

## 1 Purpose and Scope

This test method detects the presence of a fluorochemical finish, or other compounds capable of imparting a low energy surface, on all types of fabrics, by evaluating the fabric's resistance to wetting by a selected series of liquid hydrocarbons of different surface tensions.

## 2. Terminology

**Oil Repellency:** In textiles, the characteristic of a fiber, yarn or fabric whereby it resists wetting by oily liquids.

**Oil Repellency Grade:** In textile testing, the symbol for any step of a multistep standard reference scale for a quality characteristic. The Oil Repellency Grade is assigned to test specimens exhibiting the highest degree of the quality comparable to the testing step.

## 3. Classification: Refer to table 1.

Table 1. Standard Test Liquids.

Oil Repellency Grade	Composition	Surface Tension (25°C) (dynes/cm)	M. Point/ B. Point (°C)
0	None (Fail Kaydol)	---	---
1	Kaydol	31.5	348 (B.P.)
2	Kaydol:n-hexadecane (65:35)	---	---
3	n-hexadecane	27.3	17 ~ 18 (M.P.)
4	n-tetradecane	26.4	4 ~ 6 (M.P.)
5	n-dodecane	24.7	-10.5 ~ -9.0 (M.P.)
6	n-decane	23.5	173 ~ 175 (B.P.)
7	n-octane	21.4	124 ~ 126 (B.P.)
8	n-heptane	19.8	98 ~ 99 (B.P.)

## 4. Test method

## 4.1 Oil Repellency

4.1.1 testing condition: The standard testing condition is  $20 \pm 2$  °C,  $65 \pm 2$  %R.H.

4.1.2 Sample preparation: cut 2 specimens in 20cm × 20cm.

## 4.1.3 Test procedure:

- (1) Place the test specimen flat on the white textile blotting paper on a smooth, horizontal surface.
- (2) Beginning with the lowest-numbered test liquid (AATCC Oil Test Grade Liquid No. 1), carefully place small drops (approximately 5 mm in diameter or 0.05mL volume) on the test specimen in five locations along the filling direction. The drops should be approximately 4.0cm apart.

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(3) The dropper tip should be held at a height of approximately 0.6cm from the fabric surface while placing drops. Observe the drops for  $30\pm 2$ sec, from approximately a  $45^\circ$  angle. If no penetration or wetting of the fabric at the liquid-fabric interface and no wicking around the drops occur, place drops of the next higher-numbered test liquid at an adjacent site on the fabric and again observe for  $30\pm 2$ sec. Continue this procedure until one of the test liquids shows obvious wetting or wicking of the fabric under or around the drop within  $30\pm 2$ sec.

4.1.4 Evaluation and Report: The oil repellency grade should be measured on two separate specimens. If the two grades agree, report the value. When the two grades are not in agreement, a third determination should be made. Report the grade of the third determination if that value is the same as either of the first two determinations. When the third determination is different from either of the first two, report the median value. Report the oil repellency grade to the nearest 0.5 value. For example, if the first two grades are 3.0 and 4.0 and the third determination is a 4.5 value, report the median value of 4.0.

4.2 Washing requirement:

4.2.1 Select the specified washing condition and drying method based on the following table or provided care instruction by supplier.

4.2.2 Fill washing machine to the specified water level (18 gal, about 68L) and adjust the water temperature.

4.2.3 Add  $66\pm 1$ g of 1993 AATCC Standard Reference Detergent to the washing machine. Then, add test specimens and ballast (total weight:  $1.8\pm 0.1$ kg) into machine. Set the washer for the selected washing cycle and time.

4.2.4 Remove the specimen after final spin and dry the specimen according to the specified method based on table 2. After drying, condition the specimens by laying each specimen separately on the screen in an atmosphere of  $20\pm 2^\circ\text{C}$  and  $65\pm 2\%$  R.H. at least 4 hours.

Table 2. Alternative Washing and Drying Conditions.

Machine Cycle	Washing Temperature	Drying Procedure
(1) Normal/Cotton Sturdy	(II) $27\pm 3^\circ\text{C}$ ( $80\pm 5^\circ\text{F}$ )	(A) Tumble
(2) Delicate	(III) $41\pm 3^\circ\text{C}$ ( $105\pm 5^\circ\text{F}$ )	i. Cotton Sturdy
(3) Permanent Press	(IV) $49\pm 3^\circ\text{C}$ ( $120\pm 5^\circ\text{F}$ )	ii. Delicate
	(V) $60\pm 3^\circ\text{C}$ ( $140\pm 5^\circ\text{F}$ )	iii. Permanent Press
		(B) Line
		(C) Drip
		(D) Screen

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5. Mark: Refer to Table 3.

Table 3. Oil Repellency Mark.

Term Type \ Grade	As Received	After 10 times washing	After 20 times washing	Usage Reference
	I	Above 5	---	
II	Above 5	Above 3	---	Durable Oil Repellency
III	Above 5	---	---	Normal Oil repellency

6. Reference

CNS 11308 L 3217-1985 Textile Oil Repellency Test Method

AATCC 118-2002 Oil Repellency : Hydrocarbon Resistance Test

AATCC 135-2003 Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics

ISO 14419-1998 Textile-Oil Repellency-Hydrocarbon Resistance Test

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