
**Paints and varnishes — Determination
of resistance to abrasion —**

**Part 1:
Method with abrasive-paper covered
wheels and rotating test specimen**

iTeh STANDARD PREVIEW
*Peintures et vernis — Détermination de la résistance à l'abrasion —
Partie 1: Méthode utilisant des roues revêtues de papier abrasif et une
éprouvette rotative*
(standards.iteh.ai)

ISO 7784-1:2016

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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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 7784-1:1997), which has been technically revised with the following changes:

- a) the title has been changed;
- b) the terms and definitions clause has been amended;
- c) a figure explaining the principle of the method was amended;
- d) the supplementary test conditions previously in Annex A have been integrated in the test report;
- e) the calibration of the apparatus previously in Annex B has been deleted;
- f) the test procedure has been re-arranged;
- g) the text has been editorially revised and the normative references have been updated.

ISO 7784 consists of the following parts, under the general title *Paints and varnishes — Determination of resistance to abrasion*:

- *Part 1: Method with abrasive-paper covered wheels and rotating test specimen*
- *Part 2: Method with abrasive rubber wheels and rotating test specimen*
- *Part 3: Method with abrasive-paper covered wheel and linearly reciprocating test specimen*

Introduction

This part of ISO 7784 is one of the three parts of ISO 7784 dealing with test methods for the determination of the resistance to abrasion of coatings using abrasive wheels. The characteristics and differences of these methods are summarized in [Table 1](#).

Table 1 — Types of method

Standard	Abrasive wheel		Test specimen movement
	Type	Degree of freedom	
ISO 7784-1	Abrasive paper on rubber wheel	Freely rotatable	Rotation
ISO 7784-2	Abrasive rubber wheel		
ISO 7784-3	Abrasive paper on metal wheel	Rigid – with stroke-dependent rotation ^a	Linear reciprocation

^a A mechanism rotates the abrasive wheel by a small angle after each double stroke so that a new area of the abrasive paper is effective.

The methods using abrasive-paper covered wheels (ISO 7784-1 and ISO 7784-3) are preferably to be applied.

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Paints and varnishes — Determination of resistance to abrasion —

Part 1: Method with abrasive-paper covered wheels and rotating test specimen

1 Scope

This part of ISO 7784 specifies a method for determining the resistance to abrasion of coatings, for which two loaded, freely rotatable but eccentrically arranged abrasive-paper covered wheels affect the coating of the rotating test specimens.

2 Normative references

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

ISO 1514, *Paints and varnishes — (Standard panels for testing)*

ISO 2808, *Paints and varnishes — Determination of film thickness*

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 4618, *Paints and varnishes — Terms and definitions*

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

ISO 7619-2, *Rubber, vulcanized or thermoplastic — Determination of indentation hardness — Part 2: IRHD pocket meter method*

FEPA-Standard 43-1, *Grains of fused aluminium oxide, silicon carbide and other abrasive materials for coated abrasives Macrogrits P 12 to P 220¹⁾*

FEPA-Standard 43-2, *Grains of fused aluminium oxide, silicon carbide and other abrasive materials for coated abrasives Microgrits P 240 to P 2500¹⁾*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618 and the following apply.

3.1

test specimen

specimen on which the test is to be carried out

3.2

abrasive wear

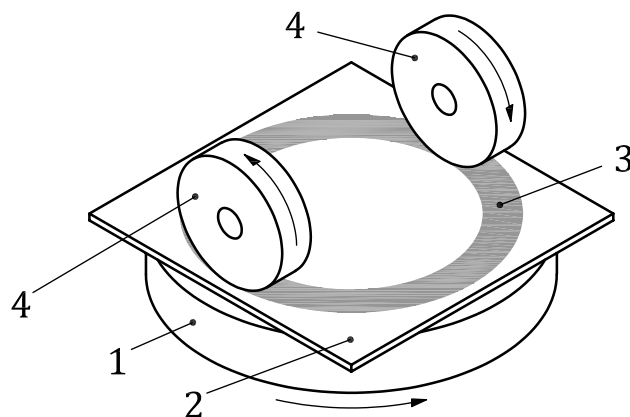
wear, occurring due to laminar removal of coating material on the surface

1) FEPA: Federation of European Producers of Abrasives.

4 Principle

Two pivot-mounted rubber wheels, covered with agreed abrasive paper, are pressed onto the coating of the rotating test specimen applying the agreed test load. The eccentric arrangement of the axes of the abrasive wheels relative to the axis of rotation causes a crosswise abrasive wear in a ring-shaped zone. The loss of mass of the coating caused by abrasive wear after the agreed number of cycles is determined.

Figure 1 illustrates the test principle.



Key

- 1 turntable
- 2 test specimen
- 3 wear zone
- 4 abrasive wheels

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Figure 1 — Principle of the abrasion test with rotating test specimen

5 Apparatus and materials

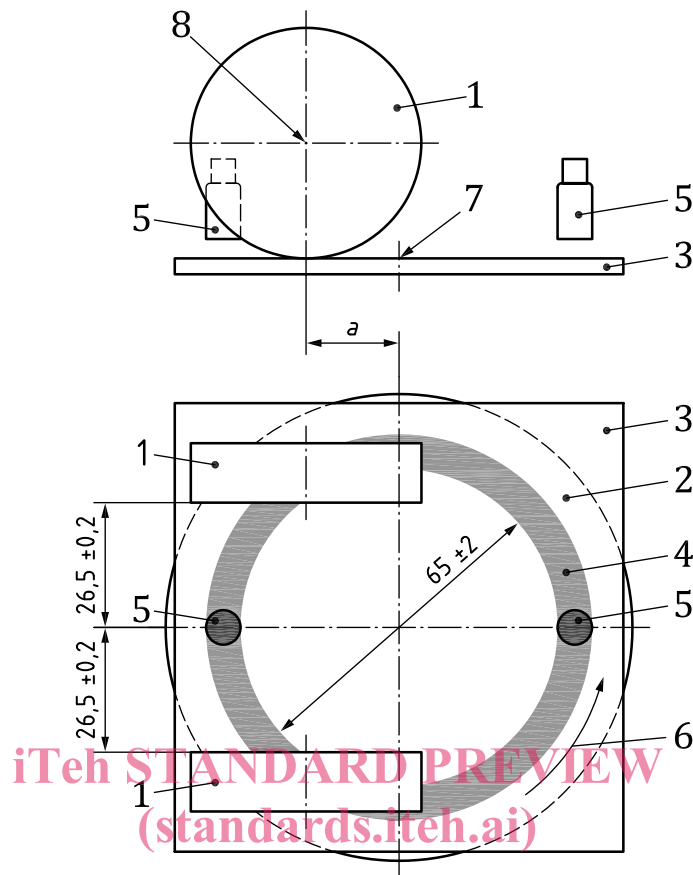
5.1 **Turntable abrasion tester**, as exemplified in Figure 2, with the following properties.

5.1.1 The rotational speed of the turntable onto which the test specimen is fixed shall be $(60 \pm 2) \text{ min}^{-1}$. The number of cycles is pre-set on an operation counter.

5.1.2 Two arms are attached to the device, each with a mandrel, onto which the abrasive wheels (5.2) and, if necessary, the weights (5.3) are attached. Ball bearings are used for the mandrels for the abrasive wheels so they can rotate with low friction.

5.1.3 It shall be ensured that in lowered condition, the positions of the abrasive wheels relative to the axis of rotation comply with the dimensions indicated in Figure 2.

5.1.4 A suction device shall be available in order to remove abrasive dust generated during the test.



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Key

- 1 abrasive wheels
- 2 turntable
- 3 test specimen
- 4 wear zone (about 10 mm wide)
- 5 vacuum nozzles
- 6 rotating direction
- 7 axis of rotation (turntable)
- 8 axis of rotation (abrasive wheel)
- a Offset ($19,0 \pm 0,5$) mm.

Figure 2 — Schematic diagram of the turntable abrasion tester

5.2 Abrasive wheel, consisting of the rubber wheel (5.2.1) on which the abrasive paper (5.2.2) is adhered. Two abrasive wheels are required for the test.

5.2.1 Rubber wheel, cylindrical rubber disk equipped with an axial bore hole for attachment on the supported mandrel on the arm of the apparatus (see 5.1.2). The diameter of the rubber wheel shall be ($50,5 \pm 0,5$) mm and the thickness ($12,7 \pm 0,2$) mm.

The hardness of the elastomer material (in Shore A in accordance with ISO 7619-1 or in IRHD in accordance with ISO 7619-2) shall be agreed.

NOTE It is common to agree on the rubber wheel on the basis of the identification of the abrasive wheel manufacturer.