360 Products Inc.

Comparisons of the wall mounted "360 Exhaust Driver" vs. the spinning roof mounted "Turbine Ventilator"

There are many manufactures of the wind driven turbines and they have been around a long time. They are constructed of aluminum, stainless or galvanized. They rotate on bushings or bearings. They advertise as "long life", quiet, and rugged, and easy to install. The advertised cfm ratings can differ by 100% between the numerous brands, as attached. How those ratings are determined is a mystery, they work well, but the ones we have tested come in at much less cfm low-pressure, crossflow testing.

The 12-inch turbine we have for testing purposes is about 8 years old, galvanized, in perfect shape, no dents, spins on a plastic bushing, makes no noise and spins freely. Recent tests on our testbed had it starting to rotate between 2.4 – 2.6 mph wind speed. With the use of two different nanometers the wind speed was confirmed accurate within that range. Fan speed is set at the 5 – 5.5mph range and the turbine is mounted on top of a sealed enclosure. A 6" ID pipe is sealed to an opening in the enclosure extending away from the fans air movement. Taking readings with the nanometers at the center of the pipe opening we obtained repeated readings with the two different styles of nanometers. The cfm produced came in far from the airflow specs as reported on the attached. This test is as realistic as it would be on a shipping container (they are also sealed) with the low pressure created by the exhaust vent and only one source of air intake at our 6" pipe opening. So what we are measuring is exactly that volume of air that is being drawn inside, with an accurate constant flow of wind driving the turbine.

The same test-bed and equipment was used to test and calibrate our "Exhaust Driver". The only difference was it is side mounted. A draw range is a more accurate method for determining airflow for any vent. The constant change of wind will naturally change vents performance. We rate the "Exhaust Driver" at 3-4 cu ft/1 MPH of wind. That calculates to 17- 22 cfm with our wind speed of 5 – 5.5 MPH. The turbines draw rate was 19 – 23.5 cfm with the identical wind.

Being wall mounted, our exhaust vent will also pick up thermals. If the Exhaust vent is on a south facing wall, even on a cloudy day, the warmth of the sun can easily ad 2000 cu ft of airflow in a day as the warm air rises up the walls. Another advantage of wall mounted is the addition of incoming winds hitting those vertical walls and then accelerating up to 50% faster as the air rides around the corners and up over the top. **Wind chaos** is the perfect description of what happens around large man-made cubes. Our exhaust vents are always installed near the top and near a corner. That accelerated air flow on the vent increases the interior air exchanges proportionally. All turbines have a low wind threshold, but our exhaust vent "driver" does not. It will draw with any air current regardless of its mph rating. The rooftop also sees turbulence and gusts, but less wind speed than the outside corners. The turbine continues to draw in turbulence, but due to the momentum of the rotating mass it will not accelerate with the short bursts or "gusts" of wind that are common in nature.

Complete Air Exchanges

A 20 ft container has an approximate inside air volume of 1300 cu ft. when empty. It would only take a light breeze of 4-5 mph for half a day to generate a minimum of 12 complete air exchanges. Add some thermals, turbulence, a light evening breeze and 15 -20 air exchanges are highly likely. Half fill that container and the exchange rate now doubles.