INTERNATIONAL STANDARD

ISO 7267-3

First edition
1988-03-15

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Rubber-covered rollers — Determination of apparent hardness —

Part 3:
Pusey and Jones method

Cylindres revêtus de caoutchouc — Détermination de la dureté apparente —
Partie 3: Méthode Pusey et Jones

Reference number
ISO 7267-3 : 1988 (E)

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.

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 7267-3 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Printed in Switzerland

Rubber-covered rollers — Determination of apparent hardness —

Part 3:
Pusey and Jones 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 this International Standard 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 as the Pusey and Jones indentation value. The Pusey and Jones plastometer apparatus is used to measure the depth of indentation of an indentor under a specified force into the surface of the rubber. The indentation value should not be confused with hardness as measured by the international rubber hardness test methods ISO 48, ISO 1400 and ISO 1818, since in these methods the rubber immediately adjacent to the indentor is precompressed. The Pusey and Jones indentation value is an inverse measurement of hardness, i.e. the harder the rubber the lower the Pusey and Jones indentation value.

2 Definition

For the purpose of this part of ISO 7267, the following definition applies.

Pusey and Jones indentation value: The distance of indentation, in hundredths of a millimetre, of a ball 3,175 mm in diameter under a force of 9,8 N.

3 References

ISO 48, *Rubber, vulcanized — Determination of hardness (hardness between* 10 *and* 100 IRHD*).* [1)]

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

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.*

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

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

1) At present at the stage of draft. (Revision of ISO 48 : 1979, ISO 1400 : 1975 and ISO 1818 : 1975.)

5 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 should 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.

6 Apparatus

6.1 Plastometer, consisting of a supporting frame, an indentor, a mass for applying a fixed gravitational force on the indentor, a depth indicator, and a specimen holder.

6.1.1 Supporting frame, so configured that the indentor and mass may be independently raised or lowered vertically, permitting the indentor to rest on the surface of the test specimen and the mass to be applied subsequently to the indentor.

6.1.2 Indentor, consisting of a vertical steel shaft attached at the upper end to the spindle of the indicator gauge and having at the lower end a steel ball. The steel ball shall be 3,175 ± 0,015 mm (0.125 0 ± 0.000 5 in) in diameter and shall be made of highly polished, non-corrosive hard metal properly treated to resist wear.

6.1.3 Mass, of 1 000 ± 0,01 g.

6.1.4 Depth indicator, comprising a dial gauge or other suitable device graduated in increments of 0,01 mm (0.000 4 in) and having a range of at least 3 mm to indicate the movement of the indentor.

6.1.5 Specimen holder, consisting of a clamp made of two metal plates held together by two threaded bolts as shown in the figure. The purpose of the clamp is to hold the specimens flat and free from slight movements that might introduce variations into the test. The top plate shall be provided with a hole and slot for the operation of the indentor.

7 Procedure

7.1 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 (6.1) with the axis of the indentor (6.1.2) vertical on the roller over the position where the hardness is to be measured and lower the indentor into contact with the roller surface and until the gauge needle of the depth indicator (6.1.4) makes three revolutions. Adjust the dial gauge to read zero. Apply the indenting force by lowering the supporting plate (6.1.1) so that the mass (6.1.3) rests fully on the indentor as shown by a space of approximately 5 mm between the supporting plate and the shoulder of the mass tube. Read the amount of indentation on the gauge 60 s after the application of the force.

7.2 Make three measurements for each test area 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).

8 Expression of results

Express the apparent hardness as the median of three measurements for each test area reported to the nearest whole number as the Pusey and Jones indentation value.

9 Test report

The test report shall include the following information:

a) a reference to this part of ISO 7267;

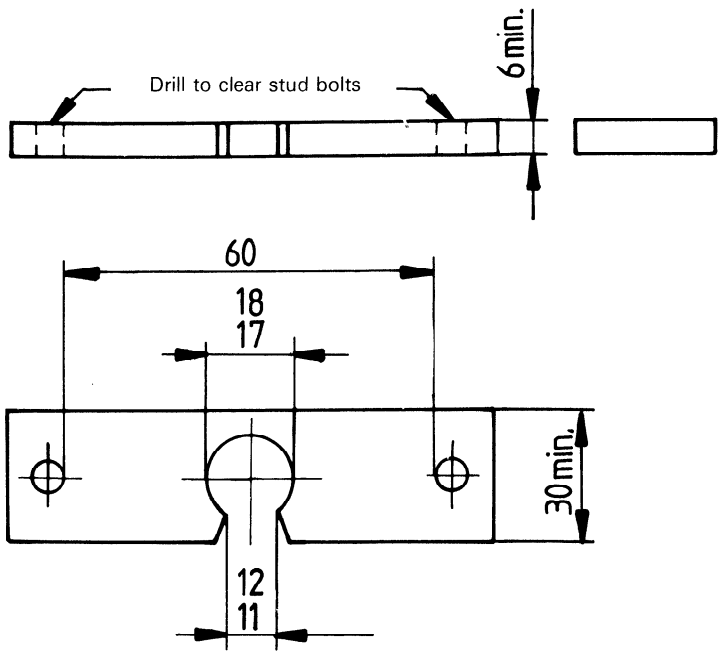
b) a complete identification of the roller tested;

c) conditioning and temperature of test;

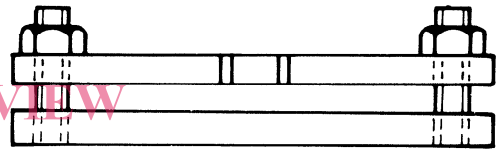
d) the apparent hardness, expressed inversely as the Pusey and Jones indentation value;

e) the date of the test.

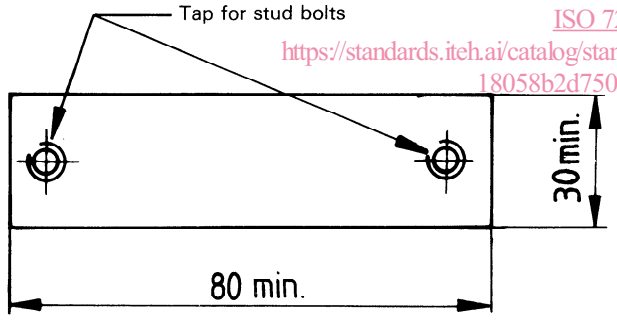
Dimensions in millimetres

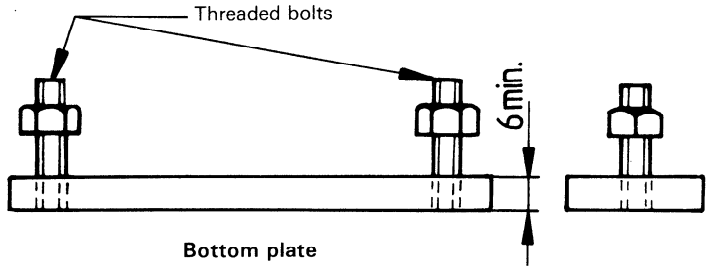


Top plate



Assembled view





Bottom plate

Figure — Holder for test specimen

This page intentionally left blank

This page intentionally left blank

UDC 678.066.6 : 620.178

Descriptors : rubber products, rollers, tests, hardness tests.

Price based on 3 pages