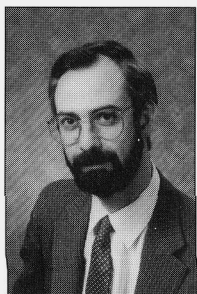


## TECH TRANSFER

### The many aspects of metal shingles

by Thomas L. Smith, AIA, RRC

**T**here are a variety of metal shingles intended to simulate traditional roof coverings, such as wood shakes and shingles and tile. Metal shingles are also available that appear similar to Victorian-style metal shingles from many decades ago. And recently, a copper shingle was introduced as an alternative to copper panels.



Besides copper, metal shingles are commonly made of aluminum zinc alloy-coated steel (Galvalume™), galvanized steel or aluminum. The steel and aluminum products are typically factory-coated with polyvinylidene fluoride (Kynar™) or acrylic. Some of the acrylic-coated products are also surfaced with stone granules.

Metal shingles come in a variety of sizes, but generally are up to about 12 inches (300 mm) wide by up to 5 feet (1.5 m) in length.

A few of the metal shingles are quite new, while others have been used in the United States for more than two decades. As an addition to the synthetic roof coverings paper in the *Proceedings of the 10th Conference on Roofing Technology*, this article discusses several aspects regarding the use of metal shingles.

#### Attributes

Generally, metal shingles have the following attributes:

1. They are relatively lightweight.
2. They typically have a Class A fire rating. *However, to achieve this rating, some shingles require very special substrates, such as a layer of Type X gypsum board. It is therefore important to check with the manufacturer to determine what is necessary to achieve*

*a Class A rating, if one is desired.*

3. They are relatively resistant to impact (e.g., hail, wind-blown debris or golf balls). Although they can be dented, this damage is often just cosmetic and may not even be noticeable (depending upon shingle profile and texture).

4. The degree to which the shingle excels at simulating another product varies. Some of the shingles are quite aesthetically pleasing, while others are not very attractive. To ensure that your customer is satisfied with the appearance prior to application of a specific shingle, it is recommended the customer look at a roof that used the proposed product, rather than relying on judgment based upon photos or a sample.

#### Uncertainties

Following are some of the uncertainties of metal shingles:

1. As with many roofing products, the expected service life of metal shingles is not well defined. Because of limitations of accelerated aging and other test methods, be cautious in advising your customer what service life they could expect, unless there are several successful examples of similar products performing for the stated service life in similar climates.

For these products, premature failures will likely be associated with deterioration of wood battens, corrosion of fasteners or perhaps the shingles, blow-off or leakage problems associated with inadequate underlayment, poor detailing or installation of flashings.

Aesthetic failures related to loss of coating or color fade may also occur. To overcome potential problems, careful selection of products and design and application of the system is very important, particularly because there are no ASTM standards or industry guidelines for metal shingles.

2. Wind performance of metal shingles is highly variable. Some shingles have superb wind resistance, and some are among

the poorest roof covering performers. Be cautious of shingles that can easily deform and rely upon clips or interlocking mechanisms for their attachment. As with many steep-slope products (with the exception of tiles), current test methods are inadequate for testing metal shingles.

#### Slope

There are no industry standards for minimum slope for metal shingles, so the designer should consult the manufacturer. However, some manufacturers may be non-conservative in their recommendations.

Similarly, there are no industry standards for underlayment requirements. If the design of a specific product is more susceptible to water infiltration (because of a deluge or wind-blown rain), a more water-resistant underlayment will be prudent. And, to avoid damage during application, a robust underlayment may be needed. Some manufacturers recommend a #15 organic felt, but this can be easily torn when installing metal shingles. For more information on underlayments, see the September 1993 "Tech Transfer."

#### Attachment

When fastening metal shingles directly into plywood or oriented-strand board (OSB), ring- or screw-shank nails are recommended to avoid wind-induced back-out. Aluminum or stainless-steel nails are recommended for fastening aluminum shingles, and copper nails are recommended for fastening copper shingles. For steel shingles, galvanized nails are typically used—the galvanizing requirements of ASTM A 641 Class 2 are recommended. For batten material and attachment information, refer to the recommendations in the September 1993 "Tech Transfer." **PR**

*Thomas L. Smith is NRCA's director of technology and research.*