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JIS K 6253-3 : 2012

(JRMA/JSA)

**Rubber, vulcanized or thermoplastic—
Determination of hardness—
Part 3: Durometer method**

ICS 83.060

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In the event of any doubts arising as to the contents,
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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by the Japan Rubber Manufacturers Association (JRMA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

Consequently, **JIS K 6253**:2006 has been withdrawn and partially replaced with this Standard.

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Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

JIS K 6253 series consists of the following 5 parts under the general title “*Rubber, vulcanized or thermoplastic—Determination of hardness*”:

Part 1: General guidance

Part 2: IRHD method (hardness between 10 IRHD and 100 IRHD)

Part 3: Durometer method

Part 4: IRHD pocket meter method

Part 5: Calibration and verification of hardness testers

Rubber, vulcanized or thermoplastic— Determination of hardness— Part 3: Durometer method

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **ISO 7619-1** published in 2010 with some modifications of the technical contents.

The portions given continuous sidelines or dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies a method for determining the hardness of vulcanized or thermoplastic rubber using durometers.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 7619-1:2010 *Rubber, vulcanized or thermoplastic—Determination of indentation hardness—Part 1: Durometer method (Shore hardness)* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

WARNING : Persons using this Standard should be familiar with normal laboratory practice. This Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS K 6200 *Rubber—Vocabulary*

JIS K 6250 *Rubber—General procedures for preparing and conditioning test pieces for physical test methods*

NOTE : Corresponding International Standard: ISO 23529 *Rubber—General procedures for preparing and conditioning test pieces for physical test methods* (MOD)

JIS K 6253-1 *Rubber, vulcanized or thermoplastic—Determination of hardness—Part 1: General guidance*

JIS K 6253-5 *Rubber, vulcanized or thermoplastic—Determination of hardness—
Part 5: Calibration and verification of hardness testers*

NOTE : Corresponding International Standard: ISO 18898 *Rubber—Calibration
and verification of hardness testers* (MOD)

JIS Z 8401 *Guide to the rounding of numbers*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS K 6200** and **JIS K 6253-1** apply.

4 Principle and choice of durometer

4.1 Principle

The durometer hardness is the depth of penetration of a specified indenter forced into the material under specified conditions. Measurement of rubber hardness by a durometer or an IRHD pocket hardness meter are subjected to influence from the following factors.

- the elastic modulus of the rubber;
- the viscoelastic properties of rubber;
- the thickness of the test piece;
- the geometry of the indenter;
- the pressure exerted;
- the rate of increase of pressure;
- the interval after which the hardness is recorded.

Because of these factors, it is inadvisable to relate results obtained using a durometer directly to IRHD values, although correlations have been established for some individual rubbers and compounds.

NOTE : **JIS K 6253-2** (see literature [1] in Bibliography) specifies the method for measurement of international rubber hardness degrees (IRHD) of the range 10 IRHD to 100 IRHD. Information concerning the relationship between durometer readings and IRHD values is detailed in published literatures (see literatures [2], [3] and [4] in Bibliography).

4.2 Types and choice of durometer

Among durometers of type A, type D, type E and type AM, the scale shall be chosen as follows:

- for values less than 20 with a type D durometer: type A;
- for values less than 20 with a type A durometer: type E;
- for values over 90 with a type A durometer: type D;
- for thin test pieces (less than 6.0 mm thick): type AM.

NOTE : Type E durometer as stated in this Standard corresponds to type AO durometer in **ISO 7619-1**.

5 Apparatus

The apparatus consists of the following five components.

5.1 Pressure foot

The pressure foot for types A and D shall have a diameter of (18.0 ± 0.5) mm and a central hole of diameter (3.0 ± 0.1) mm. For type E, the pressure foot shall have a minimum area of 500 mm^2 with a central hole of diameter (5.4 ± 0.2) mm. For type AM, the pressure foot shall have a diameter of (9.0 ± 0.3) mm and a central hole of diameter (1.19 ± 0.03) mm. The tolerances on the dimension of the central hole and the requirement for the size of the pressure foot only apply to instruments used on a stand. If the instrument is not used on a stand, the pressure foot shall be such as to permit measurements at least 6.0 mm away from any edge for types A and D durometers, and 7.0 mm away from any edge for type E durometer.

5.2 Indentor

The shape and dimensions of indentor are shown in figure 1 for type A durometer, in figure 2 for type D durometer, in figure 3 for type E durometer and in figure 4 for type AM durometer. The material of indentor shall be resistant to abrasion and corrosion.