

# 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





### We are Pioneering British Greentech





O Monodraught

# **Natural Ventilation**

# History







# Windcatcher principles





### **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.









# **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.





## **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.





# 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





# **Case Study – Bournemouth University**

Location: Bournemouth Systems: Cool-phase<sup>°</sup>

### 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 20<sup>th</sup> April 2012 and 24<sup>th</sup> 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 CO<sup>2</sup> 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%		

CO2 Levels Science Lecture Room				
> 1000ppm	>1200ppm >1		.500ppm	
0%	0%		0%	
Energy Used Science Lecture Room – 61 weeks				
Cost in £'s (Assumed 0.11f/KWh)	138.5 KWhs	E15.24 total	£0.25p Wk	





# **Installation Examples**





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