Airable RESEARCH LAB
WHERE SUSTAINABLE SOLUTIONS START

Roof Maxx Functionality with Algae Staining

Asphalt roofing shingles are composed of fiberglass impregnated with asphalt (a semi-solid petroleum byproduct) and colored roofing granules. Roof Maxx works on these shingles by wetting the surface of the roof and soaking into the asphalt that holds the granules in place, restoring flexibility. Algae staining has no impact on Roof Maxx's functionality. Regardless of algae's presence on a roof, the treatment penetrates the asphalt and performs as designed.

Roof Maxx works, in part, because it contains methyl esters (derived from soybean oil). These compounds are made up of fatty acids, have low surface tension, and have an affinity for asphalt. (Asphalt and methyl esters have similar structures, which indicates that the two are miscible, i.e., they can be mixed.) Thanks to these properties, the Roof Maxx treatment wets the roof surface evenly and penetrates the asphalt. (In a similar fashion, methyl esters are used in agriculture as a carrier for herbicides and pesticides. The methyl esters allow the products to wet out plant parts and provide adhesion, allowing for controlled application.)

The most common class of roof algae is Gloeocapsa Magma, a bacterium that feeds off the limestone filler in asphalt shingles. As the bacteria die, they turn from green to black, creating dark stains that can streak the roof surface. Cyanobacteria such as Gleocapsa Magma are typically smaller than 60 microns—much smaller than typical roofing granules, which are typically non-porous and have a particle size of about 1000 to 2000 microns. The Roof Maxx formulation could easily flow around any bacteria to penetrate the roofing material.

Furthermore, the cell wall of the bacteria is composed of phospholipids, and phospholipids comprise fatty acids. As methyl esters also comprise fatty acids, the phospholipids and the methyl esters product should be miscible (much like asphalt). In other words, the bacterial wall should not repel the Roof Maxx treatment. In fact, there are literature studies of fatty acids and methyl esters that interact with bacteria and can be antimicrobial as well.

Resaturation is not something you can see with the naked eye, especially when shingles are covered by colored roofing granules. However, independent tests have been conducted to determine Roof Maxx's effectiveness. For example, on 17-year-old three-tab shingles, the treatment has been shown to reduce pliability failure, granular loss, water permeability, and even damage from hail.