



Technical Bulletin #10

NATIONAL SLATE ASSOCIATION

Technical Bulletin No. 10: Natural Slate Vs. Synthetic Imitations

Slate shingles are a natural product with exceptional durability and aesthetic beauty. They have been in use in North America for over 400 years. Since the early twentieth century, manufacturers of synthetic shingle products - whether they be petroleum-based asphalt shingles, fiber-reinforced cementitious products, or polymer-resin based shingles - have been trying to replicate the appearance and durability of natural slate. The first asphalt shingles, which measured roughly 16" x 10", were marketed as a slate shingle lookalike. More than a century later, we

have seen dozens and dozens of synthetic shingles hit the market, only to be pulled due to persistent failures or bankruptcy stemming from the financial burden of lawsuits alleging breach of contract, false advertising, and/or manufacturing defects. The fact is, no synthetic shingle has ever achieved a service life of 50 years, not to mention that of a S₁-grade slate (75 years or more).

Not only is natural slate nonflammable, impact resistant, and unaffected by ultraviolet (UV) light and most chemicals, it presents and retains an inherent, grand appearance

that no synthetic shingle manufacturer can match, try as they might. Here are some specifics comparing natural slate to synthetic polymer resin products available in the marketplace of the early 2020s:

Fire Rating

All natural slate shingles have a Class A fire rating when installed over #30 felt (Figure 1). Natural



Figure 1: Slate roof assembly undergoing the burning brand test in accordance with UL 790, *Standard Test Methods for Fire Tests of Roof Coverings*.



Figure 2: Burning and charred synthetic shingle.



Figure 3: Ice ball cannon (left) and impact zone (right) during impact resistance testing of natural slate shingles in accordance with FM 4473.

slate does not ignite or burn.¹ Some synthetic shingles require the use of special underlayments to achieve a fire rating and most will burn (Figure 2).

Impact Resistance

Natural slate shingles measuring 3/8" thick are rated Class 4 for hail impact resistance, the highest rating that can be achieved (Figure 3). One-quarter-inch thick natural slate meets Class 3 requirements.^{1,2} Some synthetic shingles meet these same classifications.

Wind Uplift Resistance

Natural slate shingles can handle winds up to 160 mph, exceeding the requirements of ASTM D3161, Class F (110 mph) and FM 4475 (150 mph).^{1,3} Most polymer resin synthetic shingles are only rated to 110 mph.

Color Retention

There are essentially two categories of natural slates in use today when it comes to color retention, unfading and semi-weathering.⁴



Figure 4: Example of 97-year old Vermont semi-weathering green slate mixed with Vermont unfading purple slate.

Unfading slate shingles tend to maintain their original color throughout their service life. Semi-weathering is really a misnomer as the slate shingles do not actually weather or diminish in expected service life, but rather are likely to experience some degree of color change over time. The term is most often applied to New York/Vermont gray/black, black, and variegated purple slates and some gray, gray/green, and purple slates. Color

change of varying degrees, to shades of buff, tan, and brown, may naturally occur over differing periods of time in these slates due to the presence of calcite and iron compounds (Figure 4). The resulting variation in color is part of the beauty of natural slate that cannot be replicated using manufactured imitation products. Most synthetic shingles do actually suffer color fade over time, regardless of marketing claims, becoming lighter in color as they are exposed to UV light from the sun (Figure 5).

Appearance

There is nothing more authentic than the appearance of a natural slate roof. Each slate is unique



Figure 5: An example of fading color in synthetic shingles. In the center, a missing shingle exposes the normally concealed portion of two shingles in the course below. In the lower left, two new shingles highlight the fading that has taken place in the adjacent shingles over time.



and the look unmistakable, increasing a home's curb appeal and value for decades (Figure 6). Synthetic shingle manufacturers may attempt to replicate the appearance of natural slate, but with a limited number of molds, their shingles appear too uniform and exhibit a plastic-like sheen.

Further, synthetic products are limited to use in single-width and, in some instances, random-width roofs, whereas natural slate offers unlimited design possibilities in the form of single-width, random-width, graduated, textural, patterned, and sculptural roofs (Figure 7).



Figure 6: An eyebrow dormer covered with Vermont semi-weathering green slate.



Figure 7: Example of a textural natural slate roof (left) and a graduated textural natural slate roof (right).



Durability

Natural roofing slates classified as S₁ in accordance with ASTM C406, *Standard Specification for Roofing Slate*, have an expected service life of at least 75 years. In fact, many currently available S₁ slates have a life expectancy in the range of 100 to 175 years or more based on actual, in-service performance. No synthetic shingle, except perhaps for asbestos-cement shingles, has ever made it to 50 years on a roof as their UV and thermal stabilizers, specialty fire retardants, binders, and pigments break down, causing the shingles to become brittle, crack, snap, warp, and curl.

Warranties

Many slate quarries offer a no-cost warranty against defects in their roof shingles for a period of 75 to 100 years regardless of project type (commercial, institutional, residential, public). Some synthetic shingle manufacturers offer a lifetime limited materials warranty on residential projects, but restrict their warranty to just 50 years for commercial projects. Others prorate their materials warranty and/or charge a per-square fee for their warranty and most have been written to significantly limit the manufacturer's exposure to liability.

Endnotes

¹ See the Resources section of NSA's website (www.slateassociation.org/resources) for more information on wind, impact (hail), and fire testing of slate roofing, including test results.

² When tested in accordance with FM 4473, Specification Test Standard for Impact Resistance of Rigid Materials by Impacting with Freezer Ice Balls. Class 4 requirements are no damage following the impact of 2" diameter ice balls traveling at 76 miles per hour (mph) striking the same location twice. Class 3 requirements are no damage following the impact of 1-3/4" ice balls travelling at 69 mph.

³ ASTM D3161, Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method). FM 4475, Approval Standard for Class 1 Steep Slope Roof Covers.

⁴ See NSA's *Slate Roofs: Design and Installation Manual*, 2010 Edition, "Colors and Weathering Designations," for a more complete description of these terms, as well as other traditional and current terms, such as "fading," "weathering," and "non-weathering."

For more information on slate roofing, please see *Slate Roofs: Design and Installation Manual*, 2010 Edition, available at www.slateassociation.org



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Installation Standards Committee: Jeff Levine (Editor), Alan Buehl, Remo Capolino, Dan Cornwell, Robert Fulmer, Dave Large, Russel Watsky.

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