Designation: D7334 – 08 (Reapproved 2022)

Standard Practice for Surface Wettability of Coatings, Substrates and Pigments by Advancing Contact Angle Measurement[1]

This standard is issued under the fixed designation D7334; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the measurement of the angle of contact when a drop of liquid is applied to a coated surface, substrate, or preformed disk of pigment.

1.2 There are two types of contact angles, advancing and receding. This standard deals only with advancing contact angles.

1.3 This practice is intended to supplement the manufacturer's instructions for the device being used to make the measurements, but is not intended to replace them.

1.4 A common test liquid is water, but many other liquids such as solvents, surfactant and dispersant solutions and even liquid paints can be used.

1.5 This practice is based on goniometry, which involves the observation of a sessile drop of test liquid on a solid substrate.

1.6 Although contact angles are governed by surface tension, this standard cannot be used to measure surface tension directly.

1.7 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.8 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1193 Specification for Reagent Water

D5725 Test Method for Surface Wettability and Absorbency of Sheeted Materials Using an Automated Contact Angle Tester (Withdrawn 2010)[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *advancing contact angle, n*—the contact angle that is measured immediately after the sessile drop is placed on the surface.

3.1.1.1 *Discussion*—The drop has the maximum volume allowable for the liquid-solid interfacial area: any addition will make the drop expand and increase the liquid-solid interfacial area. This can be thought of as the "wetting angle" because the drop is ready to wet additional area. This is the contact angle used in this method and in most coating measurements.

3.1.2 *contact angle, n*—the interior angle that a drop makes between the substrate and a tangent drawn at the intersection between the drop and the substrate as shown in Fig. 1.

3.1.2.1 *Discussion*—This is the angle formed by a liquid at the three phase boundary where a liquid, gas (air) and solid intersect.

3.1.3 *receding contact angle, n*—the contact angle measured when material is removed from the drop so that it contracts.

3.1.3.1 *Discussion*—The liquid-solid interfacial area will decrease. This is the "de-wetting angle."

3.1.4 *sessile drop, n*—drop of liquid on the upper side of a horizontal surface (as in Fig. 1).

3.1.5 *surface tension, n, and surface energy, n*—the terms surface tension and surface energy are often used interchangeably.

3.1.5.1 *Discussion*—They are the same numerically, although they have different units. They are measures of an effect

[1] This practice is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.23 on Physical Properties of Applied Paint Films.

Current edition approved Jan. 1, 2022. Published January 2022. Originally approved in 2008. Last previous edition approved in 2013 as D7334 – 08 (2013). DOI: 10.1520/D7334-08R22.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.