

Air-Sealing the Rim Joist

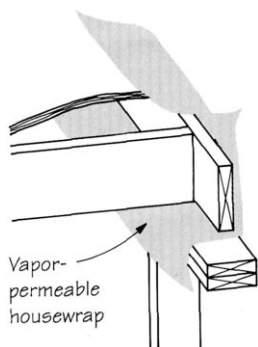
by Bruce Sullivan

A highway of air leaks runs through just about every house. It collects traffic from every interior wall that holds a pipe or wire. If interior wall cavities are used as ducts, it's rush hour whenever the furnace kicks on. The fast lane is the space between floor joists where air travels back and forth to the outside wall and leaks in and out around the rim joist.

Blocking the access routes — every receptacle, pipe, and duct — may be the only option for existing homes, though it's tedious and never totally effective. In new construction and major remodels, however, it's worth blocking the major outlet. By sealing the rim joist, you avoid the need to seal all those little penetrations that lead into joist cavities.

Unfortunately, the rim joist is one of the most difficult leaks in a house to seal. This article illustrates a few practical methods that builders have found successful. If you know another good way, drop us a line so I can share it with other readers.

Connector Strip



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The method shown below originated with the polyethylene air/vapor barrier, which is still used in Canada. This variation uses a strip of vapor-permeable housewrap, such as Tyvek, instead of polyethylene sheets. Since the sheet is vapor-permeable, you don't have to insulate the outside to keep the rim warm and prevent condensation. The strip is installed at the rim joist and connected to a continuous air barrier, such as polyethylene, on the inside surface of the building's insulated shell.

The connector strip gets installed at the framing stage. A framer must drape a 2- to 3-foot-

wide strip over the top plate of the first floor wall. It will hang there, getting in the way until the upper floor is framed and sheathed.

Then, framers flip the strip onto the second floor deck, tack it in place temporarily, and lift the second-floor wall on top of the strip. Later, the strip is caulked to the air barrier on the walls above and below.

Gusty winds and general abuse on the construction site shred some housewrap materials. Also, housewrap can be slippery, which might cause an otherwise sure-footed worker to fall when walking on the plate. To keep it out of the way and reduce wear, place the strip between the top plates of the first floor wall.

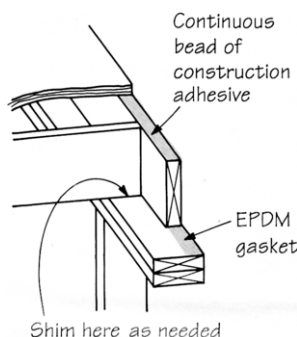
Gasket and Adhesive

Before setting the rim, you can tack a resilient rubber gasket onto the plate to fill gaps in the wood. The gasket forms an excellent seal because it's continuous, not interrupted by the floor joists as with some other methods.

EPDM bulb gaskets are sold by Resources Conservation (2633 N. Calvert St., Baltimore, MD 21218; 301/366-1146), Energy Federation (354B Waverly St., Framingham, MA 01701; 508/875-4921), and Shelter Supply (1325 E. 79th St., Minneapolis, MN 55425; 800/762-8399). Saturated foam strips are sold by Denarco Sales Co. (12710 Idlewild St., White Pigeon, MI 49099; 616/641-2206) and illbruck/USA (447 Elmwood, Troy, MI 48084; 313/843-3223).

Even when compressed, these gaskets will hold the rim up by $\frac{1}{16}$ to $\frac{1}{8}$ inch. You may want to use scraps of gasket as shims to bring the floor joists up to the same level. Interior bearing walls should

Gasket and Adhesive



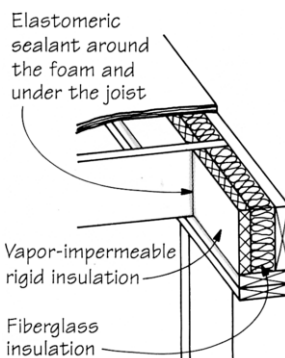
get a full-length gasket so the building loads are carried evenly. Setting the rim will be harder, because the gasket prevents the rim from sliding on the plate. You'll have to lift it into place. This may also make it harder if you have to square the floor framing.

On top of the rim, a continuous bead of construction adhesive will also create a long-lasting seal with very little extra effort.

Foam Squares

Cut a piece of fiberglass insulation, install it next to the rim, and then cover it with a piece of foam. The combined thickness of the fiberglass and foam should bring the foam flush with the inside face of the plate (or mud sill, if you're in the basement). Caulk all four sides of the foam, plus the crack under each floor joist. This will give you a continuous seal.

Foam Squares



With this method, sealing doesn't interfere with framing. It will take more time, but you can use less expensive labor. The foam insulation adds a bit of cost, but it's easy to cut. (Actually any rigid material that qualifies as a vapor retarder will work.) If carefully done, the seal will be just as good as with other methods, but there's more room for error.

What About Housewrap?

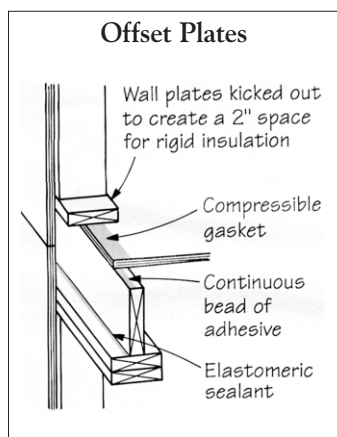
"Hold on," you may be saying, "Why all the fuss? Isn't this what housewrap is supposed to fix?" Housewrap helps. But I'm skeptical. Housewrap makes a great weather barrier, but I'm not willing to call it a *continuous air barrier*. I've never seen any definitive proof that housewrap alone achieves the kind of airtightness many builders strive for. Better

information may soon be available when engineers at Dupont (the makers of Tyvek) finish their field study of actual homes. Stay tuned for details.

In the meantime, one thing is certain: If housewrap has a prayer of functioning as a *continuous air barrier*, you'll have to do more than just staple it on over the wall sheathing. Installing housewrap properly takes many hours, a case of caulk, and half a dozen rolls of construction tape. The cost of these extras make some of the options in this article look cheap and easy.

Offset Plates

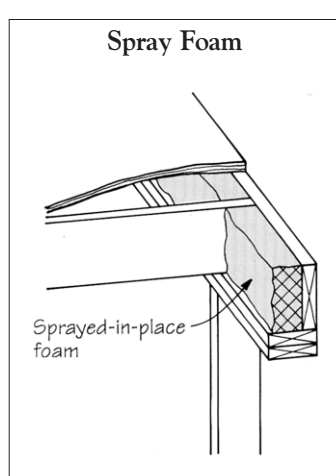
Keeping the rim joist warm is critical in cold climates, where condensation can accumulate on cold framing. The well-known trick of kicking out the bottom plate of a 2x6 wall allows room for rigid insulation on the outside. You may need to add fiberglass insulation on the inside to reach the R-value of the rest of the above-grade wall.



For air-sealing, this detail creates a nice corner between the top plate of the first-floor wall and the rim. Caulk the corner with a continuous bead of high-quality elastomeric sealant, and seal the rim to the subfloor above with a continuous bead of construction adhesive. This method uses inexpensive materials, and doesn't interfere with the work flow during framing.

Spray Foam

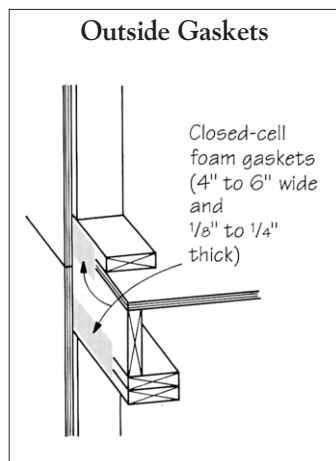
Foam sprayed into the rim cavity easily seals all the leaks. I doubt that anyone would call in a spray foam crew just to do rim joists. At the very least, you'll also want them to fully insulate the walls and seal the pipe and wire holes to the attic. But this option wins the easy award. You simply hire out the job. Of course, it will cost much more than other methods. Also, the current formulations of urethane foam use CFC



foaming agents, so you might consider icynene foam, the ozone-friendly alternative (Insealation, 376 Watline Ave., Mississauga, ON L4Z 1X2, Canada; 800/361-3155).

Outside Gaskets

Here's an idea that's new to me, but it seems very promising. Apply gaskets 4 to 6 inches wide to span the gaps on the outside. I heard about this from a Canadian builder, who used polyethylene sill sealer that was about 1/4 inch thick. He reported no problems with bulging sheathing or siding. Wide gaskets made of EPDM, closed-cell foam, or saturated open-cell foam should work, too. Because the gasket doesn't prevent the rim from sliding on the plate, it's no trouble to position the rim and square the floor framing.



This will be easy if you tip up your wall framing and then nail on the sheathing. For those who install sheathing on the deck, you'll have to tack the strip of gasket to the top plate, then lay the sheathing on top. ■

Bruce Sullivan, a writer in Eugene, Ore. specializing in energy topics for builders, is the principle of Iris Communications, and the editor of Northwest Builder.