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Fourth edition
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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

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

This fourth edition cancels and replaces the third edition (ISO 7267-3:2011), of which it constitutes a minor revision to update the normative references in Clause 2.

A list of all parts in the ISO 7267 series can be found on the ISO website.

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, 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 document 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 one test method. Consequently, three methods are described in the ISO 7267 series, each capable of standing alone.

Rubber-covered rollers — Determination of apparent hardness —

Part 3:
Pusey and Jones method

WARNING 1 — Persons using this document should be familiar with normal laboratory practice. This document 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 determine the applicability of any other restrictions.

WARNING 2 — Certain procedures specified in this document might 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 document specifies a method for the determination of the apparent hardness of vulcanized- or thermoplastic-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 method ISO 48,[1] since in this method 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 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 18899:2013, *Rubber — Guide to the calibration of test equipment*

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.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
Pusey and Jones indentation value
depth of indentation of a ball 3,175 mm in diameter under a force of 9,8 N

Note 1 to entry: It is expressed in hundredths of a millimetre.

4 Time-interval between vulcanization/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 23529).

5 Conditioning and temperature of test

Where possible, the test shall be carried out at standard laboratory temperature in accordance with ISO 23529. 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 might 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 can be independently raised or lowered vertically, permitting the indentor to rest on the surface of the test roller and the mass to be applied subsequently to the indentor.

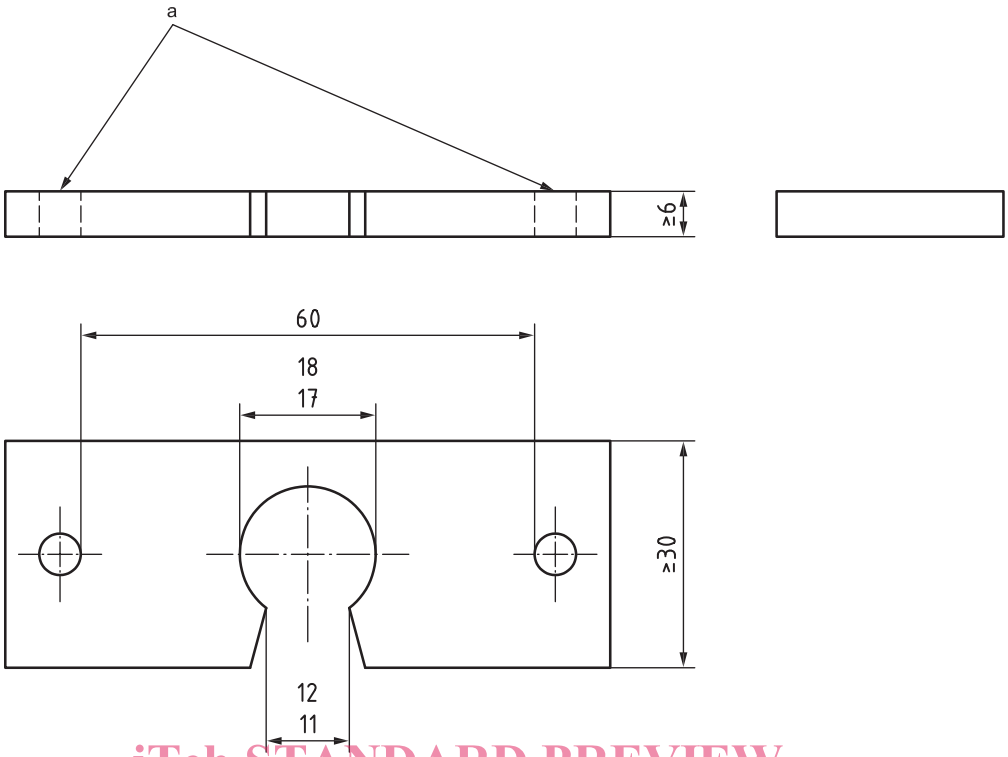
6.1.2 Indentor, consisting of a vertical steel shaft attached at the upper end to the spindle of the indicator gauge and having at the lower end a steel ball. The steel ball shall be (3,175 ± 0,015) mm in diameter and shall be made of highly polished, non-corrosive hard metal properly treated to resist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

6.1.3 Mass, of (1 000 ± 2) g.

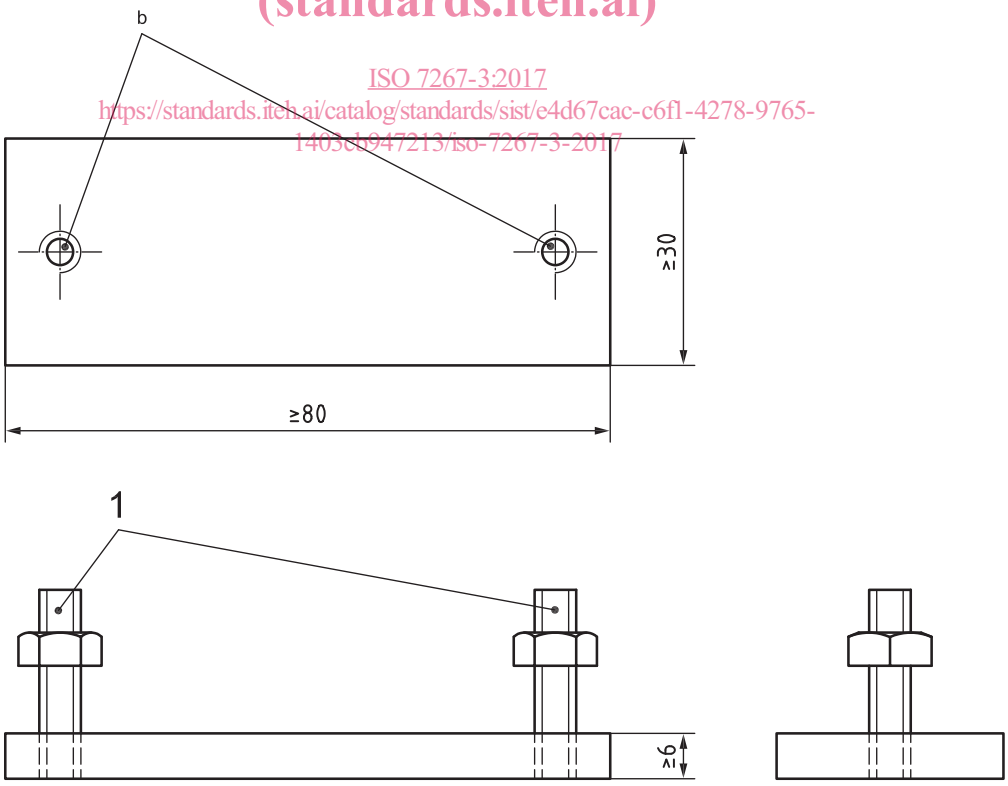
6.1.4 Depth indicator, comprising a dial gauge or other suitable device graduated in increments of 0,01 mm and having a range of at least 3 mm to indicate the movement of the indentor.

6.1.5 Specimen holder, consisting of a clamp made of two metal plates held together by two threaded bolts as shown in Figure 1. The purpose of the clamp is to hold the test roller 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.

Dimensions in millimetres



a) Top plate



b) Bottom plate