Bournemouth University

Case Study - Low Energy Ventilation and Cooling

- **Location:** Bournemouth
- **Contact:** Steve Cox, Bournemouth University
- **Systems:** Cool-phase® system
- **Sector:** Education

Science Lecture Room Served by Cool-phase®

The Science Lecture Room at Bournemouth University was fitted with two new Cool-phase® units discreetly positioned within the ceiling void to provide natural cooling within the room.

Scenario

Two Monodraught Cool-phase systems were specified to serve the Science Lecture Room at the University to provide intelligently controlled low energy ventilation and natural cooling via thermal batteries to the area to maintain thermal comfort and air quality levels throughout the year.

Detail

The design team at Monodraught carried out dynamic thermal modelling which were able to predict that 2N° 8 KWhr Cool-phase systems would fully dissipate the heat gains within all the areas of the building where the Cool-phase was to be installed.

The installation was carried out by Monodraught's installation team and commissioning of the systems was completed in April 2012.
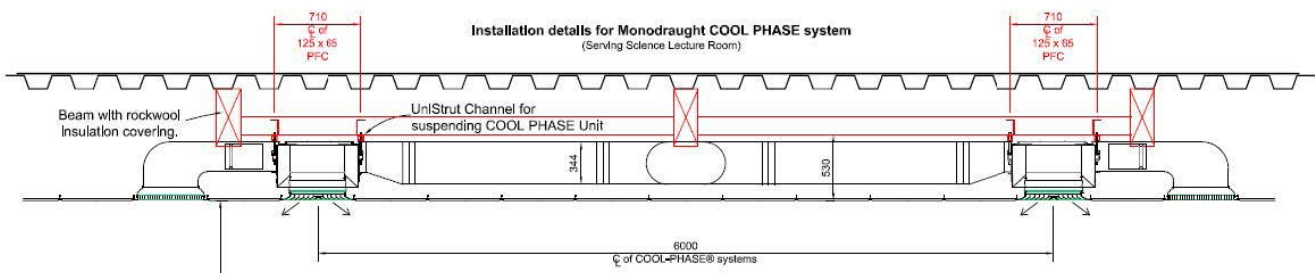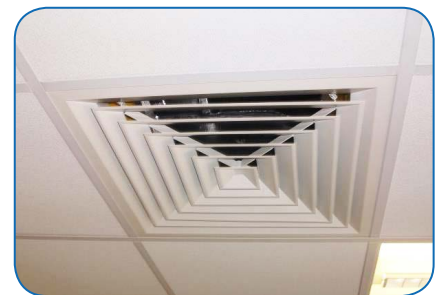
Results

The Cool-phase system monitors and records temperatures, CO_2 levels and energy use. The results below are based on data collected by the units installed in the room between 20th April 2012 and 24th June 2013.

Temperature Comparison

This table shows the overall average daily temperatures for the room. 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.

The Cool-phase system has maintained an ideal temperature within the rooms of less than 25°C across the logged period for the majority of the time. With only a very small percentage of time being monitored at over 25°C and at no point exceeding 28°C, this more than meets the target for overheating in terms of either CIBSE guide A or BB101.

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

Background or atmospheric CO_2 level is approximately 400 parts per million (ppm) and 1500 ppm or above would be considered a high level.

CO_2 Levels Science Lecture Room		
> 1000 ppm	> 1200 ppm	> 1500 ppm
0%	0%	0%

Energy Use

As shown in this table the two Cool-phase units installed in the Science Lecture Room used a combined 138.5 KWHs of energy across the logged period.

Assuming 0.11 £/KWh that amounts to £15.24 or an average of £0.25p a week.

Energy Used Science Lecture Room - 61 Weeks			
Cost in £'s (Assumed 0.11£/KWh)	138.5 KWhs	£15.24 Total	£0.25p Wk

Conclusion

The Monodraught Cool-phase system has shown that it meets the design criteria and specification that the client requested. A requirement for fresh air and to ensure that CO_2 levels remain within acceptable boundaries, which the results above have proven is the case. The solution has also been shown to meet the overheating criteria, keeping temperatures within an acceptable level. This has been achieved with very low energy use and equally low running costs.