



Designation: D4660 – 23

Standard Test Methods for Polyurethane Raw Materials: Determination of the Isomer Content of Toluenediisocyanate¹

This standard is issued under the fixed designation D4660; 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 These test methods measure the amount of toluene-2,6-diisocyanate (2,6-TDI) isomer or toluene-2,4-diisocyanate (2,4-TDI) isomer in mixtures of the 2,4- and 2,6-isomers of toluenediisocyanate (TDI). Two different test methods are provided to give accurate results over the broad range of isomer concentrations possible.

1.1.1 *Test Method A*—Applicable to TDI samples containing 5 to 95 % of 2,6-TDI isomer (5 to 95 % 2,4-TDI isomer).

1.1.2 *Test Method B*—Applicable to TDI samples containing 0 to 5 % of 2,6-TDI isomer (95 to 100 % 2,4-TDI isomer).

NOTE 1—These test methods are equivalent to ISO 15064.

1.2 The values stated in SI units are to be regarded as standard.

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.*

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*:²

D883 Terminology Relating to Plastics

E180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Spe-

cialty Chemicals (Withdrawn 2009)³

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

2.2 *ISO Standard*:⁴

ISO 15064 Plastics—Aromatic Isocyanates for Use in the Production of Polyurethanes—Determination of the Isomer Ratio in Toluenediisocyanate

3. Terminology

3.1 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**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *isomer*—a compound having the same molecular formula (percentage composition and molecular weight) as another compound but differs in chemical or physical properties.

3.2.2 *isomer content*—the amount of an isomer expressed as a percentage of total 2,4- and 2,6-TDI isomer amount.

4. Summary of Test Methods

4.1 Both test methods are based on the quantitative measurement of absorption bands arising from out-of-plane C-H deformation vibrations of the aromatic ring.

4.2 In Test Method A, the infrared spectrum of a cyclohexane solution of the sample is recorded in the 770 to 840-cm⁻¹ region. The absorbance ratio of the 805 cm⁻¹ to the 782 cm⁻¹ band is measured and converted to percent 2,6-TDI, or percent 2,4-TDI, or both, from a previously established calibration curve.

4.3 In Test Method B, the absorbance of the 782-cm⁻¹ band is measured from an infrared spectrum of an undiluted sample

¹ These test methods are 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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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.

⁴ 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