



Designation: D 4659 – 03

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

This standard is issued under the fixed designation D 4659; 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 determine the specific gravity of toluenediisocyanate and crude methylene-bis-(4-phenylisocyanate). These test methods also are applicable to many other liquids. (See Note 1.)

1.1.1 *Test Method A*—Specific gravity by pycnometer, for high-accuracy determination.

1.1.2 *Test Method B*—Specific gravity by hydrometer, for a less accurate, but rapid, determination.

1.2 The values stated in SI units are to be regarded as the standard. The values given in brackets 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 and health practices and determine the applicability of regulatory limitations prior to use. For specific warning and precautionary statements see Notes 2 and 3.*

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 891 Test Methods for Specific Gravity, Apparent, of Liquid Industrial Chemicals
- D 1193 Specification for Reagent Water
- E 1 Specification for ASTM Thermometers
- E 100 Specification for ASTM Hydrometers
- E 202 Test Methods for Analysis of Ethylene Glycols and Propylene Glycols

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee D20 on Plastics and are the direct responsibility of Subcommittee D20.22 on Cellular Plastics.

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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.

## 3. Terminology

3.1 *Definitions*:

3.1.1 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.

## 4. Significance and Use

4.1 These test methods can be used for research or for quality control to characterize isocyanates used in polyurethane products.

### TEST METHOD A—SPECIFIC GRAVITY BY PYCNOMETER

## 5. Apparatus

5.1 *Pycnometer*, of 25 or 50-mL capacity, conical shape with a capillary side arm overflow tube having a standard-taper 5/12 ground-glass joint and a ground-glass vented cap. A thermometer graduated from 12 to 38°C in 0.2° divisions attached to the neck of the flask by a standard-taper 10/18 ground-glass joint. This thermometer should be calibrated using the ASTM thermometer specified in 5.3.

5.2 *Water Bath*—A water bath maintained at  $25 \pm 0.05^\circ\text{C}$ .

5.3 *Thermometer*—An ASTM low-softening point thermometer, calibrated from  $-2$  to  $+80^\circ\text{C}$ , which meets the requirements for Thermometer 15C in Specification E 1.

5.4 *Analytical Balance*—A balance having a sensitivity of at least 0.1 mg.

## 6. Reagents and Materials

6.1 *Purity of Reagents*—Use reagent grade chemicals in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical

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