

Test Method for Soil Release: Oily Stain Release

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Foreword

This test method measures the ability of fabrics to release an oily soil during home laundering. Standard laundering procedures represent, but may not exactly replicate, current consumer practices, which vary by sample, over time and among households. Alternate stains or care procedures may be addressed by other methods or modifications of this method.

In this method, corn oil is forced into the fabric before laundering. To evaluate a fabric's ability to resist or repel oily stains, use AATCC TM118, Oil Repellency: Hydrocarbon Resistance Test.

1. Purpose and Scope

1.1 This test method is for the evaluation of fabrics to release an oily soil after exposure to home laundering conditions.

1.2 This test may be performed on garments or other end products suitable for home laundering.

2. Principle

2.1 Corn oil is applied to a test specimen. The oil is forced into the fabric by using a specified weight. The stained fabric is then laundered in a prescribed manner and the residual stain evaluated by comparison with a stain release scale showing a graduated series of stains. Results are reported as a grade from 5 to 1, with 5 representing no residual stain and 1 representing the most residual stain.

3. Referenced Documents

NOTE: Use current versions of all publications unless otherwise specified.

3.1 AATCC LP1, Home Laundering: Machine Washing (see 15.1).

3.2 AATCC TM118, Oil Repellency: Hydrocarbon Resistance Test (see 15.1).

3.3 AATCC TM133, Colorfastness to Heat: Hot Pressing (see 15.1).

3.4 ASTM D1776, Standard Practice for Conditioning and Testing Textiles (see 15.2).

4. Terminology

4.1 **soil**, n.—dirt, oil or other substances not normally intended to be present on a substrate such as a textile material.

4.2 **soil release**, n.—the degree to which a soiled substrate approaches its original, unsoiled appearance as a result of a care procedure.

4.3 **stain**, n.—a local deposit of soil or discoloration on a substrate that exhibits some degree of resistance to removal, as by laundering or drycleaning.

5. 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.

5.1 Follow good laboratory practices. Wear safety glasses in all laboratory areas.

5.2 Detergent may cause irritation. Take care to prevent contact with skin and eyes.

5.3 Follow manufacturer's safety recommendations when operating laboratory testing equipment.

6. Uses and Limitations

6.1 In this method, soils are purposely forced into the fabric before laundering. To evaluate a fabric's ability to resist or repel oily soils, use AATCC TM118.

6.2 Standard laundering conditions are not intended to replicate consumer care for all samples. By laundering all samples under the same conditions, this method provides a relative measure of stain release properties. The method may be modified to use recommended care for a particular sample, but results should not be compared with those for samples laundered under different conditions.

6.3 Specimens prepared for this method should not be used for dimensional change or appearance evaluation. Specimens for this method should be laundered separately from specimens for dimensional change or appearance. Although specimen dimensions are the

same for these methods, oily stains may interfere with evaluation of other properties.

7. Apparatus and Materials (see 15.3)

7.1 Conditioning facilities and racks with pull-out, perforated shelves for laying specimens flat (see 15.1).

7.2 AATCC Blotting Paper (see 15.1).

7.3 Corn oil (see 15.4).

7.4 Glassine paper (see 15.1).

7.5 Timer.

7.6 Cylindrical weight, 6.4 cm (2.5 in.) diam., 2.268 ± 0.045 kg (5.0 ± 0.1 lb) (stainless steel is preferable, see 15.1). Multiple weights are recommended to efficiently process multiple samples.

7.7 Amber bottle (see 15.5) with medicine dropper, 76 mm glass, 2-mL capacity, capable of dispensing 20 drops/mL.

7.8 Automatic washing machine (see Table I, 15.6).

7.9 Tumble dryer, normal cycle: maximum exhaust temperature $68^{\circ}\text{C} \pm 6^{\circ}\text{C}$ ($155^{\circ}\text{F} \pm 10^{\circ}\text{F}$), cool down time ≤ 10 min. (see 15.6).

7.10 AATCC 1993 Standard Reference Detergent (powder, without brightener [WOB]) (see 15.1).

7.11 Balance with at least 5.0-kg (10.0-lb) capacity.

7.12 Laundering ballast Type 1 (see Table II, 15.7).

7.13 Water hardness test kit, residential use.

7.14 Evaluation area, as described in Appendix A.

7.15 AATCC Stain Release Scale (see 15.1)

8. Specimens

8.1 Use two test specimens $38 \times 38 \pm 1$ cm ($15.0 \times 15.0 \pm 0.4$ in.) for each determination.

9. Conditioning

9.1 Prior to the application of corn oil, condition test specimens as directed in ASTM D1776. (Use conditions indicated in Table 1 for Textiles, general. Estimate conditioning time as indicated in Table 2 for the appropriate fiber content.) Lay each swatch or product, separately, on a screen or perforated shelf of a conditioning/drying rack.

Table I—Standard Washing Machine Parameters (see 15.9)

Cycle	(1) Normal
Water Level, L (gal)	72 ± 4 (19 ± 1)
Agitation Speed, strokes/min.	86 ± 2
Washing Time, min.	16 ± 1
Final Spin Speed, rpm	660 ± 15
Final Spin Time, min.	5 ± 1
Wash Temp, °C (°F) ¹	(III) Warm: 41 ± 3 (105 ± 5)

¹ Due to US Department of Energy requirements, many washing machines use cooler water. An external control box may be used to override the machine set temperatures.

Table II—Type 1 Laundering Ballast Parameters

	Type 1
Fiber Content	100% cotton
Greige Fabric Yarns	16/1 ring spun
Greige Fabric Construction	52 × 48 ± 5 yarns/in., plain weave
Finished Fabric Weight	155 ± 10 g/m ²
Edges	All edges hemmed or over-edged
Finished Piece Size	920 × 920 ± 30 mm (36.0 × 36.0 ± 1 in.)
Finished Piece Weight	130 ± 10 g

10. Soil Application Procedure

10.1 Place a single thickness of blotting paper on a smooth, horizontal surface.

10.2 Place the specimen face up, flat, on the blotting paper.

10.3 Using the medicine dropper, place 5 drops (approx. 0.2 mL) of corn oil in the approximate center of the test specimen. Apply all drops in the same location.

10.4 Place a 7.6 × 7.6 cm (3.0 × 3.0 in.) square of glassine paper over the soil application area.

10.5 Place the weight on the glassine paper, directly over the soil application area.

10.6 Allow weight to sit undisturbed for 60 ± 5 s. Then remove the weight and discard the glassine paper.

10.7 Repeat 10.2-10.6 for the second specimen. If testing multiple samples to be laundered together, the use of multiple weights allows greater testing efficiency. Do not use blotting paper sites that have previously been used for soil application.

10.8 Wash specimens 20 ± 5 minutes after corn oil has been applied to allow stains to set in. Do not allow test specimens to contact each other in a manner that would transfer corn oil. The maximum number of test specimens per washer load shall be 30. If testing multiple samples and to comply with the 20 ± 5 minutes dwell time requirement, it is recommended that the prescribed washing machine temperature, detergent and ballast pieces to be used are ready for all specimens to be added at the same time.

11. Laundering Procedure

11.1 Washing.

11.1.1 Set washing machine controls to generate the parameters indicated in Table I.

11.1.2 Load for laundering shall consist of all specimens in the sample, plus enough laundering ballast pieces to make a total load weight of 1.8 ± 0.1 kg (4.0 ± 0.2 lb).

11.1.3 Begin selected wash cycle. Allow machine to fill to specified water level.

11.1.4 Measure and record washing water hardness (see 15.8).

11.1.5 Add 66 ± 1 g of AATCC 1993 Standard Reference Detergent (without brightener) to washing machine as directed by washing machine manufacturer's instructions. If detergent is added directly to wash water, agitate briefly to dissolve completely. Stop agitation before adding wash load.

11.1.6 Add wash load (test specimens and ballast), distributing evenly around center agitator. Restart wash cycle.

11.1.7 Allow washing to proceed through the final spin cycle.

11.1.8 Separate tangled specimens and ballast pieces, taking care to minimize distortion. Proceed to drying procedure.

11.2 Tumble Drying.

11.2.1 Place the washed load (test specimens and ballast) in the tumble dryer, and set the temperature control to generate a maximum exhaust temperature of 68°C ± 6°C (155°F ± 10°F).

11.2.2 Allow the dryer to run until the load is fully dry.

11.2.3 Remove specimens from dryer immediately on completion of the cycle and lay flat to prevent formation of wrinkles or creases that can affect the stain release rating.

11.3 Ironing (optional)

11.3.1 If the specimens are extremely

wrinkled and the consumer would ALWAYS expect to iron the end product, hand iron swatches or products prior to evaluation. Use caution due to the extremely high variability in hand ironing procedures performed by individual operators (no standard test method exists for hand ironing procedures).

11.3.2 Use safe ironing temperature for the sample. See AATCC TM133, Table I, Safe Ironing Temperature Guide for guidance regarding textile fibers. Exert the minimum pressure necessary to smooth specimen.

11.4 Evaluate the grade of stain release of each specimen within 4 h after drying. Reconditioning is not required.

12. Evaluation

12.1 Mount the Stain Release Scale on the viewing board, with the center of the scale 114 ± 3 cm (45 ± 1 in.) from the floor (see Appendix A).

12.2 Place the test specimen flat with face up in the center of the table. Rotate the fabric to the angle that produces the lowest grade.

12.3 Stand directly in front of the specimen for evaluation. Stand 76 ± 3 cm (30 ± 1 in.) from the viewing board, with eyes 157 ± 15 cm (62 ± 6 in.) from the floor. Varying the viewing angle either horizontally or vertically can affect grades obtained on some fabrics.

12.4 Two observers shall independently assign a grade to each test specimen. The grade is that of the Stain Release Scale that corresponds most closely to the residual stain on the test specimen. Half-step grades (i.e., 1.5, 2.5, 3.5, 4.5) may be assigned to residual stains that are between grades on the Stain Release Scale.

12.5 Calculate the mean of 4 grades for the sample (2 observers, 2 specimens) to nearest 0.1. This is the unit of measure for this test method.

13. Report

13.1 Describe or identify the fabric tested.

13.2 Report that the sample was tested using AATCC TM130-2018t.

13.3 Report the testing conditions:

13.3.1 Water hardness of the washing procedure in terms of parts per million (ppm).

13.4 Report the test results:

13.4.1 Mean stain release grade calculated in 12.5.

13.4.2 Individual stain release grades for each specimen and observer, or standard deviation of the mean.

13.5 Describe any modification(s) of the published method, including alternate staining or laundering procedures.