

METHOD 9041A

pH PAPER METHOD

1.0 SCOPE AND APPLICATION

1.1 Method 9041 may be used to measure pH as an alternative to Method 9040 (except as noted in Step 1.3) or in cases where pH measurements by Method 9040 are not possible.

1.2 Method 9041 is not applicable to wastes that contain components that may mask or alter the pH paper color change.

1.3 pH paper is not considered to be as accurate a form of pH measurement as pH meters. For this reason, pH measurements taken with Method 9041 cannot be used to define a waste as corrosive or noncorrosive (see RCRA regulations 40 CFR §261.22(a)(1)).

2.0 SUMMARY OF METHOD

2.1 The approximate pH of the waste is determined with wide-range pH paper. Then a more accurate pH determination is made using "narrow-range" pH paper whose accuracy has been determined (1) using a series of buffers or (2) by comparison with a calibrated pH meter.

3.0 INTERFERENCES

3.1 Certain wastes may inhibit or mask changes in the pH paper. This interference can be determined by adding small amounts of acid or base to a small aliquot of the waste and observing whether the pH paper undergoes the appropriate changes.

CAUTION: THE ADDITION OF ACID OR BASE TO WASTES MAY RESULT IN VIOLENT REACTIONS OR THE GENERATION OF TOXIC FUMES (e.g., hydrogen cyanide). Thus, a decision to take this step requires some knowledge of the waste. See Step 7.3.3 for additional precautions.

4.0 APPARATUS AND MATERIALS

4.1 Wide-range pH paper.

4.2 Narrow-range pH paper: With a distinct color change for every 0.5 pH unit (e.g., Alkaacid Full-Range pH Kit, Fisher Scientific or equivalent). Each batch of narrow-range pH paper must be calibrated versus certified pH buffers or by comparison with a pH meter which has been calibrated with certified pH buffers. If the incremental reading of the narrow-range pH paper is within 0.5 pH units, then the agreement between the buffer or the calibrated pH meter with the paper must be within 0.5 pH units.

4.3 pH Meter (optional).

5.0 REAGENTS

5.1 Certified pH buffers: To be used for calibrating the pH paper or for calibrating the pH meter that will be used subsequently to calibrate the pH paper.

5.2 Dilute acid (e.g., 1:4 HCl).

5.3 Dilute base (e.g., 0.1 N NaOH).

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 All samples must be collected using a sampling plan which addresses the considerations discussed in Chapter Nine of this manual.

7.0 PROCEDURE

7.1 A representative aliquot of the waste must be tested with wide-range pH paper to determine the approximate pH.

7.2 The appropriate narrow-range pH paper is chosen and the pH of a second aliquot of the waste is determined. This measurement should be performed in duplicate.

7.3 Identification of interference:

7.3.1 Take a third aliquot of the waste, approximately 2 mL in volume, and add acid dropwise until a pH change is observed. Note the color change.

7.3.2 Add base dropwise to a fourth aliquot and note the color change. (Wastes that have a buffering capacity may require additional acid or base to result in a measurable pH change.)

7.3.3 The observation of the appropriate color change is a strong indication that no interferences have occurred.

CAUTION ADDITION OF ACID OR BASE TO SAMPLES MAY RESULT IN VIOLENT REACTIONS OR THE GENERATION OF TOXIC FUMES. PRECAUTIONS MUST BE TAKEN. THE ANALYST SHOULD PERFORM THESE TESTS IN A WELL-VENTILATED HOOD WHEN DEALING WITH UNKNOWN SAMPLES.

8.0 QUALITY CONTROL

8.1 All quality control data must be maintained and available for easy reference or inspection.

8.2 All pH determinations must be performed in duplicate.

8.3 Each batch of pH paper must be calibrated versus certified pH buffers or a pH meter which has been calibrated with certified pH buffers.

9.0 METHOD PERFORMANCE

9.1 No data provided.

10.0 REFERENCES

10.1 None required.

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