

---

---

**Paints and varnishes — Determination  
of film thickness**

*Peintures et vernis — Détermination de l'épaisseur du feuil*

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[ISO 2808:2019](#)

<https://standards.iteh.ai/catalog/standards/iso/c7cf7cf8-dc3c-44ae-859c-d23c57debccd/iso-2808-2019>



**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

ISO 2808:2019

<https://standards.iteh.ai/catalog/standards/iso/c7cf7cf8-dc3c-44ae-859c-d23c57debccd/iso-2808-2019>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
Foreword .....	v
Introduction .....	vi
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
<b>4 Determination of wet-film thickness .....</b>	<b>5</b>
4.1 General .....	5
4.2 Mechanical methods .....	5
4.2.1 Principle .....	5
4.2.2 Field of application .....	5
4.2.3 General .....	5
4.2.4 Method 1A — Comb gauge .....	5
4.2.5 Method 1B — Wheel gauge .....	6
4.2.6 Method 1C — Dial gauge .....	7
4.3 Gravimetric method .....	9
4.3.1 Principle .....	9
4.3.2 Field of application .....	9
4.3.3 General .....	9
4.3.4 Method 2 — By difference in mass .....	9
4.4 Photothermal method .....	10
4.4.1 Principle .....	10
4.4.2 Field of application .....	10
4.4.3 General .....	10
4.4.4 Method 3 — Determination using thermal properties .....	11
<b>5 Determination of dry-film thickness .....</b>	<b>11</b>
5.1 General .....	11
5.2 Mechanical methods .....	11
5.2.1 Principle .....	11
5.2.2 Field of application .....	12
5.2.3 General .....	12
5.2.4 Method 4A — By difference in thickness .....	12
5.2.5 Method 4B — Depth gauging .....	15
5.2.6 Method 4C — Surface profile scanning .....	17
5.3 Gravimetric method .....	18
5.3.1 Principle .....	18
5.3.2 Field of application .....	19
5.3.3 General .....	19
5.3.4 Method 5 — By difference in mass .....	19
5.4 Optical methods .....	19
5.4.1 Principle .....	19
5.4.2 Field of application .....	22
5.4.3 General .....	22
5.4.4 Method 6A — Cross-sectioning .....	23
5.4.5 Method 6B — Wedge cut .....	24
5.4.6 Method 6C — White-light interferometry .....	24
5.5 Magnetic methods .....	25
5.5.1 Principle .....	25
5.5.2 Field of application .....	25
5.5.3 General .....	25
5.5.4 Method 7A — Magnetic pull-off gauge .....	25
5.5.5 Method 7B.1 — Magnetic-flux gauge .....	26
5.5.6 Method 7B.2 — Magnetic field change, magnetic-induction principle .....	27

5.5.7	Method 7C — Eddy-current gauge	28
5.6	Radiological method	29
5.6.1	Principle	29
5.6.2	Field of application	29
5.6.3	General	29
5.6.4	Method 8 — Beta backscatter method	30
5.7	Photothermal method	30
5.7.1	Principle	30
5.7.2	Field of application	31
5.7.3	General	31
5.7.4	Method 9 — Determination using thermal properties	31
5.8	Acoustic method	32
5.8.1	Principle	32
5.8.2	Field of application	32
5.8.3	General	32
5.8.4	Method 10 — Ultrasonic reflection	32
5.9	Electromagnetic method	33
5.9.1	Method 11 — Terahertz method	33
<b>6</b>	<b>Determination of thickness of uncured powder layers</b>	<b>35</b>
6.1	General	35
6.2	Gravimetric method	35
6.2.1	Principle	35
6.2.2	Field of application	35
6.2.3	General	35
6.2.4	Method 12 — By difference in mass	35
6.3	Magnetic methods	36
6.3.1	Principle	36
6.3.2	Field of application	36
6.3.3	General	36
6.3.4	Method 13A — Magnetic-induction method	36
6.3.5	Method 13B — Eddy-current	37
6.4	Photothermal method	38
6.4.1	Principle	38
6.4.2	Field of application	39
6.4.3	General	39
6.4.4	Method 14 — Determination using thermal properties	39
<b>7</b>	<b>Test report</b>	<b>39</b>
	<b>Annex A (informative) Overview of methods</b>	<b>41</b>
	<b>Annex B (informative) Measurement of film thickness on rough surfaces</b>	<b>44</b>
	<b>Annex C (informative) Factors affecting the precision of readings obtained when measuring on wooden substrates</b>	<b>46</b>
	<b>Bibliography</b>	<b>48</b>

## 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](http://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](http://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 of 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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, SC 9, *General test methods for paints and varnishes*.

This fifth edition cancels and replaces the fourth edition (ISO 2808:2007), which has been technically revised. The main changes compared to the previous edition are as follows:

- the terms and definitions have been updated to ISO 4618 and ISO/IEC Guide 99;
- the principle has been revised;
- white-light interferometer has been added as method 6C;
- the terahertz method has been added as method 11;
- the existing methods have been adapted to the current state of metrology;
- the characterisation of the methods and procedures in [Annex A](#) have been revised;
- information in [Annex A](#) on the precision of the individual methods has been adapted to current standards;
- the references to test standards and constructions standards in [Annex A](#) have been updated;
- former Clause 7 on measurement of the film thickness on rough surfaces has been moved to [Annex B](#);
- [Annex C](#), on factors which influence measuring accuracy when measurements are performed on wood has been added.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document consistently enumerates the individual coatings applied in a multi-layer system by referring to the first coating applied on the substrate as coating 1. Some other standards referring to individual test methods enumerate in reverse order.

# iTeh Standards (<https://standards.itih.ai>) Document Preview

[ISO 2808:2019](https://standards.itih.ai/catalog/standards/iso/c7cf7cf8-dc3c-44ae-859c-d23c57debccd/iso-2808-2019)

<https://standards.itih.ai/catalog/standards/iso/c7cf7cf8-dc3c-44ae-859c-d23c57debccd/iso-2808-2019>

# Paints and varnishes — Determination of film thickness

## 1 Scope

This document describes methods for measuring the thickness of coatings applied to a substrate. Methods for determining wet-film thickness, dry-film thickness and the film thickness of uncured powder layers are described.

For each method described, this document provides an overview of the field of application, existing standards and the precision.

Information on measuring film thickness on rough surfaces is given in [Annex B](#).

Information on measuring film thickness on wooden substrates is given in [Annex C](#).

## 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 3611, *Geometrical product specifications (GPS) — Dimensional measuring equipment: Micrometers for external measurements — Design and metrological characteristics*

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

ISO 8503-1, *Preparation of steel substrates before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates — Part 1: Specifications and definitions for ISO surface profile comparators for the assessment of abrasive blast-cleaned surfaces*

<https://standards.iteh.ai/catalog/standards/iso/c7cf7cf8-dc3c-44ae-859c-d23c57debccd/iso-2808-2019>

## 3 Terms and definitions

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

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

— ISO Online browsing platform: available at <https://www.iso.org/obp>

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

### 3.1

#### **film thickness**

distance between the surface of the film and the surface of the substrate

### 3.2

#### **wet-film thickness**

thickness of a freshly applied wet coating material, measured immediately after application

### 3.3

#### **dry-film thickness**

thickness of a coating remaining on the surface when the coating has hardened

### 3.4

#### **thickness of uncured powder layer**

thickness of a freshly applied coating material in powder form, measured immediately after application and before stoving