

The Best Way to Insulate a Rim Joist

Stop energy losses with a spray-foam kit

BY ISAAC SAVAGE

As a building-performance consultant, my main goals are to improve the comfort, efficiency, durability, and healthfulness of buildings. To achieve these goals, it's necessary to control the movement of heat, air, and moisture within and through a building envelope. Attention to insulation and air-sealing details throughout a house is critical.

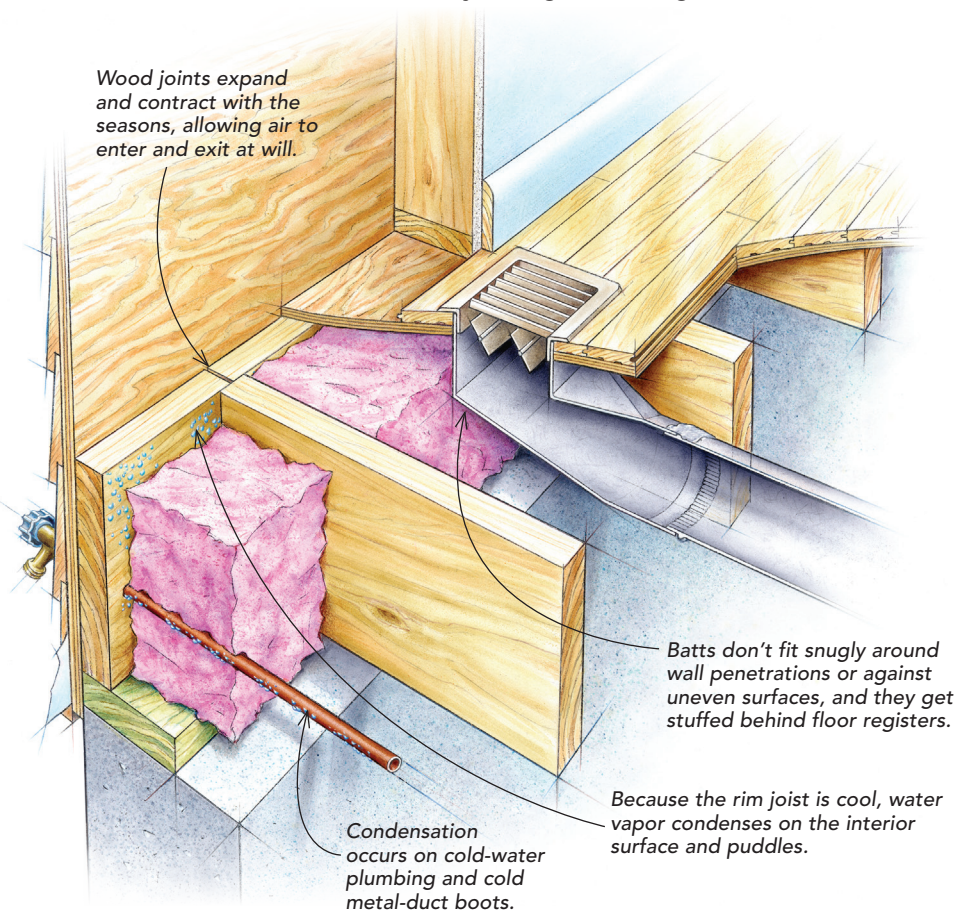
The areas most susceptible to energy loss and moisture damage are often the ones you no longer see after a home is built. The rim joist, also known as a band joist, is a perfect example. It should be insulated to achieve the same R-value as the exterior walls. All joints around the rim joist are susceptible to expansion and contraction, making them especially vulnerable to air and moisture movement. Once the drywall is installed, the rim joist is rarely thought about again. But improper insulating and sealing in this area can lead to comfort complaints, high energy bills, air-quality issues, and moisture damage.

In the past, few options have been available for insulating rim joists, but with the increased awareness of building science, manufacturers are developing innovative solutions to insulate this area properly. Relatively new to the market, two-component spray-foam kits offer a quick, effective solution to tricky insulating problems. The kits consist of two liquid chemicals that mix together in the tip of a gun, then expand once they hit the surface. The foam is highly adhesive, so it sticks and stays in place as it expands to fill gaps. Once cured, the foam provides an effective air seal as well as insulation. □

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FIBERGLASS DOESN'T STOP AIRFLOW

Stuffing fiberglass batts between floor joists is a common method of insulating the rim joist in many homes, but it's a severely flawed technique. Fiberglass works best in an enclosed space where it can trap air (between drywall and the exterior sheathing of a stud wall, for example). When used as shown in the drawing below, the insulation cannot perform at its full-rated R-value because air and moisture can move freely in and out of the building through wall penetrations and wood joints, eventually making their way into conditioned space through areas like floor registers. Not only does air move freely around the batts, but because the insulation is not enclosed, it moves freely through the fiberglass as well.



FOAM-KIT BASICS

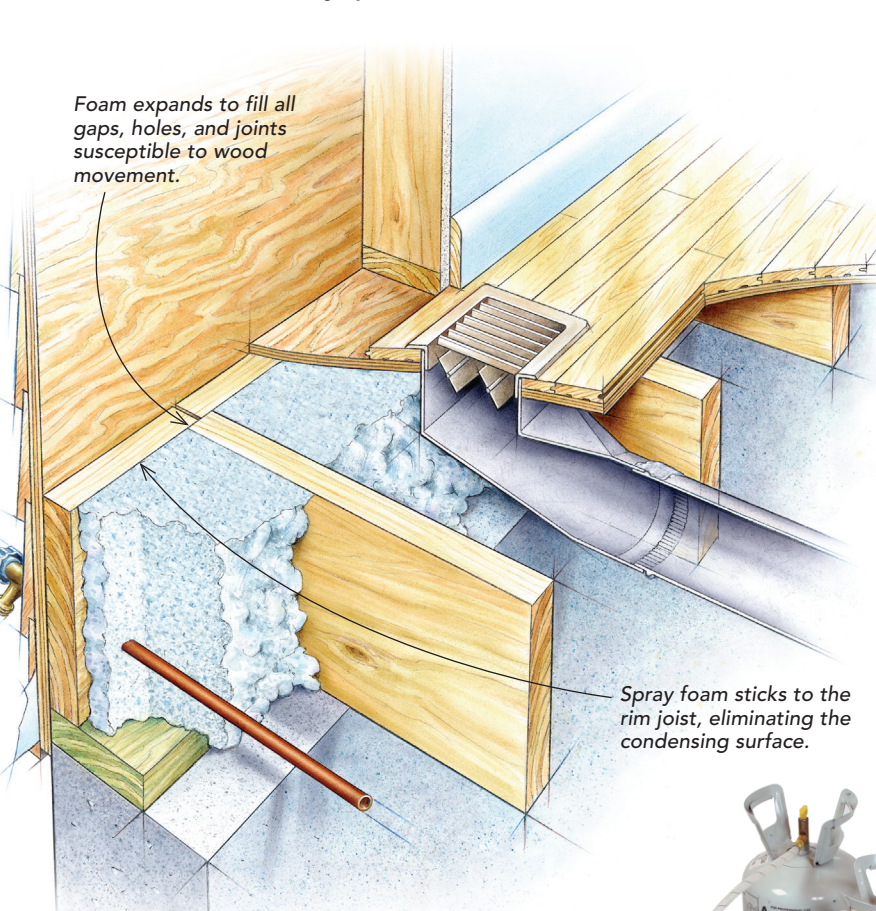
Spray-foam kits (about \$360 for a 200-bd.-ft. kit) are available in either open- or closed-cell foam. Either type is suitable for the rim joist. Spray-foam kits are available in sizes to cover 100, 200, and 600

bd. ft. at 1-in. thickness. Open-cell foam is R-4 per in. and allows vapor to pass through it, which lets the building dry to the inside. Closed-cell foam is R-6.7 per in. and does not allow vapor to transfer as quickly.

Open-cell kits have a flame-retardant formulation while closed-cell kits are available in standard and flame-retardant formulations. Specific kit yields and formulations are available at rhhfoamsystems.com.

SPRAY FOAM DOES

A two-component spray-foam kit (below) is insulation and air barrier, making it the fastest, most efficient way to seal the rim joist. When sprayed between floor joists, the mixture sticks to the surrounding surfaces. The foam expands to fill holes made by wall and floor penetrations, and it seals wood joints, stopping air and water vapor from entering or escaping. Once the foam expands fully, it insulates the cavity as well. Because the foam doesn't allow air to move through it (which diminishes R-value), it always performs at its full-rated R-value.



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FOAM STICKS TO EVERYTHING

When applying expandable foam, protect anything you don't want covered in foam. (1) Wear protective clothing; I recommend using a Tyvek suit with a hood. Wear gloves, goggles, and a high-quality respirator.

Applying foam is fairly simple. Don't stop spraying for more than 30 seconds, or the foam will dry in the gun and ruin the kit. Before you start, shake the canisters well to mix the liquid inside; then open the valves. Coat the gun end of tips with petroleum jelly before you start spraying so that they're ready when you need them. (2) Replace a tip when you notice a decrease in spray volume, and spread more petroleum jelly around the connection between tip and gun. (3, 4) The gun reacts much like a garden-hose spray nozzle, so keep steady pressure on the trigger. Spray the cavity perimeter first, then cross back and forth to fill the space. Adjust the speed of your strokes to get the thickness you're looking for.

