Venting a Tricky Old Roof

VENT THIS. When this home was built in the 1880s, it likely had all the roof ventilation it needed. But add modern roof underlayment, asphalt shingles, and blown-in attic insulation to the equation, and a couple of gable-end vents can no longer provide the airflow it needs. The trick to retrofitting ventilation on this and many older homes is to recognize that **the eave is often not an option for locating intake vents.**

Retrofitting undershingle intake and ridge vents helped to cool and dry this 120-year-old attic

BY MIKE GUERTIN

I've been working on this old house for a few years now. Among other projects, I retrofitted the house with central air-conditioning, which has duct runs in the attic, and updated the bathroom, swapping the original claw-foot tub for a walk-in shower. But I'm not the only remodeling contractor who has worked on this house since it was built in the 1880s. The roof has likely been replaced a few times, most recently with asphalt shingles and roofing underlayment. And at some point in the 1970s, the attic was insulated with loose fill.

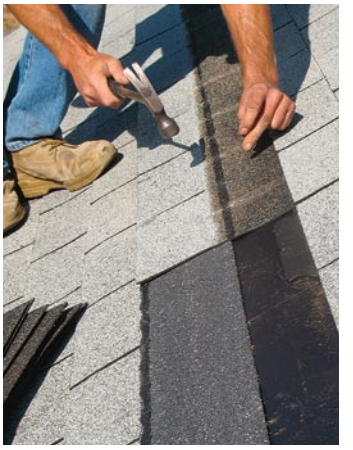
As soon as I started working on the house, I knew that it might have attic-ventilation issues. After all, when the house was built, it wasn't insulated and couldn't have been as tight as it is today. Rather than strain their budget, however, the

ROOFTOP INTAKES SOLVE THE PROBLEMS AND DRAW COOL AIR

Undershingle intake vents can be installed anywhere within the first few feet of the eave. Here, the intake vents were installed 2½ ft. from the eave, about 6 in. above a thick layer of loose-fill insulation in the attic.

Cut a 1-in.-wide strip of sheathing. *Remove two courses of shingles and the nails along the cutline. Use an old carbide sawblade and set the depth of cut to the thickness of the sheathing. Alternatively, you can drill a series of 1½-in.-dia. holes in each rafter bay.*

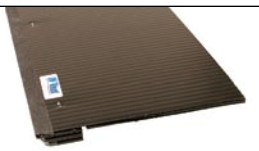
Position the intake vent. *Slip the top edge of the vent under the roofing underlayment. Fasten the vent with nails provided by the manufacturer, or use 2-in. to 2½-in. roofing nails.*



Reshingle. *Apply a starter strip cut from new shingles before reinstalling the old shingles (photo above).*

SOURCES

The following manufacturers sell undershingle intake vents that cost approximately $3 to $3.50 per lin. ft. with net free-vent area (NVFA) ratings of 9 sq. in. to 10 sq. in. per lin. ft.



COR-A-VENT
IN-Vent
www.coravent.com

DCI PRODUCTS
Smart Vent (installed above)
www.dciproducts.com

AIR VENT
The Edge Vent
www.airvent.com

homeowners agreed to keep a close eye on the attic. After a couple of years, it became clear that the two small gable-end vents weren't providing enough airflow to keep the attic cool and dry. In the summer, the temperature skyrocketed during the day and didn't cool down in the evening. In the winter, moisture condensed on cold surfaces.

One approach to fixing these problems is to insulate the underside of the roof with spray foam, which makes the attic semiconditioned space and brings it into the building envelope. But there are several challenges to this approach, including the high cost of installing spray foam. I decided to use a more cost-effective method and installed a balanced attic-vent system, which uses intake vents (typically installed in the soffits) and exhaust vents (typically installed at the ridge). The system creates steady airflow that helps to keep the attic cooler; carries away excess moisture vapor, reducing the chance for condensation and mold growth; and reduces the likelihood of ice damming.

Shingle-over ridge vents were a no-brainer for the exhaust vents, but choosing the style of intake vents was a bit trickier. The eaves on this house project only 8 in. from the sidewall, and the soffit boards are applied to the underside of the sloping rafter tails, which meant there was not enough room to install intake vents in the soffit. Venting drip edge would have been my next choice. But the eaves are filled with loose-fill insulation. In fact, the insulation blocks the first 2 ft. of the rafter bays. In the end, I opted to use shingle-over intake vents. These specialty vents look like a one-sided ridge vent and can be installed anywhere within the first few feet of the eave. I installed them about 2½ ft. up from the eave edge, just above the insulation level.

This roof is roughly 36 ft. long. It took one person one day to retrofit the intake and exhaust vents. The attic is now noticeably cooler in the summer, and it stays dry in the winter. □

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Product photos, drawing: Dan Thornton

RIDGE VENTS EXHAUST WARM AIR TO COMPLETE THE SYSTEM

There are a number of similar ridge vents available; this is the Shingle Vent II from Air Vent. Before installing any roof-top vents, check with your building inspector. High-wind and seismic zones could present structural concerns.

Strip the shingles and underlayment. *If the roof isn't too old, you might be able to reuse the cap shingles. If not, be sure to have new cap shingles on hand. With a utility knife, expose about 2 in. of the sheathing on both sides of the ridge.*

Remove a strip of sheathing. *Cut the sheathing back 2 in. on conventionally framed roofs and on truss roofs with ridge blocking. On truss roofs without ridge blocking, cut a 1-in. strip. Nail or screw down the top edge of the remaining sheathing.*

Install the ridge vent, and cap it. *Install the ridge vent over the slot with the nails provided by the vent manufacturer or 2-in. to 2½-in. roofing nails. Cap the vent with shingles using the same type of nails. Sometimes the ridge vent won't cover the top lap of the highest course of shingles. In this case, add new shingle tabs before installing the ridge vent (photo below).*

Balanced venting for any roof

Attic venting relies on physics. Because warm air is more buoyant than cool air, it rises and escapes through the ridge vents, in turn drawing cool air into the attic through intake vents near the eave. The trick is to make sure you provide enough ventilation for the size of the attic in question. The International Residential Code and most roofing manufacturers call for balanced venting: a minimum vent-opening area of 1 sq. ft. for every 300 sq. ft. of attic space. This ratio assumes that the venting is divided evenly between intake and exhaust. If balanced intake and exhaust aren't possible, then the vent-opening ratio increases to 1 sq. ft. of vent for every 150 sq. ft. of attic floor area. Intake and exhaust vents are rated in square inches of net free-vent area (NFVA). Determining the necessary length or number of roof vents you need means converting square feet to square inches. Below is an example of how to determine the necessary venting for a 1200-sq.-ft. attic.

The necessary length of the vents could be less than the length of the building. Rather than stopping the vent, consider running it the length of the roof for a better appearance, stopping so that the last cap shingle lies flat before reaching the rake edge, the sidewall, or a chimney.

Example: venting for a 1200-sq.-ft. attic

STEP 1

1200 sq. ft.
÷ 300 sq. ft. (for balanced vents)
= 4 sq. ft. of NFVA

STEP 2

4 sq. ft. of NFVA
x 144 (in. per sq. ft.)
= 576 sq. in. of NFVA

STEP 3

576 sq. in. of NFVA
÷ 2
= 288 sq. in. of intake (and 288 sq. in. of exhaust)

STEP 4

288 sq. in.
÷ 9 (NFVA-per-foot rating of intake vent)
= 32 lin. ft. of intake
÷ 2
= 16 ft. of intake per side of roof
(Repeat step 4 for exhaust vents.)