Q In recent years, moss and lichen growth on asphalt roof shingles seems to have become an increasing problem in our area. What's the best way to prevent recurring organic growth on roofs and, when preventative measures fail, what's the best way to remove the growth?

A *Mike Guertin, a builder and remodeler in East Greenwich, R.I., and frequent presenter at JLC Live, responds:* I have spent a fair amount of time dealing with moss, lichens, and algae on roofs. It's a problem here in Rhode Island, especially at my own house, and it doesn't seem to be limited to a particular type of asphalt shingle. Laminated shingles may have more nooks and crannies where debris can settle and provide food for moss, and the edges may make it easier for spores to hang tight until they begin growing, but I don't know of any studies on whether three-tab or no-cutout single-tab shingles are less prone to organic growth than architectural shingles.

Prevention. As far as I know, there aren't any "moss-resistant" shingles, though there are algae-resistant ones made with granules that contain copper, such as Owens Corning's StreakGuard shingles. When it rains, copper ions wash out of the granules to inhibit algae growth. To help resist moss growth on a new roof, you can install copper or zinc strips according to the manufacturer's instructions. Depending on the local climate, sun exposure (north-facing roofs are more prone to organic growth than south-facing roofs), and tree cover, you may need only one strip of metal near the ridge to inhibit moss growth, or you may need to install strips along shingle courses every 3 to 4 feet up the roof slope. Again, ions from the copper or zinc strips wash down the roof each time it rains, and it's those ions that inhibit moss growth.

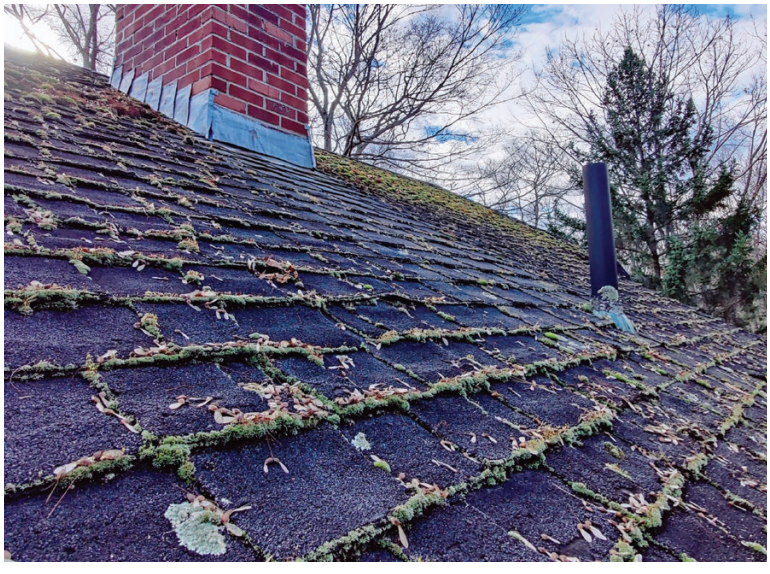

Photo: Andrew Wormer

This north-facing roof is clad with architectural laminated shingles, which are made up of multiple layers of asphalt-coated fiberglass that can trap organic debris and provide food for moss growth.

Removal. Once moss has gained a foothold on a roof, there's no fast and easy way to get rid of it. Manually removing it—with a stiff-bristled broom or even a hard-edged tool—can cause more damage than the moss does. I've found that an effective solution is a product called Spray & Forget Roof Cleaner (sprayandforget.com), a liquid concentrate that comes in a container that can be attached to a garden hose. It's not a quick fix; when I used it the first time, it took about three or four months before the moss on my roof turned brown and started falling off on its own. Now I spray the roof with the solution every three years, and it keeps the lichens, moss, and algae at bay.

There are other, similar products that probably will work as well. What they all have in common is that they're not as aggressive as the bleach/detergent/water mixes you'll find recipes for online. Those bleach mixes will kill the moss in a few days, but what washes off onto plants below can kill more than you intended. Spray & Forget is bleach-free and, since it's applied in a mist, not much reaches the ground, and it doesn't seem to have much of an impact on plantings below.

I have noticed more moss, lichens, and algae in my area than I used to, but whether that is the result of a warming climate is hard to say. It could be that most asphalt shingles last longer than they did in the 1970s and '80s. Back then, we replaced roofs every 15 to 20 years; now, it seems we replace them every 30 to 35 years or longer. My roof was moss-free for 15 years, then it started growing. To eliminate the problem altogether, my next roof will be metal.

Q On our last two bathroom remodels, clients wanted to upgrade to heat pump water heaters because the tax rebates on them are so good right now. But we have concerns about these units cooling the basement in winter. Are heat pump water heaters viable for cold climates and, if so, how is the installation typically handled to avoid adding to a home's heating load?

A *Connor Dillon, quality manager at the Building Science Institute, a firm offering training and quality control to home energy raters, responds:* Heat pump water heaters (HPWHs) take heat from the surrounding air and pull it over coils to heat the water inside the tank. A side effect of their operation is that they both cool and dehumidify the air around them. That's wonderful for homeowners in warmer climate zones, especially hot, humid zones, where anything you can do to offset cooling bills and lower indoor humidity is great, but it causes concerns about installing the units in climate zones 5 and above. Some people have concerns about whether an HPWH will even work as intended in a cold climate. And some homeowners who are already dealing with cold floors over a basement during the winter worry about the unit making their basement (and floors) even colder.

The first concern is unfounded: An HPWH works even in cold climates. The "heat pump" mode will typically operate between 35°F and 120°F. Below 35°F, the hybrid nature of the water heater kicks in to heat the water using electric resistance rather than relying on the heat pump. Most manufacturers recommend setting the unit to the hybrid mode as a default setting; it will automatically switch from heat pump to electric heating depending on input to the sensors.

As to the issue of cooling the basement, we see this handled in a variety of ways, but not all of them work. The most common approach is to build a sealed, insulated utility closet to house the unit. While this might make sense in theory, there are two problems with it in practice: First, these water heaters need a minimum volume of air to operate correctly. Requirements vary by manufacturer and model, but in the case of one model, the smallest volume it can operate in is 450 cubic feet—a 10-foot-by-6-foot-by-7-foot-6-inch room. Most other manufacturers require almost twice that—700 cubic feet or more. The second problem is that sealing the closet locks the cooler air around the unit, dropping the temperature near it and triggering the electric resistance mode. This reduces the unit's efficiency, defeating the purpose of installing a more efficient appliance.

It is possible to make this work, however. One option is to put the HPWH in an insulated closet, then use louvered doors with the size of the louver area based on the space requirements of the specific model. This will limit the amount of cold air outside the closet but will provide enough air for the unit to operate efficiently. In one example we saw, a full-louvered door lowered the space requirement from 450 cubic feet to 84 cubic feet—an 81% reduction.

A second option is to put the unit in a sealed closet with the inlet and/or outlet ducting to it (this is model dependent). HPWH manufacturers often offer adapters, sometimes called "duct kits," built specifically for this purpose. This adds an extra cost to buying the water heater, but the kit and requisite ductwork could allow you to install the unit in a small, sealed closet with no minimum space requirements.

While project specific, a third possibility is that you may not need to worry if you have a furnace, boiler, or other heating equipment in the same area as the HPWH. Because the unit relies on the air around it to heat water, the waste heat in the air from the heating appliance may offset the cooling from the water heater. This symbiotic setup is not for every project; for starters, it assumes the heating appliance near the water heater is the sole space heating system and is therefore running most of the time that the HPWH is. If the furnace is supplemented by wood or pellet heating in the living space, for example, it might not be dumping waste heat into the basement often enough to offset the cooling. Be sure you carefully consider this option before implementing it as a solution.