

GDT 124

A. Scope

For a complete list of GDTs, see the Table of Contents.

This test method covers the testing of fibers to determine their abrasion loss in the presence of water and an abrasive charge.

B. Apparatus

The apparatus consists of the following:

1. Micro-Deval Abrasion Machine: Use a jar rolling mill capable of running at $100, \pm 5$ revolutions per minute.
2. Containers: Use stainless steel, micro-Deval abrasion jars with a 5qt (5 L) capacity with a rubber ring in the rotary locking cover. The internal diameter shall be 7.6 in (193 mm) and the internal height shall be 6.7 in (170 mm).
3. Abrasion Charge: Stainless steel balls with a diameter of $3/8$ in, ± 0.02 in ($9.5, \pm 0.5$ mm). Each jar requires a charge of 2.6 ± 0.01 lb (1250, ± 5 g) of balls.
4. Sieves: Use 8 in (200 mm) diameter sieves with square openings and other sieves that conform to AASHTO M 92 as follows:
 - No. 8 (2.36 mm)
 - No. 16 (1.18 mm)
 - No. 30 (600 μm)
 - No. 50 (300 μm)
 - No. 100 (150 μm)
 - No. 200 (75 μm)
 - No. 250 (45 μm)
 - No. 300 (38 μm)
5. Oven: Use an oven capable of maintaining a temperature of 230 °F (110 °C).
6. Balance: Use a balance or scale accurate to 0.00022 lb (0.1 g).

C. Sample Size and Preparation

1. Dry two representative 0.02 lb (10 g) samples of the fibers.
2. Subject 1 of the samples to AASHTO T 11 (Total minus No. 200 (75 μm) alternate except that the sample is washed over a No. 300 (38 μm) sieve instead of a No. 200 (75 μm) sieve). This will be the reference sample.

D. Procedures

1. Place the remaining sample in the micro-Deval abrasion container with 2.6 ± 0.01 lb (1250, ± 5 g) of steel balls and 0.2 gal (750 ml) of tap water.
2. Place the micro-Deval container on the machine.
3. Run the machine at $100, \pm 5$ revolutions per minute for 10 minutes.
4. Remove the balls from the sample by pouring the sample and water onto a nest of 8 in (200 mm) sieves with No. 4 (4.75 μm) and No. 300 (38 μm) openings, being careful not to lose any material that is retained on the No. 300 (38 μm) sieve.
5. Subject the sample to AASHTO T 11 (Total minus No. 200 (75 μm) alternate except that the sample is washed over a No. 300 (38 μm) sieve instead of a No. 200 (75 μm) sieve) using the 10 g original weight for calculations.
6. Record the cumulative percent retained on each sieve for the No. 8 (2.36 mm) through the No. 300 (38 μm) sieves.

E. Calculations

1. Calculate a percent loss per sieve—No. 8 (2.36 mm) through No. 300 (38 μm)—by dividing the original cumulative percent retained (from the reference sample) on each sieve into the loss for the same sieve on the abrasion test sample and multiplying by 100.
2. Express the loss as the arithmetic average loss per sieve (No. 8 (2.36 mm) through No. 300 (38 μm)). For example:

Sieve	Calculations for Accumulated % Retained					
	Reference Sample	—	Test Sample =	Loss	Reference Sample x 100 =	% Loss/ Sieve
No. 8 (2.36 mm)	89.0	—	43.5 =	45.5 ÷	89.0 x 100 =	51.1
No. 16 (1.18 mm)	90.1	—	44.2 =	45.9 ÷	90.1 x 100 =	50.9
No. 30 (600 μm)	92.4	—	45.0 =	47.4 ÷	92.4 x 100 =	51.3
No. 50 (300 μm)	93.3	—	49.6 =	43.7 ÷	93.3 x 100 =	46.8
No. 100 (150 μm)	96.6	—	53.1 =	43.5 ÷	96.6 x 100 =	45.0
No. 200 (75 μm)	98.7	—	57.7 =	41.0 ÷	98.7 x 100 =	41.5
No. 250 (45 μm)	99.0	—	62.1 =	36.9 ÷	99.0 x 100 =	37.3
No. 300 (38 μm)	99.3	—	65.0 =	34.3 ÷	99.3 x 100 =	34.5
Average % Loss =						44.8%

F. Report

Report the loss on the appropriate form.