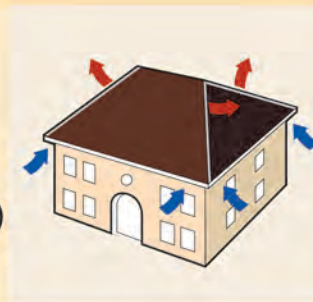
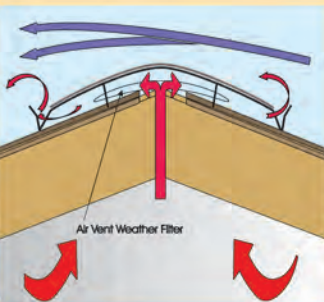




ATTIC VENTILATION:

Tips and Answers from the Experts



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ATTIC VENTILATION

HAS NEVER BEEN MORE IMPORTANT.

Construction practices and products have changed dramatically in recent decades. Windows and doors are more airtight, insulation levels have increased, and the use of house wraps and vapor retarders is commonplace. Yes, houses are more airtight and that helps save energy. But these changes have created new issues with indoor air quality and attic ventilation.

WORKING TO CODE MAY NOT BE ENOUGH.

As construction has changed, code requirements have not always kept up. Heat or moisture problems can develop in an attic, even when the contractor has installed an attic ventilation system up to code. At the same time, shingle manufacturers are requiring “proper attic ventilation” to validate shingle warranties. That’s why it’s never been more important for contractors to know all the “ins and outs” of attic ventilation.

LOOK TO US FOR ANSWERS.

Air Vent is the attic ventilation expert. Our intensive research and testing have led to the development of superior ventilation products. The performance of these products has been proven again and again through testing and tens of thousands of successful real-world installations.

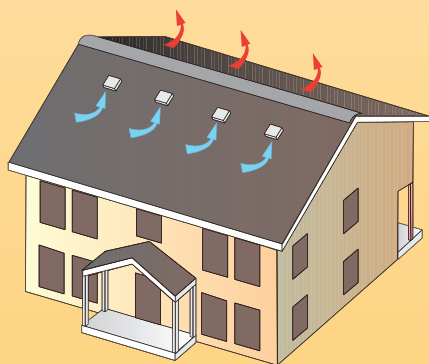
As the acknowledged industry experts, we at Air Vent are committed to informing and educating contractors, builders, architects, code officials and other industry professionals.

This booklet is a compilation of tips and the answers to some of the questions most commonly asked at Air Vent’s *Attic Ventilation: Ask the Expert*[™] seminars. We hope you find it useful. Please be aware that this booklet is not intended to serve as an installation manual or to replace any instructional literature which may accompany Air Vent products. Please consult installation instructions which accompany Air Vent products for all pertinent installation information.

TIP 1

DON'T SHORT-CIRCUIT YOUR VENTILATION SYSTEM.

- There are two important principles to remember when installing attic ventilation:
 - 1) Ventilation is a *system* of intake and exhaust
 - 2) Air follows the path of least resistance
- Air should enter the attic at the lowest point, move up through the attic and exit at the ridge.
- Never install more than one type of exhaust system. If you do, the stronger exhaust vent will pull from the other one. When that happens, one of the vents is functioning as an intake vent and one works as an exhaust vent, short-circuiting the ventilation system.
- Short-circuiting the exhaust has its consequences:
 - 1) Large areas of the attic are left unventilated because air circulates only at the top of the attic.
 - 2) If the secondary exhaust vent becomes an intake vent, it is prone to weather infiltration because exhaust vents are not designed to pull air into the attic.
- Do not mix or combine any two types of exhaust vents on the same roof above a common attic: ridge vents, power fans, gable louvers, wind turbines and roof louvers.



If more than one type of exhaust vent system is installed (for example, ridge vents and roof louvers as in this illustration), one acts as intake and the other as exhaust, leaving large areas of the attic unventilated and increasing the potential for possible weather infiltration problems.

TIP 2

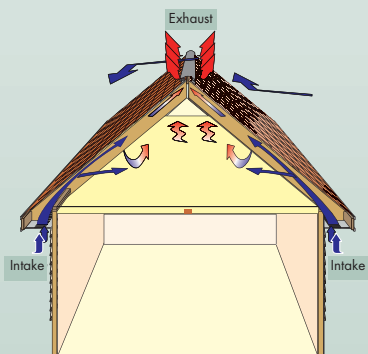
BALANCE INTAKE AND EXHAUST.

- Ventilation is a system of *intake* and *exhaust*. That means the flow of air will always be restricted to the lesser area.
- To get the most exhaust out of the attic, the intake area should be equal to or exceed the exhaust area.
- According to building codes a *balanced ventilation* system means at least 50% of the required vent area must be intake and 50% exhaust. However, many ventilation engineers recommend installing additional intake to maximize airflow.

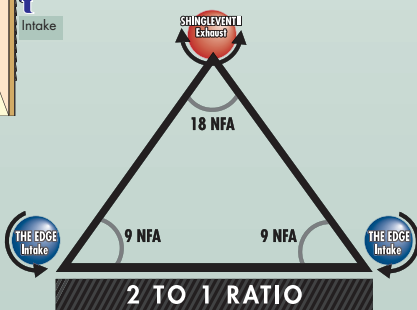
How to Achieve The Balanced System®

Air Vent's ridge vents (ShingleVent® II, FilterVent® and VenturiVent™ Plus) have 18 square inches of net free area per linear foot. To balance these ridge vents with intake vents do the following:

- 1) Measure the length of the ridge.
- 2) Multiply that number by 18 (that gives you the net free area at the ridge).
- 3) Install the same amount of net free area using intake vents such as Air Vent's The Edge™ Vent (see Bonus Tip below).



The intake net free area should match or exceed the exhaust net free area.



Bonus Tip:

Install Air Vent's shingle-over roof-mounted The Edge™ Vent for quick and easy balanced intake. It provides 9 square inches of net free area per linear foot or exactly half as much as Air Vent ridge vents. Once you've calculated the length of the ridge, double that number and you'll know the number of feet of The Edge Vent you'll need to install.



TIP 3

INSPECT THE ATTIC.

- When safe and practical to do so, inspect the attic when estimating a roofing job. Check for damage and assess the current ventilation system. Here's why:
 - 1) It allows you to find any damage due to lack of ventilation and what may need to be done to repair the damage.
 - 2) It helps you determine how you can improve the attic ventilation system.
 - 3) It adds to your professionalism.

HERE ARE SOME THINGS TO LOOK FOR WHEN INSPECTING AN ATTIC:

- Note the size and location of existing intake and exhaust vents.
- Check for signs of moisture damage such as mold stains on wood, compacted insulation from moisture droplets and rust on nails.
- Make sure intake vents are clear of debris. If there are rectangular undereave vents make sure that there's at least one installed between every rafter space or every 2 or 4 ft. apart as required to balance the system.
- Is the insulation blocking the soffit area? If so, pull it back and insert an insulation baffle.
- If an insulation baffle is already in place, make sure dirt, debris or insulation isn't clogging it.
- Can you see light at the soffit? If so, this ensures that there is in fact a hole cut for the intake vent.
- Inform the homeowner of what you found and the benefits of improving the attic ventilation system.



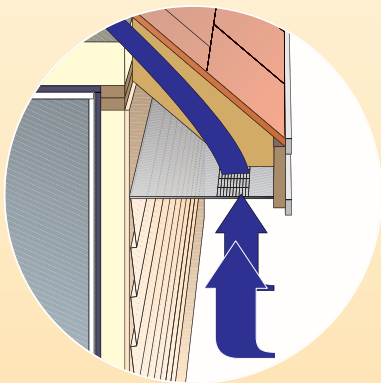
Air Vent's Attic Inspection Form features a handy checklist to help you make a complete evaluation and specification for attic ventilation

For a FREE PDF of the *Attic Inspection Form* visit www.airvent.com. To order your FREE pad(s) email us: ventilation@gibraltar1.com.

TIP 4

THINGS TO LOOK FOR OUTSIDE THE ATTIC:

- Don't laugh, but make sure there is a hole cut for the intake vent. We've seen applications where the intake vent was in place without holes.
- Is there dirt or debris clogging the intake vent?
- Have the intake vents been painted and plugged with paint? If so, replace them.



When installing continuous soffit vents and undereave vents, position them evenly around the attic to maximize airflow at the far outside edge of the soffit.

Bonus Tip:

During the attic inspection, check the condition and the amount of insulation in the attic. The homeowner may need to contact an insulation contractor to add insulation to improve the attic system – or you can offer the service yourself.

TIP 5

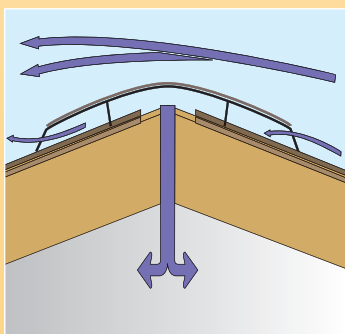
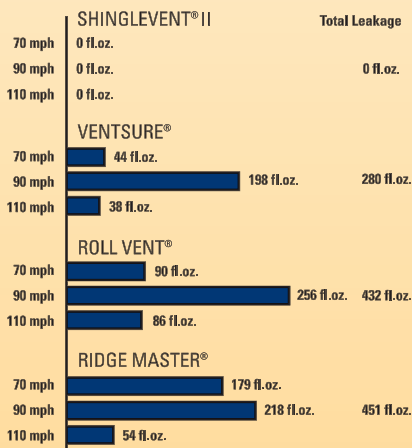
MAKE SURE VENTS PROTECT THE ATTIC FROM THE WEATHER.

- Some ridge vents without external baffles have been known to leak. Here's how it happens:
- Wind blows up the roof and hits the ridge. If there's nothing to deflect or stop it, air enters through the vent.
- Snow and rain can be carried with it. Some ridge vents are designed to trap the weather when it hits the vent to protect from weather infiltration. This method doesn't always work.
- Testing in accordance with Dade County Protocol was conducted on different ridge vents on a 4/12 roof. After being subjected to 8" per hour rain with winds that varied from 35-110 mph, some ridge vents leaked over 400 ounces of water. ShingleVent II passed the test without even a drop of water in the bucket. The chart shows the complete results.

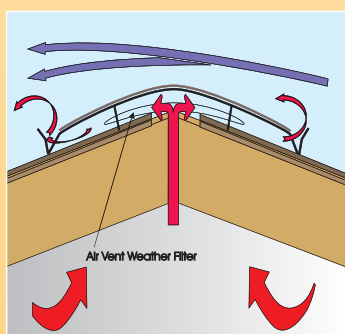
For Additional Weather Protection Go with the Internal Weather Filter

In extreme weather conditions, the internal weather filter in Air Vent's ridge vents ShingleVent II, Multi-Pitch Filter Vent, Peak Performer II and Hip Ridge Vent helps to form a more complete barrier against wind-driven snow and rain. The unwoven, untreated filter helps prevent rain, snow, insects and other debris from entering the attic. Any debris stopped by the filter is flushed away by the exhaust airflow.

Wind Speed and Water Leakage



Un baffled/unfiltered ridge vent can allow air to enter the attic along with rain and snow



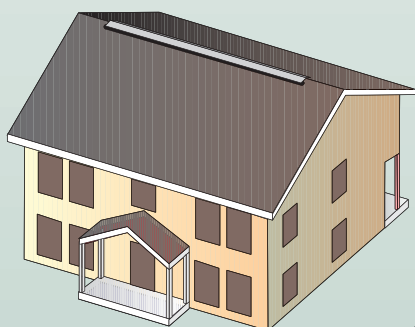
Ridge vent with external baffle/ internal weather filter

Ridge vents with an external baffle and internal weather filter provide superior protection from weather infiltration.

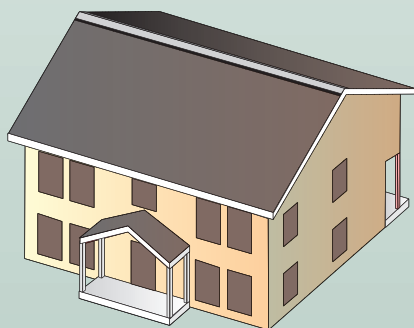
TIP 6

INSTALL RIDGE VENTS FROM END-TO-END.

- Ridge vents are generally regarded as the preferred method of attic ventilation for two reasons:
 - 1) They're installed along the entire ridge to provide a continuous flow of air along the underside of the roof deck across the entire peak of the roof (when balanced with proper intake).
 - 2) They blend in with the ridge of the roof, making them nearly invisible from the ground.
- One giveaway that a ridge vent is installed on the roof is the staggered appearance when it's not installed from end-to-end.
- Even though the slot length is terminated 6" from the exterior wall when installing Air Vent ridge vents, run the vent along the entire ridge for a clean, even roofline.



For best appearance, install ridge vents along the entire ridge. Stopping short of the end creates a staggered roofline.



Bonus Tip:

It's important that exhaust vents be designed to provide weather protection.

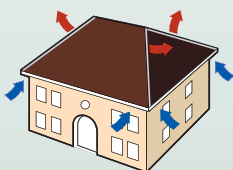
- Be sure to flash and caulk around roof louvers, wind turbines, etc.
- When installing ridge vents on dimensional shingles, use a tri-polymer sealant between the low areas of the shingle and the vent being sure not to plug the drain holes.

Q:

How do you ventilate a hip roof?

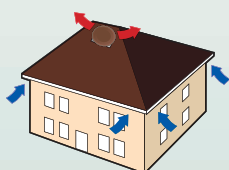
You have two good options:

- 1) Air Vent's Hip Ridge™ Vent has been designed specifically for ventilating hip roofs. It's a shingle-over ridge vent that installs on the diagonal hips. Add intake vents around the perimeter of the house to achieve a balanced flow of air. The Hip Ridge Vent has features to enhance airflow performance and weather protection including an external wind baffle, integrated gaskets and rain diverters, and an internal weather filter.



Air Vent's Hip Ridge™ Vent is designed for diagonal hips.

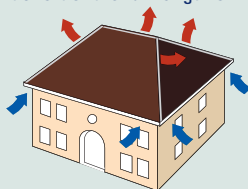
- 2) A roof-mount power attic ventilator is another way to ventilate a hip roof. Mounted on the back of the home, a power vent is thermostatically controlled and should have a humidistat also to provide ventilation whenever needed. As with any exhaust vent, power vents need proper intake ventilation.



Another option for ventilating a hip roof is either an electric or a solar powered attic ventilator with intake vents.

Bonus Tip:

- Run the Hip Ridge Vent the entire length of the diagonal hip even though the slot cut only runs to the midpoint of the hip. This will help give the roof a clean, aesthetically pleasing appearance. Stopping the vent short of the full length of the diagonal hip will reduce curbside appeal.
- Install ShingleVent® II or VenturiVent™ Plus ridge vent on the horizontal peak to add more exhaust airflow and to blend with the Hip Ridge Vent.
- Visit www.airvent.com for photographs showing a Hip Ridge Vent installation.



How to determine what size power attic ventilator you need:

- Multiply the attic square footage by 0.7. That tells you the minimum CFM (cubic feet of air moved per minute) capacity of the fan needed for the attic.
- Add 20% for roofs over 6/12 pitch and add 30% for roofs over 10/12 pitch.
- Make sure the attic has enough intake ventilation for the fan to work properly. Calculate this by dividing the CFM capacity of the fan by 300. That gives you the square feet of intake vent area needed. To convert that number into square inches, multiply it by 144.

Bonus Tip:

Always install a power attic ventilator equipped with a combination thermostat/humidistat. The thermostat will help prevent heat buildup, but obviously, only works in the warmer months. The humidistat is an important feature that helps prevent moisture buildup in the winter and spring.

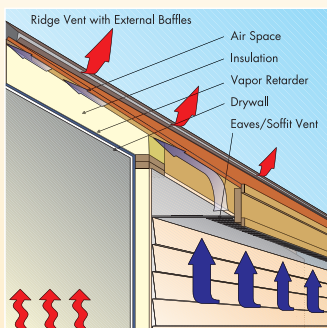
There are also solar powered attic ventilators in roof-mount and gable-mount designs that use sunlight to power the vent. Some models have a Solar Controller allowing operation without the sun.



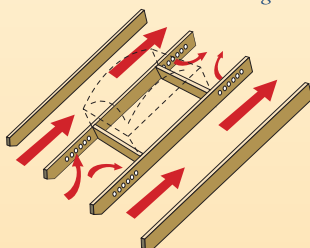
Q:

What is your recommendation for ventilating a cathedral ceiling?

- A ridge vent with a balanced intake vent system is the only practical solution.
- There must be an air space between the underside of the roof deck and the insulation. Many building codes and manufacturers require a minimum 1½" air space.
- Allow for airflow around blockages such as skylights or chimneys that may block the airflow from the intake vent to the ridge vent. To unblock the airflow, drill six 1" holes (horizontally) in the rafter above and below the skylight or other blockage. See *Ventilation Views: Specialty Applications* on www.airvent.com for more about drilling holes.
- When using insulation baffles do not butt them end-to-end or overlap them. Leave a space to allow hot air and moisture to pass through. If a space is not included between consecutive pieces, the insulation baffles could act as a vapor retarder on the wrong side of the insulation.



A ridge and roof-top intake or soffit vent system ventilates a cathedral ceiling.



Q:

How much ventilation do I need?

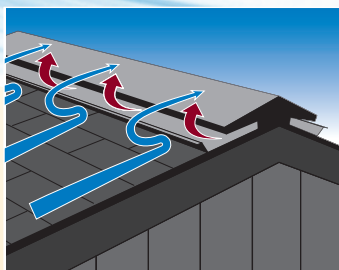
For optimum airflow and performance, we recommend 1 square foot of net free ventilation area for every 150 square feet of attic floor space balanced between exhaust vents and intake vents regardless of whether a vapor retarder is used.

Visit www.airvent.com for a FREE, customizable ventilation calculator. Check out the Air Vent APP, too.

Q:

Do all ridge vents perform the same?

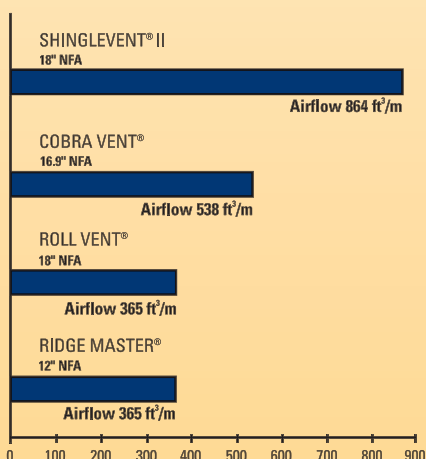
- NO. When it comes to airflow, rigid ridge vents with external baffles outperform other types of ridge vents. That's because the baffle deflects wind over the vent, creating an area of low pressure at the vent openings to pull air out of both sides of the vent.
- Test results at Architectural Testing Laboratory showed that vents with the same or similar net free area ratings differed dramatically when it came to how much air can actually pass through the vent. Take a look at the chart (*below left*).



As wind hits the external baffle it is deflected over the vent, creating low pressure at the vent openings to pull air out of both sides of the vent. It's known as the Bernoulli Effect.

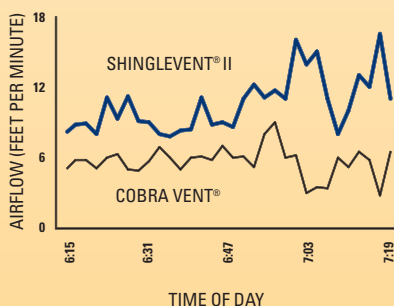
- On an actual test home at a research facility in Florida researchers measured the airflow coming out of a ridge with ShingleVent II installed on it compared to a ridge with rolled Cobra Vent® installed on it. See the performance difference in the chart (*below right*).

Net Free Area and Air Permeability



Ridge vents with the same or similar net free area differ dramatically when the amount of air that can be pulled through the vent (air permeability) is measured.

Airflow Out of Ridge: Cobra Vent vs ShingleVent II

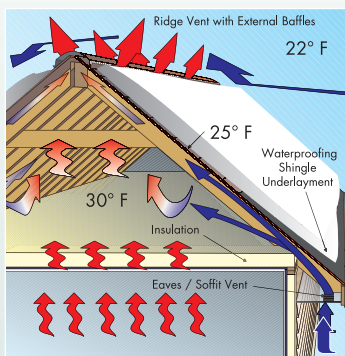


During a one-hour early morning time period with an average wind speed of only 3.5 miles per hour, more airflow was measured out of ShingleVent II compared to Cobra Vent.

Q:

How can you help prevent ice dams?

- The best defense against ice dams is a combination of attic *insulation*, *ventilation* and installation of *waterproofing shingle underlayment* on the roof.
- The goal of the insulation/ventilation combination is to create a cold roof system. Many ice dams are the result of heat loss from the living area of the home. The escaped heat in the attic causes snow to melt at the peak in an uneven pattern.
- From the peak, snow melt runs down to the eaves where it refreezes and builds up to form an ice dam.
- Check the attic for insulation. Insulation with an R-49 rating is recommended in most areas of the country where ice dams occur. Insulation that is compressed or damp may have lost some of its R-value.
- Be sure to properly install a good venting system. Remember, you want to create a ventilation system that minimizes the temperature differential between the outside and the inside of the attic. The ventilation system should also help eliminate roof deck temperature differentials from low on the roof, near the eave, to high on the roof, toward the peak.



Four conditions can lead to ice dams:

- 1) heavy snowfall*
- 2) outside temperature drops to 22° F*
- 3) attic temperature exceeds 32° F*
- 4) low areas of the roof remain cool*

Q:

Can I use vented soffit panels for intake ventilation?

Carefully look at aluminum and vinyl soffit panels to make sure that they provide sufficient net free area per linear foot to balance the ventilation system. The manufacturer can provide those specifications. Keep in mind that a ridge vent that provides 18 square inches of net free area per linear foot requires intake vents on both sides of the house that provide 9 square inches of net free area per linear foot in order to properly balance the system.



Before using vented soffit panels check with the manufacturer to ensure the net free area is sufficient to balance the ventilation system. Also be sure the correct sized holes/openings are cut in the soffit.

Q:

Can I use exhaust vents – such as roof louvers – low on the roof for intake?

It's potentially a problem that could lead to *weather infiltration* and could *short-circuit* the proper airflow of the ventilation system, unless the vent has been designed to be both an intake and exhaust vent.

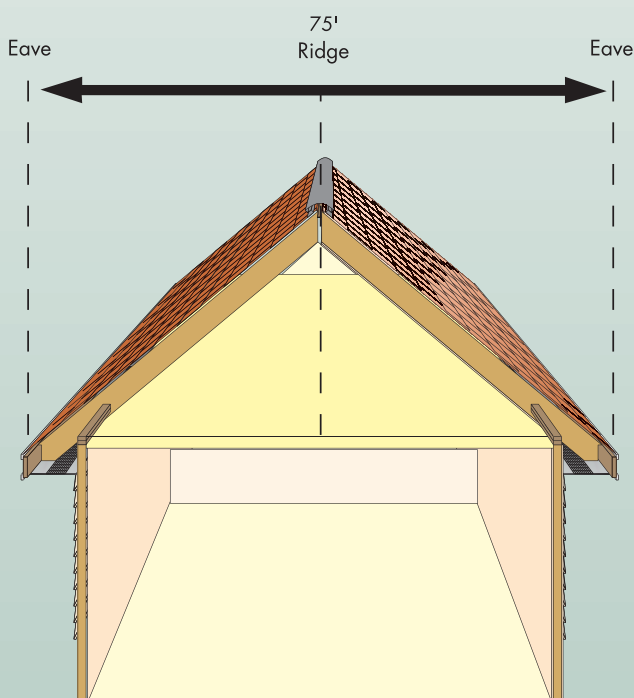
- *Weather infiltration.* An exhaust vent placed low on the roof could lead to weather infiltration because the vent is not designed to be an intake vent. If the exhaust vent is pulling in air, it can eventually pull in rain, snow, dust and dirt. Furthermore, an exhaust vent low on the roof will receive an increased amount of watershed from higher points on the roof that it's not designed to handle.
- *Short-circuiting.* Proper airflow travels from low at the soffit or roof's edge to high near the peak of the roof. Placing an exhaust vent low on the roof interrupts this airflow because air will always follow the path of least resistance. Depending if intake vents are in place in the soffit/roof's edge, the path of least resistance may be between the exhaust vents low on the roof to the exhaust vents high on the roof, or between the soffit vents and the exhaust vents low on the roof. Either way, part of the roof deck is not being properly ventilated.



Q:

What's the maximum roof width on which ridge vents will be effective?

- We'll define roof width as the distance from eave to ridge to eave in the plan view.
- A combination ridge vent/roof-top intake or soffit vent system will be effective on a roof that is 75 feet wide or less, assuming the ridge vent provides 18 square inches of net free area per linear foot and is balanced with sufficient intake venting.
- This is based on establishing minimum code requirements of 1 square foot of net free area per every 300 square feet of attic floor space balanced with half intake and half exhaust vents.



A ridge vent that provides 18 square inches of net free area per linear foot can be used on a house 75 feet wide or less.

Q: How do I ventilate knee wall applications?

Providing proper intake ventilation for knee wall applications without overhangs is a challenge. Here are some things to consider.

1) Use roof-top installed The Edge Vent or vented drip edge with wooden slats. Make sure there is a path for the intake air to travel above the vaulted ceiling to the ridge vent. In many Cape Cod style homes with knee walls, the vaulted portion above the second floor room is densely packed with insulation.

To open this area for airflow, you can slide wood slats up the underside of the roof deck (for short spans only) and then flip them on edge to force down the insulation.

This process is easiest to achieve if the fascia can be pulled down to allow access to the underside of the roof deck from outside the house.

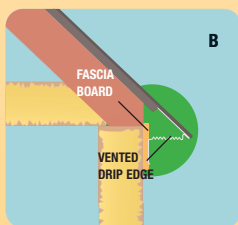
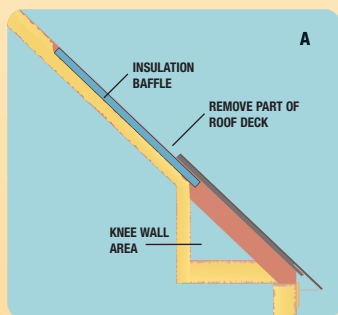
Someone can feed the wood slats from outside while someone in the knee wall area guides the slats toward the ridge.

2) Use roof-top installed The Edge Vent or vented drip edge with insulation baffles (vented drip edge illustrated below).

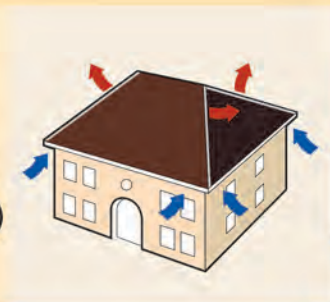
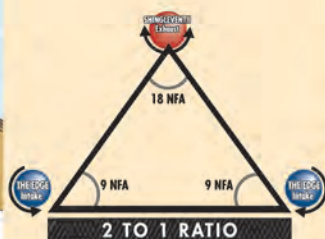
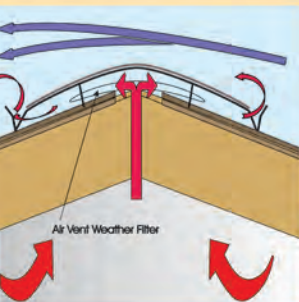
In situations where roof deck replacement is required, try placing insulation baffles in the rafter bays

(A) before putting the decking down. The insulation

baffles will provide the air space required for the air to flow from the roof-top installed The Edge Vent or vented drip edge in the knee wall area **(B)** to the ridge vent in the vaulted area. Be sure that the baffles are placed in every rafter bay and at the full length of the cathedral portion so that the entire roof area can be ventilated.



We hope you found this booklet of tips and answers useful. For more information, call 1-800-AIR-VENT (247-8368) or go to our web site at www.airvent.com.



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