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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; 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 Test Method (TM) 132, 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 Evaluation Procedure 1) (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 TM22, Water Repellency: Spray Test).

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.