

9.9 ATTIC VENTILATION

SWS Detail: 4.0188.2 Unconditioned Attic Ventilation; 4.0102.2 SPF Roof Insulation - Vented Roof Deck

Attic ventilation has the following functions.

- To keep the attic insulation and the attic's other building materials dry by circulating dry outdoor air through the attic.
- To prevent ice dams in cold weather by preventing snow melt and keeping the roof deck cold during the winter.
- To remove solar heat from the attic during the summer.

9.9.1 Attic Ventilation as a Solution for Moisture Problems

The best way to keep attic insulation dry is to air seal the attic floor to block moist indoor air from entering the attic. Adding attic vents may help to solve certain attic moisture problems.

- Seasonal moisture deposition.
- Ice damming in areas that currently lack high and low vents.

Adding attic vents won't solve these attic moisture problems.

- Moisture deposited by air leaks between the living space and the attic.
- Rain driven through attic vents.
- Roof leaks that dampen building materials beyond the capacity of the vents to dry.

9.9.2 When to Install Attic Ventilation

Install more attic ventilation only if you believe that the home needs one of the attic-ventilation functions listed above. Consider the following discussion points.

- Don't increase attic ventilation without first sealing attic air leaks and testing the attic air barrier for adequate airtightness.
- Avoid cutting new vents through the roof to avoid the possibility of roof leaks.
- Attic ventilation may not provide a useful function in some climates, such as persistently damp climates or windy, rainy climates.

Important note: The IRC offers an outright exception to ventilating attics if a code official determines that “atmospheric or climatic conditions” aren't favorable to attic ventilation.

9.9.3 Attic Ventilation Requirements

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Always vent exhaust fans directly to outdoors (through a soffit, gable, or wall) and never into a ventilated attic.

Net free area is the area of the vent minus the vent's solid obstructions such as screens and louvers. The net free area is typically 50% to 70% of the gross vent area.

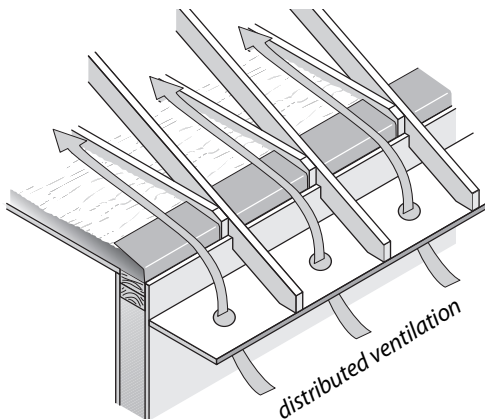
The IRC and SWS state these requirements for attic ventilation.

- ✓ Provide a maximum ratio of one square foot of net free vent area to 150 square feet of attic area.
- ✓ The IRC requires only one square foot of net free area per 300 square feet of attic area for cool-climate ceilings, that have an interior vapor barrier, or well distributed ventila-

tion (high and low), or with thorough air-sealing of the ceiling.

- ✓ Vents must have screens, with $\frac{1}{4}$ -to- $\frac{1}{16}$ inch or less opening, to prevent the entry of pests and to reduce the entry of snow and rain.
- ✓ Vertical vents must have louvers to deflect rain.

Soffit chute or baffle: Install a maximum amount of insulation that the baffle allows. The chute prevents wind-washing and conveys the ventilation air over the insulation. The distributed vents ventilate the whole surface of the insulation and cool the whole roof in winter, preventing ice damming.



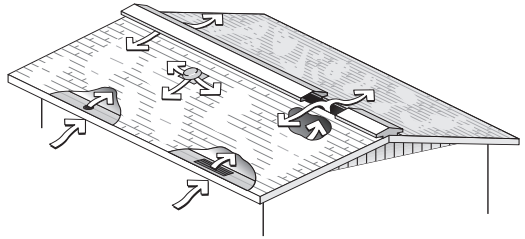
- ✓ Install vent chutes or baffles to prevent blown insulation and spray-foam insulation from entering the space between soffit vents and the attic.
- ✓ The baffles should allow the maximum amount of insulation to be installed over top plates without restricting ventilation paths. Vent chutes or baffles also help prevent the wind-washing of insulation caused by cold or hot air entering soffit vents. They should extend upwardly along the rafter to at least 4 inches above the finished insulation level.
- ✓ For spray-foam insulation installed under the roof deck, vent chutes or baffles can create a duct that carries ventilating air along the underside of the roof deck, which keeps the roof deck dry and cold in winter. *See “Unvented Spray Foam Roof-Deck Insulation” on page 158.*

- ✓ Don't install power ventilators to increase attic ventilation because of their energy consumption and doubtful effectiveness.

High and Low Vents

A combination of high and low vents is the best way to move ventilating air through the attic. Soffit vents and ridge vents are an ideal combination for high-low attic ventilation. However, gable vents and roof vents, located high or low, also create acceptable ventilation.

Low and high attic ventilation: Distributed ventilation — high and low — is more effective than vents that aren't distributed.



9.9.4 Power Ventilators

Power ventilators have limited value ventilating attics for air-conditioning energy savings or moisture mitigation.

- Power ventilators typically run longer than necessary.
- Power ventilators often consume more electricity than they save in reduced air conditioning.
- Power ventilators can pull conditioned air out through ceiling air leaks, counteracting their ventilating or cooling benefit.

9.9.5 Unventilated Attics

According to the IRC, new attics may be unventilated if the two conditions listed here are both met.

1. There is no vapor barrier installed in the ceiling.

2. The roof assembly is insulated with an air-impermeable insulation, such as high-density sprayed polyurethane, to the bottom of the roof sheathing or foam board on the top side of the roof sheathing.