



Designation: D5836 – 20

Standard Test Method for Determination of 2,4-Toluene Diisocyanate (2,4-TDI) and 2,6-Toluene Diisocyanate (2,6-TDI) in Workplace Atmospheres (1-2 PP Method)¹

This standard is issued under the fixed designation D5836; 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 test method describes the determination of 2,4-toluene diisocyanate (2,4-TDI) and 2,6-toluene diisocyanate (2,6-TDI) in air samples collected from workplace atmospheres in a cassette containing a glass-fiber filter impregnated with 1-(2-pyridyl)piperazine (1-2 PP). This procedure is effective for determining the vapor content of atmospheres. It is advisable to perform a field extraction for atmospheres containing aerosols to avoid the possibility of an underestimation.

1.2 This test method uses a high-performance liquid chromatograph (HPLC) equipped with a fluorescence or an ultraviolet (UV) detector (**1-4**).^{2,3} An ultra high performance liquid chromatograph (UPLC) can also be used, provided that its performance is equivalent to what is stated in this standard.

1.3 The validated range of the test method, as written, is from 1.4 to 5.6 µg of 2,4-TDI and 2,6-TDI which is equivalent to approximately 9.8 to 39 ppb for 2,4-TDI and 2,6-TDI based on a 20-L air sample. The HPLC method using an UV detector is capable of detecting 0.078 µg of 2,4-TDI and 0.068 µg of 2,6-TDI in a 4.0-mL solvent volume, which is equivalent to 0.55 ppb for 2,4-TDI and 0.48 ppb for 2,6-TDI based on a 20-L air sample.

1.4 The isomers of 2,4-TDI and 2,6-TDI can be separated utilizing a reversed phase column for the HPLC method. Because industrial applications employ an isomeric mixture of 2,4- and 2,6-TDI, the ability to achieve this separation is important.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

¹ This test method is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.04 on Workplace Air Quality.

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² Validation data and a preliminary draft of this test method were provided by the Salt Lake Technical Center of the U.S. Dept. of Labor, Occupational Safety and Health Administration, Salt Lake City, UT.

³ The boldface numbers in parentheses refer to a list of references at the end of this standard.

1.6 *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. See Section 9 for specific precautions.*

1.7 *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:⁴

- D1193 Specification for Reagent Water
- D1356 Terminology Relating to Sampling and Analysis of Atmospheres
- D1357 Practice for Planning the Sampling of the Ambient Atmosphere
- D3686 Practice for Sampling Atmospheres to Collect Organic Compound Vapors (Activated Charcoal Tube Adsorption Method)
- D4840 Guide for Sample Chain-of-Custody Procedures
- D5337 Practice for Flow Rate Adjustment of Personal Sampling Pumps
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 Other Documents:

- ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories⁵

3. Terminology

3.1 Definitions:

⁴ 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.

⁵ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandinnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.