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

GB/T 39693.2-2025

Replacing GB/T 6031-2017

**Rubber, vulcanized or thermoplastic - Determination of
hardness - Part 2: Hardness between 10 IRHD and 100 IRHD**
(English Translation)

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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 2 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 6031-2017 "Determination of Hardness of Vulcanized Rubber or Thermoplastic Rubber (10IRHD~100IRHD)" and is consistent with...

Compared with GB/T 6031-2017, apart from structural adjustments and editorial changes, the main technical changes are as follows.

- a) The slight vibration device for the hardness tester in the instrument has been removed (see 5.2.5 of GB/T 6031-2017);
 - b) The requirement to use talc powder as a separating powder on the test specimen in the test procedure has been removed (see section 10 of GB/T 6031-2017).
- chapter);

c) The requirement to apply slight vibration in the test procedure has been removed (see Chapter 10 of GB/T 6031-2017);

d) The method of representing experimental results has been added (see Chapter 12).

This document is equivalent to ISO 48-2:2018 "Determination of hardness of vulcanized or thermoplastic rubber - Part 2: International hardness test of rubber".

(10IRHD~100IRHD)

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. The purpose is to introduce all 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 international hardness of vulcanized rubber or thermoplastic rubber.

Methods for determining rubber 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: 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.

Method for determining indentation hardness using the Shore hardness tester.

---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 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 or thermoplastic rubbers.

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 2:

International Hardness of Rubber (10IRHD~100IRHD) 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 of the 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 four methods for determining the hardness of vulcanized or thermoplastic rubber on flat surfaces (standard hardness methods) and four...

Methods for determining the apparent hardness of curved surfaces (apparent hardness methods). Hardness values are expressed as the International Rubber Hardness (IRHD). These measurement methods...

The applicable hardness range is 10IRHD to 100IRHD.

The main differences between these methods lie in the diameter of the spherical indenter and the magnitude of the indentation force; the appropriate method should be selected based on the specific application. The applicable scope of each method is shown in Figure

1.

This document does not describe a method for determining hardness using a portable hardness tester, which is described in ISO 48-5.

Index number explanation.

This document specifies the following four methods for determining standard hardness.

---Method N (Routine Test). Applicable to rubber with a hardness range of 35 IRHD to 85 IRHD, and can also be used for rubber with a hardness of Rubber in the range of 30IRHD to 95IRHD.

---Method H (High Hardness Test). Applicable to rubber with a hardness range of 85IRHD to 100IRHD.

---Method L (Low Hardness Test). Applicable to rubber with a hardness range of 10IRHD to 35IRHD.

---Method M (Micro-test). Essentially a scaled-down version of Method N (Routine test), it can be used for thinner and smaller samples.

It is suitable for rubber with a hardness range of 35IRHD to 85IRHD, and can also be used for rubber with a hardness range of 30IRHD to 95IRHD.

Note 1: Within the ranges of 85IRHD~95IRHD and 30IRHD~35IRHD, the hardness values measured using method N may differ from those measured using method H or method N, respectively.

The data obtained by L are not entirely consistent. For technical purposes, the difference is generally not significant.

Note 2: Due to various surface factors of rubber, such as surface roughness caused by abrasion, the results obtained from micro-tests may not be completely consistent with those obtained from conventional tests.