

Technical Bulletin – Very Severe Hail FM 4475 Testing

ABOUT THIS BULLETIN

- This report summarizes results of independent hail testing of F-WAVE® REVIA® XTM™ Shingles.
- F-WAVE® REVIA® XTM™ Shingles **meet the performance requirements for FM 4475 Very Severe Hail**. This rating represents **2x the impact toughness** of UL 2218 Class 4 or FM 4473 Class 4 impact tests.
- F-WAVE® REVIA® XTM™ Shingles that are correctly installed according to the Installation Manual are eligible for coverage for hail damage as described in the F-WAVE WeatherForce® Advantage Standard Product Limited Warranty, provided all other warranty criteria (such as registration and ownership status) are met.

TEST RESULTS

- In summary, 2-inch diameter ice balls were fired sequentially at the same spot on the F-WAVE® REVIA® XTM™ Shingles with **no visible cracking or damage observed**.
- Multiple locations on each shingle are shot, and the tests are also carried out on shingles that have been subjected to accelerated aging to simulate real world conditions.
- Test results on non-weathered shingles are shown in **Table 1** and **Figure 1**.
- Test results after 1000 hours of UV exposure are shown in **Table 2** and **Figure 2**.
- Test results after 1000 hours of UV exposure and 1000 hours of heat exposure are shown in **Table 3** and **Figure 3**.

IMPACT	MISSILE VELOCITY	WEIGHT	DIAMETER	ENERGY	IMPACT AREA	OBSERVATION	RESULTS
	m/s (fps)	g (lbs)	mm (in.)	ft-lb			
1	47.1 (154.6)	65.8 (0.145)	50.8 (2.0)	53.89	Bottom left corner, 2" from bottom	No visible cracking or breakage	Pass
2	46.7 (153.3)	67.7 (0.149)	50.8 (2.0)	54.52	Bottom left corner, 2" from bottom	No visible cracking or breakage	Pass
3	48.8 (160.1)	64.6 (0.142)	50.8 (2.0)	56.74	Top right corner, 2" from top	No visible cracking or breakage	Pass
4	49.4 (162)	64.2 (0.142)	50.8 (2.0)	57.73	Top right corner, 2" from top	No visible cracking or breakage	Pass

TABLE 1 - Impact Test Results for Non-Weathered Shingles

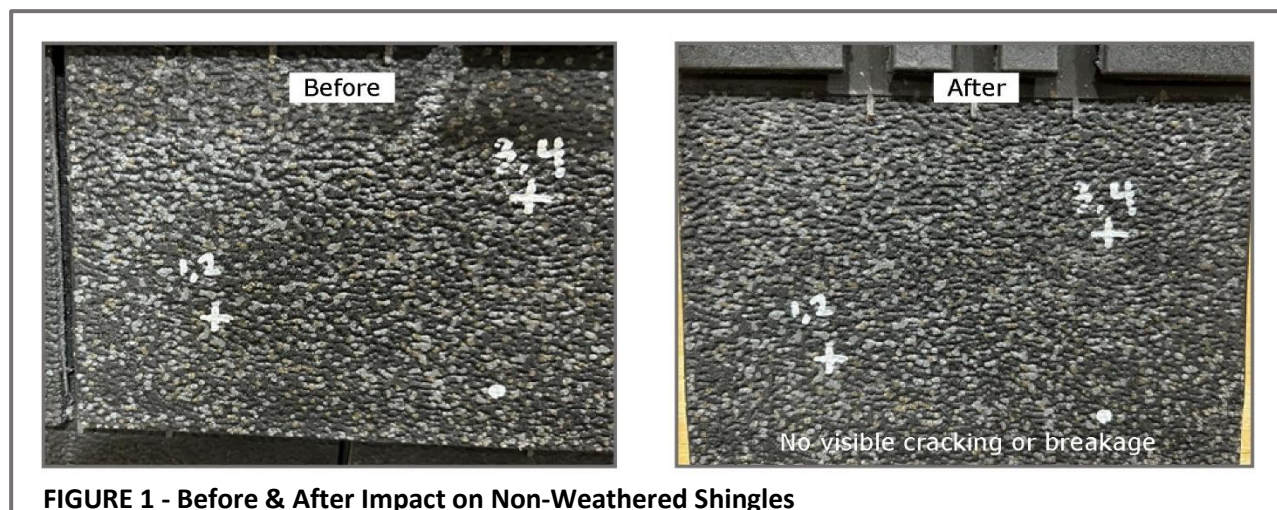
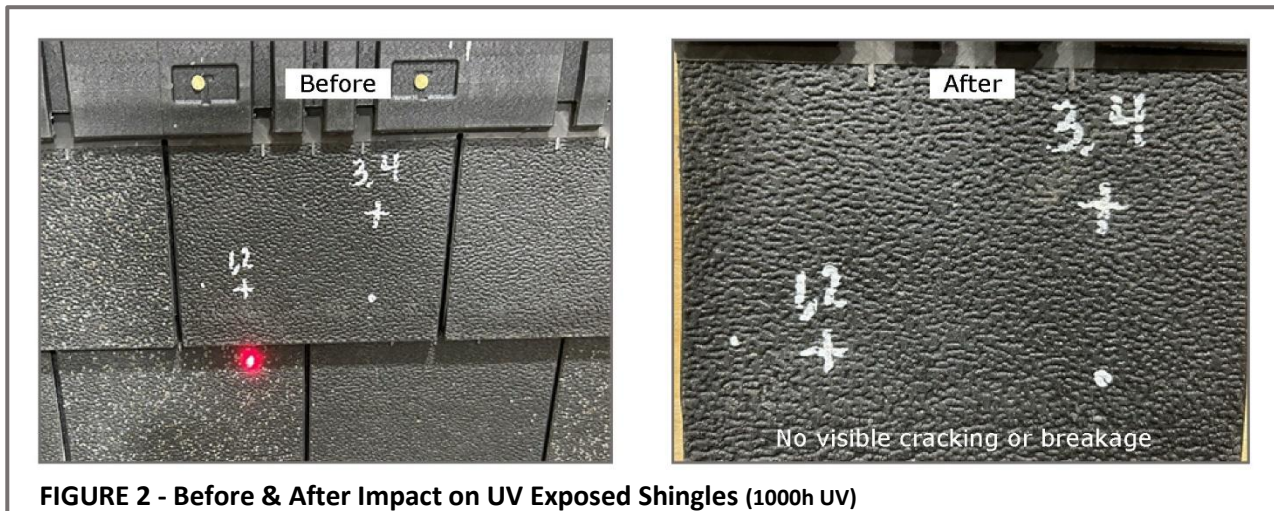


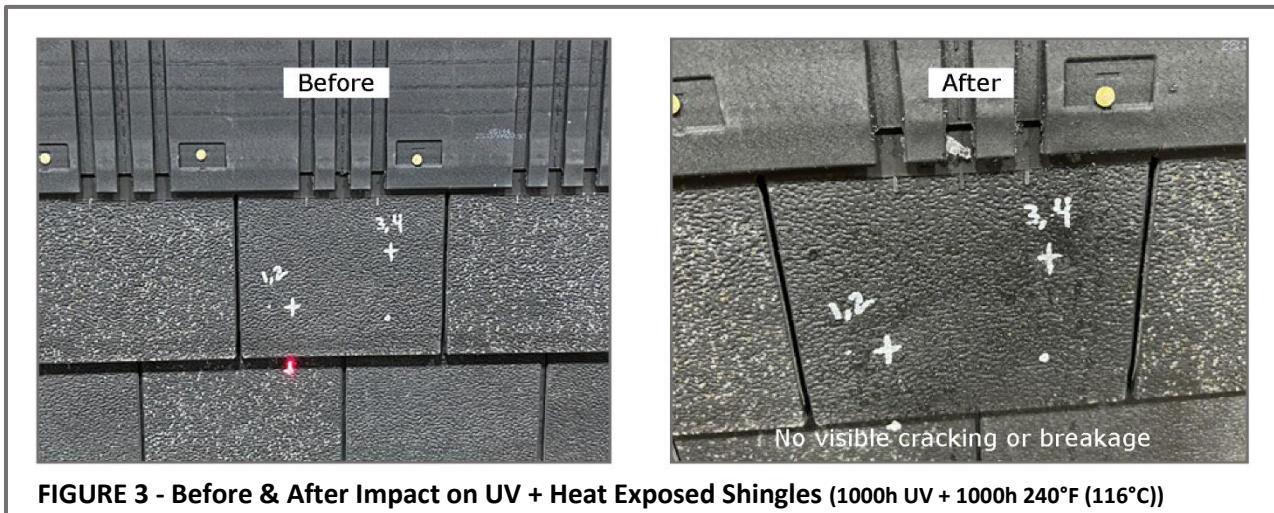
FIGURE 1 - Before & After Impact on Non-Weathered Shingles

IMPACT	MISSILE VELOCITY	WEIGHT	DIAMETER	ENERGY	IMPACT AREA	OBSERVATION	RESULTS
	m/s (fps)	g (lbs)	mm (in.)	ft-lb			
1	48 (157.4)	65.7 (0.145)	50.8 (2.0)	55.77	Bottom left corner, 2" from bottom	No visible cracking or breakage	Pass
2	48 (157.4)	67.5 (0.149)	50.8 (2.0)	57.30	Bottom left corner, 2" from bottom	No visible cracking or breakage	Pass
3	46.6 (153)	67.9 (0.150)	50.8 (2.0)	54.46	Top right corner, 2" from top	No visible cracking or breakage	Pass
4	48.3 (158.6)	64.1 (0.141)	50.8 (2.0)	55.25	Top right corner, 2" from top	No visible cracking or breakage	Pass

TABLE 2 - Impact Test Results for UV Exposed Shingles (1000h UV)

FIGURE 2 - Before & After Impact on UV Exposed Shingles (1000h UV)

IMPACT	MISSILE VELOCITY	WEIGHT	DIAMETER	ENERGY	IMPACT AREA	OBSERVATION	RESULTS
	m/s (fps)	g (lbs)	mm (in.)	ft-lb			
1	49.3 (161.8)	64.4 (0.142)	50.8 (2.0)	57.77	Bottom left corner, 2" from bottom	No visible cracking or breakage	Pass
2	48.4 (158.9)	65.5 (0.144)	50.8 (2.0)	56.67	Bottom left corner, 2" from bottom	No visible cracking or breakage	Pass
3	47.3 (155.1)	67 (0.148)	50.8 (2.0)	55.23	Top right corner, 2" from top	No visible cracking or breakage	Pass
4	47.7 (156.4)	65.7 (0.145)	50.8 (2.0)	55.07	Top right corner, 2" from top	No visible cracking or breakage	Pass

TABLE 3 - Impact Test Results for UV + Heat Exposed Shingles (1000h UV + 1000h 240°F (116°C))


NOTES

- This Technical Bulletin is a summary of Report Number S7038.01-801-44 R0, which is available in full at fwaverroofing.com/resources.
- Accelerated UV weathering is conducted for 1000 hours according to ASTM G154.
- Heat aging is carried out for 1000 hours at 240 +/- 5°F (116 +/- 3°C).

*Installers should consult the most recent F-WAVE Installation Manuals at fwaverroofing.com/resources to determine all recommended installation requirements. For additional support or questions, visit fwaverroofing.com or call F-WAVE Technical Support at **1-888-GO-FWAVE** (1-888-463- 9283). All product names, logos, and brands are property of FWAVE, LLC or their respective owners. All company, product and service names used are for identification purposes only. Use of these names, logos, and brands does not imply endorsement.*