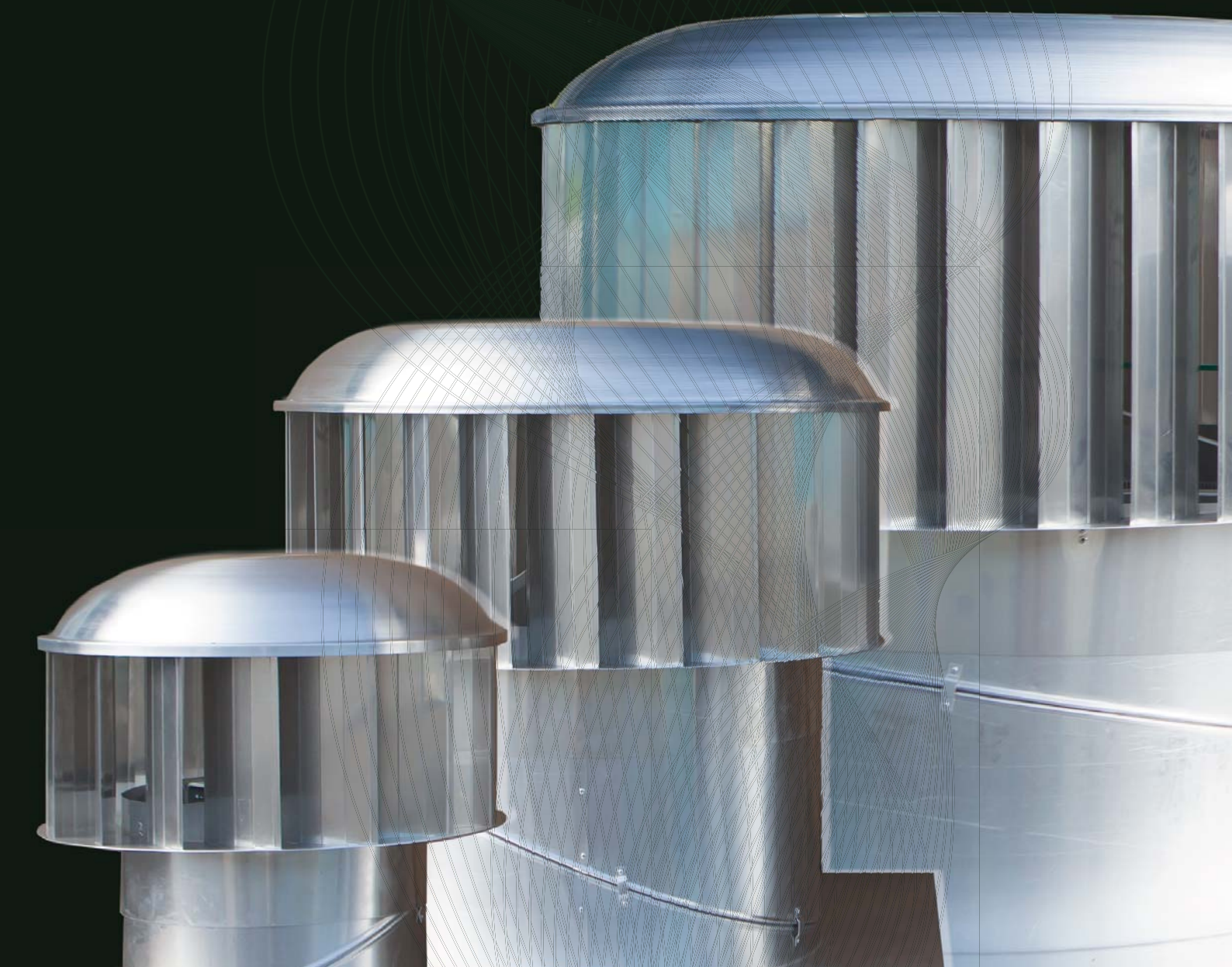
Green-Vent Wind

Wind Driven Roof Ventilators



Why is Ventilation Important?

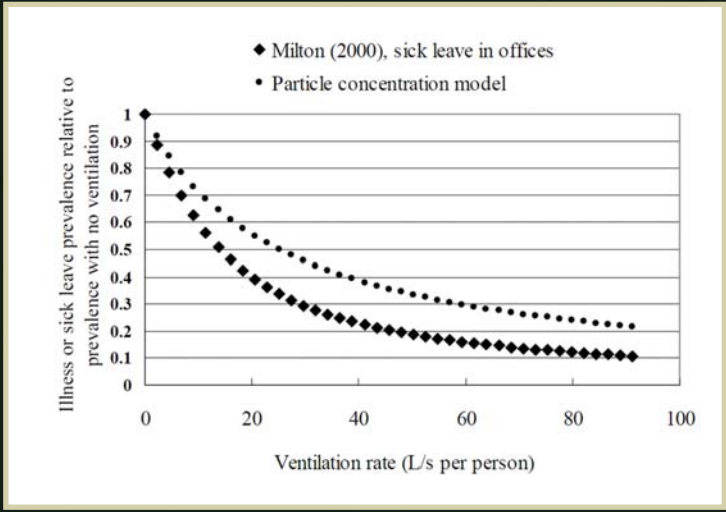
There are many areas in both residential and commercial buildings that can benefit from being properly ventilated. Introducing cooler & fresher air from the external environment and into the internal areas of the building can lead to the following benefits;

1) **Reduced maintenance on the building.**
   - i) Structural deterioration of the building components due to high humidity levels in summer months and condensation in winter months.

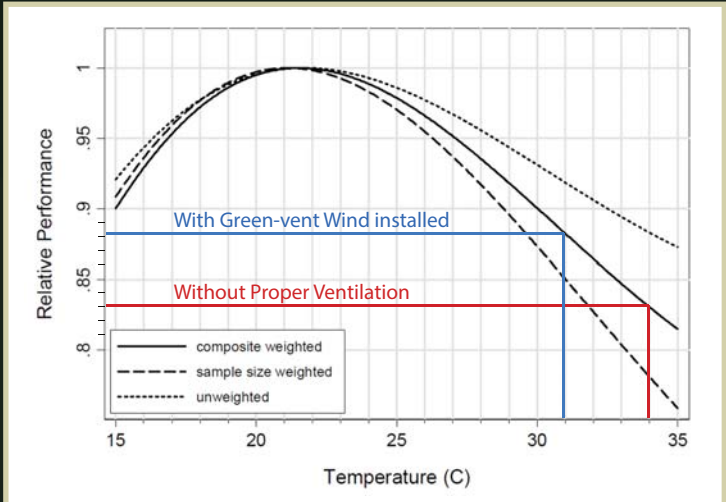
2) **Improve the Energy Efficiency of the building.**
   - i) Excessive heat load on Air Conditioning ductwork caused by HOT air trapped under the roof which results in the Air Conditioner having to work longer and harder.
   - ii) Reduced performance and benefits of any ceiling insulation as a result of the excessively hot air trapped in the roof space.

3) **Improve the internal environment of the building.**
   - i) Removing Airborne pollutants such as smoke, dust, poisonous gases & fumes from machinery or vehicles will improve the health of the occupants inside the building.
   - ii) Reducing the temperature in work areas will increase worker comfort.

4) **Increased Productivity from occupants in the building.**
   A report titled " Indoor Climate and Productivity" written by Olli Seppänen, a Professor at the Helsinki University of Technology in Finland, includes the following;



Graph 1 - Shows the reduction in sick leave as the ventilation rate on the internal of a building increases.



Graph 2 - Shows the reduction in the relative performance of workers as the temperature increases.

"There is increasing evidence that indoor environmental conditions substantially influence health and performance. Macro-economic estimates show that potential benefits from indoor environmental improvements for the society are high."

"There is an obvious need to develop tools and models so that economic outcomes of health and performance can be intergrated in cost benefit calculations with initial, energy and maintenance costs."

Green-vent Wind uses no energy and also requires no maintenance, so the calculation of the cost benefit only needs to include the initial cost of the installation.

When you look at Graph 2 you will see a drop of 3°C will improve productivity by approx 5%. This is when looking in the range above 30°C. To make the calculation more conservative we will work on a 3% improvement.

Calculation as follows:

No. of Workers x Hourly Wage x 3% = Cost of Productivity lost per hour

$$\frac{\text{Green-vent Wind Installation Cost}}{\text{Cost of Productivity lost per hour}} = \textbf{Return on Investment (in hours)}$$

NOTE: The R.O.I calculated does not include improvement in productivity due to reduced sick leave, as shown in Graph 1.

For the full report please visit the download page on our website at: ***www.eco.ph/download***

What are the Basic Principles for Ventilating a Building?

For any ventilation system to work effectively there must also be an appropriate amount of inlets vents, relative to the amount of Roof Ventilators, in order to access the cooler and fresher air on the outside of the building.

Diagram 1.

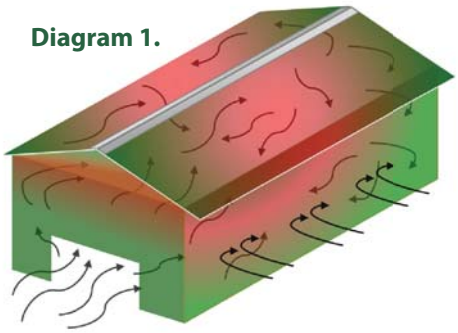


Diagram 2.

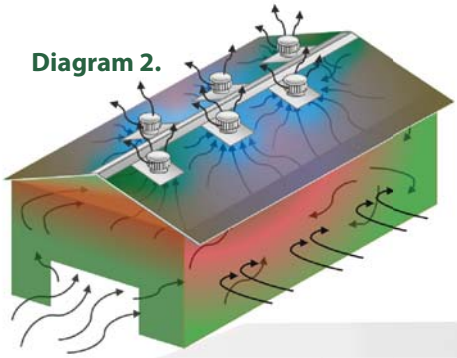


Diagram 3.

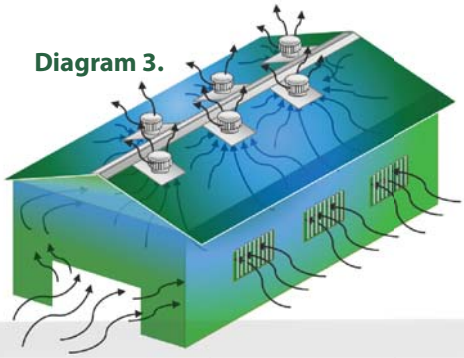


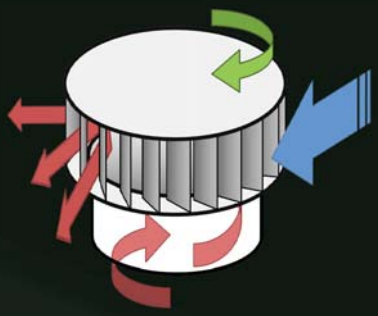
Diagram 1: This would be considered a non ventilated building, with hot and stale air remaining inside.

Diagram 2: This could be considered a ventilated building, but the building will not get the full benefits of the Green-vent Wind as their is insufficient inlets to allow enough fresh air to enter.

Diagram 3: A properly ventilated building utilizing Green-vent Wind with adequate inlets, allowing fresh and cooler air to enter and hot & stale enter to exit.

How does Green-vent Wind actually work?

Green-vent Wind utilizes the renewable energy of the Wind to create a positive flow through the ventilator. Even the slightest wind speeds will cause the head to spin. An area of low pressure is created on the leeward side of the Green-vent Wind and the air drawn out between the vanes on the head of the ventilator feed this low pressure zone.



This process allows for a continuous air flow through the Green-vent Wind. The centripetal forces created by the rotation of the Green-vent Wind will expel the air outwards from the edge of the vanes and this hot and stale air is replaced by cooler and fresh air from outside the building. Thermal currents and temperature differentials will also allow the ventilation process to occur with Green-vent, even with no wind.

Will the Green-vent Wind leak during heavy rainfall?

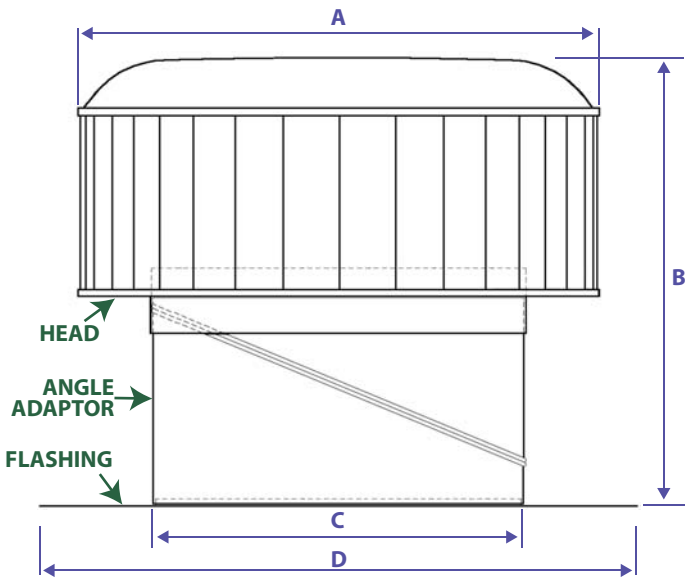
The design principles that are utilized by the Green-vent Wind have been in wind driven ventilators for over 30 years in Australia. The design has proven to resist leakage during the heaviest of rainfalls.

Pampanga, Philippines - August 7, 2012. A monsoon dumped 114mm of rain, 1/4 of the monthly average rainfall in 24 hours.

The photo on the left was taken during this rainfall, the Green-vent Wind 900mm units installed on the American Plaque Factory in Pampanga did not have any leakage or rain penetration whatsoever.

Specifications of the Green-vent Wind

Dimensions



Ventilator	A Overall diameter	B Overall height	C Throat diameter	D Flashing size
GVW300	480mm	480mm	300mm	500mm x 600mm
GVW600	770mm	720mm	600mm	900mm x 900mm
GVW900	1100mm	940mm	900mm	1200mm x 1200mm

Material Specifications

Vanes: Aluminium 5005 H34

Plates: Aluminium 5005 H34

Angle Adaptor: Aluminium 5005 H34

Flashing: Aluminium 5005 H34

Dome: Aluminium 1200 H0

Brackets: Aluminium 6060 T591

Tri-bracket: Powdercoated Mild Steel

Shaft: 304 Stainless Steel

Upper Bearing: Double row ball bearing - BWF30-119Z

Lower Bearing: Single row ball bearing – SB204-12C

Upper Bearing Assembly: Glass reinforced ASA

Upper Bearing Protector: Aluminium 1200 H0

Lower Bearing Protectors: 304 Stainless Steel

*** Tri-bracket & Lower Bearing only used on GVW900*

Throat Area

Green-vent Wind 300 = 0.071m^3

Green-vent Wind 600 = 0.283m^3

Green-vent Wind 900 = 0.636m^3

Total Weight

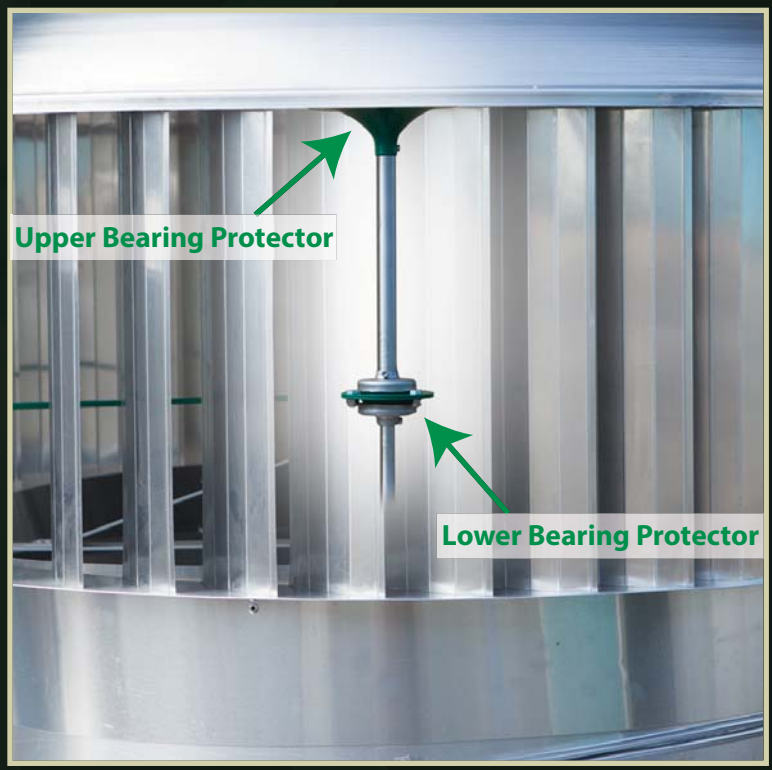
Green-vent Wind 300 = 5kg

Green-vent Wind 600 = 12kg

Green-vent Wind 900 = 25kg

Green-vent Wind offers you:

- Vertical Vane Technology for greater performance at all wind speeds.
- Up to 3 times the exhaust capacity of round shaped ventilators.
- Light weight, high strength aluminium construction means no rust.
- Three different sizes for cost efficiency.
- Performance without any Electricity.
- Year-round ventilation.
- High Precision - Quality Bearings.
- Larger exhaust openings on all sizes for better ventilation results.
- 15 Year Manufacturers Warranty.
  see Warranty terms & conditions for more information.



All units include the Upper Bearing Protector as standard, the Green-vent Wind 900mm unit also includes a Stainless Steel Bearing Protector as standard for the Lower Bearing.

How many Green-vent Wind do I need?

To determine the number of Green-vent Wind required to properly ventilate the building, use the following:

1. Building Dimensions
   Length ___ m x Width ___ m x Height ___m
   = _____ m^3 Total Building Volume. (TBV)
2. How many air changes are required for the building? - see Table 1. (ACH)
3. TBV x ACH = _____ m^3 / per hour
4. Convert this to Litres per second by multiplying by a factor of 0.278. _____ m^3 / per hour x 0.278 = _____L/Sec. Total Ventilation Rate (TVR)
5. Select the preferred Green-vent Wind size, and check the 'Metric' Performance Table for exhaust capacity of the ventilator at the wind speed closest to the average in your area.
6. Divide the TVR by the exhaust capacity to determine the number of Green-vent Winds required.

Example following above calculations:

1. *Building is 58m x 40m x 5m = 11,600 m^3*
2. *Building is a warehouse so we'll use 5 (ACH)*
3. *11,600 x 5 = 58,000 m^3 / per hour*
4. *58,000 x 0.278 = 16,124 L/Sec*
5. *We'll use GVW900 and wind speed of 12km/hr which has an exhaust capacity of 2,700L/sec.*
6. *16,124 ÷ 2,700 = 5.97 - so say 6 x units*

Ideal AIR CHANGES per Hour		
Factories & Warehouses	≈	5 to 10
Gymnasiums	≈	10 to 15
Assembly Halls	≈	10 to 15
Toilets	≈	10 to 15
Laundries	≈	15 to 20
High Smell (Piggeries etc)	≈	20 to 30

Table 1 - Recommended Air Changes depends on building usage.

METRIC PERFORMANCE TABLE				
EXHAUST CAPACITY (L/sec) in following wind speeds				
Ventilator	diameter	6km/hr	12km/hr	16km/hr
GVW300	300mm	270	480	620
GVW600	600mm	620	1,104	1,420
GVW900	900mm	1,560	2,700	3,460

Table 2 - Exhaust capacity in Metric figures, based on various wind speeds.

IMPERIAL PERFORMANCE TABLE				
EXHAUST CAPACITY (cfm) in following wind speeds				
Ventilator	diameter	3.7mph	7.5mph	10mph
GVW300	12"	572	1,017	1,314
GVW600	24"	1,314	2,339	3,009
GVW900	36"	3,306	5,721	7,332

Table 3 - Exhaust capacity in Imperial figures, based on various wind speeds.

300mm dia **600mm dia** **900mm dia**

GREEN-VENT WIND

WIND DRIVEN ROOF VENTILATORS

Australian Technology

REDUCE YOUR CARBON FOOTPRINT
INSTALL GREEN-VENT

Made in the Philippines

Manufactured by:

SG Eco Industries Inc.

Building 15A Philexcel Business Park, M-Roxas Highway,
Clark Freeport Zone, Pampanga, PHILIPPINES
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