



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

This standard is issued under the fixed designation D 5075; 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 XAD-4 sorbent tube attached to a sampling pump. 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 XAD-4 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 µg/m³ and 0.37 µg/m³ for 1-h sample duration and 0.01 µg/m³ and 0.05 µg/m³ 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 µg/m³ and 0.19 µg/m³ for 1-h sample duration and 0.01 µg/m³ and 0.02 µg/m³ for 8-h sample duration (2). Both LOD and LOQ can be reduced by increasing the sensitivity of the thermionic specific detector.

1.5 The values stated in SI units are to be regarded as 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 and health practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary information is given in 13.6.

2. Referenced Documents

2.1 ASTM Standards:

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

Current edition approved March 10, 2001. Published May 2001. Originally published as D 5075 – 90. Last previous edition D 5075 – 96^{ε1}.

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

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres³

D 1357 Practice for Planning the Sampling of the Ambient Atmosphere³

D 3631 Test Methods for Measuring Surface Atmospheric Pressure³

D 5337 Practice for Flow Rate for Calibration of Personal Sampling Pumps³

E 260 Practice for Packed Column Gas Chromatography⁴

E 355 Practice for Gas Chromatography Terms and Relationships⁴

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1356 and Practice E 355.

3.2 *Definitions of Terms Specific to This Standard:*

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

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

3.2.3 *XAD-4 resin*—macroreticular polystyrene-divinylbenzene copolymer beads.

4. Summary of Test Method

4.1 A known volume of air is drawn through a sorbent sampling tube containing XAD-4 resin to adsorb the nicotine and 3-EP present.

4.2 The XAD-4 sorbent tube contents are transferred to a 2-mL autosampler vial, and the nicotine and 3-EP are desorbed with ethyl acetate containing 0.01 % triethylamine and a known quantity of quinoline, the internal standard.

4.3 An aliquot of the desorbed sample is injected into a gas chromatograph equipped with a thermionic-specific (nitrogen-phosphorus) detector.

³ *Annual Book of ASTM Standards*, Vol 11.03.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

