International Standard

ISO 19403-2

Paints and varnishes — Wettability —

Part 2: Determination of the surface free energy of solid surfaces by measuring the contact angle

Peintures et vernis — Mouillabilité —

Partie 2: Détermination de l'énergie libre de surface des surfaces solides par la mesure de l'angle de contact

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Foreword

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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 document 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).

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This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 139, *Paints and varnishes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 19403-2:2017), which has been technically revised.

The main changes are as follows:

— the minimum size of the text samples has been changed to 4 cm × 4 cm;

— definition 3.1 on “recently advanced contact angle” has been added;

— the use of ethylene glycol as test liquid has been deleted;

— in 7.2.1, the information on the camera tilt angle has been added;

— the normative references have been updated.

A list of all parts in the ISO 19403 series can be found on the ISO website.

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.

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Paints and varnishes — Wettability —

Part 2: Determination of the surface free energy of solid surfaces by measuring the contact angle

1 Scope

This document specifies a test method to measure the contact angle for the determination of the surface free energy of a solid surface. The method can be applied for the characterization of substrates and coatings.

NOTE 1 For the determination of the surface free energy of polymers and coatings, it is preferred to use either the method according to Owens, Wendt, Rabel and Kaelble [3],[4],[5] or the method according to Wu.

NOTE 2 The morphological and chemical homogeneity have an influence on the measuring results. The procedures indicated in this document are based on the state-of-the-art employing the drop projection method in penumbral shadow. Other methods are not excluded.

Measuring the contact angle on powders is not part of this document.

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 4618, *Paints and varnishes — Vocabulary*

ISO 19403-1:2022, *Paints and varnishes — Wettability — Part 1: Vocabulary and general principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618, ISO 19403-1 and the following apply.

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

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

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

3.1
recently advanced contact angle
contact angle of a droplet at rest after the three-phase contact line has advanced over a previously dry surface

Note 1 to entry: The recently advanced contact angle is thermodynamically not defined.

4 Principle

A minimum of three drops of at least two test liquids are dosed onto the flat surface of a test specimen. For every drop, the contact angle is measured. From the averaged contact angles of every liquid, their surface

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