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

**Part 3:  
Reciprocating test panel method**

*Peintures et vernis — Détermination de la résistance à l'abrasion —  
Partie 3: Méthode de panneau d'essai animé d'un mouvement de  
va-et-vient*

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## Contents

	Page
Foreword.....	iv
Introduction.....	v
1 Scope .....	1
2 Normative references .....	1
3 Principle.....	1
4 Required supplementary information.....	2
5 Apparatus and materials.....	2
6 Sampling.....	3
7 Test panels .....	3
8 Procedure .....	4
9 Expression of results .....	6
10 Precision.....	7
11 Test report .....	7
Annex A (normative) Required supplementary information.....	8
Annex B (informative) Recommended reference panel for the calibration of abrasive paper.....	9

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 part of ISO 7784 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 7784-3 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

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

— Part 1: *Rotating abrasive-paper-covered wheel method*

— Part 2: *Rotating abrasive rubber wheel method*

— Part 3: *Reciprocating test panel method*

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Annex A forms a normative part of this part of ISO 7784. Annex B is for information only.

## Introduction

This document is one of three parts of ISO 7784 dealing with determination of resistance to abrasion of a dried film of paint, varnish or related product.

Parts 1 and 3 both specify a method using abrasive paper for determination of the resistance to abrasion. In part 2, a method using rubber wheels is described. The user of ISO 7784 should note that the methods using abrasive paper (parts 1 and 3) are the preferred methods.

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# Paints and varnishes — Determination of resistance to abrasion —

## Part 3: Reciprocating test panel method

### 1 Scope

This part of ISO 7784 is one of a series of standards that deals with the sampling and testing of paints, varnishes and related products.

It specifies a method of determining the resistance to abrasion of a dried film of paint, varnish or related product by rubbing the film against a strip of abrasive paper attached to a stationary wheel.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 7784. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 7784 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1513:1992, *Paints and varnishes — Examination and preparation of samples for testing.*

ISO 1514:1993, *Paints and varnishes — Standard panels for testing.*

ISO 2808:1997, *Paints and varnishes — Determination of film thickness.*

ISO 3270:1984, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing.*

ISO 15528:—<sup>1)</sup>, *Paints, varnishes and raw materials for paints and varnishes — Sampling.*

### 3 Principle

A dried paint or varnish film on a test panel is abraded, under specified conditions, by rubbing the panel against a strip of abrasive paper attached to the circumference of a stationary wheel. The wheel is weighted so that the abrasive paper is pressed against the panel with a specified force. After each complete reciprocating movement (double stroke, DS) of the panel, the wheel is advanced through a small angle to bring an unused portion of the abrasive strip into contact with the test surface.

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1) To be published. (Revision of ISO 842:1984 and ISO 1512:1991)

Either the resulting loss in mass of the test panel is measured after a specified number of double strokes, and the loss in mass for one double stroke (mg/DS) and the abrasion resistance (DS/mg) are calculated, and/or the mean number of double strokes required for wearthrough of the coating (or the topcoat of a multicoat system) is determined (see clause 9).

## 4 Required supplementary information

For any particular application, the test method specified in this part of ISO 7784 needs to be completed by supplementary information. The items of supplementary information are given in annex A.

## 5 Apparatus and materials

### 5.1 Abrasion tester (see Figure 1)<sup>2)</sup>

The tester shall consist of a clamping device or pressure plate for holding the test specimen level and rigid and a (50 ± 0,05) mm diameter wheel, to the outer circumference of which a 12-mm-wide strip of silicon carbide paper is attached. The force between the wheel and the test surface shall be capable of being varied from zero to at least (6,9 ± 0,05) N.<sup>3)</sup>

The abrasive action shall be produced by rubbing a test panel in a reciprocating manner (stroke length 30 mm) against a stationary wheel. Other types of instrument in which the panel and the wheel are moved relative to one another in a reciprocating manner may also be used, providing they give the same results.

After each double stroke, the wheel shall be advanced through a small angle to bring a fresh area of the silicon carbide paper into contact with the test surface before making the next double stroke.

The angle of rotation shall be such that, after 400 double strokes, the wheel will have made one complete revolution. On completion of this cycle, the strip of silicon carbide paper shall be replaced.

The frequency of motion of the test panel shall be (40 ± 2) DS/min.

The number of double strokes may be registered by means of a counter, and provision is normally made for the apparatus to switch off automatically after a preset number of double strokes has been reached (400 DS maximum). The test surface shall be kept free of loose powder or abrasion debris during the test.

### 5.2 Abrasive paper

The recommended abrasive paper is P180 grade silicon carbide paper (maximum grit size 150 µm). The strip shall be 12 mm wide. Its length shall be such that it covers the abrasive wheel without any overlap or gap at the ends (a strip length of 157 mm should be sufficient). It shall be attached to the wheel by double-sided adhesive tape (5.3) or self-adhesive abrasive paper shall be used (see note 3).

NOTE 1 Other types of abrasive paper may be used by agreement between the interested parties.

NOTE 2 Several grades of abrasive paper are specified in the P-series defined in the particle-size standard published by the Federation of European Producers of Abrasive Products (FEPA)<sup>4)</sup>.

NOTE 3 Self-adhesive abrasive paper is also available from some manufacturers.

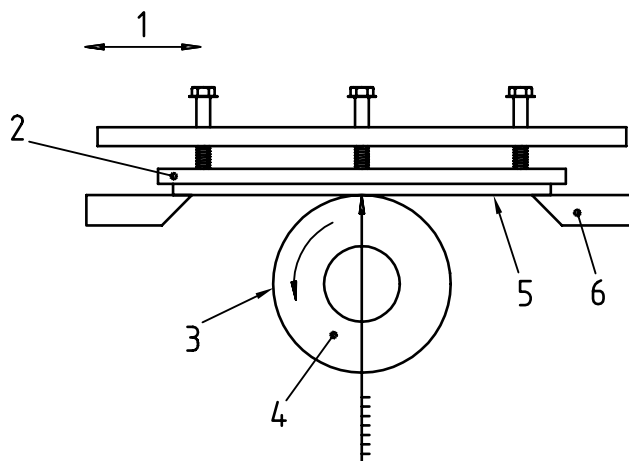
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2) A suitable abrasion tester is available from Suga Test Instruments Co Ltd, 5-4-14, Shinjuku, Shinjuku-ku, Tokyo 160, Japan.

3) 6,9 N = 700 gf

4) FEPA Standard 43-GB-1984, obtainable from the British Abrasive Federation, P.O. Box 58, Trafford Park Road, Trafford Park, Manchester M17 1JD, United Kingdom.





#### Key

- 1 Reciprocating motion
- 2 Specimen press
- 3 Abrasive paper
- 4 Wheel
- 5 Specimen
- 6 Specimen support

Figure 1 — Abrasion tester — General description

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### 5.3 Double-sided adhesive tape (standards.iteh.ai)

Ordinary commercially available 12-mm-wide tape is suitable.

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### 5.4 Reference panel <https://standards.iteh.ai/catalog/standards/sist/3f7ffb53-6de0-42e4-ab0b-4bc9e8f9813f/iso-7784-3-2000>

A recommended reference panel for the calibration of abrasive paper is the PMMA panel, which is described in annex B.

Other reference panels may be used by agreement between the interested parties.

### 5.5 Balance

Use a balance with an accuracy of 0,1 mg.

## 6 Sampling

Take a representative sample of the product to be tested (or of each product in the case of a multi-coat system), as described in ISO 15528.

Examine and prepare each sample for testing, as described in ISO 1513.

## 7 Test panels

### 7.1 Substrate

The substrate shall be plane and, unless otherwise agreed, made of transparent glass, mild steel or aluminium in accordance with ISO 1514. However, paper sheeting which is suitable for the coatings under test may also be used.