
International Standard



7267/1

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**Rubber-covered rollers — Determination of apparent hardness —
Part 1 : IRHD method**

Cylindres revêtus de caoutchouc — Détermination de la dureté apparente — Partie 1 : Méthode DIDC

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7267/1 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

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Rubber-covered rollers — Determination of apparent hardness — Part 1 : IRHD method

0 Introduction

The hardness of a roller covering has traditionally been determined on the finished roller, since it is this hardness that is critical to the correct functioning of the roller in its end application. Values of hardness determined by whichever method is chosen are therefore dependent not only on the method employed and on the rubber, but also on the diameter of the roller and on the thickness of the covering and in the case of thin coverings on the nature of the roller core. For this reason the term "apparent hardness" is used to distinguish between the values obtained by the methods described in the various parts of this International Standard and those that would be obtained for the rubber if it was possible to use the standard test methods for standard test pieces forming the subjects of other International Standards.

Since rollers vary considerably in size, construction and end use, and in view of the fact that hardness determinations are made for such different purposes as specification and factory process control, it has not been possible to standardize on one test method. Consequently three methods are described, each capable of standing alone. Therefore ISO 7267 comprises the following parts :

Part 1 : IRHD method.

Part 2 : Shore-type durometer method.

Part 3 : Pusey and Jones method.

1 Scope and field of application

This part of ISO 7267 specifies a method for the determination of the apparent hardness of vulcanized rubber roller covers, expressed in international rubber hardness degrees (IRHD). The method is similar in principle to the methods used for the determination of the hardness of rubber vulcanizates in ISO 48, ISO 1400 and ISO 1818 in that it consists essentially of measuring the depth of penetration of a spherical indenter operating under a specified force. The apparatus used is similar to that described in ISO 48, ISO 1400 and ISO 1818, differing only in that the base is designed specifically for application to roller covers and similar curved surfaces.

2 References

ISO 48, *Vulcanized rubbers — Determination of hardness (Hardness between 30 and 85 IRHD)*.

ISO 471, *Rubber — Standard temperatures, humidities and times for the conditioning and testing of test pieces*.

ISO 1400, *Vulcanized rubbers of high hardness (80 to 100 IRHD) — Determination of hardness*.

ISO 1818, *Vulcanized rubbers of low hardness (10 to 35 IRHD) — Determination of hardness*.

ISO 1826, *Rubber, vulcanized — Time-interval between vulcanization and testing — Specification*.

ISO 6123/1, *Rubber- or plastics-covered rollers — Specifications — Part 1 : Requirements for hardness*.

3 Time-interval between vulcanization and finished grinding, and testing

Tests shall not be carried out less than 16 h after vulcanization and/or finished grinding and, for arbitration purposes, not less than 72 h after vulcanization (see ISO 1826).

4 Conditioning and temperature of test

Where possible, the test shall be carried out at standard laboratory temperature in accordance with ISO 471. The product under test shall be maintained under the test condition for sufficient time to reach temperature equilibrium with the test environment. Where this is impracticable, the period of time and the conditions shall be given in the product specification (see the note).

The same temperature shall be used throughout any one test or series of tests intended to be comparable.

NOTE — For large rollers having heavy metal cores, ambient conditions may not allow equilibrium temperatures to be obtained.

5 Apparatus

The apparatus used shall be essentially that described in ISO 48, "normal test" for measurements between 30 and 85 IRHD, that described in ISO 1400 for measurements between 85 and 100 IRHD, and that described in ISO 1818 for measurements between 10 and 35 IRHD, but differing in the following respects.

- a) For rollers having a radius greater than 50 mm, the base of the instrument shall have a hole below the plunger allowing free passage of the annular foot such that measurement may be made above or below the base.

The lower surface of the base shall be in the form of two cylinders parallel to each other and the plane of the base. The diameter of the cylinders and their distance apart shall be such as to locate and support the instrument on the curved surface to be tested (see figure 1).

- b) For rollers having a radius of 50 mm and less, metal jigs or V blocks shall be provided to support the journals or shafts of the rollers so that the indenter is vertically above the axis of the roller under test (see figure 2).

6 Procedure

6.1 Firmly locate the roller to be tested, with its major axis horizontal and with the area in which the hardness is to be measured uppermost. Place the measuring equipment with the axis of the plunger vertical on the roller over the position where the hardness is to be measured and lower the foot into contact with the roller surface. Bring the plunger and indenting ball into contact with the surface of the rubber under the contact force.

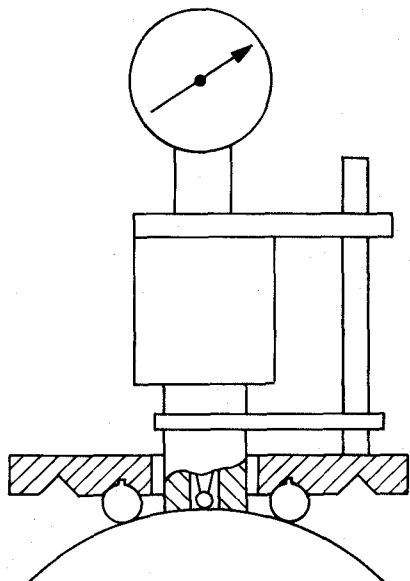


Figure 1 — Testing surfaces of large radius

After 5 s, adjust the gauge to read 100 and apply the additional major indenting force. Maintain this force for 30 s and then take the gauge reading as the hardness in IRHD.

6.2 Make three measurements at different points at least 6 mm apart within the test area at which the hardness is to be determined.

NOTE — Several test areas along the length and around the circumference of the roller may be required to determine the average hardness of the covering and the hardness variation over a single roller (see ISO 6123/1).

7 Expression of results

Express the apparent hardness as the median of the three measurements for each test area reported to the nearest whole number in IRHD.

8 Test report

The test report shall include the following information :

- a) a reference to this part of ISO 7267;
- b) a complete identification of the roller tested;
- c) conditioning and temperature of test;
- d) the apparent hardness, expressed in IRHD;
- e) the date of the test.

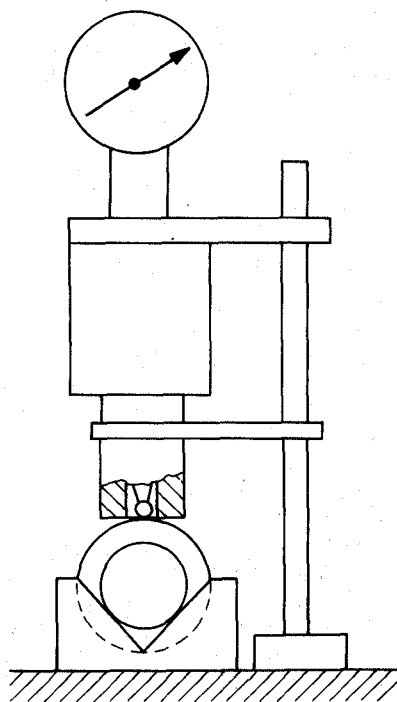


Figure 2 — Test jig for surfaces of small radius