TECHNICAL BULLETIN

ROLL VENT®

UPWARD CONVECTION

Attic air heated by contact with a hot roof on a sunny day tends to rise. Thus, in a zero wind condition, without the benefit of a positive airflow across the roof, it is important for an attic ventilation system to function. Additionally, this system should work with a small difference in attic air temperature and outside air temperature (called delta T and expressed as ΔT).

Roll Vent was installed on a 6' x 8' test shed with a 3/12 pitch roof (Roof Slope = 14°). The shed was placed indoors in a draft free "0" wind environment. All openings were sealed so that the interior air could only travel up and out of the test shed via the Roll Vent. Precision thermometers were installed to monitor both interior and exterior temperature. The test started with both temperatures equalized at 77°F. A small amount of passive white smoke was introduced into the shed in order to be able to "see" any airflow.

Using two quartz infrared heaters with no fans, the interior temperature was raised to 79°F, 2°FΔT. No white smoke was visible. The interior temperature was then raised to 81°F, 4°FΔT. At 81°F a small but noticeable amount of smoke was visible. At 85°F, 8°FΔT the volume of smoke increased. At 91°F, 12°FΔT, the volume of smoke was at its maximum.

Roll Vent, with its excellent air permeability, performed in a zero wind condition with as low as a 4°FΔT. This means that Roll Vent is always working, wind or no wind, to provide superior attic ventilation.

Roll Vent must be installed properly, in accordance with Application Instructions.

BENJAMIN OBDYKE

For additional information call:

800-346-7655

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TECHNICAL BULLETIN

ROLL VENT®

NET FREE AREA

Net Free Area or Net Free Vent Area—the area, measured in square inches, open to "unrestricted" airflow is commonly used as a "yardstick" to measure relative vent performance.

I. Calculations for the Net Free Vent Area of the nylon matting are as follows:

Typical Values (approximate)

Density of Nylon Matting	0.0433 lbs/in^3
Product Width	10.5 in
Product Length (sample)	12.0 in
Product Height	0.9 in
Matrix Weight	.1300 lbs/ft
Total Volume of Sample	113.4 in^3

Sample Calculations

a. Volume of Nylon = product weight/density of nylon matting
= .1300/.0433
= 3.002 in^3

b. Free Volume = total volume – volume of nylon
= 113.4 – 3.002
= 110.4 in^3

c. Percent Free Volume = free volume/total volume
= 110.4/113.4
= 97.35%

d. Total Face Area = product height x product length x 2
= 0.9 x 12 x 2
= 21.6 in^2

e. Net Free Vent Area[1] = percent free volume x total face area
= .9735 x 21.6
= 21.03 in^2/lin ft of the nylon matting

II. Calculations for the Net Free Vent Area of the nylon-polyester non-woven fabric are as follows:

Typical Values (approximate)

Density of nylon-polyester non-woven fabric	.70 oz/in^3
Fabric thickness	.024 in
Fabric weight	2.95 oz/yd^2

Sample Calculations

a. Total Volume Fabric Takes Up = 36 in x 36 in x .024 in
= 31.104 in^3/yd^2

b. Volume of Polymer = Fabric weight/density of fabric
= 2.95/.700
= 4.21 in^3/yd^2

c. Percent Volume of Polymer = Volume of polymer/volume of fabric
= 4.21/ 31.10
= 13.5%

d. Percent of Free Volume = 100% – 13.5% = 86.5%

III. Calculations for Total Net Free Area is as follows:

Net Free Area of matrix x percent free volume of fabric = total Net Free Area. 21.03 square inches per linear foot x 86.5% = 18.19 square inches per linear foot.

Therefore the total Net Free Vent Area of Roll Vent from the above relationships is 18 square inches per linear foot minimum.

References:
[1] ASHRAE Fundamentals Handbook, 1985 Edition, Chapter 22.6.

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TECHNICAL BULLETIN

ROLL VENT®

WIND, RAIN AND SNOW TESTING

I. Static Uplift [1]

Roll Vent was mounted on a 3/12 roof (Roof Slope = 14°) and subjected to internal pressures pushing UP on the Roll Vent with a force of up to 100 pounds per square foot with NO damage or failure occurring to either the Roll Vent or the cap shingles.

II. Dynamic Water (Rain) [2]

Roll Vent was mounted on a 3/12 roof (Roof Slope = 14°) with one eave located normal to and nominally 1'- 4" downwind from a 13'- 6" diameter propeller of a 2,100 horsepower aircraft engine used as a wind generator. The wind speed at the deck was determined by Pitot tube calibration of engine RPM versus wind-speed.

Water spray was added to the airstream upwind of the Roll Vent at a rate equal to an 8 inch per hour rain. Roll Vent was visually observed for damage during and after the test and the shed was inspected for water infiltration at wind speeds up to 100 miles per hour. There was no leakage, damage or failure at any point during or after the test.[3]

Roll Vent must be installed in accordance with Application Instructions. Roll Vent is not recommended for installations under 3/12 pitch.

III. Roll Vent Simulated Snow Infiltration

Testing was performed on Roll Vent applied to a test shed to simulate dynamic snow infiltration.

A 6' long section of ridge vent was installed over the opening and shingles.

Roll Vent was mounted on a plywood sheathed, wood framed test shed with a 3/12 roof (Roof Slope = 14°).

The test shed incorporated full length vented soffit at each eave.

The entrance to the test shed was closed during the test.

The eave was located normal to and nominally 10' downwind from the 13'-6" diameter propeller of a 2650 horsepower aircraft engine wind generator. The wind speed at the deck was determined by prior Pitot tube calibration of engine RPM versus windspeed.

Fine soft wood saw dust was added to the airstream upwind of the deck at a rate of about 5 lbs. per minute.

The underside of the specimen was visually observed for saw dust infiltration and damage during the test.

With fine saw dust added to the airstream as noted above, the specimen was subjected to incrementally increased wind speeds for the time periods noted below.

Wind Speed (MPH)	Duration (Minutes)
30	5
50	5
70	5

No saw dust infiltration, damage nor failures were evident.

IV. Roll Vent Under a Snow Load

Results from ASTM C165.83 shows that a load of 28,290 PA or 590 pounds per square foot is required to compress Roll Vent by 10%.

For a snow load, we will take the weight of water to be 7.2 pounds per gallon and take 1/5 of that to be the weight of snow (per the Philadelphia National Weather Service) or 1.44 pounds per gallon. Converting to cubic feet, we have 1.44 pounds per gallon x 7.477 gallons per cubic feet = 10.77 pounds per cubic feet as the weight of the snow.

For each inch of snow per square foot we obtain a volume of 1/12 foot x 1 foot x 1 foot = 0.0833 cubic feet. Therefore, for each inch of snow on the roof, a weight of 10.77 pounds per cubic feet x 0.0833 cubic feet = 0.897 pounds of snow per square foot. To compress Roll Vent by 10%, a snow load of 590/0.897 = 657.75 inches of snow or 54.81 feet would be required!

References:

[1] ASTM E-330, Procedure A.

[2] CRL Test No. 4955.

[3] All tests and results were performed and certified at Construction Research Laboratory, Miami, FL

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TECHNICAL BULLETIN

ROLL VENT®

HIP ROOF WIND AND RAIN TESTING

I. Static Uplift [1]

Roll Vent was mounted on a 6/12 roof (Roof Slope = 27°) with the length of the structure tilted to a 45° angle to the ground to simulate a hip roof condition. The structure was subjected to internal pressures pushing up on the Roll Vent with a force of up to 100 pounds per square foot with NO damage or failure occurring to either the Roll Vent or the cap shingles.

II. Dynamic Water (Rain)[2]

Roll Vent installed as described above on the test shed, with one side located normal to and nominally ten feet downwind from a 13'-6" diameter propeller of a 2,100 horsepower aircraft engine used as a wind generator. The wind speed at the deck was determined by Pitot tube calibration of engine RPM versus windspeed. Water spray was added to the airstream upwind of the Roll Vent at a rate equal to an 8 inch per hour rain. Roll Vent was visually observed for damage during and after the test and the shed was inspected for water infiltration at wind speeds up to 100 miles per hour. There was no leakage, damage, or failure at any point during or after the test.[3]

Roll Vent must be installed in accordance with Application Instructions.

References:

[1] ASTM E-330 Procedure A.

[2] CRL Test No. 4998.

[3] All test and results were performed and certified at Construction Research Laboratory, Miami, FL.

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TECHNICAL BULLETIN

ROLL VENT®

ROLL VENT AND A BALANCED SYSTEM

To function properly, a ridge vent system must be "balanced" with equal amounts of "net free area" at the ridge line and at the eaves (soffits). It is acceptable to have greater than 50% of the required ventilation at the soffit, but never less than 50%. The following example illustrates the necessary calculations for installing a ridge vent system using soffit:

***To Meet Code:**

1. Attic floor space of 30' x 60' = 1800 ft^2
2. Ventilation required in a ridge ventilation system:

   $*1/300 \times 1800\ ft^2 = 6\ ft^2$

   $\frac{144\ in^2}{1\ ft^2} \times 6\ ft^2 = 864\ in^2$

Roll Vent or Ridge Vent Calculation:

3. At most 50% of 864 in^2 must be at ridgeline

   $50\% \times 864\ in^2 = 432\ in^2$

   Amount of linear feet of Roll Vent required:

   $\frac{1\ lin\ ft}{18\ in^2} \times 432\ in^2 = 24\ lin\ ft$

Soffit Vent Calculation:

4. At least 50% of 864 in^2 must be at eaves (soffits)

   $50\% \times 864\ in^2 = 432\ in^2$

   Examples:

a. A typical 10" soffit with 8 in^2/lin ft:

   $\frac{1\ lin\ ft}{8\ in^2} \times 432\ in^2 =$ 54 lin ft (27 lin ft at each eave.)

b. A typical 12" soffit with 6 in^2/lin ft:

   $\frac{1\ lin\ ft}{6\ in^2} \times 432\ in^2 =$ 72 lin ft (36 lin ft at each eave.)

c. A typical 15" center vent soffit with 4 in^2/lin ft:

   $\frac{1\ lin\ ft}{4\ in^2} \times 432\ in^2 =$ 108 lin ft (54 lin ft at each eave.)

Check with your soffit manufacturer for NFA specifications.

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