



# VENTILATION CONCEPTS & TROUBLESHOOTING TECHNIQUES

SEMINAR GUIDE & WORKBOOK



## ABOUT LOMANCO®

Lomanco has been producing quality ventilation products since 1946. It's what we know and do best.

Our innovative manufacturing facility, engineering lab, and testing facility are used to produce our high quality products with proven performance. You can feel secure knowing a great product is on your roof, backed by the history and integrity of Lomanco vents.

We never compromise on quality. Lomanco knows the importance of manufacturing ventilation products that have the correct emphasis on net free area, weather protection, and longevity. We've spent a great deal of time and energy making sure the proper amount of each is present in all of our products.

Lomanco corporate headquarters, manufacturing plant, engineering lab, and testing facility. Jacksonville, Arkansas.





# SEMINAR FOR

- DISTRIBUTORS
- DEALERS
- BUILDERS
- CONTRACTORS
- ARCHITECTS
- INSPECTORS



## VENT SELECTOR APP

**The ventilation expert you can fit in your pocket.**

The ventilation calculations discussed within this book can be performed and shared effortlessly by downloading the Lomanco® Vent Selector App for iOS and Android devices. The Vent Selector App is a ventilation guide with many useful resources and tools.

## DOWNLOAD NOW

LOMANCO VENT SELECTOR APP



Scan to  
download  
the app.

## APP FEATURES

### ○ VENT CALCULATOR

Quickly calculate the intake and exhaust ventilation needed for any installation.

### ○ WHIRLYBIRD® PITCH TOOL

Calculate the pitch of a roof and view the Whirlybird® pitch base number required.

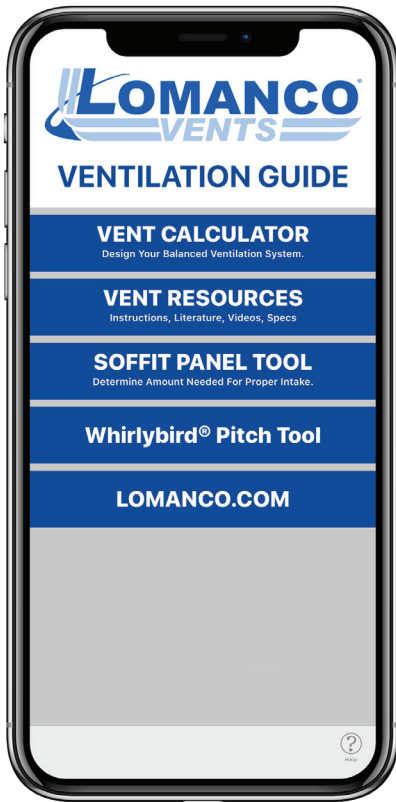
### ○ VENT RESOURCES

View, download, and share the latest Lomanco literature, instructions, specs, videos, and more.

### ○ SOFFIT PANEL TOOL

Determine if there is enough soffit panel to properly meet intake needs and learn how to boost intake if needed.





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# WHAT IS VENTILATION?

## Proper Ventilation

Simply having ventilation in an attic space doesn't ensure proper ventilation. In order to properly ventilate an attic, ventilation must be specifically calculated based on attic space square footage and correctly installed.

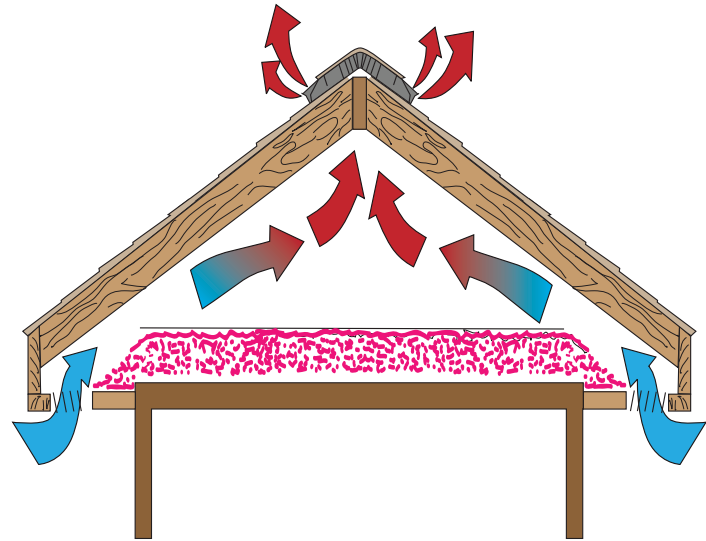
A properly balanced ventilation system consists of 50% intake ventilation placed near the lower part of the attic space, and 50% exhaust ventilation placed near or at the roof peak. The exhaust ventilation should be at least 3 feet higher than the intake ventilation for proper ventilation.

It is estimated that as many as 9 out of 10 US homes lack proper ventilation. Fortunately for homeowners, contractors, and roofers, Lomanco offers a full line of home ventilation products to supply the proper amount of ventilation to existing and new construction.

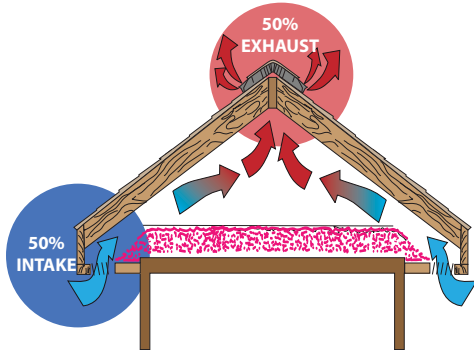
## VENTILATION

noun | ven-ti-la-tion

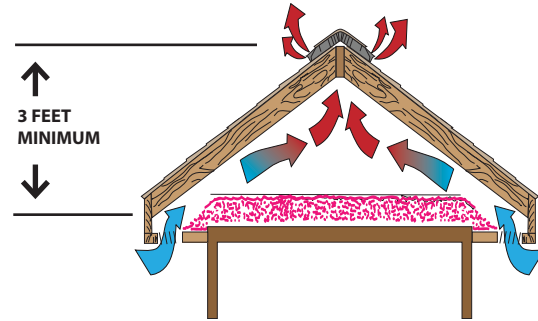
Ventilation is simply the process of supplying a continuous flow of air through the attic space.



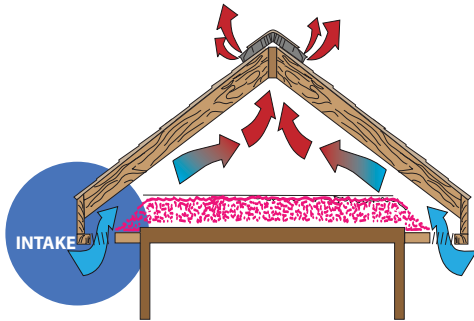
# PROPER VENTILATION



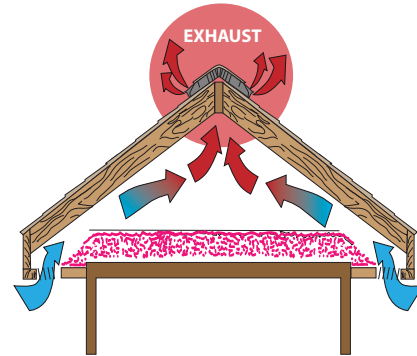
**Balanced System:** 50% Intake ventilation and 50% exhaust ventilation.



**Vent Location:** Exhaust system must be at least 3 feet higher than the intake system.



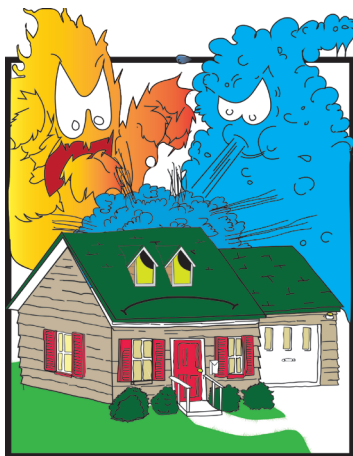
**Intake Location:** Intake should be near the lower part of the attic area.



**Exhaust System:** Exhaust should be at or near the peak.

# WHY VENTILATE?

## Home Enemies: Heat & Moisture



Heat and moisture are evident in all geographical areas year-round. In order to fight heat and moisture, homes in all climates must be ventilated year-round.

Heat in unventilated attics may cause temperatures to exceed 150 degrees. This can cause damage to shingles, roof sheathing, and also radiate down into the living area.

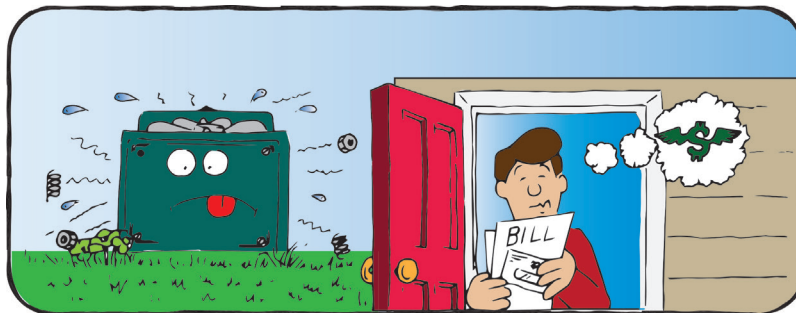
## EFFECTS OF HEAT & MOISTURE



Shingle and sheathing damage.



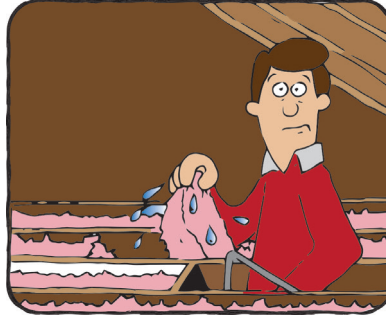
Peeling and blistered paint.



Increased utility bills and maintenance costs.



Wood rot, mold, and mildew.



Ineffective insulation.



Ice dams.



Voided warranties.

## Home Enemies: Heat & Moisture

Moisture is a home's #1 enemy, and can cause rot, mildew, mold, paint blisters, and ineffective insulation.

It is estimated that over 50% of homes show *visible* signs of improper ventilation.

Proper ventilation reduces energy bills, winter ice build up, and eliminates mold and mildew, which can lead to major health problems. Ventilating the attic space extends the life of shingles, insulation, and other building components.

# WHY VENTILATE?

## Mold & Mildew

Heat and moisture can result in “sick attics” that are often filled with toxic mold and mildew. Spores need a food source, such as wood members in an attic space, plus heat and moisture to begin colonizing. Extreme caution should be exercised if an odor or colony is detected.

## Condensation

Attics that are not properly ventilated have moisture created by simple condensation. Air inside an improperly ventilated attic will be warmer than the air outside. When this warmer, moist air comes into contact with the colder roof sheathing, condensation will occur. In effect, “raining” in the attic space.



Mold covering wood roof sheathing in an attic.



Mold and mildew on an interior drywall ceiling.



Moisture in the form of frost “raining” on attic insulation as it melts.



Mold and mildew in a poorly ventilated bathroom.



# MAJOR PROMOTERS OF VENTILATION

## Other than Lomanco, who says ventilation is important?

Shingle, insulation, window and paint manufactures all say proper ventilation is required for their products to function and perform as intended. Many manufacturers include proper ventilation as a condition of warranty. The warranty on these products can be determined VOID if proper ventilation is not installed.



HVAC and utility companies have determined that proper ventilation will cause less wear and tear on heating and cooling systems by causing them to run less and more efficiently. The result is lower maintenance cost and utility bills.

Building codes require a properly installed ventilation system.

- SHINGLE MANUFACTURERS
- INSULATION MANUFACTURERS
- PAINT MANUFACTURERS
- WINDOW MANUFACTURERS
- BUILDING CODES
- UTILITY COMPANIES
- HVAC COMPANIES

# MARKET FOR VENTILATION PRODUCTS

## Less than 10% of homes are properly ventilated.

What is the market for ventilation products?

According to industry statistics, less than 10% of existing homes are properly ventilated.

## Lack of ventilation is not due to cost - it is due to lack of knowledge.

Not only is ventilation necessary for a proper roof system, it also adds value to a shingle project. Ventilation should be checked or quoted on every insulation package sold.

## Every roofing package sold should include ventilation.



# VENTILATION SALES OPPORTUNITY

## Shingle Truckload Formula

The Shingle Truckload Formula can be used to calculate yearly ventilation sales based on shingles sales.

**1. Divide the squares of shingles on a truckload (210) by the squares of shingles on the average house (30).**

$$210 \div 30 = 7$$

**2. Multiply this number (7) by the truckloads of shingles sold per year.**

In this example, 150 truckloads per year will be used.

### Example Calculation:

$$7 \times 150 \text{ truckloads per year} = 1,050$$

**3. Multiply the step two result by the average retail cost to ventilate a house (\$170) to determine yearly ventilation sales based on shingles**

$$1,050 \times \$170 = \$178,500 \text{ in ventilation sales based on shingles}$$

## Gross profit if ventilation is sold with shingles:

### Shingles:

Average cost per square = \$ \_\_\_\_\_

Your average profit margin = % \_\_\_\_\_

Gross profit per square = \$ \_\_\_\_\_

Average # of squares per truckload = 210

**Gross profit per truckload = (a) \$ \_\_\_\_\_**

### Ventilation:

Average cost per home = \$ \_\_\_\_\_

Average 7 homes per truckload = \$ \_\_\_\_\_

Your gross profit on vents = % \_\_\_\_\_

**Gross profit on vents = (b) \$ \_\_\_\_\_**

Percent more gross profit if ventilation is sold with shingles equals b divided by a.

**$b \div a = \%$  \_\_\_\_\_**

# HOW TO SIZE A VENTILATION SYSTEM

## 1/300 Rule

**Ventilation is based on the 1/300 rule: for every 300 square feet of attic area, one square foot of net free area of ventilation must be provided. Ventilation should be balanced - 50% intake and 50% exhaust.**

Note: All Lomanco attic ventilation product requirements are based on the minimum standard 1/300 rule as set for the by the International Building Code (IBC) and the International Residential Code (IRC). If local code requirements require the 1/150 rule, please double the requirements. Lomanco foundation ventilation product requirements are based on the 1/150 rule.

See page 16 for the 2018 IBC requirements.

### Using the 1/300 rule to determine ventilation needed

#### 1. Calculate the square footage of the attic area to be ventilated.

To determine the square footage of an attic area, multiply the attic length by the attic width.

*80' x 25' = 2,000 sq. ft. of attic area to be ventilated*

#### 2. Calculate the total Net Free Area (NFA) required.

To determine the NFA required for proper ventilation, divide attic area square footage by 300 (the 1/300 Rule).

*2,000 sq. ft. ÷ 300 = 6.66 sq. ft. of total NFA required*

#### 3. Calculate the amount of intake and exhaust NFA required.

A balanced ventilation system is made up of 50% intake and 50% exhaust. Divide the total NFA required by two to determine the required intake and exhaust NFA.

*6.66 sq. ft. ÷ 2 = 3.33 sq. ft. of intake NFA and 3.33 sq. ft. of exhaust NFA required*

#### 4. Convert NFA to square inches (in<sup>2</sup>).

To convert from square feet to square inches, multiply by 144.

*3.33 sq. ft. x 144 = 480 in<sup>2</sup> of intake and 480 in<sup>2</sup> of exhaust required*

#### 5. Calculate the number of exhaust vents required.

Divide the exhaust NFA required by

the NFA of your selected exhaust vent model. In this example we will be using the Model 750 vent for exhaust (50 in<sup>2</sup> NFA). Round up to the next whole number.

$$480 \div 50 = 9.6 = 10 \text{ Model 750 Exhaust Vents}$$

#### **6. Calculate the number of intake vents required.**

Determine the number of intake vents required from the total NFA of the exhaust vents chosen.

$$10 \text{ 750 Vents} \times 50 \text{ in}^2 \text{ NFA} = 500 \text{ in}^2 \text{ NFA}$$

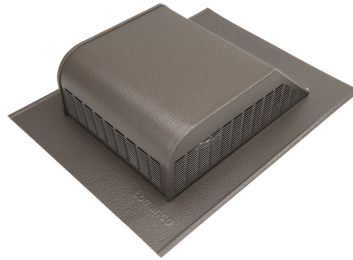
Use this NFA number to calculate intake vents required. In this example we will be using the Model C816 cornice vent for intake (65 in<sup>2</sup> NFA). Round up to the next whole number.

$$500 \text{ in}^2 \text{ NFA} \div 65 \text{ in}^2 \text{ NFA} = 7.7$$

Round up to the next whole number.

*8 Model C816 intake vents*

In conclusion, for a 2000 sq. ft. home, proper ventilation could be achieved with 10 Model 750 exhaust vents and 8 Model C816 intake vents.



## **How much does it cost?**

Based on national averages:

$$10 \text{ (750 vents)} \times \$15.00 \text{ each} = \$150$$

$$8 \text{ (C816 vents)} \times \$2.50 \text{ each} = \$20$$

**\$150 + \$20 = \$170 national average to ventilate a 2000 sq. ft. home**

**Proper ventilation with quality Lomanco products = low-cost insurance.**

If our quality products are 10% higher than others on the market, there would only be \$17.00 savings on the example on this page. Considering a Lomanco Vent is at least a 30 year vent, the cost would be only 57 cents per year.

Inadequate ventilation becomes apparent when problems occur in the form of ineffective insulation, leaking roofs, rotting sheathing, peeling paint, high utility costs, etc.

# HOW TO SIZE A VENTILATION SYSTEM

## International Residential Building Code

All Lomanco attic ventilation product requirements are based on the minimum standard 1/300 rule as set for the by the International Building Code (IBC) and the International Residential Code (IRC). If local code requirements require the 1/150 rule, please double the requirements. Lomanco foundation ventilation product requirements are based on the 1/150 rule.

### 2018 International Residential Code (IRC) requirements.

#### R806.1 Ventilation Required

Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow.[...] Required ventilation openings shall open directly to the outside air and shall be protected to prevent the entry of birds, rodents, snakes and other similar creatures.

#### R806.2 Minimum Vent Area

The minimum net free ventilating area shall be 1/150 of the area of the vented space.

Exception: The minimum net free ventilation area shall be 1/300 of the vented space provided both of the following conditions are met:

1. In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.

2. Not less than 40 percent and not more than 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically. The balance of the required ventilation provided shall be located in the bottom one-third of the attic space. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.

#### R806.3 Vent and Insulation Clearance

Where eave or cornice vents are installed, blocking, bridging and insulation shall not block the free flow of air. Not less than a 1-inch (25 mm) space shall be provided between the insulation and the roof sheathing and at the location of the vent.



# HOW TO SIZE A VENTILATION SYSTEM



**Skip the math, download the app.**

The ventilation calculations discussed within this book can be performed and shared effortlessly by downloading the Lomanco® Vent Selector App for iOS and Android devices. The Vent Selector App is a ventilation guide with many useful resources and tools.



**Scan to download the app.**

# PRODUCT DESIGN

## Static Roof Vents

Static roof vents are installed evenly spaced (between rafters) along the upper part of a roof near the peak and allow air to exhaust from the attic space.

## Gable Vents

Gable vents are installed in the gables of a roof. Gable vents are available in triangular, rectangular and square designs. A gable vent is installed at each gable end in most installations.

## Wind Turbines

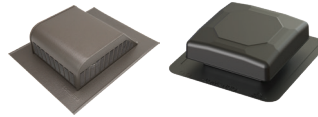
Wind turbines are made of specially designed vanes that utilize the power of the wind to pump air out of an attic space through rotary motion. Wind turbines function as static vents when there is no wind force present.

## Power Vents

Power vents use electric powered fans to move air out of the attic space. Power vents turn on and off as needed through adjustable thermostat and/or humidistat controls.

## TYPES OF EXHAUST VENTS

### Static Vents



### Turbine Vents



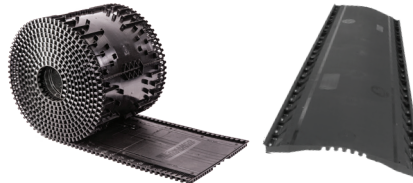
### Gable Vents



### Power Vents



### Ridge Vents



### Solar Vents



# PRODUCT DESIGN

## Solar Vents

Solar vents use fans powered by the sun via solar panels to move air out of the attic space.

## Ridge Vents

Ridge vents are installed at the peak of a roof's ridge and produce airflow through two methods:

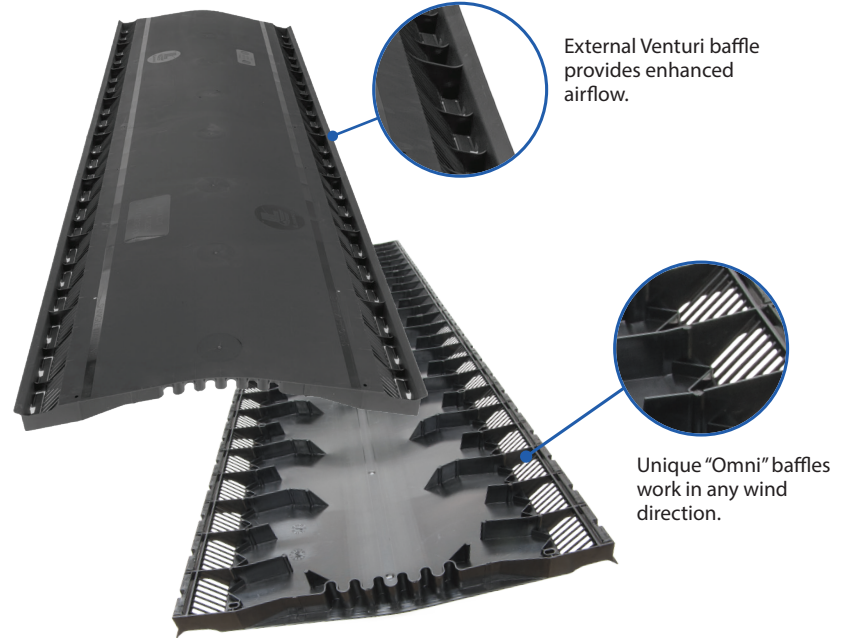
Thermal effect - warm air rises to the ridge and exits through the ridge vent.

Bernoulli Effect - low air pressure is created when wind moves over the external baffles of the vent, which "lifts" air out of the attic space.

Exterior baffles and adequate intake are necessary for ridge vents to function properly. The Lomanco Omni Series Ridge Vents provide unique Omni Baffles, omnidirectional baffles, that work in any wind direction.

Ridge vents provide a low-profile design for a minimized appearance, and shingle-over style vents blend in with roofing materials.

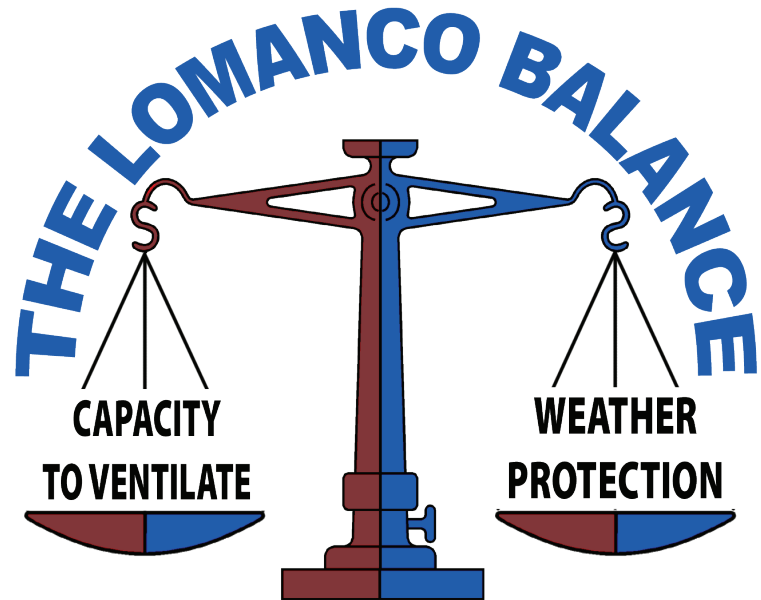
## RIDGE VENT BAFFLE DESIGN



# THE LOMANCO BALANCE

Lomanco incorporates the “Lomanco Balance” in the design of all of our ventilation products. Lomanco ventilation products give you the maximum ventilation capacity balanced with the best weather protection.

Whether you are a home builder or homeowner, the best return on your investment for protecting the longevity of your home is the proper installation of a balanced ventilation system with the proven performance of Lomanco vents.



# FACTORS AFFECTING VENTILATION

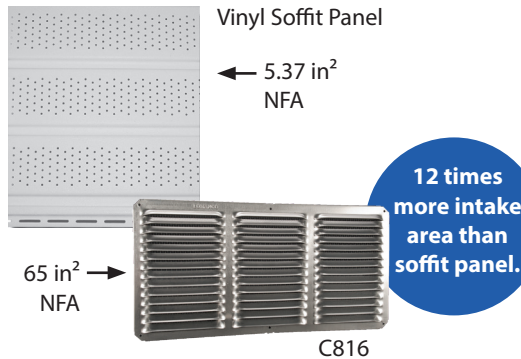
Many factors can affect ventilation and prevent ventilators from functioning as intended. The following pages cover many common factors affecting ventilation in detail, as well as solutions.

- INADEQUATE INTAKE
- MIXED EXHAUST
- MULTI-LEVEL EXHAUST
- MULTI-SIDE EXHAUST
- EXHAUST AS INTAKE
- IMPROPER RIDGE VENT INSTALL
- IMPROPER VENT OPENINGS

# INADEQUATE INTAKE CAUSES

Inadequate intake is the number one reason ventilation systems fail.

Figure A



It can take ten or more ventilated soffit panels to equal the ventilation capacity of one 16" x 8" soffit vent. When using vinyl soffit panels, Lomanco highly recommends that all soffit panels be ventilated and that air chutes are used in every rafter/truss soffit opening to prevent insulation blockage.

Using a starter vent is a solution for providing intake on homes with little or no soffit overhang. A shingle over intake vent is also a solution for providing intake on homes with little or no soffit overhang.



Air blockage.



Insulation blockage.



Inadequate soffit panels.



Improper vent openings.



# INADEQUATE INTAKE SOLUTIONS

## Starter Vent



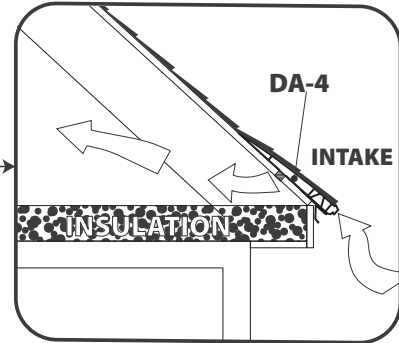
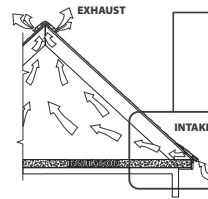
SV-10 Starter Vent

Using a starter vent is a solution for providing intake on homes with little or no soffit overhang.

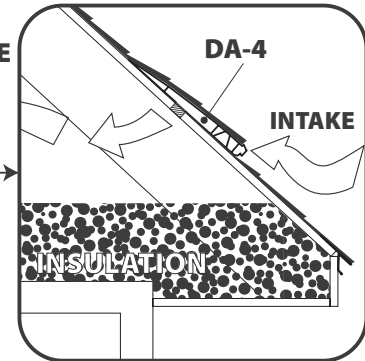
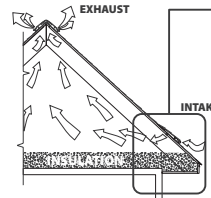
## On-the-Deck Shingle Over Vent

An on-the-deck shingle over intake vent is also a solution for providing intake on homes with little or no soffit overhang. This type of vent can also be used to boost inadequate intake from perforated soffit panels to the required NFA for a balanced system.

### DA-4 INSTALLED AS ROOF EDGE INTAKE VENT.

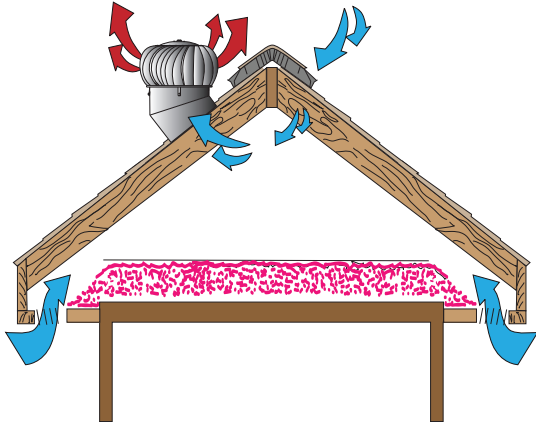


### DA-4 INSTALLED AS OFF ROOF EDGE INTAKE VENT.



# MIXED EXHAUST

Do NOT mix different exhaust products on a single roof.



Install only one type of exhaust ventilation with a common attic area. Exhaust vents pull air from the nearest intake source. The use of two or more types of exhaust vents can cause one of these vents to act as intake for the other. The system can short circuit and cause weather infiltration when exhaust products are mixed.



Turbine vents, slant back vents and ridge vent, all on one roof.



Multiple types of pan-style vents mixed on a roof.



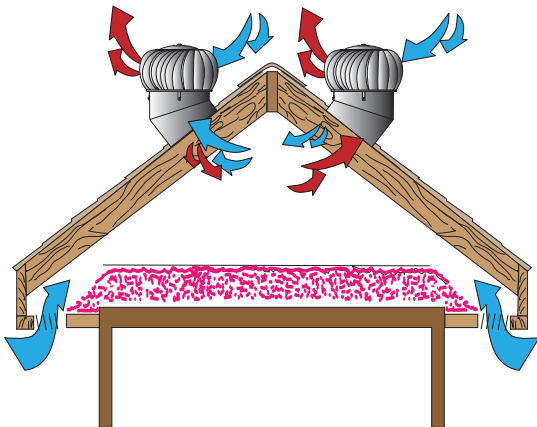
Gable vents and ridge vents mixed on a home.



Ridge vent mixed with a turbine vent on a roof.

# MULTI-LEVEL & MULTI-SIDE EXHAUST

Do NOT install exhaust vents on multiple levels or multiple sides.



Installation of vents at more than one level on a roof or on multiple sides of the roof allows upper exhaust vents to pull air in from lower exhaust vents rather than pulling air from intake vents.

Install all exhaust vents at the same height within a common attic area.

Install roof vents on the same side of the ridge.



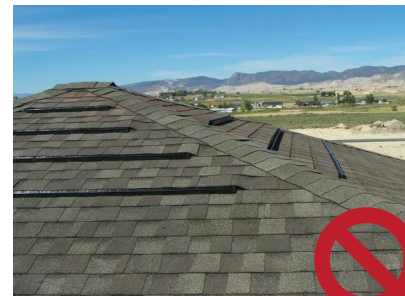
Slant back vents used on multiple sides of a roof.



Pan-style vents used at multiple levels on a roof.



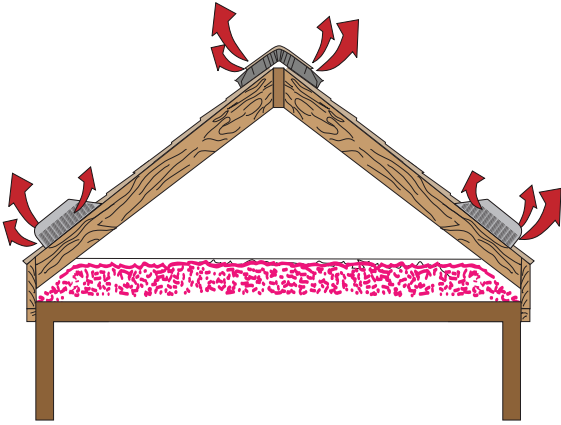
Pan-style vents used at multiple levels on a roof.



Ridge vent used on multiple levels and multiple sides of a roof.

# EXHAUST AS INTAKE

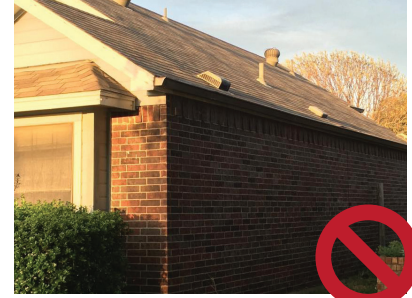
Do NOT use exhaust vents for intake ventilation.



Using exhaust vents as intake ventilation can lead to serious weather infiltration problems. Exhaust vents are not designed to function as intake vents.



Slant back exhaust vents used as intake ventilators.



Slant back exhaust vents used as intake ventilators.



Pan-style exhaust vents used as intake ventilators.



Slant back exhaust vents used as intake ventilator



# RIDGE VENT INSTALLATION

## Do NOT use ridge vents on roof hips.

Ridge vents are design to be used as exhaust vents. When installed on hips, the exhaust and intake become indefinable and can also lead to weather infiltration.

## Do NOT install ridge vents on dormers.

Avoid placing ridge vents on dormers when dormers are lower than the main ridge and connected to the main attic. The main ridge will use the closest vent for intake, creating a high probability that the dormer vent will allow weather infiltration.

## Separate attic areas on differing ridge lines.

When using ridge vents on homes with multiple ridge line heights separate the attic areas to create standalone attics. Separate with plastic sheeting or wood. See Figure A.



Ridge vent installed on hips.



Ridge vent installed on hips.



Ridge vent installed on dormers

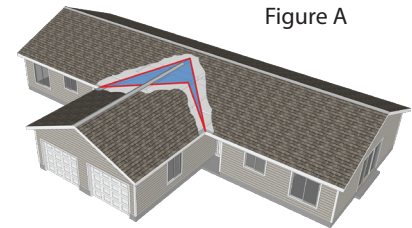
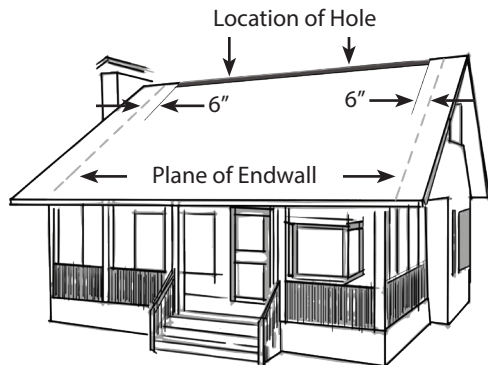


Figure A

Separate attic area on differing ridge lines.

# RIDGE VENT INSTALLATION

Cut ventilation openings to recommended size.



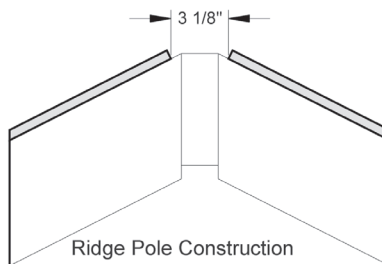
Improper vent openings can lead to weather infiltration and render internal baffling ineffective.



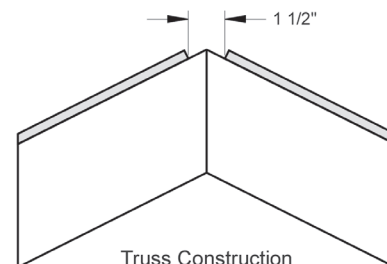
Improper ridge vent opening.



Improper ridge vent opening.



Proper ridge vent opening size.



Proper ridge vent opening size.



# THREE MUST DO STEPS TO ATTIC VENTILATION

1

**Install all exhaust ventilation at the SAME HEIGHT within a common attic area.**

Installation of exhaust vents at more than one level on a roof allows the upper exhaust vent to pull air in from lower exhaust vents rather than from the intake vents. Intake air must come from intake vents located near the lower part of the attic space to properly ventilate the total attic area and eliminate weather infiltration.

2

**Install ONLY ONE TYPE of exhaust ventilation within a common attic area.**

Exhaust vents pull air from the easiest intake source. Vent types cannot be mixed. The use of different types of exhaust vents could make one of the vents act as intake for the other. Intake air must come from intake vents located near the lower part of the attic space to properly ventilate the total attic area and eliminate weather infiltration.

3

**Install a BALANCED SYSTEM of intake and exhaust ventilation.**

**50% Intake Ventilation** - Intake vents located near the lower part of the attic area are required to balance your ventilation system.

**50% Exhaust Ventilation** - use a Lomanco Ventilation Selector guide, the calculators at [lomanco.com](http://lomanco.com), or the Lomanco Vent Selector App to determine the number of vents needed to properly ventilate an attic to meet the minimum code ventilation standard.

# VENTILATION QUIZ

1. What is ventilation?

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2. Why ventilate?

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3. Name two products which ventilation prolongs their lifetime:

1. \_\_\_\_\_
2. \_\_\_\_\_

4. What percentage of existing homes are properly ventilated?

\_\_\_\_\_ %

5. Calculate the number of the following products required to ventilate a 2000 sq. ft.

home:

750 Vents : \_\_\_\_\_ C816 Vents: \_\_\_\_\_

6. How much would the system in question 5 cost?

---

7. Name the two factors, known as the Lomanco Balance, used in ventilator development at Lomanco:

1. \_\_\_\_\_

2. \_\_\_\_\_

8. What is the number one reason for weather infiltration in most ventilation systems?

---

9. Name two exhaust ventilation products that should not be mixed when installed in a common attic area:

1. \_\_\_\_\_

2. \_\_\_\_\_

10. Roof vents should be placed across the ridge from one another.

Circle one:            True        False

11. Roof vents are exhaust ventilators. They may not provide the desired weather protection if used as intake ventilators.

Circle one:            True        False

12. What is the best configuration for venting multi-ridged common attic areas?

---

---

13. What type of vent is especially affected by incorrectly cut openings?

---

*answers: 1.) pg. 6 2.) pg. 8-10 3.) pg. 9 4.) pg. 12 5.) pg. 15 6.) pg. 15 7.) pg. 20 8.) pg. 24 9.) pg. 24 10.) pg. 25 11.) pg. 26 12.) pg. 27 13.) pg. 28*

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1. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

2. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3. 1. \_\_\_\_\_  
 2. \_\_\_\_\_

4. \_\_\_\_\_ %

5. 750 Vents : \_\_\_\_\_ C816 Vents: \_\_\_\_\_

6. \_\_\_\_\_

7. 1. \_\_\_\_\_

2. \_\_\_\_\_

8. \_\_\_\_\_

9. 1. \_\_\_\_\_

2. \_\_\_\_\_

10. Circle one: True False

11. Circle one: True False

12. \_\_\_\_\_  
 \_\_\_\_\_

13. \_\_\_\_\_

14. How would you rate this presentation?

Circle one (10 is best): 1 2 3 4 5 6 7 8 9 10

15. How can Lomanco better serve your business?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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## This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

# GLOSSARY

**Balanced Ventilation System:** Consists of 50% intake ventilation placed near the lower part of the attic space, and 50% exhaust ventilation placed near or at the roof peak. The exhaust ventilation should be at least 3 feet higher than the intake ventilation.

**Bernoulli Effect:** A phenomenon whereby low pressure resulting from wind passing over a structure or object creates a pulling or lifting action.

**Condensation:** The change of water from vapor to liquid when warm, moist air comes in contact with a cold surface.

**Deck:** The surface, installed over the supporting framing members, to which the roofing is applied.

**Dormer:** A framed window unit projecting through the sloping plane of a roof. See Figure A.

**Drip Edge:** A corrosion-resistant, non-staining material used along the eaves and rakes to allow water run-off to drip clear of underlying construction.

**Eave:** The horizontal lower edge of a sloped roof. See Figure A.

**Exhaust Vent:** An outlet or opening installed at or near the roof peak for the purpose of ventilating the underside of the roof deck.

**External Baffle:** The built-in wing or lip on a ridge vent that deflects wind up and over the vent creating the Bernoulli Effect. It also deflects weather elements over the vent and away from the attic.

**Gable:** The upper triangular portion of a sidewall that comes to a point at the ridge of a double sloping roof. See Figure A.

**Hip:** The inclined external angle formed by the intersection of two sloping roof planes. Runs from the ridge to the eaves. See Figure A.

**Ice Dam:** Condition formed at the lower roof edge by the thawing and re-freezing of melted snow on the overhang. Can force water up and under shingles, causing leaks.

**Intake Vent:** An inlet or opening installed in the lower part of the roof for the purpose of ventilating the underside of the roof deck.

**Louver:** A vent opening with a series of horizontal slats arranged as to permit ventilation, but to exclude weather infiltration.

**Net Free Area (NFA):** The total unobstructed area through which air can enter or exhaust a static vent, typically in square inches. All non-powered vents have an NFA rating.

**Overhang:** The portion of the roof structure that extends beyond the exterior walls of a building.

**Pitch:** The degree of roof incline expressed at the ratio of the rise, in feet, to the span, in feet; pitch is 1/2 of slope.

**Proper Ventilation:** See Balanced Ventilation System.

**Rafter:** The supporting framing member immediately beneath the deck, sloping from the ridge to the wall plate.

**Ridge:** The uppermost horizontal external angle formed by the intersection of two sloping roof planes. See Figure A.

# GLOSSARY

**Rise:** The vertical distance from the eaves line to the ridge.

**Run:** The horizontal distance from the eaves to a point directly under the ridge. One half the span.

**Sheathing:** See Deck.

**Slope:** The roof incline expressed as the ratio of the rise, in inches, to twelve inches of run.

**Soffit:** The finished underside of eaves.

**Span:** The horizontal distance from eave to eave.

**Square:** A unit of roof measure covering 10 feet x 10 feet or 100 square feet.

**Stack/Chimney Effect:** Cold air exerts pressure under warm air forcing it to rise and induce vertical ventilation.

**Thermal Effect:** The inherent property of warm air to rise, also known as thermal buoyancy.

**Vent:** Any outlet for air that protrudes through

the roof deck, such as a pipe or stack. Any device installed on the roof, gable, or soffit for the purpose of ventilating the underside of the roof deck.

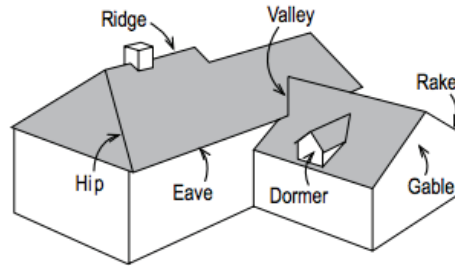


Figure A





## VENTILATION CONCEPTS & TROUBLESHOOTING TECHNIQUES