Q&A

Q. Unvented Roofs and Shingle Warranties

While the IRC has approved the use of certain "hot" unvented attics, it seems that asphalt-shingle manufacturers still recommend that their shingles be installed over vented roof assemblies. Does this mean that shingle manufacturers will void their warranties if the roof deck is insulated with sprayed-in-place foam?

A. *Bill Woodring, director of technical services at GAF Materials Corp., responds:* GAF-Elk's shingle warranty is still valid when the shingles are installed over a roof deck insulated with SPF foam, which can be an effective method of boosting a home's energy performance. But foam that isn't installed according to building code requirements and manufacturer's instructions can lead to condensation problems, mold growth, and roof deck deterioration. The issue, of course, is that the insulation can retard or block moisture-vapor migration through the roof assembly, where it can then condense in the framing, sheathing, and insulation. Expansion and contraction of the roof deck from changes in moisture levels can lead to buckling and distortion — even splitting — of the shingles.

Condensation problems tend to be more of a concern in cooler climates, since vapor drive from the interior to the exterior of a building is strongest when exterior temperatures and relative humidity are low and interior temperatures and relative humidity are high. The unvented attic guidelines in the IRC (see R806.4, 2009 IRC) are intended to ensure that warm, moist air won't cool to its dewpoint temperature within the roof assembly and condense. But if I were a designer or specifier, I would also run dewpoint calculations when using SPF insulation underneath the roof deck — regardless of climate zone — to confirm that the proposed roof assembly won't have a condensation issue.

If an unvented roof is insulated according to IRC guidelines and the recommendations of the sprayed-in-place foam manufacturer are followed — and if dewpoint calculations confirm that condensation won't occur within the roof assembly — I wouldn't expect any problems. However, since GAF-Elk does not supply the sprayed-in-place foam insulation, any damage to our shingles — or any other roof-related problems attributable either to sprayed-in-place insulation applied to the roof deck or to a lack of ventilation — is not covered by the terms of our warranty.

Also, before installing asphalt shingles from any other manufacturer, I would contact the company for its recommendations and to confirm that this type of installation won't void its warranty.

Q. Metal Connectors and Galvanized Coatings

Can standard galvanized Simpson STHD strap-tie holddowns be used in contact with ACQ plates and framing? We've been schooled by our local building officials to avoid placing anything but stainless steel or heavy-duty hot-dipped galvanized metal connectors in contact with ACQ lumber, but these aren't stocked by our local lumberyard.

A. *Chris Paterson, an engineer in Simpson Strong-Tie's research and development department, responds:* Because new wood preservatives such as ACQ-D and CA-B are roughly twice as corrosive as CCA-C, galvanized metal connectors and fasteners used with PT wood require thicker protective zinc coatings. So in addition to offering "continuous" G90 hot-dip galvanized coatings (where a layer of zinc is applied to both sides of sheet steel at a coating weight of 0.90 ounce of zinc per square foot) for its standard products and G185 (1.85 oz/ft^2 of zinc) coatings for its ZMAX connectors and fasteners, Simpson sells post hot-dip galvanized HDG connectors with approximately 2.0 oz/ft^2 zinc coatings.

In the continuous hot-dip galvanizing process, coil and sheet steel is coated with molten zinc prior to fabrication. Post hot-dip galvanized products are dipped in a molten zinc bath after they have been fabricated.

How much corrosion resistance a connector needs depends on where it will be used and the type of preservative used in the lumber (see chart, next page). For example, in

a dry interior environment — the kind of location where STHD straps would be found if they were installed correctly, with the strap above the concrete and behind the housewrap and siding — our testing has shown that a G90 coating offers plenty of protection as long as you're using dry (less than 19 percent moisture content), ammonia-free ACQ-D lumber, or wood treated with sodium or zinc borate. But if the treated ACQ lumber has a moisture content higher than 19 percent, or if the ACQ also contains ammonia (more common on the West Coast, because the ammonia solution allows ACQ-B to penetrate difficult-to-treat species like Douglas fir) and has a retention level lower than 0.40 pcf (pounds of preservative per cubic foot of wood), then you should use HDG STHDs and fasteners, which are available by special order. Alternatively, you could use the G90 STHDs along with an approved peel-and-stick barrier membrane, such as Grace Vycor Deck Protector — but be sure to use HDG fasteners. For ACQ with retention levels of 0.40 pcf or greater, stainless steel connectors and fasteners should be used (though Simpson STHDs aren't available in stainless steel).

For more information about Simpson's connector coating recommendations and barrier membranes, go to strongtie.com and look for technical bulletins T-PTWOOD08-R and T-PTBARRIER08-R.

Connector Coating Recommendations for Various Exposures
(Simpson Strong-Tie)

Low = Use Simpson standard painted and G90 galvanized connectors as a minimum.

Med = Use ZMAX®/HDG galvanized connectors as a minimum. Use fasteners which meet the specifications of ASTM A153 or SDS screws with double-barrier coating.

High = Use Type 303, 304, 305 or 316 Stainless Steel connectors and fasteners:

Environment	Untreated Wood	SBX/ DOT & Zinc Borate	MCQ	ACQ-C, ACQ-D (Carbonate), CA-B & CBA-A			ACZA	Other or Uncertain
				No Ammonia	With Ammonia	Higher Chemical Content[1]		
Interior – Dry	Low	Low	Low[5]	Med[5]	Med	High	High	High
Exterior – Dry	Low	N/A[2]	Med	Med	High	High	High	High
Exterior – Wet	Med	N/A[2]	Med[3,4]	Med[3,4]	High	High	High	High
Higher Exposure	High	N/A[2]	High	High	High	High	High	High
Uncertain	High	N/A[2]	High	High	High	High	High	High

1. Woods with actual retention levels greater than 0.40 pcf for ACQ and MCQ, 0.41 pcf for CBA-A, or 0.21 pcf for CA-B (Ground Contact level).
2. Borate treated woods are not appropriate for outdoor use.
3. Test results indicate that ZMAX/HDG and the SDS double-barrier coating will perform adequately, subject to regular maintenance and periodic inspection. However, the nationally-approved test method used, AWPA E12-94, is an accelerated test, so data over an extended period of time is not available. If uncertain, use stainless steel.
4. Some treated wood may have excess surface chemicals making it potentially more corrosive. If you suspect this or are uncertain, use stainless steel.
5. Where noted in the table, applications where the wood is dry *(moisture content less than 19%)* when installed and will remain dry in-service may use a minimum coating recommendation of "Low."
6. Type 316 stainless steel connectors and fasteners are the minimum recommendation for ocean salt air and other chloride environments.

Courtesy Simpson Strong-Tie

Q. Trowel-Applied Membranes

Are the new trowel-applied membranes used for waterproofing showers as good as sheet membranes? Are some better than others?

A. *Contributing editor Michael Byrne, a tile setter and consultant in Los Olivos, Calif., responds:* I started using sheet-membrane materials in the early 1970s and was an early adopter when NobleSeal TS came on the market. Today, I still use TS, but I use liquid — or trowel-applied — membranes as well. And by the way, liquid-applied membranes are not exactly new — their use by first-century Roman tile installers is well documented.

Since I tend to upgrade from the tile industry's minimum standards, I generally use liquid systems designed for continuous immersion — rather than value-engineered materials that offer only limited water-shedding protection. When I have a choice, I prefer to use Bonsal's B-6000 and its companion reinforcing fabric for waterproofing. I also use Custom's 9240 system. These materials have an important property in common: When properly applied and cured, they will not re-emulsify if exposed to moisture.

Do liquid-applied systems work as well as sheet membranes? It depends. The most critical factor — aside from the tested performance and suitability of a particular product — is how carefully the system was installed. In my consulting work, I have seen many examples of mediocre systems that have provided long service because the installer followed all the rules, and in some cases applied a third or fourth layer of liquid instead of the minimum one or two. I have also inspected installations where top-of-the line CPE sheet materials failed because the installer did not follow the manufacturer's directions. And I've inspected liquid systems that were applied properly but nevertheless failed because the system was not rated for the application.

With so many different waterproofing

and crack-isolation membrane systems to choose from, a designer or installer needs to have a firm understanding of an installation's intended use and select the most appropriate level of protection. While some of the components may appear similar, performance levels of all tile membrane systems are definitely not the same. All brands have unique application and installation requirements and limitations, and they all have unique viscosities: Some are thin enough to shoot with an airless sprayer, some are gels that can be spread with a brush or roller or notched trowel, while others are site-mixed pastes so thick and viscous they can only be spread with a notched trowel.

Regardless of which membrane I choose, I always try to use thinset and grout from the same manufacturer. Because I install tile in many different applications, I've learned the skills required to install any type of waterproofing system. Equally important, I insist on treating surface prep and the installation of waterproofing, crack isolation, and sound reduction membranes as costs separate from that of tile installation.