



Designation: D 3161 – 99a

Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method)¹

This standard is issued under the fixed designation D 3161; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the procedure for testing asphalt shingles that are resistant to wind blow-up or blow-off when applied on low slopes in accordance with the manufacturer's instructions. It is generally used to determine the blow-off resistance of sealed and interlocked shingles at a given wind velocity, but may be used to test unsealed or sealed shingles at other wind velocities as is applicable.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Type of Shingles

2.1 Shingles are of two types:

2.1.1 *Type I*—Shingles with a factory-applied adhesive (self-sealing shingles).

2.1.2 *Type II*—Shingles of the lock type, with mechanically interlocking tabs or ears.

3. Significance and Use

3.1 Most asphalt shingles that have demonstrated wind resistance by this test, have also performed well in use. Natural wind conditions differ with respect to intensity, duration, and turbulence; these conditions are beyond the means of this test to simulate.

3.2 Many factors influence the sealing characteristics of shingles in the field; for example, temperature, time, roof slope, contamination by dirt and debris, and interference by misplaced fasteners. It is not the objective of this test to address all of these influences. When testing shingles with sealant, this test is designed to determine the wind resistance when representative samples of shingles are sealed under defined conditions before testing.

4. Apparatus

4.1 *Test Machine*, capable of delivering a horizontal stream

of air through a rectangular opening 914 mm (36 in.) wide and 305 mm (12 in.) high at a velocity of 97 km/h (60 mph) \pm 5 % as measured at the orifice. The machine shall be equipped with an adjustable stand to receive a test panel and be adapted to setting the test panel at any desired slope, at any horizontal distance from the lower edge of the duct opening, and at various angles incident to the wind direction.

4.2 *Timer*, capable of reading to the nearest minute.

4.3 *Mechanical Circulation Conditioning Cell or Room*, for self-sealing shingles, having forced circulation of air capable of receiving a 1.27-m (50-in.) wide by 1.68-m (66-in.) long, or larger test panel on a slope of 2 in. rise per foot (17 % slope) and of maintaining a uniform temperature of 57 to 60°C (135 to 140°F).

5. Test Samples

5.1 The test panels shall be of plywood, tightly matched sheathing boards, or other suitable decking material and not less than 1.27 by 1.68 m (50 by 66 in.) in size. They are to be of such rigidity that they will not twist or distort with normal handling, or vibrate from the wind velocity during the test.

5.2 Apply self-sealing shingles to duplicate panels, parallel to the short dimension of the panel, in the normal manner recommended by the manufacturer. Use roofing nails, properly positioned in accordance with the manufacturer's instructions, to fasten each shingle, and no cement other than the factory-applied adhesive shall be used to fasten down the tabs. Do not apply pressure to the shingle tabs either during or after application.

5.3 Apply lock-type shingles to at least four panels, parallel to the short dimension of the panel, in accordance with the manufacturer's instructions. Secure the shingles at the outer edge of the test panel by exposed nailing to simulate anchoring at the rake edges of a roof deck.

5.4 Control the temperature at $27 \pm 8^\circ\text{C}$ ($80 \pm 15^\circ\text{F}$) and maintain the slope of the panel at 2 in./ft (17 % slope) during application of the shingles.

6. Conditioning of Self-Sealing Shingle Test Decks

6.1 Maintain the test panels at a slope of 2 in./ft (17 % slope) and at a temperature of $27 \pm 8^\circ\text{C}$ ($80 \pm 15^\circ\text{F}$) until beginning heat conditioning.

6.2 Place the test panels in the conditioning cell or room on

¹ This test method is under the jurisdiction of ASTM Committee D08 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.02 on Prepared Roofings, Shingles, and Siding Materials.

Current edition approved July 10, 1999. Published September 1999. Originally published as D 3161 – 72 T. Last previous edition D 3161 – 99.