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## CPD Article

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### A Wind Powered Ventilation Solution

Every roof and building requires a good air exchange. Ventilation turbines can be used in private and commercial sectors of building construction for most types of roofs and ventilation shafts. This article explains how air exchange helps to protect the roof structure from humidity and overheating, importance of ventilating buildings and also how this system ensures active and permanent ventilation and thanks to the fact that it uses wind energy, which is free, it is environmentally friendly and cost saving.

#### Key Learning outcomes

- Why you should ventilate roof structures and buildings
- Understand the principles of wind powered ventilation
- Why this ventilation system is eco-friendly
- Why condensation occurs under the roof
- Benefits of wind powered ventilation

## 1.0 Ventilation And Why Ventilate

We all know that ventilation is very important, but what exactly is ventilation?

Ventilation is simply the process of providing a continuous supply of outdoor air to the attic space of a home or general areas of any building.

What is proper ventilation?

In order to have proper ventilation, ventilation needs must be specifically calculated based on attic space square meterage and correctly installed.

Proper ventilation consists of 50% intake ventilation placed near the lower part of the attic space, and 50% exhaust ventilation placed near or at the roof ridge. The exhaust ventilation should be at least 1 metre higher than the intake ventilation.

It is estimated that a lot of homes have some form of improper ventilation. Fortunately for homeowners, contractors, and roofers there are wind powered turbines to supply the proper amount of ventilation to existing and new constructions.

Why Ventilate?

You may be curious as to why ventilation is important – ventilation is very important for many reasons.

In order to fight heat and moisture, homes in all climates must be ventilated year-round.

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

Moisture is a home's number 1 enemy, and can cause rot, mildew, mould, paint blister and ineffective insulation.

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



Ventilation turbine mounted on a metal roof directly at the ridge for the best operating conditions.

## 2.0 Proper Ventilation Conserves Energy

Proper ventilation conserves energy all year long, while improper attic ventilation is one of the most common energy-wasters in homes today.

During hot summer months, it is not uncommon for a poorly ventilated attic to reach really high temperatures. This superheated air not only speeds the deterioration of paint, roofing, and insulation, but penetrates down through the ceiling to heat the entire living area. Technical details about ventilation of dwellings can be found in Approved Document F.

Proper ventilation removes superheated air. Therefore, air conditioning systems do not have to work as long or as hard. Cooling bills will be lower, and the cooling system will last longer.

During cold winter months, attic ventilation is equally important to reduce attic condensation. A home relies on insulation to help retain heat produced by a heating system. If insulation in an improperly ventilated attic becomes wet from moisture and it becomes practically useless. This allows heat to escape through the attic and becomes a waste of money and energy. To ensure proper attic ventilation it is important to keep air moving.

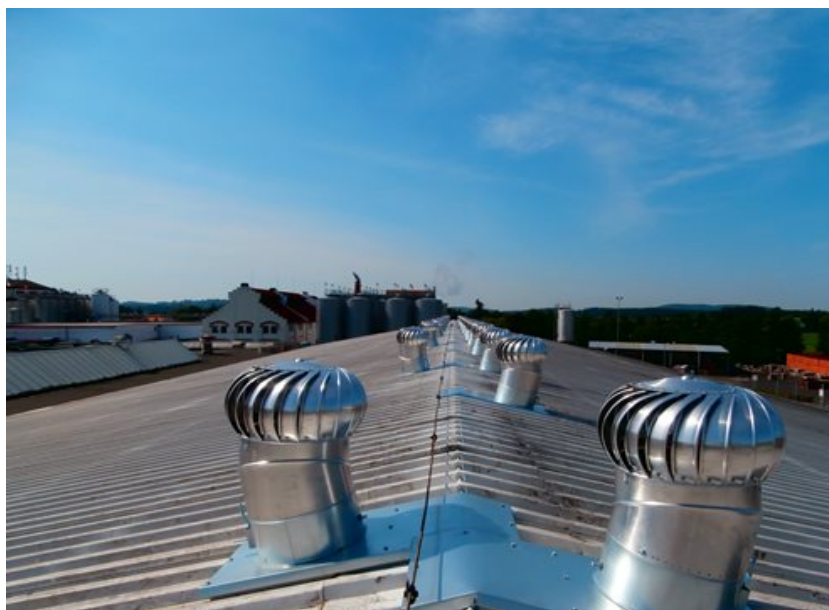
Properly installed wind powered turbine keeps air moving through your home year-round.

Whether you're a home owner or home builder, the best return on investment for protecting the longevity of your house is the proper installation of a balanced ventilation system with the proven performance and quality of ventilation turbines.

Wind turbines are geared toward saving energy, increasing efficiency, and enhancing the performance of your home's building products.

Ventilation for your attic space is essential, but do not forget the dwellings and the cellar.

An often-overlooked area of ventilation is the cellar in the foundation of a home. Cellar ventilation should never be overlooked. A properly installed ventilation system will provide much needed moisture control. This helps eliminate environments favourable to mould, mildew, termites and other insects.



Ventilation turbines on a farm building

### 3.0 Ventilation Of Roof Structure

This is the area where the turbines are mostly used. The roof is more exposed to weather influences than the perimeter walls of the house or the floor adjacent to the ground.

Every roof construction must be ventilated because of the condensation that occurs on the bottom side of the roof can cause considerable problems in the roof structure and even in the interior. These days, experts daily deal with the problem of condensation in roofs with a ventilated air gap between the roofing and the substructure. Sheet metal roofs in particular suffer from condensation and ventilation turbines can be the solution needed for larger Industrial units also.

In order to prevent these problems, the project designers place the turbines in the roof construction to create a vacuum in the gap and effectively extract the humidity and/or moisture from it. As the ventilation is permanent, the risk of condensation is reduced.

Why condensation occurs under the roof

It is a common opinion that condensation in cold ventilated gaps results from a water vapor that penetrates in the gap from the heated attic space through the roof structure. If we ignore the fact that through this structure, which is strictly vapor-proof, should not permeate any moisture at all, there is also an external source of moisture. At night, in the morning, but even in the daytime, if the sun does not shine on the roof, the temperature of the roofing can drop significantly below the air temperature, even by more than 10°C. In other words: whenever we see the grass, trees, cars or roofs covered by a frost or dew, we have to assume that the same situation is in the ventilated gap (well supplied with outside air), that is on the underside of the roofing and on the surface of the waterproofing. Due to proper ventilation ensured by a ventilation turbine, dew and frost from the ventilated gap will generally disappear earlier than from the outdoor surfaces.



Condensation under the roof

#### 4.0 Ventilation OfThe Attic And Loftspace Areas OfThe House

It is an essential use that is directly related to the comfort of every resident of the house. Turbines thanks to their permanent function ensure that the temperature of the overheated loftspace is reduced by tens of degrees and thus directly reduces the heat load of the interior. In a particular case of a family house using a single turbine, the temperature in the loft space dropped by 15 °C. This resulted in a temperature drop of 4 °C in the attic, namely from 29.5 °C to 25.3 °C.

Turbines in air-conditioned houses

Turbines for houses where air-conditioning is used have even greater financial benefits. Here by reducing the thermal load of the building through the roof system great savings are made in operating costs since the air conditioning is not so heavily loaded and works at lower power with lower consumption.

Turbines have the same positive effect on production and administrative buildings. Throughout the summer, the turbines exhaust the excess heat accumulating under the roof cladding, significantly lowering the temperature throughout the interior.

By investing in the turbine, we can save hundreds of pounds a year for air conditioning operations.

Although the turbine does not operate at as high a minute power as an electric motor, but its power is comparable within 24 hours, often several times higher than with an engine.

Other turbine options

Other sections of a property can be ventilated, especially cellars, bathrooms and toilets. Simply wherever there is a need for continuous ventilation while ensuring economical operation and low purchase costs.



Wind powered ventilation of the attic on the family house

### 5.0 Benefits Of Wind Powered Ventilation

A Ventilation Turbine ensures a continuous air rinse of the roof cladding. The wind driven turbines drain undesirable moisture and heat from the roof cladding, which significantly prolongs its service life.

Eco-friendly wind powered ventilation saves electricity. It uses the cheapest energy source - a natural wind that is completely free and is inexhaustible!

In the summer, the ventilation turbines drain overheated air from the attic and loft space and significantly reduce the thermal load of the entire building. At home with air conditioning, they take heat away, relieving the load on the air conditioning and significantly saving large sums of money.

Ventilation turbines continuously ventilate interiors, attics, production and storage areas, ventilation shafts, production halls, and diverse agricultural objects such as cowsheds, horse stables, etc. Regular air exchange is indispensable for quality of life. Turbines are made of special aluminium profiles and they actually have an all-aluminium construction that will not age. The thickness of the turbine blades is larger and has a major influence on the stability of the system and resistance to natural influences.

Aluminium turbines are long lasting and can be used for decades without any major maintenance. The bearings consist of a Teflon housing and high-quality stainless steel balls, so no maintenance or replacement is required as with other lower quality products. These patented bearings are also very resistant to thermal and chemical influences.

Can also be used on block of flats where must be a well-ventilated bathroom, toilet and kitchen. The ventilation can be done through a ventilation shaft where turbines are located at the outlet and can replace an electric fan that is noisy, expensive and can often be broken. In the ventilation system, we recommend combining ventilation turbines and fans.



Wind turbines with splitter on a ventilation shaft in block of flats