



Designation: D4672 – 24

# Standard Test Method for Polyurethane Raw Materials: Determination of Water Content of Polyols<sup>1</sup>

This standard is issued under the fixed designation D4672; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This test method measures the water content of polyols and many other organic compounds.

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

1.3 *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.*

NOTE 1—This test method is equivalent to ISO 14897.

1.4 *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:*<sup>2</sup>

D883 Terminology Relating to Plastics

E203 Test Method for Water Using Volumetric Karl Fischer Titration

E456 Terminology Relating to Quality and Statistics

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E2935 Practice for Evaluating Equivalence of Two Testing Processes

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D20 on Plastics and are the direct responsibility of Subcommittee D20.22 on Cellular Materials - Plastics and Elastomers.

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<sup>2</sup> 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.

2.2 *ISO Standards:*<sup>3</sup>

ISO 14897 Plastics—Polyols for use in the production of polyurethane—Determination of water content

## 3. Terminology

3.1 *Definitions*—Terms used in this standard are defined in accordance with Terminology D883, unless otherwise specified. For terms relating to precision and bias and associated issues, the terms used in this standard are defined in accordance with Terminology E456.

3.1.1 *polyurethane, n*—a polymer prepared by the reaction of an organic diisocyanate with polyols.

3.1.1.1 *Discussion*—Polyurethanes, or urethanes, as they are sometimes called, can be thermosetting, thermoplastic, rigid, flexible, cellular or solid. (See Terminology D883.)

## 4. Summary of Test Methods

4.1 This method is based on volumetric or coulometric titrations that follow the reduction of iodine by sulfur dioxide in the presence of water. An alcohol (ROH) and an amine (R'N) react with sulfur dioxide (SO<sub>2</sub>) to form an intermediate that is then oxidized by the stoichiometric reaction of iodine and water in the presence of the amine according to the following reactions:



4.2 Pyridine was historically used but has been displaced by imidazole and other amines. Methanol is a commonly used alcohol, but others are available. In Karl Fischer titrations, iodine is either added as part of the titrant by buret (volumetry) or is generated electrochemically in the titration cell (coulometry). Coulometric titrations eliminate the need for standardizing the reagent.

4.3 This method provides details specific to water determinations in polyols. A general procedure for volumetric Karl Fischer analysis, including a list of interferences, can be found in Test Method E203.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

\*A Summary of Changes section appears at the end of this standard