Q Can I use full coverage of ice membrane on an asphalt-shingle roof? Do I need to vent the roof?

A *Doug Horgan, vice president of best practices at BOWA in Silver Springs, Md., responds*: You can fully cover a roof with ice membrane, with some qualifications. Let's start with why we would do this. The first answer is to follow code provisions for roofs between 4/12 slope and 2/12 slope. Code permits three options for underlayment in this condition, as laid out (confusingly) in Section 905.1.1, Table 905.1.1(2), and Section 905.2.2: We can install a double layer of conventional underlayment; install fully taped sheathing seams with a conventional underlayment; or install full coverage of ice-dam membrane material.

A second answer is to follow the roofing-material manufacturer's directions. With asphalt, the typical requirement is the same as the code requirements—better underlayment is required once slope gets below 4/12. (Be careful with other materials, though; several synthetic slates require upgraded underlayment at higher pitches.)

Some builders elect to use an ice-barrier membrane over an entire roof even when not required by code. There's no question that these materials are more leak-resistant and hold up better during the construction process. Their self-sealing properties at edges and with fasteners are also a quality upgrade. Arguably, on a steep-slope roof they're overkill and an unnecessary expense. But for some projects, they may be worth the added peace of mind.

WHAT CAN GO WRONG?

Some ice-membrane materials fail quickly when left exposed to ultraviolet light. We've experienced this on large slate roof projects where it takes a month or two to get all the ice membrane covered. Hot summer days end up melting the material enough that it sticks to boots and peels into pieces. I've also heard of failures that weren't as obvious, resulting in leaky structures taken apart to reveal asphalt-based sheets that have turned brittle and leaked at fasteners. This damage was attributed to exposure to the sun. We've learned to use higher-grade membranes rated for 180-day exposure, or even to cover the ice-barrier membrane with another layer of underlayment.

A second layer on top is also the approach we use to prevent shingles from permanently sticking to granulated-face ice barriers, which become very sticky over time. We once experienced a failure on a 2/12 slope, and it took a four-person crew about a half day per square to remove the shingles, which came off in 2- to 3-inch square pieces along with the gooey ice membrane. Savvy roofers cover this type of ice-barrier membrane with a layer of synthetic or felt underlayment. Ice-barrier membrane with a plastic top layer doesn't have the same issue, though beware: At edges of the rolls, the sticky asphalt can adhere to shingles.

The biggest problems we've experienced have not been with the membrane itself but with penetrations and complications on the roof. The one we tore off had a pitch change, plumbing vents, skylights, a kitchen range-hood exhaust, and even a framed chimney on it. Most of these features were letting water into the assembly or, at least, under the shingles. The ice-barrier membrane held most of the water out until the nails rusted out a few years in—at that point, we had to redo the whole thing with much more attention to the detailing around the penetrations. A careful reading of various instructions will show that underlayment, properly layered in a watertight manner, is supposed to be carefully adhered to pipes, ductwork, and skylight frames before the caps and flashings are installed around the penetrations. It's challenging to find crews willing and able to take the time and care needed to make these work over the long term, so we now aim to avoid any penetrations or complications in roofs below 4/12 slope.

VENTED ROOF?

A vented roof is not an absolute requirement for a roof fully covered with an ice-barrier membrane, but if you don't have good ventilation, it will be generally riskier and you'll need to use special insulation or vapor control layers (or both) to manage moisture.

Vented roofs are able to recover from intermittent wetting, so the occasional overwhelming rain or ice storm that puts a bit of water through some nail holes can dry out and end up being no problem. However, unvented roofs don't have nearly the same drying capacity and are inherently more vulnerable to small leaks. It should be noted that many roof leaks are big enough that it doesn't matter; they'll damage the roof whether it's vented or not. Certainly venting is not a cure-all for leaky roofs.

Unvented roofs can accumulate moisture through various mechanisms, as explored in Peter Yost's article "Avoiding Wet Roofs, Part 1" (Jun/2018), which focuses on cold-climate issues, or in the follow-up article (Jul/2018), which discusses vapor diffusion ports—a way to manage moisture that is now enshrined in code for climate zones 1 to 3 (and a possible solution for certain cold-climate situations, as well).

In northern climate zones (north of climate zone 3), a spray-foam or rigid foam-board layer is part of most unvented assemblies, but another resource to consider is the educational material developed by 475 High Performance Building Supply (foursevenfive.com). This advocates for foam-free assemblies—which use non-foam insulation layers above the roof sheathing—or even for the use of "intelligent" vapor control membranes (plus dark-colored roofing fully exposed to the sun) to manage moisture in roofs insulated with air-permeable, fibrous insulation, even in colder climates.