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Test Method for pH and Total Alkali in Wet Processed Textiles: Combined

Foreword

This test method was written as an alternative to AATCC TM81 and AATCC TM144 to offer a combined method for performing these tests on a single specimen (see 14.1).

1. Purpose and Scope

1.1 This test method is used to determine the pH and total alkali content of wet processed textiles. pH and total alkali can be used to determine washing and/or neutralizing efficiency after certain wet processing steps, particularly bleaching, and can be used as a measure of the suitability of prepared fabric for subsequent dyeing and finishing operations.

1.2 To make a quantitative determination, the chemicals which influence pH must be removed from the textile specimen, collected as a water extract and then accurately measured by a pH meter.

2. Principle

2.1 Each specimen is immersed in boiling, distilled or deionized water. The specimen is boiled for an additional time, then covered and allowed to cool to room temperature. The pH of the bath is measured, then titrated with an acid to a predetermined endpoint. The percentage of total alkali on the textile can then be calculated from the amount of acid used and the weight of the specimen.

3. Referenced Documents

NOTE: Use current versions of all publications unless otherwise specified.

3.1 AATCC TM81, Test Method for pH of the Water-Extract from Wet Processed Textiles (see 14.2).

3.2 AATCC TM144, Test Method for Alkali in Wet Processed Textiles: Total (see 14.2).

3.3 W. W. Scott, *Standard Methods of Chemical Analysis*, 6th Ed., Van Nostrand, New York, 1962, p1343.

4. Terminology

4.1 **bleaching**, n.—elimination of unwanted coloring matter from a textile substrate by oxidative or reductive chemical treatment.

4.2 **pH**, n.—the negative logarithm of the effective hydrogen ion concentration or hydrogen ion activity in gram equivalents

per liter used in expressing both acidity and alkalinity on a scale with values from 0 to 14, with 7 representing neutrality, numbers less than 7 representing increasing acidity and numbers greater than 7 representing increasing alkalinity.

4.3 **total alkali**, n.—in *textile wet processing*, residual alkaline materials in a wet processed textile expressed as percent sodium hydroxide on dry weight of the textile.

4.4 **wet processing**, n.—in *textile manufacturing*, a collective term for processes included in preparation, dyeing, printing, and finishing in which the textile material is treated with a liquid, normally water, or with chemicals in solution or dispersion in a liquid.

5. Safety Precautions

NOTE: These safety precautions are for information purposes only. The precautions are ancillary to the testing procedures and are not intended to be all inclusive. It is the user's responsibility to use safe and proper techniques in handling materials in this test method. Users MUST consult manufacturers for specific details such as safety data sheets and other recommendations. Consult and follow all applicable OSHA standards and rules.

5.1 Follow good laboratory practices. Wear safety glasses in all laboratory areas.

5.2 Handle all chemicals with care.

5.3 If concentrated sulfuric acid is diluted to prepare the 0.02N sulfuric acid (see 6.5), use chemical goggles or face shield, impervious gloves and an impervious apron. Handle concentrated acids only in an adequately ventilated laboratory hood. CAUTION: Always add acid to water.

5.4 Ensure an eyewash/safety shower is located nearby and a high-efficiency particulate respirator with a full facepiece is readily available for emergency use.

5.5 Control exposure to chemicals used in this procedure at or below levels set by governmental authorities (e.g., Occupational Safety and Health Administration's [OSHA] permissible exposure limits [PEL] as found in 29 CFR 910.1000; see web site: www.osha.gov for latest version). In addition, the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVS) comprised of time weighted averages

(TLV-TWA), short term exposure limits (TLV-STEL), and ceiling limits (TLV-C) are recommended as a general guide for air contaminant exposure which should be met (see 14.3).

6. Uses and Limitations

6.1 pH and total alkali can be used to determine the suitability of wet processed textiles for subsequent dyeing and finishing operations or to evaluate the washing and/or neutralizing efficiency following any wet processing operation.

6.2 In this test method all alkalis detected, such as sodium hydroxide, sodium carbonate, sodium bicarbonate, and other alkaline salts, are calculated as sodium hydroxide. The results are reported as total alkali, expressed as NaOH.

7. Apparatus and Reagents (see 14.4)

7.1 pH meter, 0.1-unit graduations.

7.2 Beakers, glass, 600 mL.

7.3 Burette, glass, 10 mL, 0.10 mL graduations.

7.4 Buffer solutions, pH 4.0, 7.0, 10.0, or others as needed.

7.5 Sulfuric acid, 0.02N H₂SO₄ (see 3.3 for method of preparation of standard acid).

8. Calibration

8.1 Calibrate the pH meter with pH 4.0 buffer solution in accordance with the manufacturer's instructions. For dual calibration instruments, use pH 4.0 buffer and pH 7.0 or pH 10.0 buffer.

9. Specimens

9.1 Specimens may be taken dry or wet.

9.2 Dry cloth. Select two (2) or more representative dried specimens. Place in oven at 100°C (212°F) for 1 h. Cool in a desiccator and weigh to the nearest 0.1 g. Specimens should weigh 5-10 g.

9.3 Wet cloth. Select two (2) or more representative specimens weighing approximately 10-20 g in the wet state.

9.4 If the mass per unit area of the fabric is excessively low, or difficult to wet, cut the specimen into small pieces to promote better immersion in the distilled water.