

Test Method for Drycleaning: Durability of Applied Designs and Finishes

Developed in 1957 by AATCC Committee RA43; revised 1963, 1968, 1970, 1973; reaffirmed 1976, 1979, 1989, 2000, 2005, 2016; editorially revised 1969, 1983, 1986, 1993, 1995, 2004, 2008, 2010, 2019; editorially revised and reaffirmed 1985, 1994, 2011.

1. Purpose and Scope

1.1 This test method indicates the effect of repeated (see 10.1) drycleanings on the durability of applied-design or finish on textiles and other materials. It is also applicable for evaluating the durability of applied design materials and finishing agents manufactured for use on fabrics and other products intended for apparel and household use which are renovated in consumer service by commercial drycleaning procedures. This test method is to be used for evaluating the resistance of colors to spot and stain removal procedures used by the drycleaner.

1.2 This test method is not intended for evaluating colorfastness to drycleaning. For colorfastness properties use AATCC TM132, Test Method for Colorfastness to Drycleaning.

2. Principle

2.1 A specimen is agitated in a solution of solvent and a drycleaning detergent with steel balls to simulate the kind of mechanical action that occurs in a drycleaning machine. A large specimen is provided to produce a correlation with commercial conditions.

3. Terminology

3.1 **drycleaning**, *n.*—the cleaning of fabrics with organic solvents such as petroleum solvent, perchloroethylene or fluorocarbon.

NOTE: The process also includes adding detergent and moisture to the solvent, up to 75% relative humidity, and hot tumble drying to 71°C (160°F).

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 recommenda-

tions. All OSHA standards and rules must 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.

4.3 Perchloroethylene is toxic by inhalation, by repeated contact with the skin and by ingestion. It should be used only in a well vented atmosphere. Toxicology studies with laboratory animals have shown evidence of cancer in rats and mice exposed to perchloroethylene vapors at 100-400 ppm concentrations for prolonged times. Fabric saturated with this solvent should be dried in an adequately ventilated hood. Use chemical goggles or face shield, impervious gloves and an impervious apron when handling perchloroethylene.

4.4 An eyewash/safety shower should be located nearby and an organic vapor respirator should be readily available for emergency use.

4.5 Exposure to chemicals used in this procedure must be controlled 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 1910.1000; 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 10.2).

5. Apparatus and Materials (see 10.3)

5.1 Accelerated laundering machine for rotating closed canisters in a thermostatically controlled water bath at 40 ± 2 rpm.

5.2 Stainless steel cylindrical containers, 203 × 89 mm (8.0 × 3.5 in.) in diameter equipped with solvent-resistant rings.

5.3 Teflon liners.

5.4 Metal adapters (to hold containers on shaft of accelerated laundering machine) (see 10.9).

5.5 Stainless steel balls, 6.3 mm (0.25 in.).

5.6 Gray Scale for Color Change (AATCC EP1) (see 10.4).

5.7 Perchloroethylene, drycleaning grade.

5.8 Drycleaning detergent (see 10.5).

5.9 Hand iron, steam press or flatbed press.

6. Test Specimens

6.1 One test specimen is required. The size of the specimen conforms to the weight range of the product tested as follows:

up to 135 g/m²: 203 × 203 mm
(4 oz/yd²: 8 × 8 in.)

139 to 203 g/m²: 152 × 152 mm
(4.1 to 6.0 oz/yd²: 6 × 6 in.)

207 to 305 g/m²: 127 × 127 mm
(6.1 to 9.0 oz/yd²: 5 × 5 in.)

over 305 g/m²: 102 × 102 mm
(9 oz/yd²: 4 × 4 in.)

6.2 For water-repellency evaluations, a minimum specimen size of 178 mm (7 in.) square is necessary (i.e., for AATCC TM22, Test Method for Water Repellency: Spray).

7. Procedure

7.1 Run Number 1: Place the specimen in a steel container with 150 mL of perchloroethylene, 1 mL drycleaning detergent (see 10.6) and 100 steel balls. Seal the container (see 10.7), clamp in the accelerated laundering machine and run at room temperature 27°C (81°F) for 10 min. Drain.

7.2 Run Number 2: Replace the solvent with an equal amount of perchloroethylene without detergent and run another 10 min. Drain.

7.3 Run Number 3: Repeat Run Number 2. Remove the specimen, blot thoroughly between paper towels and air dry.

7.4 Finish the specimen by one of the following methods:

7.4.1 Hand Pressing [for all except pile fabrics (see 10.8)]—Cover with a damp muslin cloth, weighing 135-153 g/m² (4.0-4.5 oz/yd²), previously saturated with water and wrung out so as to retain moisture equal to approximately 75% of its dry weight and press with a hand iron having a temperature between 135-150°C (275-300°F) until dry.

7.4.2 Steam Pressing [for all except pile fabrics (see 10.8)]—A hotbed or polished metal-top type press for flat fabrics, or a cloth-top type press for rough crepes, operating at a steam pressure of between 448 and 482 kPa (65-70 psi). Lower the head of the machine and hold in contact with the fabric. During this period admit steam from the back of the

press for a period of 5-10 s.

8. Evaluation and Classification

8.1 Durability of Applied Designs—Rate the specimens containing flock, metallic or other applied designs for appearance as follows:

Grade A5—negligible or no change in appearance.

Grade A4—slightly changed in appearance.

Grade A3—noticeably changed in appearance.

Grade A2—considerably changed in appearance.

Grade A1—much changed in appearance.

8.2 Durability of Fabric Handle—Rate specimens for change in handle as follows:

Grade B5—negligible or no change in handle.

Grade B4—slightly changed in handle.

Grade B3—noticeably changed in handle.

Grade B2—considerably changed in handle.

Grade B1—much changed in handle.

8.3 Finish Performance—Evaluate fin-

ish performance characteristics in accordance with AATCC TM22.

9. Precision and Bias

9.1 *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.

9.2 *Bias*. The durability of applied designs and finishes to drycleaning 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.

10. Notes

10.1 This test is based on an extensive series of interlaboratory tests which showed good correlation between laboratory tests and commercial drycleanings for as many as three repeated drycleanings. Since a major loss of finish material occurs in the first drycleaning, a single application of this test furnishes a good indication of the effect of repeated drycleanings.

10.2 Available from Publications Office, ACGIH, Kemper Woods Center, 1330 Kemper Meadow Dr., Cincinnati OH 45240; tel: +1.513.742.2020; web site: www.acgih.org.

10.3 For potential equipment information pertaining to this test method, please visit the online *AATCC Buyer's Guide* at www.aatcc.org/bg. AATCC provides the possibility of listing equipment and materials sold by its Corporate members, but AATCC does not qualify, or in any way approve, endorse or certify that any of the listed equipment or materials meets the requirements in its test methods.

10.4 Available from AATCC, P.O. Box 12215, Research Triangle Park NC 27709; tel: +1.919.549.8141; fax: +1.919.549.8933; e-mail: ordering@aatcc.org; web site: www.aatcc.org.

10.5 Use any reputable supplier of drycleaning detergent.

10.6 Where residual soap affects the performance of the finish (e.g., where water-repellency evaluation is impaired by the presence of detergent) the detergent may be omitted from the test solution, but it is an artificial condition.

10.7 The jars need not be immersed in a water bath as required in washfastness tests.

10.8 Pile fabrics need only be air dried by any suitable means.

10.9 Necessary on older models.