

The Hostile Roof Environment

How normal weathering affects your roof

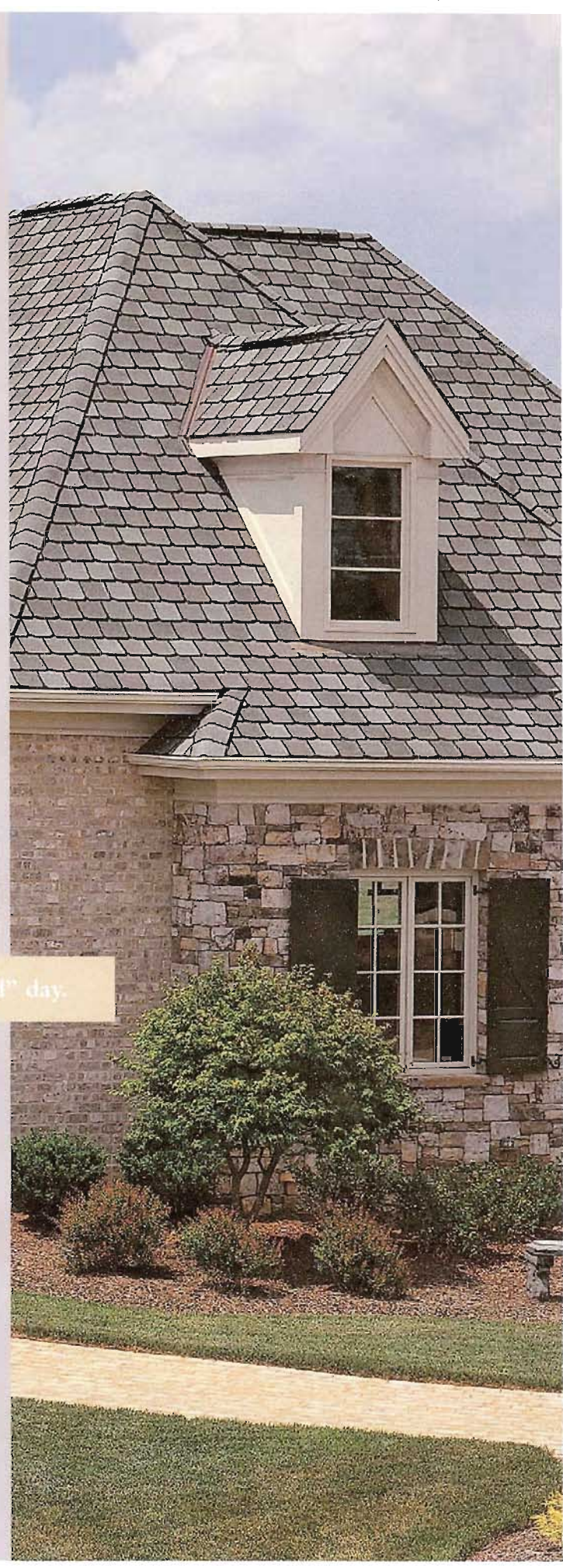
Consider the conditions your roof must endure. First, there is the intense heat of the sun, which scorches the surface of the roof and raises rooftop temperatures 50 to 75°F above ambient temperature. The sun's rays are relentless, especially during the early afternoon hours. In addition to heat, the sun is the source of ultraviolet radiation, which has been shown to degrade and accelerate the aging of the asphalt layers of the shingle. If not for the protective layer of colored granules, roofing shingles would fail very quickly. Other factors such as moisture, pollution and physical effects (roof traffic, hail, snow loads, tree limbs, etc.) all contribute to the aging and degradation of your roofing shingles.

Seasonal and weather changes also play a role in the aging of asphalt roofing shingles. For example, consider the common situation in which the roof is bathed in the intense heat of the summer sun. On such a day the rooftop may reach temperatures in excess of 160°F. Now imagine a cold front sweeping through the area, bringing with it the violent thunderstorms that are a common occurrence during the sweltering days of summer. Almost instantaneously, the rooftop temperature drops 60 -100°F as it's pounded with a summer shower. Thermal shocks such as this cause the roof deck beneath to expand and contract, placing a strain on the shingles. Year after year this process is repeated, resulting in cyclic fatigue of the shingles.

Sun, rain, heat and cold...your roof never has a "good" day.

In addition to all of the climatic and external variables that can impact the performance of your roof, consider the internal factors that negatively influence the performance of roofing shingles. Research has confirmed that an improperly ventilated air space inhibits air movement, and under most circumstances this increases moisture content in comparison with properly vented attic air spaces. Heat shortens the shingles' life and moisture causes deck movement and/or deterioration, which ultimately affects the performance of shingles.

As you can see, the roofing environment is a hostile one with many factors influencing the longevity of your roofing shingles. The natural aging process begins as soon as the shingles are installed on your roof. Day after day, the shingles are exposed to the elements—sun, rain, heat and cold. Your roof never has a "good" day.



What Will My Shingles Look Like as They Age?

Asphalt is one of the primary ingredients in roofing shingles. Its purpose is to provide the waterproofing integrity for the roof. Secondly, the asphalt holds the colored granules in place and contributes to the overall strength of the shingle. Asphalt, which is derived from petroleum, contains the oils that provide ductility and pliability to the shingles. During the lifetime of the shingles these oils begin to rise to the surface, where they are washed away by rainwater. In an attempt to restore equilibrium, new oils surface and the washing process continues. Also, the intense heat of the roof oxidizes or hardens the asphalt over time.

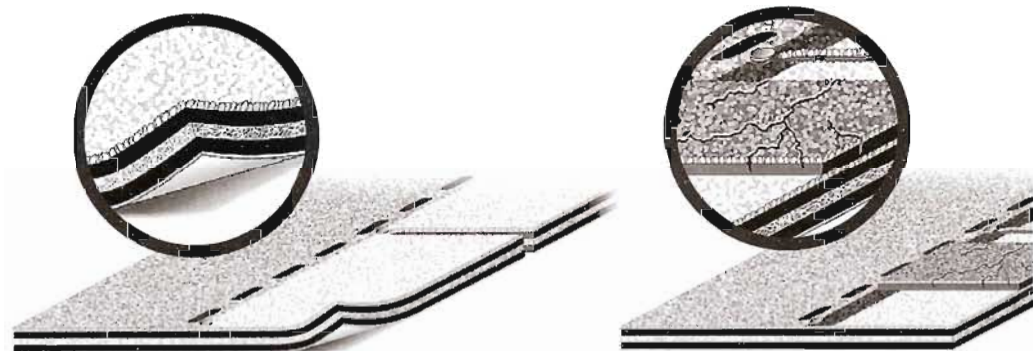
You may be asking yourself, “What can I expect my roof to look like as this aging process takes place?” One or more of the following conditions may occur over time:

Curling: As the asphalt hardens over time, the granules which were once securely embedded begin to break away. Occasionally you may have seen the colored granules in your gutters. Also, as this hardening advances, the asphalt layers begin to shrink. Of course, all of this is occurring at a microscopic level and is not something which will be noticeable on a daily basis. As the asphalt layer shrinks, it is being countered by the shingle reinforcement, which resists shrinking. We now have a situation in which the top and bottom coatings are shrinking and the reinforcement is remaining stable. As a result, the edges of the shingle may begin to curl over time. In addition, organic shingles may exhibit signs of curling which might be considered excessive, however, this is not a manufacturing defect and would be considered part of the normal weathering process of organic shingles.

Surface Cracking: Another manifestation of the normal aging process may be the development of surface cracks. For example, as the flexibilizing oils of the asphalt are depleted due to heat, the shingle becomes more brittle, to the point where surface cracking may appear. The stresses created by thermal shock and the movement of the roof deck also increase the likelihood of surface cracking.

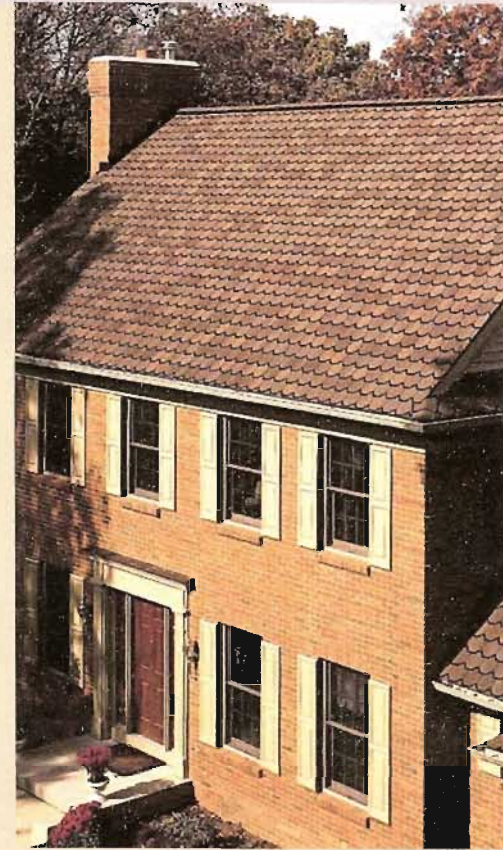
Blisters: During the course of natural weathering, small bubble-like raised areas known as blisters may appear on the surface of the shingles. The blisters may be small and pea-sized or as large as a quarter. The blisters may be open, exposing the asphalt, or closed. Blisters frequently result when minimum ventilation requirements are not met.

Staining: Finally, over a period of time, shingles may develop dark brown or black streaks that are sometimes mistaken for soot, dirt, moss or tree droppings. In actuality, this discoloration may be caused by algae growth. Although most roofing systems are susceptible to algae discoloration, it is most readily visible on white or light-colored shingles.



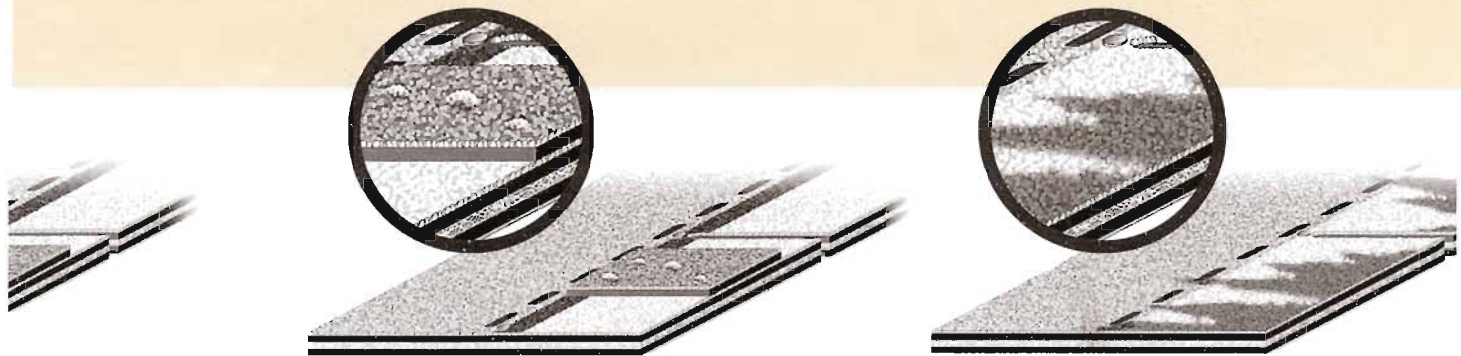
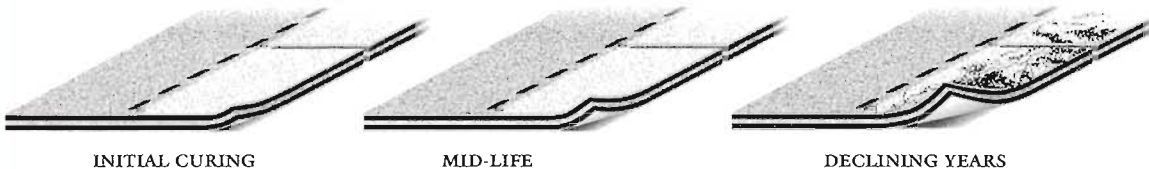
The Life Cycle of a Roofing Shingle

When your new roof was installed, friends and neighbors may have remarked how it enhanced the beauty of your home. However, research indicates that aging begins soon after the shingles are installed and progresses rapidly during the initial curing phase of its life cycle. During this stage, granule loss may occur, small blisters may develop, or the shingles may curl slightly at their edges. You may even notice that this curling is more pronounced during cold weather and the shingles may lie flat as temperatures rise. The good news, however, is that after this curing stage the shingles enter a long period of slow aging, which lasts for the major portion of the shingle's natural life.



During the "mid-life" period, aging continues at a much slower rate. The cracking or granule loss still occurs but does not increase at a noticeable rate. Only after this long period of mid-life does the aging process begin to accelerate once again as the shingles enter their declining years. It's during this period that homeowners normally think about replacing their roofs.

CURLING:



Blisters

Algae Stain

As You Review Your Roof...

Expect a natural aging process

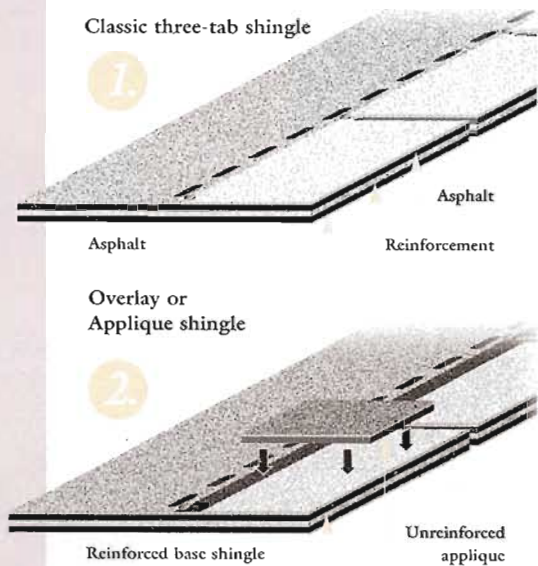
Just as the human body ages and changes appearance over the years, so too will your roof. Due to the severity of the roof environment, even a one-year-old roof may look different from a roof that was just installed. While you may have first noticed the cracks or blistering from the ladder as you were cleaning the gutters, please be mindful that these normal weathering characteristics may not be visible when you view the roof from your front lawn or driveway. And if the problem is not severe and the shingles are still providing the protection intended, then it is not a cause for alarm.

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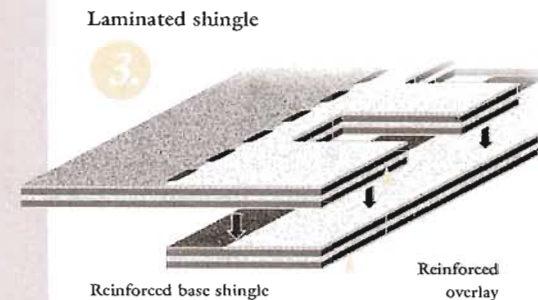
Your roof is an important investment, since it literally protects you from the elements. While there are no magical creams or ointments to prevent your roof from aging, investing a small amount of time to examine your roof can reduce your anxiety and concerns about the normal aging conditions that affect it.

Analyze your roof				
Shingle Style	3-Tab Shingle (see Figure 1)	Overlay or Applique Shingle (see Figure 2)		Laminated Shingle (see Figure 3)
		Reinforced Base Shingle	Unreinforced Decorative Applique/Overlay	
Normal Aging	slight granule loss curling algae discoloration (except AR* shingles)	slight granule loss curling algae discoloration (except AR* shingles)	surface cracking surface blisters closed blisters	slight granule loss curling algae discoloration (except AR* shingles)
Beyond Normal Aging	opened blisters cracking bald spots – exposed asphalt	opened blisters cracking bald spots – exposed asphalt		opened blisters cracking bald spots – exposed asphalt

* AR: algae-resistant



The asphalt roofing industry manufactures a variety of shingle styles. The classic three-tab shingle (see Figure 1) is the industry standard. However, as manufacturing technology became more sophisticated and architectural styles began to change, the applique and laminated shingles evolved. The applique shingle (see Figure 2) is essentially a three-tab with a second layer of asphalt and granules applied. This unreinforced applique is a decorative enhancement that serves no function other than to create a look of dimensionality.



Laminated shingles (see Figure 3) differ from the applique variety in that two or more reinforced shingles are actually "glued" together using a special laminating asphalt. The net result is that the laminated shingle will create a more distinct and textured look for the roof and provide added protection. CertainTeed's unique Shangle® and Super Shangle® products (see Figure 4) are heavyweight laminated shingles with additional features like random tabs and chamfered corners.