INTERNATIONAL STANDARD

ISO 48

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Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)

Caoutchouc vulcanisé ou thermoplastique — Détermination de la dureté (dureté comprise entre 10 DIDC et 100 DIDC)

Reference number
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Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 48 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Testing and analysis*.

This fifth edition cancels and replaces the fourth edition (ISO 48:2007), of which it constitutes a minor revision intended to update the precision statements in Annex B. It also incorporates the Technical Corrigendum ISO 48:2007/Cor.1:2009.

Introduction

The hardness test specified in this International Standard is intended to provide a rapid measurement of rubber stiffness, unlike hardness tests on other materials which measure resistance to permanent deformation.

Hardness is measured from the depth of indentation of a spherical indentor, under a specified force, into a rubber test piece. An empirical relationship between depth of indentation and Young's modulus for a perfectly elastic isotropic material has been used to derive a hardness scale which can conveniently be used for most rubbers.

When it is required to determine the value of Young's modulus itself, it is expected that an appropriate test method be used, for example that described in ISO 7743.

The guide to hardness testing, ISO 18517, can also be a useful reference.

Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)

WARNING — Persons using this International 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 and to ensure compliance with any national regulatory conditions.

CAUTION — Certain procedures specified in this International Standard may involve the use or generation of substances, or the generation of waste, that could constitute a local environmental hazard. Reference should be made to appropriate documentation on safe handling and disposal after use.

1 Scope

This International Standard specifies four methods for the determination of the hardness of vulcanized or thermoplastic rubbers on flat surfaces (standard-hardness methods) and four methods for the determination of the apparent hardness of curved surfaces (apparent-hardness methods). The hardness is expressed in international rubber hardness degrees (IRHD). The methods cover the hardness range from 10 IRHD to 100 IRHD.

These methods differ primarily in the diameter of the indenting ball and the magnitude of the indenting force, these being chosen to suit the particular application. The range of applicability of each method is indicated in Figure 1.

This International Standard does not specify a method for the determination of hardness by a pocket hardness meter, which is described in ISO 7619-2.

This International Standard specifies the following four methods for the determination of standard hardness.

— Method N (normal test) is appropriate for rubbers with a hardness in the range 35 IRHD to 85 IRHD, but can also be used for hardnesses in the range 30 IRHD to 95 IRHD.

— Method H (high-hardness test) is appropriate for rubbers with a hardness in the range 85 IRHD to 100 IRHD.

— Method L (low-hardness test) is appropriate for rubbers with a hardness in the range 10 IRHD to 35 IRHD.

— Method M (microtest) is essentially a scaled-down version of the normal test method N, permitting the testing of thinner and smaller test pieces. It is appropriate for rubbers with a hardness in the range 35 IRHD to 85 IRHD, but can also be used for hardnesses in the range 30 IRHD to 95 IRHD.

NOTE 1 The value of the hardness obtained by method N within the ranges 85 IRHD to 95 IRHD and 30 IRHD to 35 IRHD might not agree precisely with that obtained using method H or method L, respectively. The difference is not normally significant for technical purposes.

NOTE 2 Because of various surface effects in the rubber and the possibility of slight surface roughness (produced, for example, by buffing), the microtest might not always give results agreeing with those obtained by the normal test.

This International Standard also specifies four methods, CN, CH, CL and CM, for the determination of the apparent hardness of curved surfaces. These methods are modifications of methods N, H, L and M, respectively, and are used when the rubber surface tested is curved, in which case there are two possibilities:

a) the test piece or product tested is large enough for the hardness instrument to rest upon it; or

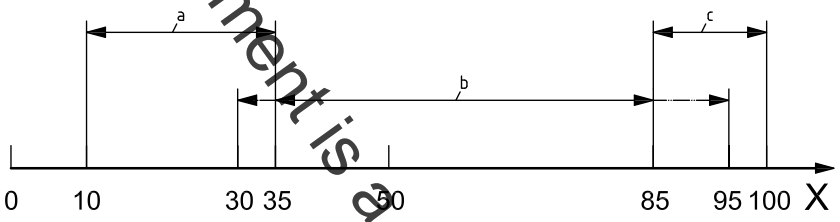
b) the test piece or product tested is small enough for both the test piece and the instrument to rest upon a common support.

A variant of b) would be where the test piece rests upon the specimen table of the instrument.

Apparent hardness can also be measured on non-standard flat test pieces using methods N, H, L and M.

The procedures described cannot provide for all possible shapes and dimensions of test piece, but cover some of the commonest types, such as O-rings.

This International Standard does not specify the determination of the apparent hardness of rubber-covered rollers, which is specified in ISO 7267 (all parts).



Key

X hardness (IRHD)

a Method L and method CL.

b Methods N and M and methods CN and CM.

c Method H and method CH.

Figure 1 — Range of applicability

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 18898, *Rubber — Calibration and verification of hardness testers*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

