



SLOVENSKI STANDARD
SIST ISO 2808:1998

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Paints and varnishes -- Determination of film thickness

Peintures et vernis -- Détermination de l'épaisseur du feuil

Ta slovenski standard je istoveten z: **ISO 2808:1997**

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ICS:

87.040

Barve in laki

Paints and varnishes

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en

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INTERNATIONAL
STANDARD

ISO
2808

Third edition
1997-09-15

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

Peintures et vernis — Détermination de l'épaisseur du feuil

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Reference number
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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.

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.

International Standard ISO 2808 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This third edition cancels and replaces the second edition (ISO 2808:1991) of which it constitutes a technical revision.

The main technical changes are:

- a) Addition of the following methods of film thickness determination:
 - 1) Gravimetric (dissolving) method (Method 9)
 - 2) Determination of dry-film thickness on blast-cleaned steel substrates (Method 10).
- b) Table 1 includes typical instrument bias and precision for each method.

Annex A forms an integral part of this International Standard.

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Paints and varnishes — Determination of film thickness

1 Scope

This International Standard reviews and specifies a number of methods that are applicable to the measurement of the thickness of organic coatings applied to a substrate. It does not apply to metallic coatings. Some of the techniques described can be adapted for the measurement of the thickness of detached coatings. The principles of the methods, their particular field of application and the expected precision are given in table 1.

This International Standard also defines terms concerning the determination of film thickness.

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Table 1 - Methods of film thickness measurement

Note 1: Many of the methods referred to below may be adapted for use with detached films.

Number and description	Techniques and applications	Typical instrument bias ¹⁾ and precision	Remarks
Method No. 1	iTeh STANDARD PREVIEW ----- (standards.iteh.ai)		
Assessment of wet-film thickness	A Comb gauge B Wheel gauge C By weighing	Bias: $\pm 2,5\% + 1\ \mu\text{m}$ Reproducibility: $\pm 15\ \mu\text{m}$	Measurements give an approximate indication of the thickness of the wet film. May be used in laboratories and on site. Method 1C may also be used for determining the dry-film thickness, but in the laboratory only.
Method No. 2	For use on films too soft to be measured by methods which use a presser foot or probe. Determination of dry-film thickness by calculation from the ratio of dry-film mass to dry-film area	Determinations are not precise	Provides a check that the mean thickness lies between specified limits. The film remains undamaged.

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Method No. 3

Measurement of dry-film thickness by mechanically contacting instruments

A Micrometer method. For use on test panels or painted surfaces that are substantially plane.

Bias: ± 2 µm

Reproducibility: ± 30 % for low and 20 % for higher film thicknesses

The film has to be hard enough to resist indentation on closing the micrometer jaws. The film is damaged in the test. The film thickness shall be greater than 25 µm unless the film is detached.

B Dial gauge method

Test panels or painted surfaces that are substantially plane or have a curvature in one direction

Reproducibility: ± 10 %, with a lower limit of 2 µm

The film has to be hard enough to resist indentation on lowering the gauge or electric-device presser foot.

Method No. 4

Measurement of dry-film thickness by the profilometric method

Recommended as a referee method for painted surfaces that are substantially plane.

Reproducibility: ± 10 %, with a lower limit of 2 µm

The film has to be hard enough to resist indentation by the profile-tracing stylus. The film is damaged in the test.

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Method No. 5

Measurement of dry-film thickness by microscope methods

A Microscopic examination of cross-section. Recommended as a referee method for films on substrates of varying profile, for example grit-blasted surfaces.

Bias: 2 µm

Reproducibility: ± 10 %

A portion of the painted article is cut out and mounted in resin. The film is damaged in the test.

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A special cutting tool or paint borer is required to cut through the film. The film is damaged in the test.

Reproducibility: ± 10 %, with a lower limit of 2 µm

Not applicable to brittle or friable films. Both A and B can be used for thicknesses of individual coats in a paint system

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C Surface profile measuring method. Applies to transparent films and to films which can be cleanly removed from the substrate.

Reproducibility: ± 10 %

A special microscope is used to examine the profile of the film (split-beam microscope). Only transparent films remain undamaged.

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Method No. 6	For magnetic metallic substrates	<p data-bbox="916 1144 943 1554">A Magnetic-induction principle</p> <p data-bbox="954 1144 981 1554">Bias: $\pm 2\% + 1\ \mu\text{m}$</p> <p data-bbox="992 1144 1019 1554">Reproducibility: $\pm 10\%$</p> <p data-bbox="1031 1144 1102 1554">B Permanent-magnet pull-off principle</p> <p data-bbox="1031 853 1058 1099">Bias: $\pm 5\% + 1\ \mu\text{m}$</p>	<p data-bbox="916 219 1031 645">The film has to be hard enough to withstand the pressure of the probe.</p> <p data-bbox="1031 367 1066 645">May be used on site.</p>
Method No. 7	For non-magnetic metallic substrates	Bias: $\pm 2\% + 1\ \mu\text{m}$	Instruments operate on the eddy-current principle.
Eddy current method		Reproducibility: $\pm 10\%$	<p data-bbox="1299 219 1417 645">The film has to be hard enough to withstand the pressure of the probe.</p> <p data-bbox="1458 389 1485 645">May be used on site.</p>

Method No. 8

Non-contact methods

Used when contact by the measuring instrument with the coating needs to be avoided. Applicable to painted surfaces which are substantially flat.

Instruments operate on the beta-particle back-scatter principle (method No. 8A) or the X-ray fluorescence principle (method No. 8B).

Reproducibility: $\pm 10\%$

Paint films have to be homogeneous for measurements to be accurate.

The coating mass is determined by dissolving the coating without dissolving the substrate. The mass of coating divided by the density and the area of the coating gives the average coating thickness.

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Method No. 9

Gravimetric (dissolving) method

Applicable to films on substrates of varying profiles, for example grit-blasted steel panels, and to films on polymeric substrates if the substrate is not affected by the paint solvent.

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Method No. 10

For dry coatings on magnetic metallic substrates having a rough (blast-cleaned) surface.

Instruments operate on the magnetic-induction principle.

Determination of dry-film thickness on blast-cleaned steel substrates

May be used on site. In some cases, method No. 5A or method No. 9 may also be used.

D) The bias data are based on information supplied by the instrument manufacturers
