



Designation: D5075 – 01 (Reapproved 2022)

Standard Test Method for Nicotine and 3-Ethenylpyridine in Indoor Air¹

This standard is issued under the fixed designation D5075; 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 covers the sampling/analysis of nicotine and 3-ethenylpyridine (3-EP) in indoor air. This test method is based upon the collection of nicotine and 3-EP by adsorption on a sorbent resin, extraction of nicotine and 3-EP from the sorbent resin, and determination by gas chromatography (GC) with nitrogen selective detection (1).²

1.2 The active samplers consist of an macroporous polystyrene-divinylbenzene copolymer (for example, XAD-4) sorbent tube attached to a sampling pump. Macroporous polystyrene-divinylbenzene copolymer is referred to “sorbent resin” throughout this method. This test method is applicable to personal or area sampling.

1.3 This test method is limited in sample duration by the capacity of the sorbent tube for nicotine (about 300 μg). This test method has been evaluated up to 24-h sample duration; however, samples are typically acquired for *at least* 1 h (sometimes *only* 1 h) (2).

1.4 For this test method, limits of detection (LOD) and quantitation (LOQ) for nicotine at a sampling rate of 1.5 L/min are, respectively, 0.11 $\mu\text{g}/\text{m}^3$ and 0.37 $\mu\text{g}/\text{m}^3$ for 1-h sample duration and 0.01 $\mu\text{g}/\text{m}^3$ and 0.05 $\mu\text{g}/\text{m}^3$ for 8-h sample duration. The LOD and LOQ for 3-EP at a sampling rate of 1.5 L/min are, respectively, 0.06 $\mu\text{g}/\text{m}^3$ and 0.19 $\mu\text{g}/\text{m}^3$ for 1-h sample duration and 0.01 $\mu\text{g}/\text{m}^3$ and 0.02 $\mu\text{g}/\text{m}^3$ for 8-h sample duration (2). Both LOD and LOQ can be reduced by increasing the sensitivity of the thermionic specific detector.

1.5 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in 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 deter-*

mine the applicability of regulatory limitations prior to use. Specific precautionary information is given in 13.6.

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*:³

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D1357 Practice for Planning the Sampling of the Ambient Atmosphere

D3631 Test Methods for Measuring Surface Atmospheric Pressure

D5337 Practice for Flow Rate Adjustment of Personal Sampling Pumps

E260 Practice for Packed Column Gas Chromatography

E355 Practice for Gas Chromatography Terms and Relationships

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D1356 and Practice E355.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *environmental tobacco smoke (ETS)*—an aged, dilute composite of exhaled tobacco smoke (exhaled mainstream smoke) and smoke from tobacco products (sidestream smoke).

3.2.2 *nitrogen-phosphorus detector (NPD)*—a highly sensitive device selective for detection of nitrogen- and phosphorus-containing organic compounds.

4. Summary of Test Method

4.1 A known volume of air is drawn through a sorbent sampling tube containing resin to adsorb the nicotine and 3-EP present.

¹ This test method is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.05 on Indoor Air.

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² The boldface numbers in parentheses refer to a list of references at the end of the text.

³ 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.