



Standard Test Method for Determination of Nonylphenol, Bisphenol A, *p*-tert-Octylphenol, Nonylphenol Monoethoxylate and Nonylphenol Diethoxylate in Environmental Waters by Gas Chromatography Mass Spectrometry¹

This standard is issued under the fixed designation D7065; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This test method covers determination of nonylphenol (NP), nonylphenol ethoxylate (NP1EO), nonylphenol diethoxylate (NP2EO), octylphenol (OP), and bisphenol A (BPA) that are partitioned into organic solvent, separated using gas chromatography and detected with mass selective detection. These compounds or isomer mixtures are qualitatively and quantitatively determined by this method. This method adheres to selected ion monitoring mass spectrometry but full scan mass spectrometry has also been shown to work well under these conditions. Either analysis may be used.

1.2 The method detection limit (MDL) and reporting limit (RL) for NP, NP1EO, NP2EO, OP, and BPA are listed in [Table 1](#).

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

1.4 *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 to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

[D1193](#) Specification for Reagent Water

[D3694](#) Practices for Preparation of Sample Containers and for Preservation of Organic Constituents

[D3856](#) Guide for Management Systems in Laboratories

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 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.

Engaged in Analysis of Water

[D5847](#) Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis

[D5905](#) Practice for the Preparation of Substitute Wastewater

[E691](#) Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 Definitions:

3.1.1 Nonylphenol, NP, n—nonylphenol is mixed isomers of branched p-nonylphenol.

3.1.1.1 *Discussion*—Commercial nonylphenol is produced by the reaction of phenol with commercial nonene. Commercial nonene is not simply a linear C₉H₁₈ alpha olefin; it is a complex mixture of predominantly nine-carbon olefins, called propylene trimer, containing no linear isomers. This synthesis results in a mixture of various branched nonylphenol isomers rather than a discrete chemical structure. The branched nonyl group is positioned predominantly in the para position on the phenol ring.

3.1.2 Octylphenol, OP, n—OP represents 4-(1,1,3,3-tetramethylbutyl)phenol.

3.1.2.1 *Discussion*—Commercial octylphenol is produced by the reaction of phenol and diisobutylene to produce predominantly the 4-(1,1,3,3-tetramethylbutyl)phenol isomer.

3.1.3 Bisphenol A, BPA, n—BPA represents 4,4'-dihydroxy-2,2-diphenylpropane.

3.1.3.1 *Discussion*—Commercial bisphenol A is produced by the condensation reaction of phenol and acetone to produce predominantly the 4,4'-dihydroxy-2,2-diphenylpropane.

3.1.4 Environmental water, n—it shall refer to water tested using this method. See [Section 5](#).

3.2 Abbreviations:

3.2.1 NP1EO—branched nonylphenol monoethoxylate.

3.2.2 NP2EO—branched nonylphenol diethoxylate.

3.2.3 n-NP—normal straight chain nonylphenol.

3.2.3.1 *Discussion*—n-NP is used in this method as a surrogate for NP, OP and BPA. n-NP is not produced commercially and is not expected to be found in environmental waters.