



Association of Textile, Apparel & Materials Professionals

AATCC takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this test method. Users of this test method are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This test method is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reaffirmed or withdrawn. Your comments are invited either for revision of this test method or for additional procedures and should be addressed to the AATCC Technical Center. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing, you should make your views known to Diana A. Wyman, Technical Director, at the address shown below.

This test method is copyrighted by AATCC, PO Box 12215, Research Triangle Park, NC 27709 USA. Individual reprints (single or multiple copies) of this method may be obtained by contacting AATCC at the above address or tel: 919-549-3526; fax: 919-549-8933, or e-mail: orders@aatcc.org.

AATCC License Agreement: This test method is copyrighted by the American Association of Textile Chemists and Colorists (AATCC), PO Box 12215, 1 Davis Drive, Research Triangle Park, NC USA. All rights reserved.

AATCC grants you a license as follows: The right to download one electronic file of this AATCC test method for temporary storage on one computer for purposes of viewing, and/or printing one copy of the AATCC test method for individual use. Neither the electronic file nor the hard copy print may be reproduced in any way. In addition, the electronic file may not be distributed elsewhere over computer networks or otherwise. The hard copy print may only be distributed to other employees for their internal use within your organization.

This test method is not for resale.

Colorfastness to Water

Developed in 1962 by AATCC Committee RA23; revised 1967, 1968, 1972, 1981, 2009, 2012, 2013; reaffirmed 1975, 1978, 1989, 2007; editorially revised 1983, 1985, 1994, 2001, 2005, 2008, 2010; editorially revised and reaffirmed 1986, 1991, 1997, 2002. Technically equivalent to ISO 105-E01.

1. Purpose and Scope

1.1 This test method is designed to measure the resistance to water of dyed, printed, or otherwise colored textile yarns and fabrics.

1.2 Distilled water or deionized water is used in this test method because natural (tap) water is variable in composition.

2. Principle

2.1 The specimen, backed by multifiber test fabric, is immersed in water under specified conditions of temperature and time, and then placed between glass or plastic plates under specified conditions of pressure, temperature and time. The change in color of the specimen and the staining of the attached multifiber test fabric are observed.

3. Terminology

3.1 **colorfastness, n.**—the resistance of a material to change in any of its color characteristics, to transfer of its colorant(s) to adjacent materials or both, as a result of the exposure of the material to any environment that might be encountered during the processing, testing, storage or use of the material.

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 Manufacturer's safety recommendations should be followed when operating laboratory testing equipment.

4.3 Observe padder safety. Ensure adequate guard at the nip point. Normal safeguards on pad should not be removed.

5. Apparatus and Materials (see 12.1)

5.1 Perspiration tester (plastic or glass plates are available with the equipment) (see 12.2).

5.2 Drying oven—convection.

5.3 Multifiber test fabrics (8 mm [0.33 in.] bands) containing acetate, cotton, nylon, silk, viscose rayon and wool shall be used for specimens containing silk, or (8 mm [0.33 in.] bands) containing acetate, cotton, nylon, polyester, acrylic and wool shall be used for specimens with no silk present.

5.4 AATCC 9-Step Chromatic Transference Scale (AATCC Evaluation Procedure 8) (see 12.3).

5.5 Gray Scale for Color Change (AATCC Evaluation Procedure 1) and Gray Scale for Staining (AATCC Evaluation Procedure 2) (see 12.3).

5.6 Wringer.

6. Test Solution

6.1 Distilled water or deionized water from an ion-exchange device.

7. Test Specimens

7.1 If the specimen to be tested is a fabric, attach a piece of multifiber adjacent fabric also measuring $5 \times 5 \pm 0.2$ to the specimen measuring $6 \times 6 \pm 0.2$ cm by sewing along one of the shorter sides, with the multifiber fabric next to the face of the specimen.

7.2 If the specimen to be tested is a yarn or loose fiber, take a mass of the yarn or loose fiber approximately equal to one half of the combined mass of the adjacent fabrics. Place it between a $5 \times 5 \pm 0.2$ cm piece of multifiber fabric and a $6 \times 6 \pm 0.2$ cm piece of the non-dyeable fabric, and sew along all four sides.

8. Procedure

8.1 Immerse the test specimen in the test solution which is at room temperature with occasional agitation to ensure thorough wetting out (approximately 15 min generally required for average fabrics) (see 12.4).

8.2 Remove the test specimen from the test solution and only pass between squeeze rolls (wringer) to remove excess liquor when the wet weight of the test specimen is more than 3 times its dry weight. Whenever possible, the wet

weight should be 2.5-3.0 times the dry weight.

8.3 Place the test specimen between glass or plastic plates and insert in the specimen unit of the perspiration tester. Adjust the perspiration tester to produce a pressure of 4.5 kg (10.0 lb) on the test specimen (see 12.2).

8.4 Heat the loaded specimen unit in an oven at $38 \pm 1^\circ\text{C}$ ($100 \pm 2^\circ\text{F}$) for 18 h.

8.5 Remove the tester from the oven and for each test specimen assembly, separate the multifiber fabric and, if used, the adjacent fabric from the test fabric. Place the multifiber fabric and test fabric specimens separately on a wire screen in a conditioned atmosphere $21 \pm 1^\circ\text{C}$ ($70 \pm 2^\circ\text{F}$) and $65 \pm 2\%$ relative humidity overnight.

9. Evaluation Method for Color Change

9.1 Evaluate the test specimen for change in color by comparison with the Gray Scale for Color Change (AATCC Evaluation Procedure 1), or by using AATCC Evaluation Procedure 7, Instrumental Assessment of the Change in Color of a Test Specimen, and record the numerical rating that corresponds to the appropriate one on the Gray Scale.

10. Evaluation Method for Staining (see 12.7)

10.1 Evaluate the staining of the multifiber fabric used (see 12.5) by comparison with the Gray Scale for Staining (AATCC Evaluation Procedure 2), the AATCC 9-Step Chromatic Transference Scale (AATCC Evaluation Procedure 8), or Instrumental Assessment of Degree of Staining (AATCC Evaluation Procedure 12), and record the numerical rating that corresponds to the appropriate one on either of them. Report which scale is used (see 12.6).

11. Precision and Bias

11.1 *Precision.* Precision for this test method has not been established. Until a precision statement is generated for this test method, use standard statistical techniques in making any comparisons of test results for either *within-laboratory* or *between-laboratory* averages.

11.2 *Bias.* Colorfastness to water can be defined only in terms of a test method. There is no independent method for determining the true value. As a means of estimating this property, the method has no known bias.