Natural Ventilation no mirage for the Obeikan Light Industrial Facility

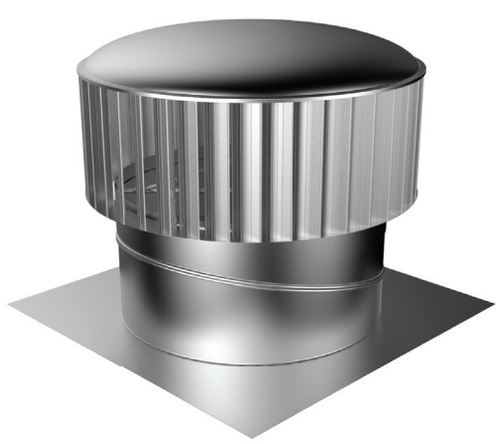
For over 25 years, the robust Hurricane® range of Vertical Vane™ natural ventilation technology has been built to endure tough climatic conditions and the harshest operating environments – just like the sand storms that occur in the hot desert environment of the Red Sea coast.

Retrofitting the ventilation system for a light industrial facility for the Obeikan Investment Group's glass factory in Saudi Arabia, Edmonds' local distributor Egphil Solar proposed the Hurricane H900 Turbine Ventilator. This challenged the conventional approach of installing motorised exhaust fans.

Installing Hurricane H900 Turbine Ventilators delivered tangible benefits to the project by:

- Improving worker comfort by reducing internal temperatures and relative humidity.
- Eliminating fan energy consumption and saving 347.5 tonnes of CO_2 each year.
- Maintaining ventilation rates throughout the building, even under low wind conditions.
- Improving discharge co-efficient and better air flow with vertical vane design.
- Providing maintenance-free natural ventilation with specially designed bearings to prevent ingress of fine dust.

To find out more, visit edmonds.com.au or contact us on 1300 858 674



EDMONDS®
Technologies for a Sustainable Future

CSR

Hurricane®

ABOUT THE PROJECT

The Obeikan Investment Group's 8,600m² light industrial facility is located approximately 350 kilometre north of Jeddah on the coast of the Red Sea. The glass making facility generates significant amounts of process heat and vapour requiring constant ventilation. With the existing ventilation system not performing as required, CSR Edmonds' local distributor, Egphil Solar, provided a natural ventilation solution using Hurricane H900 ventilators that not only provided cost savings over the life of the building but also improved worker comfort and safety on the factory floor.

The Challenge

The local climate in Yanbu is classified as desert with minimal rainfall throughout the year and temperatures regularly exceeding 40°C during the summer months. Typical wind speeds in the region vary between 0 m/s and 5 m/s for most of the time. Creating safe environments that protect workers and sensitive equipment, whilst

keeping energy use to a minimum presents a major challenge for the business in these conditions.

For the project, the team compared the H900 ventilator with electric axial fans that are typically used in these types of installations. The design was based on achieving five air changes per hour in the work area to ensure acceptable air quality and workplace temperatures for staff.

In addition, working at heights in the hot and dusty local climate presents a safety risk for maintenance staff and once installed, the H900 ventilators require almost no maintenance.

	H900	Electric Fan
Proposed number of units	48	65
Install cost[1]	USD $106,300	USD $104,430
Annual operation and maintenance cost[2]	-	USD $31,100
10-year operation and maintenance cost	-	USD $311,000
Annual CO_2 emission savings[3]	347.5 tonnes	-

[1] based on 1 SAR = USD$0.27
[2] assuming 0.12SAR per kWh
[3] based on 0.545 kg CO_2 / kWh

WHAT THE DESIGN ENGINEERS SAID

"The application of Hurricane Turbine Ventilators from Edmonds was a success. Testing shows improvement in internal conditions, while providing independence from the electricity grid."

Key Outcomes for this Project

To ensure the performance of the system, testing of temperature and humidity on the factory floor was undertaken before and after installation. The testing confirmed that installation of the H900 ventilators reduced the internal space humidity by 7% and average daily temperatures were reduced by 2°C.

In addition, by utilising a night purge operation, thermal mass in the concrete floor is used to aid in reducing temperatures during the day. Cool desert air and clear skies remove heat from the building at night, allowing the thermal mass to act as a heat sink during the day.

	Before Installation	After Installation
Relative Humidity	57%	50%
Internal Temperature	36°C	34°C
Ambient Temperature	38°C	39°C
Wind speed	16 km/h	15 km/h

Effective No Cost Natural Ventilation

True natural ventilation depends on two distinct process to provide airflow through a space; natural convection, where warm air from inside the space rises, exiting through openings at high level and drawing fresh cool air in through an opening at low level; or by wind induced ventilation where wind pressure on the building forces air through openings by a combination of positive (pushing) pressure at low level and negative (suction) pressure at high level. Both processes rely on favourable climatic conditions, moderate ambient temperatures (cooler outside than inside) and natural breezes from the right direction.

The H900 Turbine Ventilator is a natural, wind-driven ventilator that maximises energy savings through free-air cooling that can:

- Improved indoor air quality by removing pollutants.
- Improved humidity control by removing moisture build-up.
- Improved occupant comfort by removing heat build-up.

High Performance, Edmonds Vertical Vane™ Technology

The unique design of the Hurricane Turbine Ventilator allows the wind turbine to act as a centrifugal impeller. Its Vertical Vane technology provides a greater 'sail' area delivering an improved co-efficient of flow (Cf) compared to similar sized traditional spherical vents.

The Hurricane works – even under low wind conditions.

Built to Last

The Hurricane range is manufactured from marine grade equivalent aluminium as standard with options for highly corrosive environments also available. The bearing system is designed to prevent ingress of fine dust particulates in harsh environments.

Its lightweight design means additional structural strengthening of roof may not be required and the variable pitch base design can adapt to most roof angles.

Hurricane is Suited to Almost Any Application

The Hurricane range of ventilators can be adapted to suit almost any circumstance.

Special variations include:

- Fire Release (FR)
- Bush Fire Rated (BFR)
- Corrosion Resistant (S2)
- Heavy Industrial (HI)

FR900 Fire-Rated option meets the fire-resistant test to AS 1668.1-1998. The use of ventilation and air conditioning in buildings, Part 1: Fire and smoke control in multi-compartment buildings Section 4.8. Smoke-Spill fan.

BFR Bush Fire Rated option for buildings in Bushfire Prone Vegetation Category 1 areas. It is designed to comply with the Deemed to Satisfy provisions of AS3959.

S2 Corrosion Resistant option for water reservoirs or environments that are oxidative or slightly acidic (non-caustic).

HI Heavy Industrial option with polyolefin coating for highly corrosive environments.

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