



Standard Test Method for Phenols in Water by Gas-Liquid Chromatography¹

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1. Scope

1.1 This test method covers a direct aqueous injection procedure for the gas-liquid chromatographic determination of phenols, cresols, and mono- and di-chlorophenols in water.²

1.2 The precision and bias of the test method has been calculated from the results of interlaboratory analyses of three master solutions, each containing phenol, *p*-cresol, *p*-chlorophenol, 3,5-dichlorophenol.

1.3 The test method may be applied to waste water or concentrates that contain more than 1 mg/L of phenolic compounds. Therefore, for a comparison with Test Methods D1783, see Appendix X1.

1.4 The analyst should recognize that precision statements provided in 16.1 and 16.2 may not apply to waters of other matrices.

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information only.

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.* For specific hazard statements, see Note 3.

2. Referenced Documents

2.1 ASTM Standards:³

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

D1783 Test Methods for Phenolic Compounds in Water

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 Baker, R. A., "Phenolic Analyses by Direct Aqueous Injection Gas Chromatography," *Journal American Water Works Association*, Vol 58, No. 6, 1966, pp. 751–760.

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.

D3370 Practices for Sampling Water from Closed Conduits
D3856 Guide for Management Systems in Laboratories Engaged in Analysis of Water

D4210 Practice for Intralaboratory Quality Control Procedures and a Discussion on Reporting Low-Level Data (Withdrawn 2002)⁴

E260 Practice for Packed Column Gas Chromatography

E355 Practice for Gas Chromatography Terms and Relationships

3. Terminology

3.1 Definitions:

3.1.1 Definitions and terms are presented in Practice E355 and Terminology D1129.

3.1.2 The following terms used in this test method are defined in Terminology D1129 as follows:

3.1.3 *ghosting*—a gas-chromatographic interference, showing as a peak, which appears at the same elution time as a component from previous injection.

3.1.4 *internal standard*—a material present in or added to samples in known amount to serve as a reference measurement.

3.1.5 *noise*—an extraneous electronic signal that affects baseline stability.

3.1.6 *phenolic compounds*—hydroxy derivatives of benzene and its condensed nuclei.

3.1.7 *retention time*—the time that elapses from the introduction of the sample until the component peak maximum is reached.

4. Summary of Test Method

4.1 This test method uses a single gas-liquid chromatographic column for the separation of phenolic compounds and a flame-ionization detector for their measurement. The peak area of each component is measured and compared with that of a known standard to obtain quantitative results. A discussion of gas chromatography is presented in Practice E260.

4.2 In this test method, elution of characteristic phenols occurs in the following order: (1) *o*-chlorophenol, (2) phenol

⁴ The last approved version of this historical standard is referenced on www.astm.org.