Designation: D8024 – 16

Standard Test Method for Determination of (Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) in Water by Multiple Reaction Monitoring Liquid Chromatography/Mass Spectrometry (LC/MS/MS)[1]

This standard is issued under the fixed designation D8024; 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 determination of (Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) in water by dilution with acetone, filtration and analysis by liquid chromatography/tandem mass spectrometry. This test method is not amenable for the analysis of isomeric mixtures of Tributyl-tetradecylphosphonium chloride. TTPC is a biocide that strongly adsorbs to soils.[2] The water samples are prepared in a solution of 75 % acetone and 25 % water because TTPC has an affinity for surfaces and particles. The reporting range for this method is from 100–4000 ng/L. This analyte is qualitatively and quantitatively determined by this method. This test method adheres to multiple reaction monitoring (MRM) mass spectrometry.

1.2 A full collaborative study to meet the requirements of Practice D2777 has not been completed. This test method contains single-operator precision and bias based on single-operator data. Publication of standards that have not been fully validated is done to make the current technology accessible to users of standards, and to solicit additional input from the user community.

1.3 The Method Detection Limit[3] (MDL) and Reporting Range[4] for the target analyte are listed in Table 1.

1.3.1 The reporting limit in this test method is the minimum value below which data are documented as non-detects. Analyte detections between the method detection limit and the reporting limit are estimated concentrations and are not reported following this test method. The reporting limit is calculated from the concentration of the Level 1 calibration standard as shown in Table 4 for TTPC after taking into account a 2.5 mL water sample volume and a final diluted sample volume of 10 mL (75 % acetone/25 % water). The final solution volume is 10 mL because a 7.5 mL volume of acetone is added to each 2.5 mL water sample which is shaken and filtered.

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

1.5 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[5]

D1129 Terminology Relating to Water
D1193 Specification for Reagent Water
D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water
D3856 Guide for Management Systems in Laboratories Engaged in Analysis of Water
D4841 Practice for Estimation of Holding Time for Water Samples Containing Organic and Inorganic Constituents
D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis
E2554 Practice for Estimating and Monitoring the Uncertainty of Test Results of a Test Method Using Control Chart Techniques

[1] This test method is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.06 on Methods for Analysis for Organic Substances in Water.

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[2] More information on TTPC can be found at http://www.buruenergy.com/wp-content/uploads/BE-Environmental-Properties-of-Proposed-Biocide-BE-91.pdf (2014) and http://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/advancedsearch/externalSearch.do?p_type=CASNO&p=81741-28-8 (2014).

[3] The MDL is determined following the Code of Federal Regulations, 40 CFR Part 136, Appendix B, as a guide. A detailed process determining the MDL is explained in the reference and is beyond the scope of this test method to be explained here.

[4] Reporting range concentration is calculated from Table 4 concentrations assuming a 50 µL injection of the Level 1 calibration standard for TTPC, and the highest level calibration standard with a 10 mL final diluted sample volume starting with a 2.5 mL water sample. Volume variations will change the reporting limit and ranges.

[5] 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.

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