



## Standard Test Method for pH of Water Extractions of Halogenated Organic Solvents and Their Admixtures<sup>1</sup>

This standard is issued under the fixed designation D 2110; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the measurement of the pH of water extractions of halogenated organic solvents and admixtures thereof. This test method is applicable for the determination of the pH of water extractions of virgin, reclaimed, or used solvents.

1.2 *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. Summary of Test Method

2.1 The solvent sample is shaken with freshly boiled neutral distilled or deionized water and the pH of the water extract determined by one of two procedures:

2.1.1 *Procedure A*, by comparing the color formed upon the addition of Gramercy Universal Indicator with that of a calibrated Gramercy pH Indicator Color Chart, or

2.1.2 *Procedure B*, using a glass electrode pH meter.

### 3. Significance and Use

3.1 The pH of halogenated solvents varies according to the nature of stabilizers in the particular solvent. Solvents with alkaline stabilizers (amine-types) generally have pHs in the 7 to 11 range, whereas solvents containing neutral stabilizers (epoxide-types) generally have pHs in the 5 to 7 range.

3.2 Virgin and reclaimed solvents should have pHs within these ranges, dependent upon the claimed method of stabilization. These values should be within the accepted limits as proposed by the producers of the original virgin solvent.

3.3 A lowering of pH from the above values, on receipt or use, is cause for concern. In this event, solvents having epoxide stabilizers should be tested for acid acceptance; solvent having alkaline stabilizers should be tested for alkalinity.

### 4. Apparatus

4.1 *Gramercy Universal Indicator and Gramercy pH Indicator Color Chart* (Procedure A), or

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-26 on Halogenated Organic Solvents and Fire Extinguishing Agents and is the direct responsibility of Subcommittee D26.04 on Test Methods.

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4.2 *Glass Electrode pH Meter* (Procedure B).

### 5. Water

5.1 *Neutral Distilled Water* shall be prepared as follows: Boil 1 L of distilled or deionized water for 5 min in a borosilicate glass or stainless steel container, then cover and cool to room temperature. Titrate a 50-mL aliquot to a pH of 7.0 to 7.3 with either 0.01 *N* sodium hydroxide (NaOH) solution or 0.01 *N* hydrochloric acid (HCl), depending upon whether the initial pH is above or below 7. From this titer, calculate the volume of 0.01 *N* NaOH solution or 0.01 *N* HCl required to adjust the pH of the remaining 950 mL of boiled distilled or deionized water to a pH of 7.0 to 7.3. Add the calculated volume of 0.01 *N* NaOH solution or 0.01 *N* HCl together with the titrated 50-mL aliquot of neutralized water to the 950-mL stock and mix thoroughly. Determine the pH of a second aliquot. If further adjustment is necessary to obtain a pH of 7.0 to 7.3, repeat the above procedure.

### 6. Procedure

6.1 Transfer 50 mL of the halogenated organic solvent to a 250-mL separatory funnel containing 50 mL of freshly boiled neutral distilled or deionized water. Shake the mixture for 2 min; then let stand and allow the layers to separate. Drain and discard the halogenated solvent layer and transfer the water extract to a 100-mL beaker. Determine the pH of the water extract by either Procedure A or B.

6.2 *Procedure A*—Pipet 2 mL of Gramercy Universal Indicator into the water extract, stir, and compare the resultant color of a 10-mL aliquot in a 13-mm outside diameter test tube with those of the Gramercy Color Chart. The pH ( $\pm 0.25$  pH unit) of the water extract is the same as the pH of the closest matching color on the Gramercy Color Chart.

6.3 *Procedure B*—Determine the pH of the water extract to the nearest 0.1 pH unit with a calibrated glass electrode pH meter.

### 7. Precision and Bias<sup>2</sup>

7.1 The precision for Procedure A, Universal Indicator, is  $\pm 0.5$  pH unit; for Procedure B, pH meter,  $\pm 0.2$  pH unit; and for multilaboratory,  $\pm 0.9$  pH unit.

<sup>2</sup> Supporting data have been filed at ASTM headquarters and may be obtained by requesting Research Report RR D26-1007.