.2 of the 2009 edition);
- e) Added examples of how to represent experimental results [see Chapter 10 d)].

This document is equivalent to ISO 48-5:2018 "Determination of hardness of vulcanized or thermoplastic rubber - Part 5: Portable rubber presses".

Indentation hardness was determined using an international hardness tester.

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 test method 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.

Methods for determining International Hardness (IRHD).

---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: Shore Hardness Test (Shore Hardness) for Determining Indentation Hardness. The purpose is to specify the method for determining the indentation hardness of vulcanized rubber or thermoplastic rubber.

The Shore hardness test method (Shore hardness) is used to determine the indentation 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 (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 5: Method using a portable rubber hardness tester 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.

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 of vulcanized or thermoplastic rubber using a portable rubber hardness tester. This method primarily...

For quality control purposes, not for product specifications (see ISO 48-2). Mounting the portable hardness tester to a stand can improve its measurement accuracy.

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 48-2 Determination of hardness of vulcanized or thermoplastic rubbers - Part 2.10 IRHD to 100 IRHD Note. GB/T 39693.2-2025 Determination of hardness of vulcanized or thermoplastic rubber - Part 2: International hardness of rubber (10 IRHD~100 IRHD) (ISO 48-2:2018, IDT) 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 rubbers - 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 specified conditions, a specified indenter is pressed into the material being tested to form an indentation depth, and then the indentation depth is converted into a hardness value.