



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

This standard is issued under the fixed designation D 4669; 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 These test methods measure the specific gravity of polyols. (See [Note 1](#).)

1.2 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There is no equivalent ISO standard.

## 2. Referenced Documents

2.1 *ASTM Standards:* <sup>2</sup>

[D 883](#) Terminology Relating to Plastics

[D 4052](#) Test Method for Density and Relative Density of Liquids by Digital Density Meter

[E 1](#) Specification for ASTM Liquid-in-Glass Thermometers

[E 202](#) Test Methods for Analysis of Ethylene Glycols and Propylene Glycols

## 3. Terminology

3.1 *Definitions*—For definitions of terms used in these test methods see Terminology [D 883](#).

3.2 *Description of Term Specific to This Standard:*

3.2.1 *specific gravity*—the ratio of the weight in air of a given volume of the material at a stated temperature to the weight in air of an equal volume of water at a stated temperature. It shall be expressed as specific gravity, 25/25°C, indicating that the sample and reference water were both measured at 25°C.

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.22 on Cellular Materials - Plastics and Elastomers. It was recommended to ASTM by the Center for the Polyurethane Industry of the American Chemistry Council.

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

## 4. Significance and Use

4.1 These test methods are suitable for quality control, as a specification test, and for research. It is necessary when converting from kinematic to absolute viscosity.

### TEST METHOD A—SPECIFIC GRAVITY USING A PYCNOMETER

## 5. Apparatus

5.1 *Pycnometer*, of 25 or 50-mL capacity, conical shape with a capillary side arm overflow tube complete with a standard-taper  $\frac{5}{12}$  ground-glass joint to receive a ground-glass vented cap. A thermometer with a scale graduated from 12 to 38°C in 0.2-degree divisions joins the neck of the flask with a standard-taper  $\frac{10}{18}$  ground-glass joint. The thermometer contained in the pycnometer shall be calibrated in accordance with Specification [E 1](#).

5.2 *Water Bath*, capable of maintaining a temperature of  $25.0 \pm 0.05^\circ\text{C}$  during the test.

5.3 *Thermometer*, an ASTM Low Softening Point Thermometer having a range from  $-2$  to  $+80^\circ\text{C}$  and conforming to the requirements for Thermometer 15°C as prescribed in Specification [E 1](#).

5.4 *Analytical Balance*, sensitive to 0.1 mg.

## 6. Reagents

6.1 *Chromic Acid Cleaning Solution*—Prepare a saturated solution of chromic acid ( $\text{CrO}_3$ ) in concentrated sulfuric acid ( $\text{H}_2\text{SO}_4$ , sp gr 1.84).

## 7. Sampling

7.1 Polyesters and polyethers usually contain molecules covering an appreciable range of molecular weights. These have a tendency to fractionate during solidification. Unless the material is a finely ground solid it is necessary to melt (using no higher temperature than necessary) and mix the resin well before removing a sample for analysis. Since many polyols are hygroscopic, take care to provide minimum exposure to atmospheric moisture during the sampling.

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