



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by the responsible technical committee and must be reviewed every five years and if not revised, either reaffirmed or withdrawn.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.

Test Method for Vertical Wicking of Textiles

Developed in 2011 by AATCC Committee RA63; editorially revised and reaffirmed 2012; reaffirmed 2013, 2018; editorially revised 2016, 2019.

Foreword

Historically, the textile industry has utilized many different test procedures for determining the wicking characteristics of textile fabrics, i.e., the movement of water or liquid through fabrics. Within the last decade, the industry has developed new technologies that have changed water movement and absorbency responses of textiles leading to the use of the labeling term “moisture management” to describe these phenomena. Many interested groups (textile manufacturers, chemical suppliers, and retailers, as well as independent testing laboratories) participated in the efforts to standardize test methods to measure the vertical wicking properties of fabrics with moisture management attributes.

Unofficial techniques for determining the absorbency and wicking properties of textile fabrics were published in the 2004 AATCC/ASTM International's *Technical Supplement: A Compilation of Procedures and Guidelines for Textile Products* and the 2008 AATCC/ASTM International's *Moisture Management Technical Supplement: Applicable to Apparel, Linens and Soft Goods* (see 13.1). This test method is based on one of the testing procedures for wicking published in this *Technical Supplement*.

1. Purpose and Scope

1.1 This test method is used to evaluate the ability of vertically aligned fabric specimens to transport liquid along and/or through them, and is applicable to woven, knitted, or nonwoven fabrics.

2. Principle

2.1 The rate (distance per unit of time) liquid travels along and/or through a fabric specimen is visually observed, manually timed and recorded at specified intervals.

3. Terminology

3.1 **fabric**, n.—in *textiles*, a planar structure made from yarns or fibers (ASTM D123 and see 13.4).

3.2 **vertical wicking**, n.—in *a textile held vertically*, the upward movement of liquid from a cut edge.

3.3 **vertical wicking rate**, n.—the speed at which liquid travels along or through a textile.

3.4 **wicking**, n.—in *textiles*, the movement of a liquid, by capillary action, along or through a material.

3.5 **wicking distance**, n.—the linear measurement that the liquid travels along or through a textile from a starting point to a stopping point.

3.6 **wicking time**, n.—the measurable period during which liquid travels along or through a textile.

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.

5. Uses and Limitations

5.1 The movement of liquid through a fabric may be influenced by fiber content, fabric construction, mechanical or chemical processing or a combination of these.

5.2 This test method is used to evaluate the wicking ability of vertically aligned test specimens, exposed to distilled or deionized water, where wicking is influenced by gravity.

5.3 Liquids other than distilled or deionized water (tinted water, dye solutions, etc.) may be used in this test. If a liquid other than water is chosen, its surface tension should be measured and reported as solutions of different surface tensions may yield different results.

5.4 Dark fabric colors or prints and designs may be difficult to test. The use of a soluble ink of a contrasting color may help in making the marks more clearly visible.

5.5 The procedure measures the time and distance water will move up from the cut edge of a specimen, but does not duplicate an end-product's exposure during wear.

5.6 The results obtained by this test

are not a measure of comfort which is beyond the scope of this method.

5.7 The relationship between results obtained by vertical and horizontal wicking tests is not known.

6. Apparatus, Reagents, Materials

6.1 Distilled or deionized water at $21 \pm 2^\circ\text{C}$ ($70 \pm 4^\circ\text{F}$).

6.2 Marking pens, with fine point, permanent and soluble ink (see 13.2).

6.3 Stopwatch or digital timer.

6.4 Tape or ruler, mm graduations.

6.5 Surface tensiometer, if using liquid other than water (see 9.1).

6.6 Erlenmeyer flask or elongated pan (see Figs. 2 and 3).

6.7 Pipette and bulb.

6.8 Scissor jack (optional).

6.9 Straight pins or a holder that permits the suspension of a specimen into a flask or other device (see Figs. 2 and 3 and 13.3).

6.10 Small paper clip or clamp (optional).

6.11 Template, 165 (or longer) $\times$ 25 mm.

6.12 Disposable gloves, such as latex or nitrile.

6.13 Double-sided tape.

7. Specimens

7.1 Determine whether the fabric has a hydrophobic or hydrophilic side. Upon agreement between interested parties, determine whether both fabric sides are to be tested. If only one fabric side is to be tested, mark the selected side. If testing is to be performed after laundering, use a marking pen with permanent ink to denote the fabric side chosen for testing.

7.2 Minimize handling of the test specimens or use gloves as oils from the skin may affect moisture movement.

7.3 All specimens should be cut at least 100 ± 5 mm from the selvage. If testing garments, take specimens from different garment panels away from seams, pockets, plackets or other assembly features. Take each specimen such that different sets of (fabric) length and width yarns are present.

7.4 Cut three specimens at least $165 \pm 3 \times 25 \pm 3$ mm with the long dimension parallel to the fabric direction(s) chosen to be tested. For length direction testing, align the long direction of the template with the warp yarns (wales); for width direction testing, align the long direction of the template along the filling yarns (courses). Cut an extra specimen to determine water level in the flask or beaker