

Cool-phase End User Guide

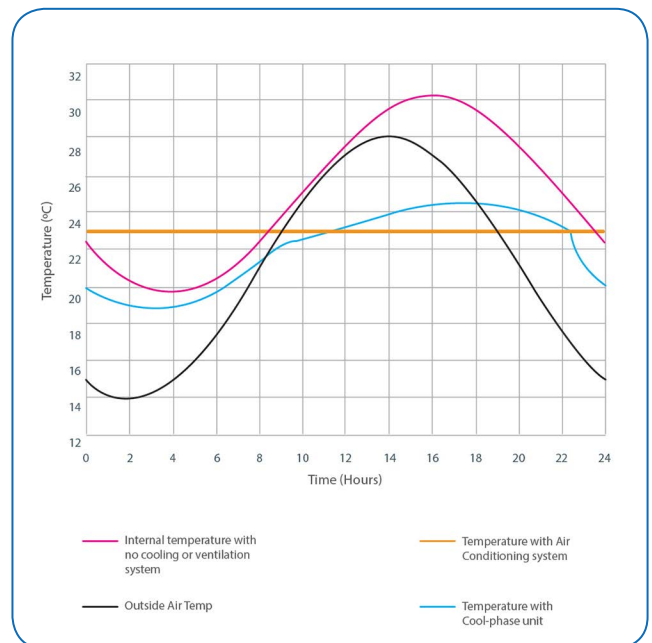
Benefits of Cool-phase

Good indoor air quality contributes to a favourable environment for building occupants and a sense of **comfort, health, and well-being**. Rather than just continually cool the air in a space, Cool-phase also ventilates with filtered fresh air from outside which helps to maintain **high internal air quality**. Cool-phase does not cool aggressively and therefore has **less of a drying effect on the air** which also contributes to a healthier indoor environment.

What does it do?

Cool-phase is a **low energy ventilation and cooling system** that provides a well ventilated and thermally comfortable environment. It does this by intelligently controlling ventilation, night time cooling, direct air cooling using external air and active air cooling using thermal batteries containing Phase Change Material (PCM). **The system is designed to make a space thermally comfortable whilst having very low energy consumption.** It is not designed to cool a space to a constant set point in the same way that a high energy system such as air conditioning or similar might do.

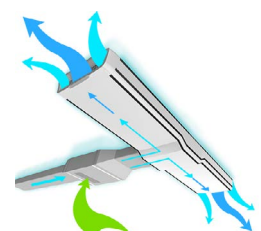
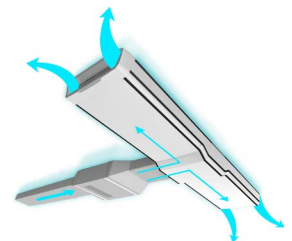
The graph to the right shows four coloured plots. The **black line** shows external air temperature, the **pink line** shows probable room temperature with no ventilation or cooling and the **blue line** shows the effect that Cool-phase will have on the room. It does not cool the room to a constant set point but cools the room relative to the external temperature.



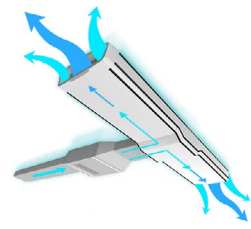
The **orange line** shows the effect a high energy system such as air conditioning or similar would have if it was set to a 23°C cooling set point. The AC system would try to hold the room to 23°C but the temperature would still fluctuate by a degree or two in reality.

System cooling and ventilation operation

- Whenever possible the system will use free cooling by using external air to keep the room cool. It will only do this if the air outside is cool enough to do so.
- If the external air is too warm to achieve room cooling the system will re-circulate internal air through the thermal batteries cooling it to keep the room thermally comfortable.

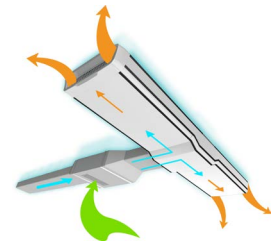


- If the CO₂ level in the room rises above a set level the system will stop re-circulating the room air and begin to ventilate with external air to improve the room air quality. This air will be sent through the thermal batteries to cool it prior to entering the room to keep the room thermally comfortable.



Winter heat recovery operation

- During the winter the system uses residual warm room air to store excess heat into the thermal batteries. This enables the system to temper the incoming cooler air to prevent cold draughts and minimise heating energy required.



Cool-phase Control Specification

Fully Automatic Control System

Five Buttons, Internal Temperature Sensor, Internal CO₂ Sensor

- **High Button:** Runs the fans at higher speeds for maximum cooling and ventilation. After 1 hour, the system reverts back to the automatic mode.
- **Medium (Auto) Button:** Returns the system to automatic mode. The system automatically adjusts speed depending on CO₂ and temperature levels.
- **Low Button:** Runs the fans at lower speeds for quieter operation. After 1 hour, the system reverts back to the automatic mode.
- **CO₂ Sensor:** It is used to update the system with the current CO₂ level within the room once per second.
- **Temperature Sensor:** It is used to update the system with the current room temperature once per second.
- **Auto Button:** Places the system back into automatic if the off button has been pressed.
- **Off Button:** Places the system into a dormant (off) mode for a period of 1 hour. After the 1 hour period, the system reverts back to the automatic mode.

