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Test Method for pH of the Water-Extract from Wet Processed Textiles

1. Purpose and Scope

1.1 This test method determines the pH of wet processed textiles.

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 The specimen is boiled in distilled or deionized water. The water-extract is cooled to room temperature and the pH is determined.

3. Terminology

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

3.2 **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 whose values run from 0 to 14 with 7 representing neutrality, numbers less than 7 increasing acidity and numbers greater than 7 increasing alkalinity.

3.3 **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.

4. 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. Manufacturers MUST be consulted for specific details such as material safety data sheets and other manufacturer's recommendations. All OSHA standards and rules must also be consulted and followed.

4.1 Good laboratory practices should be followed. Wear safety glasses in all laboratory areas.

4.2 All chemicals should be handled with care.

5. Limitations

5.1 pH can be used to determine the suitability of wet processed textiles for subsequent dyeing and/or finishing operations or to evaluate the washing and/or neutralizing efficiency following any wet

processing operation.

5.2 This method should be used in conjunction with AATCC TM144, Test Method for Alkali in Wet Processed Textiles: Total, in order to quantitatively determine the amount of an alkali present. While pH gives an indication of relative alkali or acid content, the exact amount can be masked by the presence of strong buffering agents.

6. Apparatus and Materials

6.1 pH meter with 0.1 unit graduations.

6.2 Beakers, glass, 400 mL.

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

7. Calibration

7.1 Calibrate the pH meter in accordance with the manufacturer's instructions. Select buffer solutions for calibration which are in the estimated range of the specimens' pHs.

8. Specimens

8.1 Use a 10 ± 0.1 g specimen of the material to be tested. If the specimen is difficult to wet out, then it should be cut into small pieces.

9. Procedure

9.1 Boil 250 mL of distilled water at a moderate rate for 10 min. Immerse the specimen, cover the beaker with a watch glass and boil for an additional 10 min.

9.2 Allow the covered beaker and contents to cool to room temperature. Remove the specimen with tweezers, allowing the excess liquid to drip back into the extract.

9.3 Determine the pH of the extract using a pH meter operated according to manufacturer's instructions.

10. Evaluation

10.1 The pH of the water-extract depends on the chemical treatment previously given the textile, the pH of the wash water, and the efficiency of the washing operation.

10.2 Normally, the pH of the water-extract will be higher after caustic boiling than after bleaching. If the textile is scoured after bleaching, the pH may be lower.

10.3 Textiles with high pH values may exhibit yellowing tendencies, create shade changes, alter the exhaustion and fixation of dyes, and produce a decrease in the cure of resin finishes or exhaustion of softeners.

11. Report

11.1 Describe or identify the sample.

11.2 Report that sample was tested using AATCC TM81-2022.

11.3 Report the pH of the water extract.

12. Precision and Bias

12.1 Precision.

12.1.1 In late 1993, an interlaboratory study was completed, which included five laboratories, two operators in each, running three determinations per fabric, on four fabrics. No prior assessment was made of the relative level of performance of the participating laboratories.

12.1.2 Analysis of the data set ($5 \times 2 \times 3 \times 4 = 120$ values) yielded components of variance as follows:

Laboratories	0.1203
Operators within laboratories	0.0150
Specimens within materials, laboratories, and operators	0.0188

12.1.3 Table I indicates the critical differences calculated using the values in 11.1.2.

Table I—Critical Differences for Two Averages—95% Probability Level

pH of Water-Extract from Bleached Textiles

<i>N</i>	Single Operator	Within Laboratory	Between Laboratory
1	0.38	0.51	1.09
2	0.27	0.43	1.05
4	0.19	0.39	1.04
8	0.13	0.37	1.03

12.1.4 Differences between two averages of *N* determinations, for the appropriate precision parameter, should reach or exceed the table value to be statistically significant at the 95% probability level.

12.2 Bias.

12.2.1 To the extent the pH meter used in this test method is capable of measuring values of pH that are consistent with true values of pH, the determination of the pH of the water-extract from a bleached textile, using this test method, has no known bias. During this study, no determination was made of the true value of this property by an independent, referee analytical method for the purpose of establishing presence or absence of bias.

13. History

13.1 Revised in 2022 to align to the AATCC Style Guide.

13.2 Editorially revised 2019. Reaffirmed 2016, 2012. Editorially revised 2008. Reaffirmed and editorially revised 2006. Reaffirmed 2001. Revised (with title change) 1996. Revised 1990. Reaffirmed 1989, 1988, 1983, 1980, 1977, 1974, 1969, 1968, Revised 1963.

13.3 Developed in 1954 by AATCC Committee RA34.

13.4 Related to ISO 3017.