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Barve in laki - Omočljivost - 7. del: Merjenje stičnega kota na nagnjeni površini (kot tečenja) (ISO 19403-3:2017)

Paints and varnishes - Wettability - Part 7: Measurement of the contact angle on a tilt stage (roll-off angle) (ISO 19403-7:2017)

Beschichtungsstoffe - Benetzbarkeit - Teil 7: Messung des Kontaktwinkels bei Neigetischexperimenten (Abrollwinkel) (ISO 19403-7:2017)

Peintures et vernis - Mouillabilité - Partie 7: Mesurage de l'angle de contact sur un plan incliné (angle d'écroulement) (ISO 19403-7:2017)

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Barve in laki

Paints and varnishes

oSIST prEN ISO 19403-7:2019

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**Paints and varnishes — Wettability —
Part 7:
Measurement of the contact angle on a
tilt stage (roll-off angle)**

Peintures et vernis — Mouillabilité —

*Partie 7: Mesurage de l'angle de contact sur un plan incliné (angle
d'écroulement)*

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ISO 19403-7:2017(E)

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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

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

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

Introduction

Dynamic contact angles describe the processes on the interface liquid/solid during volume increase (advancing angle) or volume decrease (receding angle) of a drop in horizontal position. As an alternative to the static method (see ISO 19403-2), for the advancing angle always a surface area is wetted, which was previously unwetted. For the receding angle, the contact angle during dewetting is observed. From the difference between advancing angle and receding angle, information on chemical homogeneity and roughness can be concluded. The receding angle is not suitable for the determination of the surface energy.

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Paints and varnishes — Wettability —

Part 7:

Measurement of the contact angle on a tilt stage (roll-off angle)

1 Scope

This document specifies a method for the dynamic measurement of the roll-off angle of a liquid drop on a solid surface. From the dynamic measurement, the advancing and receding angles of the drop rolling off can also be determined. The roll-off angle plays a role when evaluating, for example, easy-to-clean or anti-adherent surfaces.

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 — Terms and definitions*

ISO 19403-1, *Paints and varnishes — Wettability — Part 1: Terminology 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 terminological databases for use in standardization at the following addresses:

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

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

3.1

roll-off angle

α_s

tipping of the surface of the solid body, due to which a liquid drop put down onto this surface rolls off

3.2

advancing angle

θ_a

contact angle, which is measured during advancing of the three-phase point

Note 1 to entry: Generally, the advancing angle is used for the determination of the interface energy, in which case the measurement should be carried out close to the thermodynamic equilibrium. This is approximately reached if there is no influence of, for example, the dosing speed on the contact angle.

[SOURCE: ISO 19403-6:2017, 3.2]

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3.3 receding angle

 θ_r

contact angle, which is measured during receding of the three-phase point

[SOURCE: ISO 19403-6:2017, 3.3]

4 Principle

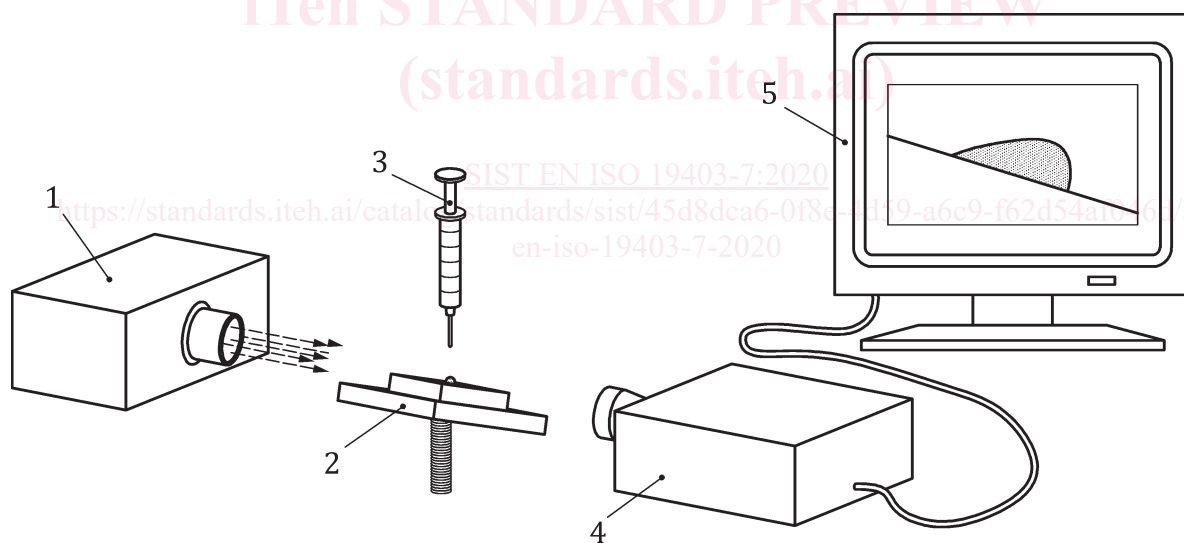
A drop is put down onto the surface to be tested. The surface is tipped with constant inclination speed until the drop rolls off. The advancing and receding angles are determined from the time curve of the left and right three-phase point.

5 Apparatus and materials

Ordinary laboratory apparatus, together with the following.

5.1 Contact angle measuring system.

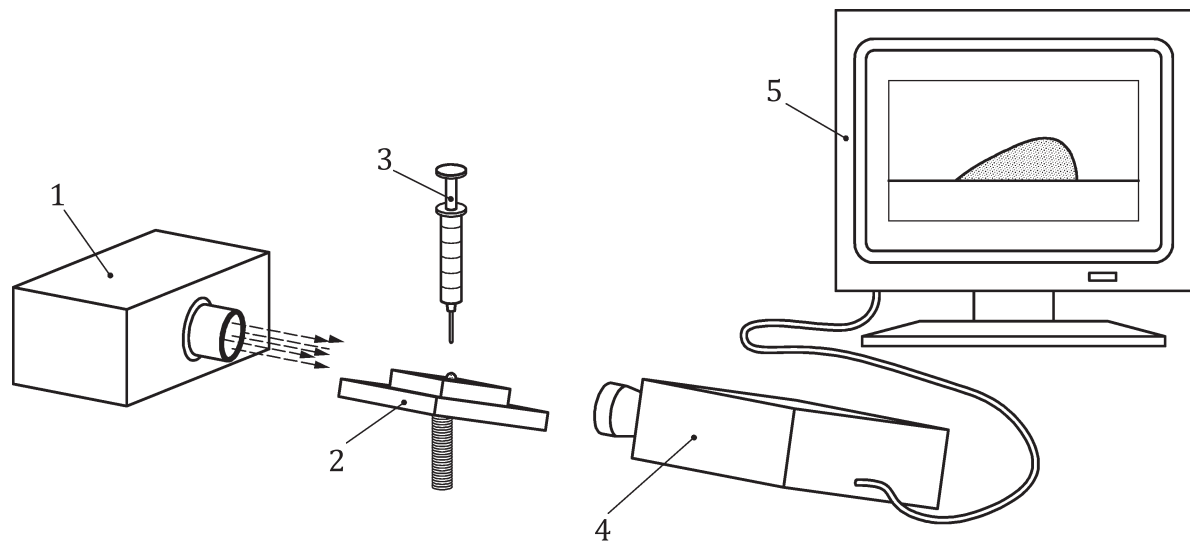
Any state-of-the-art contact angle measuring device fitted with a tilting device, preferably systems with digital image capture and analysis for measuring the contact angle. [Figure 1](#) shows a schematic example of a contact angle measuring system for which only the sample table is inclined. [Figure 2](#) shows a system for which the camera as well as the sample table are inclined.



Key

- 1 light source
- 2 specimen holder
- 3 graduated microsyringe
- 4 optical system
- 5 screen

Figure 1 — Schematic diagram of a contact angle measuring system for which only the sample table is inclined

**Key**

- 1 light source
- 2 specimen holder
- 3 graduated microsyringe
- 4 optical system
- 5 screen

Figure 2 — Schematic diagram of a contact angle measuring system for which the camera as well as the sample table are inclined

The image capturing system should be oriented in a way that the drop is within the left third of the image (when the table is inclined to the right).

NOTE The device used can differ from the schematic diagram in regard to light path and the arrangement of the components.

5.2 Dosing unit.

Dosing unit, which makes it possible to precisely apply drops in the range of microlitres to the surface.

5.3 Test liquids.

If not otherwise agreed, use at least one of the test liquids suggested in [Table 1](#). The test liquids shall have at least “purity grade” for analysis. Water shall have a surface tension of at least 71,5 mN/m.

It is recommended to test the suitability of the liquids used in accordance with ISO 19403-3 or EN 14370 prior to measuring their surface tensions. For guidance, the values from the literature for the surface tension, σ_l , are indicated in [Table 1](#). It is also possible to use an individually measured value of the surface tension as reference value. According to experience, the measured value should not deviate more than $\pm 2\%$ from the value from the literature or the individually determined value.

The test liquids shall not physically or chemically affect the surface. They may not show a notable yield value.

NOTE 1 A notable yield value is shown when a lamella of the liquid teared with a needle does not level within a given time limit (e.g. 30 s).

The test liquids shall not cross-link, show any skinning or evaporate during the measurement.