

Keep Siding Dry With a Vented Rain

The best way to deal with water is to let it drain away or dry out, and a gap of less than an inch behind the siding ensures both



Water is lazy. It will never work hard to find its way into your house. In fact, water always will follow the path of least resistance. That's why the roofing membrane, asphalt shingles, siding, housewrap, and all the flashing details on a house are installed so that they lap over each other. They work to prevent the lazy water from being sidetracked as it follows its path from the clouds to the ground.

But houses are made of wood, and over time, wood shrinks and expands. Nails loosen, siding joints open, and finishes wear away. It eventually becomes easier for water to penetrate a home's outer layers of defense, especially the siding.

Once water has gotten through that outer layer, its potential for causing problems increases, and its potential for escaping or drying is greatly reduced. To

THE CONCEPT IS SIMPLE. THE DETAILS RAISE QUESTIONS.

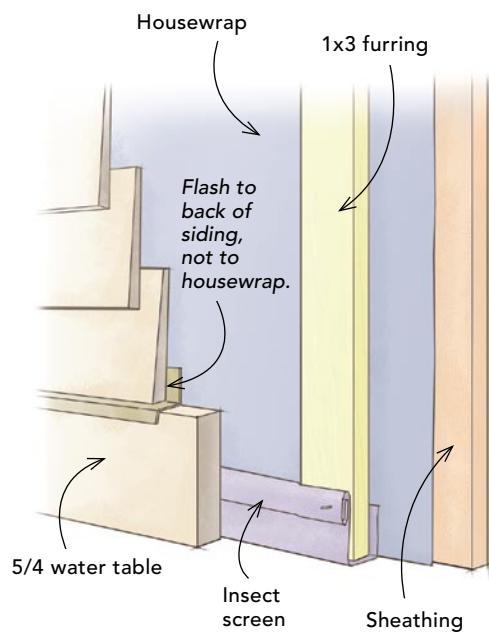
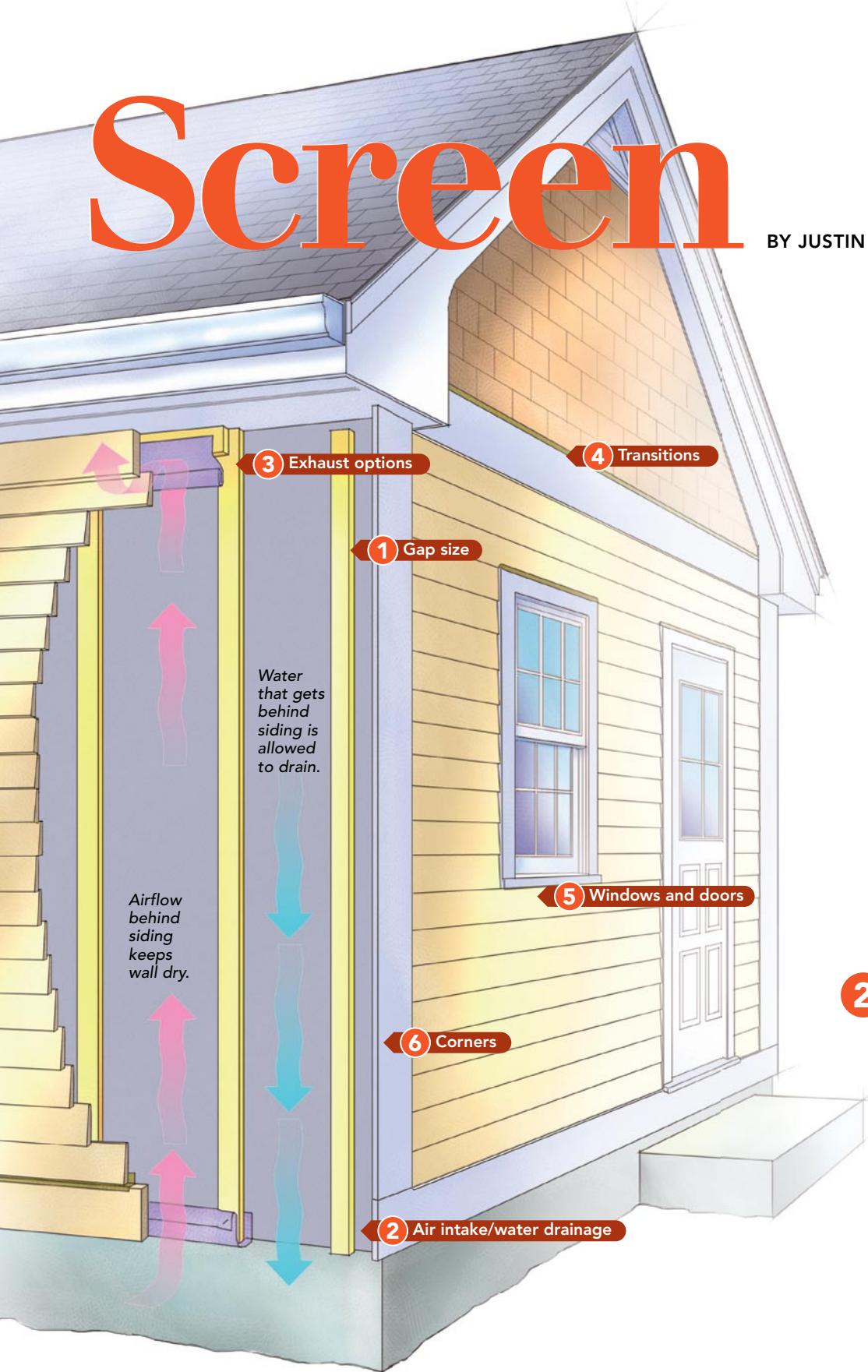
The theory behind a vented rain screen is straightforward: Water can drain, and air flowing behind the siding can intercept moisture that has penetrated, helping the wall to stay dry. The details can be tricky, though, and there is ongoing discussion (sometimes argument) over the best way to handle crucial details. Here are answers to the most common questions.

1 How much of a gap should I leave behind the siding?

The size of the gap depends on how much water you expect and, in some cases, how much you want to alter details for trim, windows, and doors. A $\frac{3}{8}$ -in. gap is a good place to start, but even a $\frac{1}{16}$ -in. gap is better than none at all. A $\frac{1}{4}$ -in. or $\frac{3}{8}$ -in. gap will allow many types of siding to be installed without having to fur out trim, though $5/4$ stock will be needed. The illustrations shown here use 1×3 furring strips to create a $\frac{3}{4}$ -in. space.

Screen

BY JUSTIN FINK



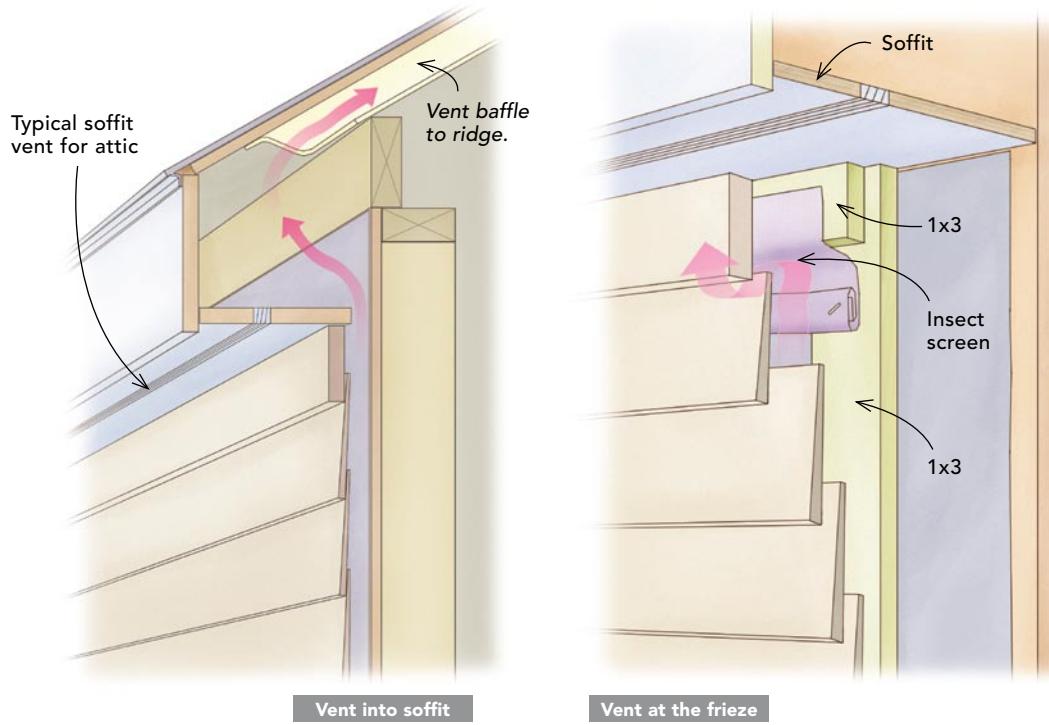
2 What's the best way to keep insects out of the air intake/water drainage openings?

The easiest way to keep insects out of the airspace is to use a corrugated vent strip with insect screen or filter fabric. It is attached at the bottom of the wall, over the housewrap, and is hidden by the first course of siding. The site-made approach is to staple up strips of insect screen over the housewrap at the bottom edge of the wall before the battens or open-weave membrane (sidebar p. 35) is installed. Then, before the siding is attached, the screen is folded up and stapled over the front face of the battens or membrane.

3

Is it OK to tie the exhaust into the attic vents, or is a frieze-vent setup better?

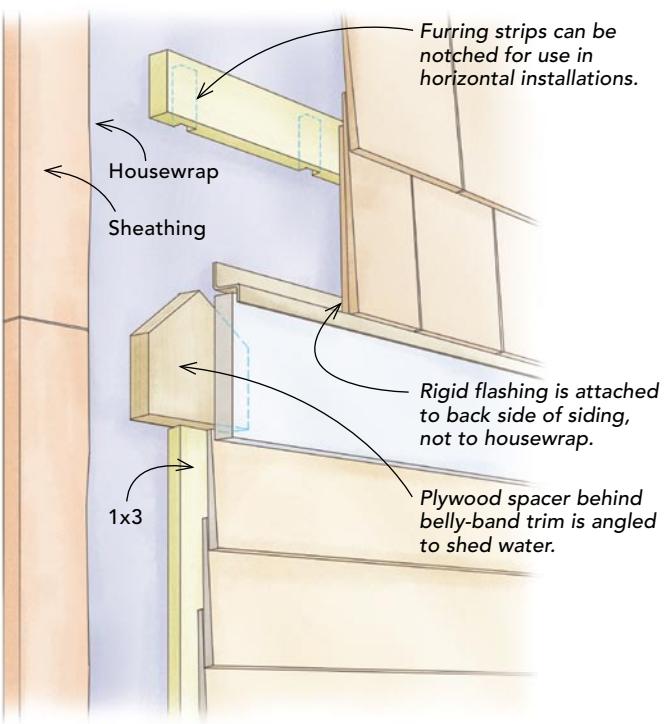
This is one of the more controversial details in a vented rain-screen setup. According to building scientist Joseph Lstiburek, it doesn't matter much either way. Venting into a soffit is fine, as long as the soffit is connected to the attic ventilation. Although building scientist John Straube agrees that venting into a soffit isn't likely to be a huge deal, he prefers to see the rain screen vented at the frieze so that potentially moisture-laden air coming from behind the siding can mix with outdoor air before being drawn into the attic.



4

Are wood strips the best option? If so, do they need to be pressure-treated?

Best is a matter of circumstances, but wood is still a fine choice for site-made rain-screen systems. Plywood or OSB of various thicknesses can be ripped into strips and fastened over the housewrap, but most builders opt for the convenience of ¼-in. lath or 1x3 furring strips. The 1x strips (shown here) are also common when installing siding over 1½-in. or thicker rigid foam. The strips hold the foam in place and provide solid nailing for the siding. Although it takes time, wood strips can even be notched and installed horizontally, an acceptable method behind sidewall shingles or vertical siding. Regardless of the type of wooden strip, pressure-treated stock is not necessary because the strips will be able to dry easily if they get wet.



prevent this trapped water from causing damage behind the siding, we need to give it an easy way out. It needs a place to go and a way to dry—and a vented rain screen offers both.

Trust me, your siding leaks

For many people reading this, the biggest challenge will be accepting the fact that the siding on their house leaks. So I'll be clear: It doesn't matter whether your house is clad with shakes, shingles, clapboards, vinyl, or stucco, your siding leaks. How do I know? Because water always finds a way behind siding, whether through gaps or cracks in the installation, wood movement, heavy downpours, or the heat of the sun driving moisture toward the cooler back of the siding.

Don't panic. Leaks are part of the reason that houses are built with weather-resistive barriers such as housewrap or felt paper under the siding. Even when installed correctly, though, housewrap isn't a guarantee against water problems.

Siding installed tight against housewrap isn't ideal for a number of reasons. Yes, housewrap is designed to shed water, but it does have a weakness. Surfactants in soap and power-washing chemicals, and tannins and sugars from wood siding, can reduce the surface tension of the water, allowing it to pass through the microscopic openings in the housewrap. Also, dirt can clog these openings, allowing liquid water to pass. The best way to eliminate this problem is to create a physical gap between the back of the siding and the face of the housewrap.

Less than an inch makes drainage possible

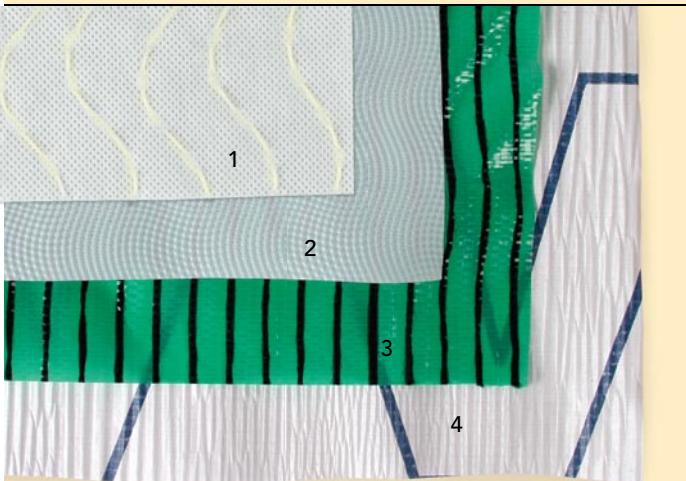
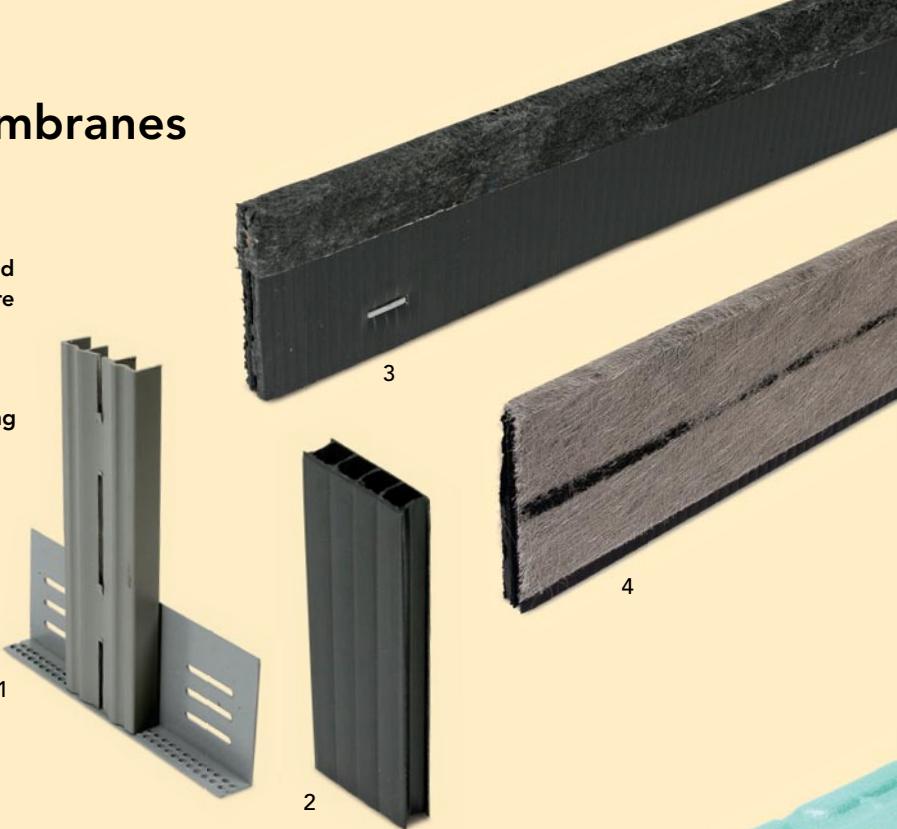
Providing a physical gap between the back of the siding and the surface of the house-

Battens, wraps, mats, and membranes

FURRING STRIPS AND BATTENS

Site-made vented rain-screen walls can be made from ripped plywood or OSB, lath strips, 1x3s, or any similar wood. Corrugated plastic battens available in thicknesses between $\frac{1}{8}$ in. and $\frac{3}{4}$ in. are quickly becoming a popular alternative. These hollow corrugated strips allow airflow between cavities in vertical installations (under clapboards, for instance), but some can also be installed horizontally (under shingles or panel siding, for instance), providing vertical drainage. Products are typically 2 in. to 3 in. wide, vary in length from 4 ft. to 10 ft., and are installed over housewrap with nails or roofing staples.

1. VaproBatten • www.vaproshield.com
2. El Dorado Battens • www.eldoradobattens.com
3. Sturdi-Strip • www.coravent.com
4. CedarVent and RafterVent • www.dciproducts.com



DRAINING HOUSEWRAPS

In areas of the country where the load on a rain-screen system is light, draining housewrap provides adequate space for drainage and ventilation. Because they still have all the qualities of a typical weather-resistive barrier, these housewraps can be used in place of standard smooth-faced housewraps, though you can expect to pay around 20% more. Some products have defined vertical channels and must be oriented to allow for drainage. Others have a nondirectional textured surface similar to the bumps on the surface of a basketball. If you are looking for a way to incorporate a modest ventilated rain screen without any changes to trim thickness, flashing details, or work habits, these are the products for the task.

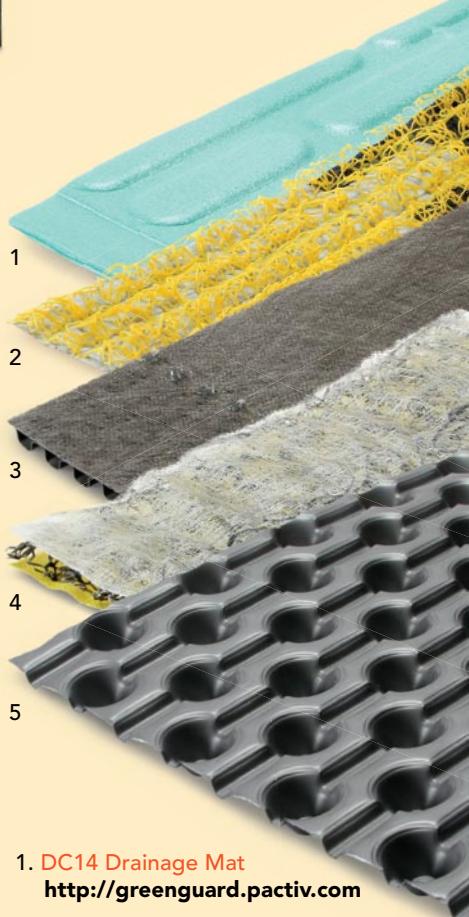
1. WeatherTrek • www.berryplasticsbpg.com
2. RainDrop • <http://greenguard.pactiv.com>
3. DrainWrap • www.tyvek.com
4. Hydofilament • www.hydrofilament.com

MATS AND MEMBRANES

This category is populated mostly by open-weave plastic membranes, which are almost entirely open space to provide maximum drainage. Products are sold in rolls, typically 40 in. to 48 in. wide, between 75 ft. and 125 ft. in length, and between $\frac{1}{4}$ in. and $\frac{3}{4}$ in. thick, though you can expect some compression when siding is nailed over the spongy material. The membrane is stapled over housewrap and is cut to fit around window and door openings. Products with housewrap attached to one side are also available, but don't expect to be able to peel back the plastic part of the membrane to tape housewrap seams without destroying the housewrap in the process. These membranes sell for about 60¢ to 70¢ per sq. ft.

Delta-Dry, a semirigid plastic mat, is a bit different. It has $\frac{1}{4}$ -in. dimples that provide venting on the back side and a combination of venting and drainage on the outside, under the siding. It is installed in place of housewrap, directly over the sheathing with $\frac{1}{2}$ -in. roofing nails or $\frac{3}{4}$ -in. pneumatic staples, and is overlapped at the seams. Expect to pay about 60¢ per sq. ft.

Finally, Pactiv makes a $\frac{1}{4}$ -in.-thick fanfold extruded-polystyrene drainage mat (R-1) that has ventilation channels on both sides. The rigid-foam product sells for about \$3 per sq. ft. and is installed over housewrap. The manufacturer claims it offers a firmer nail base than open-weave products.

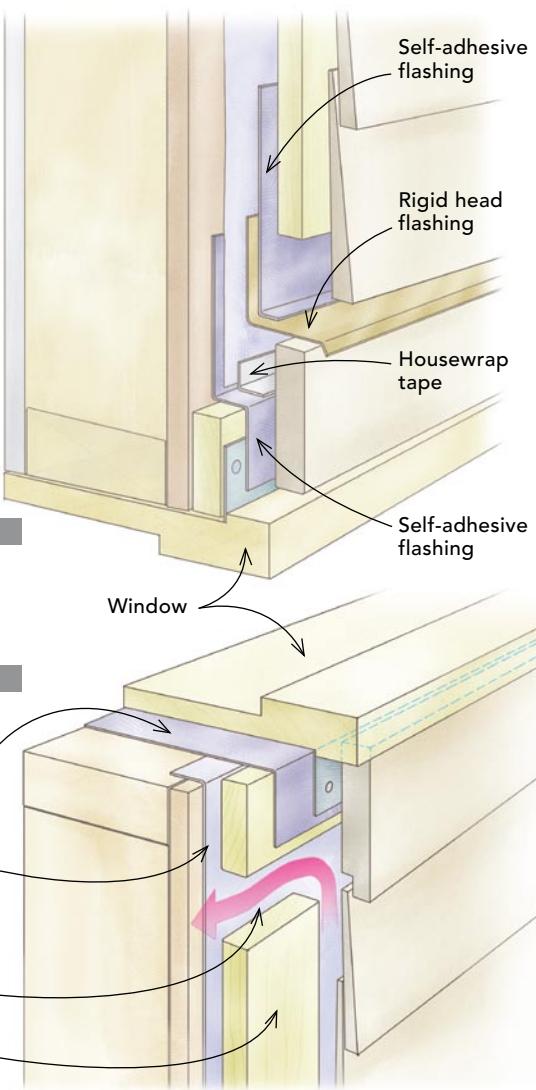
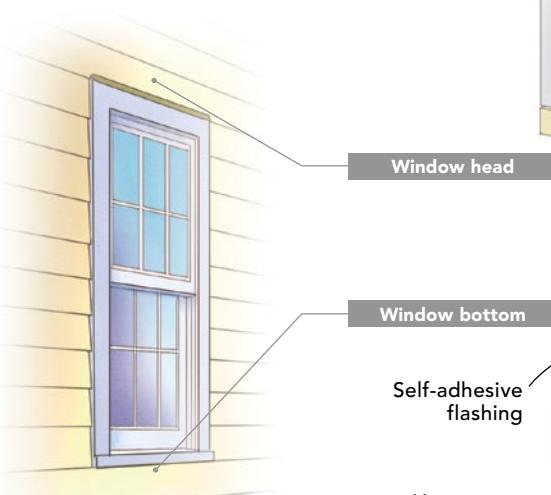


1. DC14 Drainage Mat
<http://greenguard.pactiv.com>
2. Home Slicker
www.benjaminobdyke.com
3. Enkamat
www.colbond-usa.com
4. WaterWay
www.stuccoflex.com
5. Delta-Dry
www.deltadry.com

5

Is it necessary to vent at the top and bottom of each cavity, or will one opening provide enough airflow and drainage?

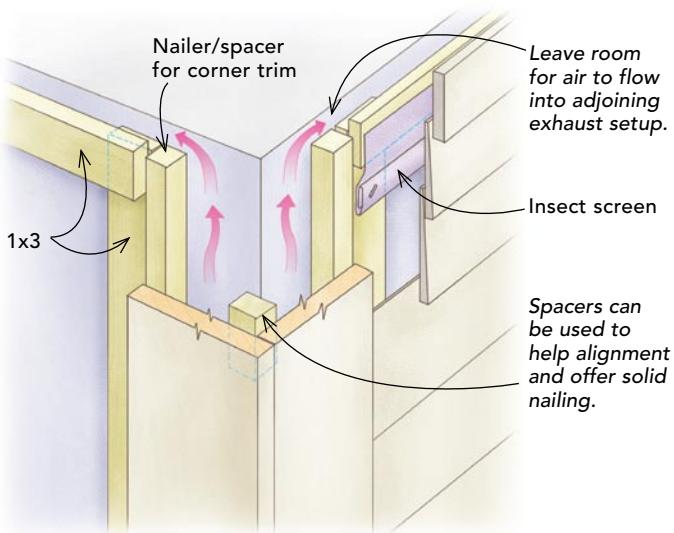
Many builders don't bother with exhaust vents in shorter sections of a rain-screen wall, such as below a first-floor window. According to Straube, however, one vent opening does not provide anywhere near the performance of a flow-through setup. That said, don't worry about intake/exhaust vents right at the window; just leave a gap for air to flow around the window.



6

Should corner boards be vented so that air can flow around corners, too?

According to Straube, the best approach is to isolate each face. The goal is to prevent rainwater from hitting one face of the house and being dragged around the more vulnerable corners by pressure differences. Straube also notes that a 1x3 nailed over a layer of housewrap is fine; there's no need to seal the corners with caulk or foam. You still can help these corners to stay dry by providing intake vents at the bottom of the corner boards that either tie into the attic ventilation or vent out the frieze.



wrap is like eliminating a bridge between two land masses. Remember that liquid water is lazy, so when given an uninterrupted conduit for drainage and all the appeal of gravity, it will follow that path every time. As long as that path runs straight down the back of the siding to daylight, bulk water isn't a threat.

Water drainage is only one part of the assembly, however. For a rain screen to function properly, it must also have a steady flow of air to help promote drying.

Ventilation is the second half of the equation

Except for vinyl, most types of siding are considered reservoir products. That is, they are like dense sponges: Even when coated with paint on all sides, they still can absorb water.

Differences in pressure (wind) and heat (sunshine) will drive absorbed water from the exterior of the siding toward the cooler back side. Unless there's enough water getting back there to drain physically or enough air leaking through the wall to help the water dry, it just sits. That's where the second part of a rain screen comes into play: the ventilation.

Located at the bottom of a wall, the same opening that allows water to drain in a rain-screen setup also acts as an intake vent for air. With another vent at the top of the wall, air will constantly flow behind the siding, picking up and removing moisture on its way out.

The concept is simple, and it usually doesn't take much to convince builders and homeowners that a vented rain screen is a best practice for long-lasting siding and a dry house. It's the details of a vented rain-screen system that seem to bog many people down. □

Justin Fink is a senior editor. Photos by Dan Thornton, except where noted.

your safety

Home building is inherently dangerous. From accidents with power tools to falls from ladders, scaffolds, and roofs, builders risk serious injury and even death. We try to promote safe work habits through our articles. But what is safe for one person under certain circumstances may not be safe for you under different circumstances. So don't try anything you learn about here (or elsewhere) unless you're certain that it is safe for you. Please be careful.

—BRIAN PONTOLILO
editor

shingles. At least two asphalt-shingle manufacturers—Elk and CertainTeed—will honor warranties when their products are installed on an unvented roof. Research has shown that shingle color has a greater effect on shingle temperature and longevity than venting under the sheathing. To learn more, read "Rethinking Attic Ventilation Requirements," which you can find here: www.sprayjones.com/rethinking-ventilation.

Where does the drip edge belong?

The drawing in your last "Energy-Smart Details" shows the roof assembly with the drip edge at the roof eaves lapped over the peel-and-stick roof membrane. I'm sure you didn't mean to show it this way.

—ROBERT COWMAN
via email

Editorial adviser Mike Guertin replies: You're right, Robert. And so is the drawing. Self-adhering roof underlayment (labeled "peel-and-stick mem-

brane" in the detail) can be installed either over or under the drip edge, depending on the type of membrane.

Fiberglass-reinforced, mineral-surfaced underlayment should be installed over the drip edge as you suggest. These membranes don't make sharp bends, and the adhesive isn't as aggressive as plastic-surfaced membranes.

For installing plastic-surfaced self-adhering roof underlayment, however, the best practice is to bend the sheet about $\frac{1}{2}$ in. onto the face of the fascia before applying the drip edge. Plastic-surfaced underlayment bends easily and bonds aggressively, creating a highly water-resistant seal with the fascia that helps the roof to resist wind-driven rain and gutter ice-dam backup. The drip edge is still used to protect the plastic-surfaced underlayment and to support the leading edge of the roofing.

Another argument for European windows

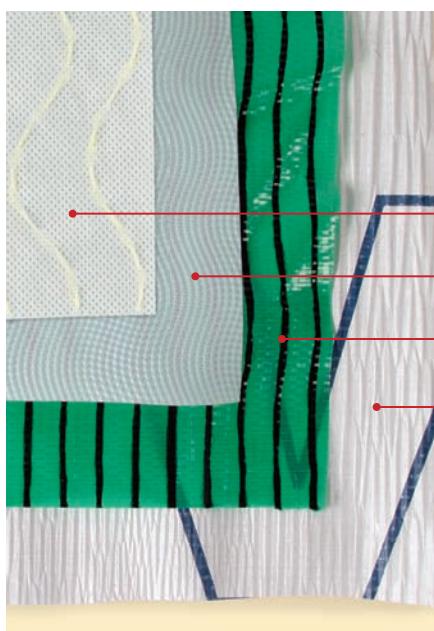
Having lived in several European homes with German-

made windows, I was interested in Martin Holladay's article on the efficiency of European windows in the September 2010 issue of *Fine Homebuilding* ("Do Europeans Really Make the Best Windows?" *FHB* #213 and online at FineHomebuilding.com).

I have different reasons why I like them, however. With casements that open inward, European windows are easy to clean and have no crank to wear out. You can turn the handle one way and open the window like a cabinet door, or you can turn it the other way and open it in at the top like a transom. Also, screens are mounted on the outside but are installed from inside the building.

Windows are only one of the "better ways" of Euro-building. But don't get me started. Their only fault is the use of the metric system, where measurements are expressed in hundreds of millimeters. How smart is that?

—THOMAS KEVER
Tallmadge, Ohio

**Correction**

In "Keep Siding Dry With a Vented Rain Screen" on p. 35 of our September 2010 issue (*FHB* #213), we botched a bunch of product labels. Here are the products, labeled correctly.

Hydrofilament
www.hydrofilament.com

WeatherTrek
www.berryplasticsbpg.com

RainDrop
<http://greenguard.pactiv.com>

DrainWrap
www.tyvek.com

Sturdi-Strip
www.coravent.com

VaproBatten
www.vaproshield.com

