



*Traditional laminated shingle with the classic wood-shake look.*

## INTRODUCTION

Asphalt shingles continue to dominate the steep-slope roofing market, and the past 20 years have seen manufacturers make significant investments in new technology and product advancements. These advancements have resulted in the introduction of new products to meet marketplace demands while continuing the advantage found with asphalt shingles—performance at an affordable price. And certainly, today's asphalt shingles aren't typically yesterday's standard strip shingle. These advancements and the products available are all good, provided we as an industry remember that an asphalt shingle must meet three basic criteria. It needs to meet the aesthetic needs

of the homeowner or property owner, it needs to shed water, and it needs to perform in situ for a very long time.

## AESTHETICS AND ASPHALT SHINGLES

As we continue to see homeowners play a more substantial role in the decision-making process for the type of roof that is installed, a shingle's style and color have become more and more important. In fact, in a recent third-party market research report, the #1 reason for recommending a shingle was its "color and style." Additionally, 88% of homeowners said that the shape and style of the roof were important to the decision-making process.<sup>1</sup> It's no wonder that homeowners are focused on the aesthetics

of their roofs today; in a 2013 study with the National Association of Realtors,<sup>2</sup> 79% of realtors surveyed said that a new designer shingle roof contributes to a higher selling price and that a house with a new designer shingle roof would be valued higher than a house with a basic shingle. In other words, the roof is no longer just a protective covering for the home; instead, it is a testament to the homeowner's personal style and, more importantly, a strong investment.

Given the importance of aesthetics today in roofing, many leading manufacturers have invested in broadening their product portfolios. Twenty years ago, there were two dominant styles of shingles: three-tab shingles and architectural laminate shin-

# ASPHALT SHINGLES:

## Proven Performance, Broad Array of Choices

By Helene Hardy Pierce, FRCI  
and Emily Videtto

gles. Most shingle companies offered each of these profiles in a variety of colors—primarily made up of different shades of a single color such as brown, gray, or black. Today, a significantly more diverse product offering is available for homeowners and contractors. Some of the most popular designs remain wood-shake-style and slate-style shingles, but many manufacturers have also created unique new shapes to match a particular architectural style. For example, diamonds and scallop-shaped shingles were designed to match Victorian and Colonial-style homes.

To get a more authentic-appearing shingle, a variety of techniques are used, including larger exposures, variability in

tab width, variability in exposure within the same shingle, and multilayer constructions. As an example, manufacturers have incorporated not only variation in exposure size, but also varying tab widths to more accurately represent what a real, hand-cut wood shake roof would look like. These unique features offer a premium aesthetic coupled with the performance of an asphalt shingle.

From a color standpoint, the days of having one base color are gone; in fact, some of the most recent shingle launches have focused on a more complex color scheme that utilizes four to five color drops on both the dragon teeth and the shingle backer (the top and bottom layer of a laminated shingle, respectively) to add more pop

and sophistication to the roof. Some manufacturers have even worked with recognized color consultants to ensure that colors match the most popular exterior color portfolios in the market and to make sure that the color patterns are in line with the overall trends in the exterior market.

While the drop sequence and patterning are important, so are the base granules used to design the finished color. Many manufacturers are working with granule suppliers to create new granules that align with “on-trend” exterior colors such as burgundy, navy, and mustard. Use of these new tones can create a more sophisticated color palette. They have also worked to improve the accessory shingle products



*Artisan-crafted shapes with oversized tabs and an ultra-dimensional profile.*

that finish the completed roof, developing ridge cap products that accentuate architectural shingle roofs by adding depth and dimension to the ridge and hip areas of the roofline.

These aesthetic improvements have offered more choices and overall better options for homeowners and property owners with steep-slope projects, and there are several do-it-yourself virtual tools that can be used to “see” different shingle styles and colors in place on an actual roof. Roof consultants should be aware, however, that the myriad of choices has also added more complexity to installation for contractors.

#### **SHEDDING WATER (AND OTHER PARTS OF THE STEEP-SLOPE ROOFING SYSTEM)**

First, “shedding water” is a broad-brush phrase meant to convey that regardless of the shingle, it must perform as a part of the steep-slope roofing system and protect the contents of the building from water intrusion. Steep-slope roofing systems not only shed water, but also protect the building from severe weather, assist with or provide ventilation for the attic space, and may contribute to insulating the conditioned space of the building.

Unlike low-slope membranes, the shingles themselves need to shed water, and they aren’t designed to be installed where water is slow to move off of the roof. There is some disagreement in our industry about what the actual slope is for use of “steep-slope” products. Is it a minimum slope of 2:12, 3:12, or 4:12? Actually, it depends on the specific shingle product, but a good rule

of thumb is 4:12; and if you have a slope less than that, some products should not be used and others will have additional installation requirements, such as a double layer of underlayment to ensure that the shingles and the roofing system protect the building and will perform.

#### **UNDERLAYMENTS AND LEAK BARRIERS**

As a component of the installed shingle roofing system, the underlayment can be critical to the overall performance of the roofing system, particularly with regard to how the system performs during severe weather. The use of polymer-modified-bitumen self-adhering membranes as a leak barrier under shingles at the eave, along

rake edges, and anywhere the shingles are terminated has greatly reduced the frequency of leaks at these vulnerable areas of the roof. Care must be taken, however, when tearing off an existing shingle roofing system, since these membranes can be difficult to remove. Generally, manufacturers will recommend or require their removal for a couple of very good reasons. First, depending on the asphalt shingle being installed as a part of the new roofing system, a buildup of multiple plies of membrane at the edge may telegraph through and be unsightly. Second, if the existing modified sheet is not compatible with the products being installed, asphalt from either the existing sheet or a newly installed product may soften and actually flow from under the shingles or over an eave edge.

There has also been an increase in the desire to install a fully adhered modified-bitumen membrane over the entire roof deck prior to the installation of asphalt shingles as a preventative measure in the event of a catastrophic wind occurrence or to reduce the possibility that severe ice damming will cause interior leaks. For most steep-slope roof deck/attic space designs, this type of installation can work only when there is adequate ventilation of the attic space, and some would claim that there should be excessive ventilation of the attic space below the deck. Caution must be exercised or interior moisture can cause condensation within the roof/deck assembly and result in subsequent rapid degradation of the roof deck due to the impermeability of these types of membranes.



*Classic old-world diamond-shaped dimensional shingle.*

Accompanying the increased use of adhered modified-bitumen sheets, there have been significant changes in underlayments being used with asphalt shingles in recent years. Traditionally, asphalt-saturated felt underlayment has been used to protect the deck under asphalt shingles; however, there are now a great number of high-performance synthetic underlayments available that provide the same benefits as traditional underlayments. Regardless of type, an underlayment is important to the performance of asphalt shingles because it provides an extra layer of protection between the shingles and the roof deck and is often critical to preventing wind-driven rain from infiltrating the system and through the roof sheathing. Key to their performance is the ability to lay flat and not cause shingles to distort over any buckles or wrinkles in the underlayment. Other items that should be considered are walkability of the underlayment and resistance to foot traffic damage.

#### **VENTILATION AND STEEP-SLOPE ROOFS**

A critical component for the performance of a steep-slope roof is proper attic ventilation that uses a continual flow of outside air through the attic space. This air-flow removes warm air from the attic space in the summer, which reduces the load on the conditioned space and, in the winter, prevents occupant-generated moisture from condensing in the attic space, contributing to keeping the roof deck cold (which reduces the potential for ice damming to occur).

Advancements in shingles, leak barriers, and underlayments have been accompanied by a greatly enhanced degree of sophistication in roofing system ventilation and the products designed to provide that ventilation. Our industry now offers designers ventilation products and systems that address many of the unique needs that specific building designs have created, such as ridge ventilation that is resistant to infiltration of snow, hip ventilation that can accommodate exhaust necessary for homes with little or no ridge, attic intake vents for use where there is no soffit, and insulated ventilated roof sheathing.

Designers and roof consultants must ensure that the roofing system and deck design provide adequate ventilation with a balanced ventilation system in accordance with specific code requirements for net-free ventilation. Deficiencies in the ventilation system can result not only in higher energy



*Look of hand-cut European shingles.*

costs and condensation in the attic space, but can contribute to significant ice damming caused by a warm deck, roof deck warping and rotting, mildew/mold growth, and buckling of the shingles.

#### **ASPHALT SHINGLES AND PERFORMANCE**

As we've stated before, the array of choices available for an asphalt shingle roof has added to the complexity of their installation. A 3-ft. x 1-ft. strip shingle with a 5-in. exposure was a common shingle to install 30 years ago, and using the same strip shingle as the starter strip and the ridge cap made any project fairly straightforward and simple. Today, before starting any project, the roofing contractor and consultant should be sure to review the installation requirements provided by the material manufacturer, even if they have been installing shingles for a long time. For example, even new color formulations may change the offsets for succeeding courses on a shingle that a contractor has installed routinely for years. Specific areas to be concerned with are underlayment requirements, starter shingles and first-course installation specifics, valleys and rake construction, offset requirements for each course (not only to prevent color patterning, but also because the offset pattern may be critical to shedding water), fastener location, and any specific requirements for high-wind areas.

Asphalt shingles must perform for a

very long time, and our industry has spent much time and effort in order to have confidence in their performance. The starting point for consideration of a fiberglass-reinforced asphalt shingle's performance has traditionally been compliance to various standards, such as ASTM D3462, *Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules*; ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*; and ASTM D7158, *Standard Test Method for Wind Resistance of Asphalt Shingles*.

ASTM D3462, the material standard specification for fiberglass asphalt shingles, will be 40 years old in 2016.<sup>3</sup> However, as with many materials and material standards, there are products that are ASTM-compliant that may not perform as well as others or as well as expected, and there have been products that do perform well in service that have not met all of the requirements of ASTM D3462. One issue that some manufacturers take note of is that ASTM D3462 is a "recipe" standard and a limited performance standard. It sets specific component criteria that must be met based on a history of "performance"; however, the very nature of this type of recipe approach can severely limit product innovation by excluding from use new raw materials or product designs. In fact, a review of the 1976 standard and the current version of ASTM D3462 show that Table 2, which has many of the recipe requirements, has not changed since this standard was first promulgated.



*Authentic wood-shake look shingle, featuring an ultra-dimensional design.*

An additional requirement for the performance of an asphalt shingle roof system can be found in the Florida Building Code's Test Protocol HVHZ, Test Application Standard (TAS) No. 100, *Test Procedure for Wind and Wind-Driven Rain Resistance of Discontinuous Roof Systems*. This test method subjects a constructed shingle roof system, including the underlayment, to a wind-driven rain; and in order to pass the test, water cannot migrate through the roofing system and sheathing, nor can any portion of the shingle roof tear or blow upward without reseating during the test. While some may take issue with the design of this test (e.g., the wind direction), it is indicative of the water-shedding capability under specific conditions of a shingle roofing assembly, and manufacturers have used this test not only for certification in high-velocity hurricane zones as required by code, but as a check on new product designs and their ability to shed water.

An alternative for consideration of the performance of asphalt shingles should be one that subjects the shingles to additional testing as opposed to mandating its recipe. This actually is what is found in ICC Evaluation Services' *Acceptance Criteria for Alternative Asphalt Shingles*, AC 438. These acceptance criteria were developed "to provide guidelines for the evaluation of alternative asphalt roofing shingles, since the codes do not provide test methods and performance requirements for such alternatives."<sup>4</sup> When

compared side by side with ASTM D3462 and the performance requirements found in the International Building Code and the International Residential Code for fire and wind resistance, this criteria maintains all of the physical property testing (what some refer to as performance testing) in ASTM D3462 and replaces a significant amount of the recipe requirements with additional performance testing, including wind-driven rain, weather resistance through accelerated aging, and temperature cycling. In addition, compliance to AC 438 requires independent third-party testing and an approved third-party quality control system.

#### LOOKING FORWARD

Regardless of style or color choice, asphalt shingles do a great job of shedding water and performing for a very long time.



Helene Hardy  
Pierce, FRCI

*Helene Hardy Pierce, FRCI, is the Vice President of Technical Services, Codes, and Industry Relations for GAF and has over 35 years of experience in the roofing industry.*



Emily Videtto

*Emily Videtto is the Vice President of Residential Marketing and New Product Development for GAF. Emily has spent over 11 years in the roofing industry, primarily focused on the residential sector.*

With a decades-long proven track record, a lengthy repertoire of accessory items, and a broad product portfolio to meet any design needs of a particular building, it is easy to understand why asphalt shingles remain a great choice for steep-slope roofing.

Manufacturers have not rested on their laurels, as evidenced by continuous investment in research and development. Advancements in product certification and listings, such as AC 438, provide a means for innovation in raw materials and shingle construction to reach the marketplace with full certification for fire, wind, and durability performance. Looking forward, it's easy to anticipate that the industry will continue to innovate, including refining products to contribute to sustainable construction and the reduced use of limited resources. These types of technical advancements should ultimately result in the enhancement of asphalt shingles and will help to maintain their market leadership as the product of preference for many steep-slope roofs. 

#### FOOTNOTES

1. "Designer Shingle New Shape Market Research" 2012.
2. National Association of REALTORS® survey commissioned by GAF of non-appraiser realtors in the U.S. Average increase as compared to basic, three-tab shingles. All data based on responses provided by non-appraisers that have had professional experience buying or selling a home with Timberline® shingles in the three years preceding the survey.
3. ANSI/ASTM D3462 – 76, approved January 29, 1976. American Society for Testing and Materials.
4. Acceptance Criteria for Alternative Asphalt Shingles, AC 438, ICC Evaluation Services, 2012.