IDFL Test Method 20-1 (Version October 2008)
DOWNPROOF / FILLPROOF of BULK FABRIC
(Using Rotating Tumbling Box)

1. General

1a. IDFL Test Method 20-1 predicts the amount of filling material that may escape through the fabric.

1b. This test method was developed in 1978 and is based on the USA Federal Standard (FTMS) 191-5530 developed in 1956. The American Feather and Down Association modified FTMS 191-5530 in its Techical Bullentin Number 23 (1978). IDFL took responsibility for maintenance of the AFDA modified method in 1993. IDFL has made minor modifications to the method and added more detailed reporting formats.

1c. This test method is the accepted method for downproof testing in the USA. This test method is also used in Canada, Japan, China and other countries.

1d. This test method can be used for testing fabric samples. See IDFL Test Method 20-2 for downproof/fillproof testing of finished products, and partially finished products.

1e. The test method can be used with down and feather fillings, synthetic fillings and other natural fillings.

2. Test Equipment

2a. Sewing machine

2a.1 Capable of using a 90 (14 USA) needle to sew 6 stitches per cm (16 stitches per inch).

2b. Rotating Tumbling Box

2b.1 The tumbling apparatus is a plastic box with inside dimensions of 46 cm x 46 cm x 46 cm (18 inches).
2b.2 One side of the tumbling box is hinged and opens completely.
2b.3 The box is supported on bearings by two shafts secured to the outside of the box at the center of two opposite sides.
2b.4 A motor is connected to one shaft through a speed reduction drive.
2b.5 The motor is set to rotate the box at a speed of 48 ±2 revolutions per minute (1,440 tumbles in 30 minutes).
2b.6 24 Nr. 7 rubber stoppers with a total weight of 0.57 kg (1.26 lbs.) are used to strike the test pillow during the test.

3. Preparation of Test Pillows

3a. Test pillows are constructed for the test procedure. At least two separate test pillows should be used.

3b. Test pillows are constructed from bulk fabric swatches.

3c. For testing of fabric already made into finished products see IDFL Test Method 20-2.

3d. Use a size 90 (14 USA) needle and 6 stitches per cm (16 stitches per inch) for all stitching in Section 4-5.

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4. Construction of Test Pillows from Fabric

4a. Prepare two test pillows for each filling-type to be tested.
4b. Cut fabric to straighten the edges. Measure and cut fabric to 33 cm (13 inches) by 42 cm (16.75 inches).
4c. Fold cut fabric in half with the outer sides (side of fabric that will be "outside" in the finished product) facing together on the inside of the fold. Folded fabric should now measure 21 cm (8 3/8 inches) by 33 mm (13 inches).
4d. Stitch bottom and side seams 7 mm (1/4 inch) from the edges. Leave an opening at the top to form an unfilled pillow shell.
4e. Turn sewn fabric inside out with the (inner) sides facing together. NOTE: In order to obtain a smooth second seam, it may be necessary to insert a ruler into the corner of the test pillow after turning to completely push out the first seam.
4f. Re-stitch the bottom and side seams 7 mm (1/4 inch) from the edges, encasing the first seams.
4g. The test pillow is now ready for filling as per Section 5.

5. Filling the Test Pillow

5a. Determine the filling or fillings that will be used in the test pillows:
  5a.1 The standard plumage mix consists of 60% (±5%) waterfowl feathers. The remaining 40% should be down and other components. The standard mix should always be tested if the product is to be filled with down and feathers.
  5a.2 Additional plumage mixes can also be tested. Two test pillows should be constructed for each filling type to be tested. The down/feather ratio of each filling mix should be noted on the report.
  5a.3 Synthetic fillings such as polyester and other natural fillings such as silk may also be tested.

5b. Place 35g of filling material into each of the 2 test pillows and sew straight across the top opening about 25 mm (1 inch) from the edge.
5c. Fold the top of the pillow over two times, creating a 18mm (0.75 inch) hem and stitch twice across the top about 13 mm (1/2 inch) apart.
5d. The finished test pillow should measure approximately 20 cm (8 inches) by 31 cm (12 inches.)

6. Tumbling the Test Pillow

6a. Condition the 2 test pillow for 24 hours in the standard ISO/IDFB climate of 20°C (±2°) and 65% RH (±4%).
6b. Complete steps 6c-6k separately for each of the two test pillows.
6c. Clean the rotating box of filling material (feathers, down, fibers and dust) from previous tests.
6d. Clean the surface of the test pillow to remove any filling material (feathers, down, fibers and dust).
6e. Place test pillow in the rotating tumble box. (Use only one test pillow at a time)
6f. Place 24 Number (#) 7 solid rubber stoppers in the rotating tumble box.
6g. Tumble the test pillow with the rubber stoppers for 30 minutes (approximately 1,440 tumbles).
6h. At the end of the tumbling period, inspect the interior of the test apparatus for filling material which may have escaped from the test pillow. Also, inspect exterior of test pillow for filling material protruding through or laying on the exterior of the test pillow.
6i. Recover all loose filling on exterior of test pillow and interior of test apparatus and record the number of feathers, down clusters, fibers and other material.
6j. Record the number of feathers, down clusters, fibers and other material protruding through fabric.
6k. Thoroughly clean interior of apparatus and rubber stoppers.

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7. Laundering or Dry Cleaning of Fabric or Test Pillow (Optional)

7a. Fabric or finished products may also be tested after laundering or dry cleaning.
7b. Use one of the following to launder or dry-clean before testing.
  7b.1 Launder or dry clean fabric one or more times before constructing test pillows.
  7b.2 Launder or dry clean test pillows one or more times after construction and filling. NOTE: If test pillows are laundered, make sure that test pillow filling is completely dry before testing. It can take 1-3 hours to dry a test pillow depending on fabric and filling material.
7c. Use the AATCC home laundering test method for laundering. (Alternate laundering methods may be used.) Report the exact method used in the test report.
7d. For dry cleaning send the fabric, finished product or test pillow to a professional cleaner who should dry clean according to the best available method for the fabric and filling material.

8. Reporting of Results

8a. Report the source of the test pillow (fabric or customer-supplied test pillow)
8b. Report the type of each filling used.
8c. Report separately the results for each filling type tested.
8d. Report separately the results before and after the optional laundering or dry-cleaning. Include in the report the laundering method and the number of wash/dry cycles completed.

8e. Report the average number of down clusters, feathers, plumage fibers, synthetic fibers, or other filling pieces that escaped or are protruding from the two test pillows after the tumbling period.

Number of Filling Pieces Escaped or Protruding from Test Pillow.

- Feathers = xx
- Down = xx
- Fibers = xx
- Other = xx (specify)

8f. Optionally report a numerical rating based upon the amount of fibers, down, and/or feathers that escaped or are protruding after the tumbling period.

Rating	*Feathers Escaped*	*Down or Fibers Escaped*		*(Optional Rating Description)*
5	0 Feathers	Almost no fibers	(0-5 fibers)	Good
4	1-2 Feathers	Few fibers	(6-10 fibers)	Pass
3	3-4 Feathers	Several fibers	(11-20 fibers)	Borderline
2	5-7 Feathers	Many fibers	(21-30 fibers)	Fail
1	8+ Feathers	Extreme fibers	(31+ fibers)	Extreme Fail

NOTE: IDFL recommends that Air Permeability test results be included together with the Downproof/Fillproof test to maximize information about the fabric.

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