



Wind Assisted Ventilation and Natural Cooling

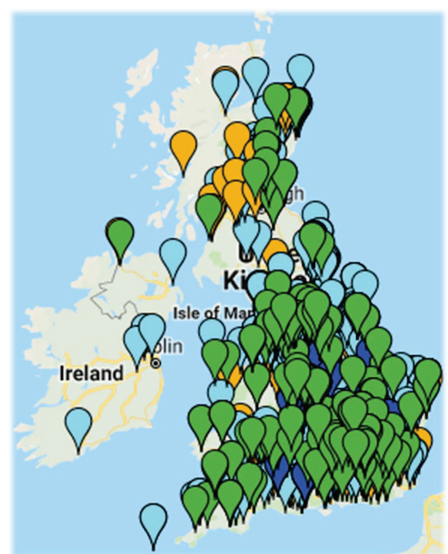
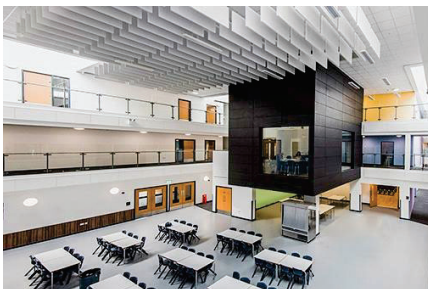
01/06/2021



We are
Pioneering British Greentech

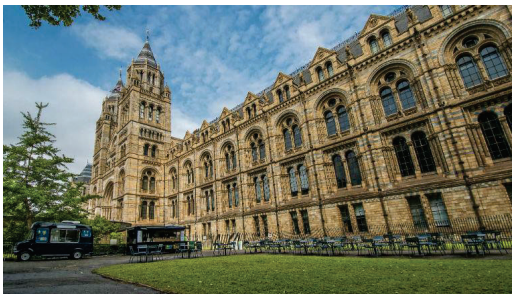


- Over 45 years experience
- 1000's of projects UK and global
- UK design and manufacture
- Innovation is part of our DNA
- Very active in R&D

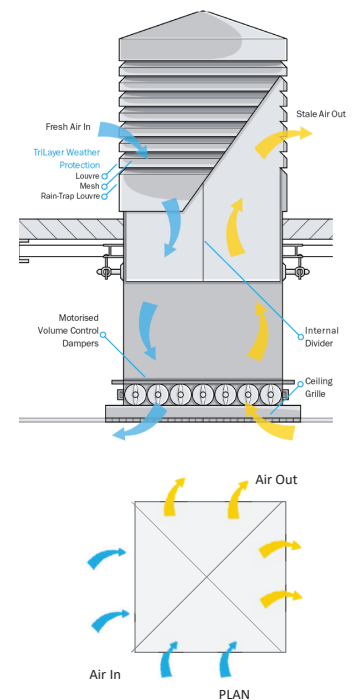


Natural Ventilation

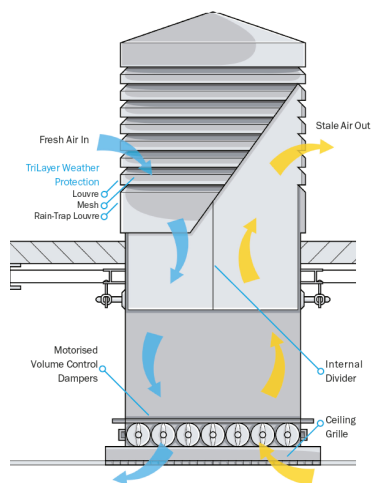
History



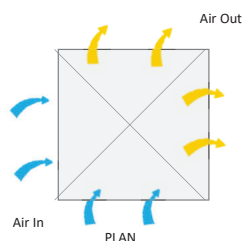
Windcatcher principles



Windcatcher principles

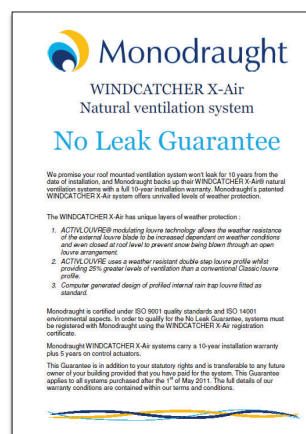


1. Wind movement
2. Air intake
3. Positive pressure
4. Cooler air
5. Low pressure
6. Natural buoyancy

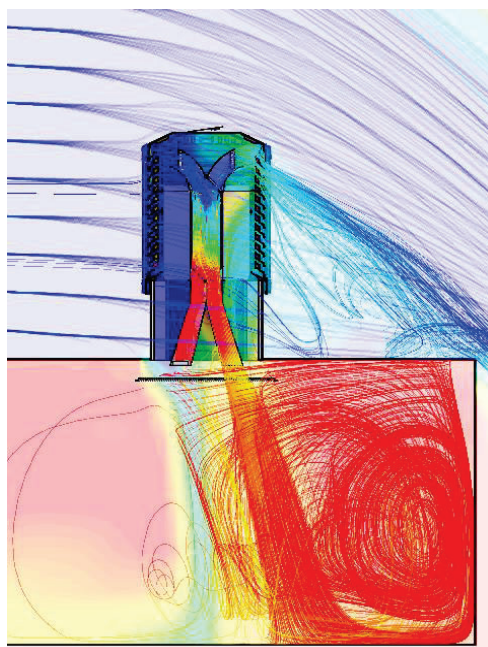
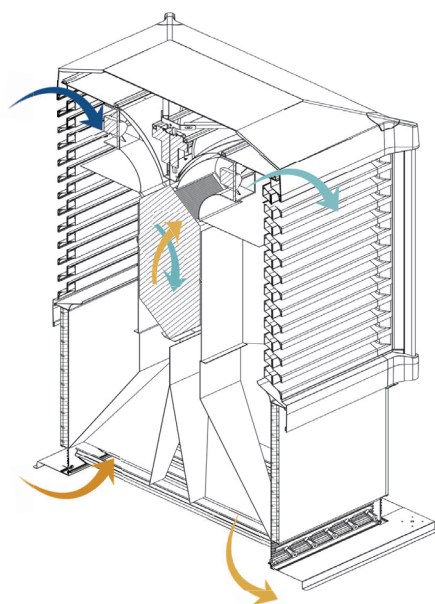
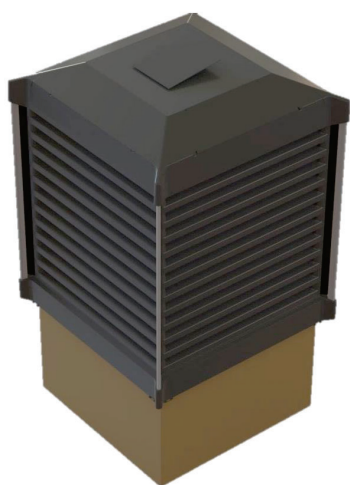


Active Louvre

- The X-Air system has patented active-louvre technology, which enabled the louvre aperture to be modulated to several positions from closed to fully open.
- When fully open the systems has a free louvre area which is 25% greater than that of a standard unit.
- The ability to modulate or close the louvres helps with rejection of inclement weather conditions
- This helps to control winter season cold buffeting airflow at the unit face prior to fine control by the dampers inside.



Windcatcher HX



 Monodraught

Natural Cooling

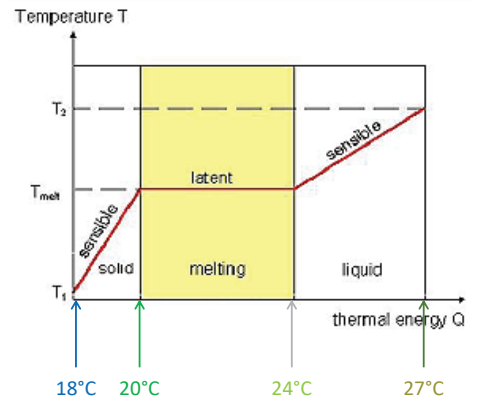
Phase Change Materials

What is a PCM?

A phase-change material (PCM) is a substance which melts and solidifies at a certain temperature and in doing so is capable of storing or releasing large amounts of energy.

Using PCM's to store and release thermal energy

- During the day as warm air is passed over the PCM it absorbs thermal energy from the air to turn from a solid to a liquid, thus cooling the air.
- Over night as cooler air is passed across the PCM it releases the thermal energy it absorbed from the warm air during the day returning to its solid state.
- This provides us with a **cooling cycle**, using only a low energy fan that is intelligently controlled.



ICE

MELTING / FREEZING

WATER

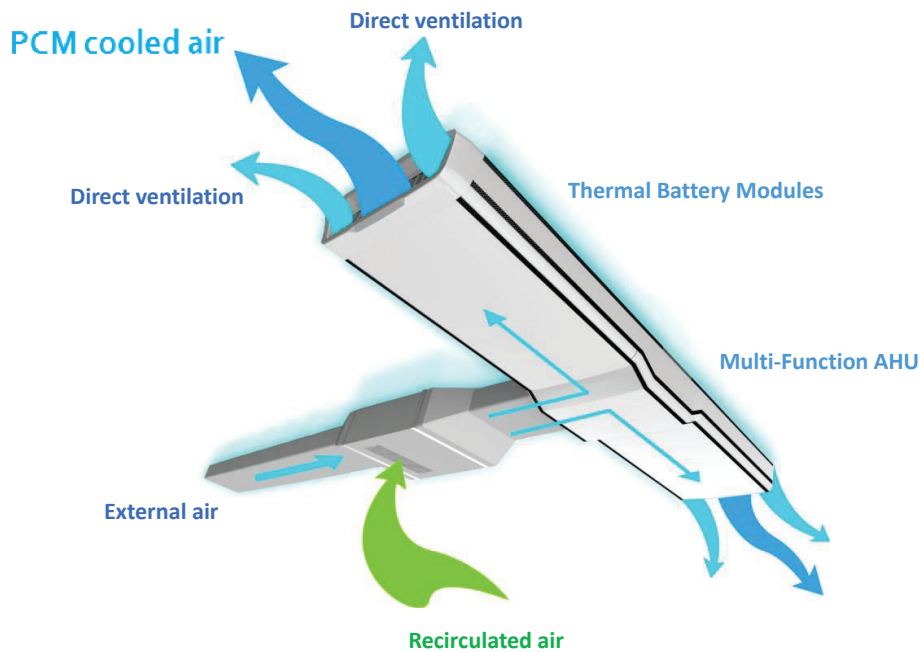


Thermal Battery

- Aluminium casing achieves excellent heat transfer from air to PCM.
- Non-flammable.
- PCM is tested to the German RAL standard – 10,000 cycles which equates to 27 years assuming 1 complete cycle a day.



How Does COOL-PHASE work?



Performance



Per COOL-PHASE® Unit:

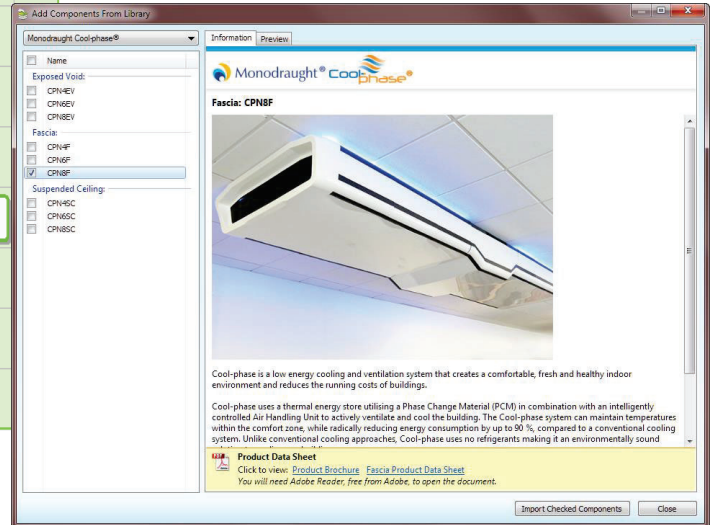
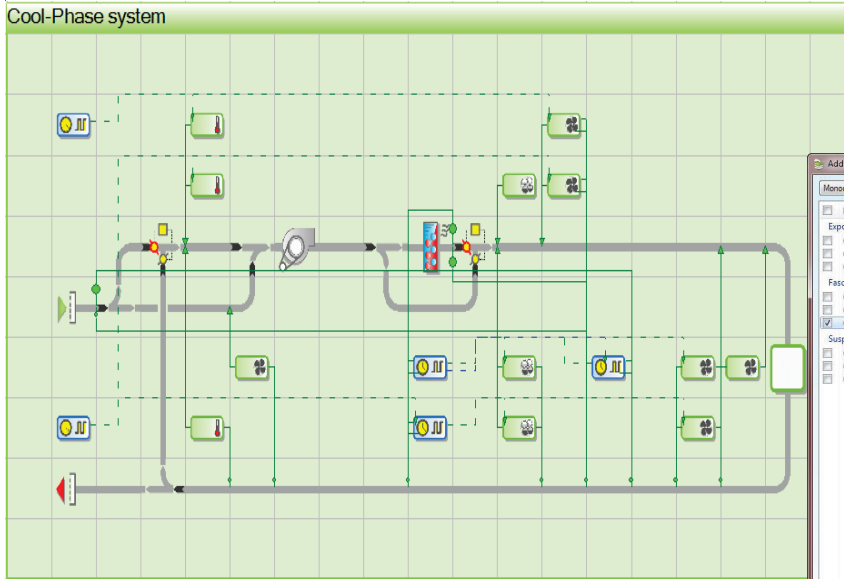
- Normal ventilation rate – 100 to 260 l/s
- Maximum ventilation rate - 300 l/s
- Total thermal energy storage – 6/8/10 KWhrs
- Typical cooling in 24 hour period >14/16/20 KWhrs

$$\text{Total Cooling} = \text{Free Cooling (Ventilation)} + \text{Night Time Cooling (Building + Flush)} + \text{Thermal Batteries (Energy Stored)}$$



Dynamic Building Simulation

Cool-Phase system



Case Study – Bournemouth University



Location: Bournemouth
Systems: Cool-phase®

Results

The Cool-phase system monitors and records temperatures, CO₂ levels and energy use. The results below are based on data collected by the units installed in each Classroom between 20th April 2012 and 24th June 2013.

Temperature Comparison

This table shows the overall average daily temperatures for each Classroom. It is clear from the table that the Cool-phase systems have kept the temperature within a very comfortable band.

This table shows the percentage of time that the internal temperature has spent at over 25°C, 28°C and 32°C during the logged period.

Air Quality

Background or atmospheric CO₂ level is approximately 400 parts per million (ppm) and 1500ppm or above would be considered a high level.

Energy Use

As shown in this table the two Cool-phase units installed in the Science Lecture Room used a combined 138.5KWhs of energy across the logged period. Assuming 0.11£/KWh that amounts to £15.24 or an average of **£0.25p a week**.

Daily Temperatures (°C) Science Lecture Room		
Average	Min Average	Max Average
20.6°C	19.0°C	21.9°C

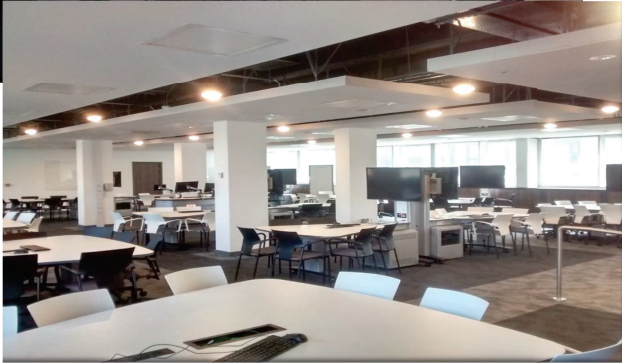
Max Temperatures (%) Science Lecture Room		
>25°C	>28°C	>32°C
0.01%	0%	0%

CO ₂ Levels Science Lecture Room		
> 1000ppm	>1200ppm	>1500ppm
0%	0%	0%

Energy Used Science Lecture Room – 61 weeks			
Cost in £'s (Assumed 0.11£/KWh)	138.5 KWhs	£15.24 total	£0.25p Wk



Installation Examples



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Thank you!



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