heat cloud

Radiant Conditioning

SPC

Why use **Heat Cloud?**

What is the **Heat Cloud product?**

Heat Cloud is a high-tech radiant panel using the latest D Tube heat transfer technology in conjunction with light aluminium sheet and thin gauge copper tube. The panels offer efficient heating performance from low water temperature systems along with low inertia and fast response times. The product is simple to install, low weight, low water volume and totally recyclable.

Available in bespoke sizes and a range of pipe configurations, Heat Cloud fits within the building's ceilings, walls or a combination of both. By utilising side profiles and/or a retaining clip system, Heat Cloud sits within the building's sub-structure without reducing the ceiling height or room dimensions and is invisible to the occupants.

How does **Heat Cloud work?**

The panels make final contact with the finished plasterboards for activation and effectively elevate the room's facing surfaces to temperatures above that of the surrounding space (typically 20-45°C). The warm surfaces then add heat to the room and occupants through radiant heat transfer. The air in the room is transparent to the radiant heat and only surfaces and occupants are directly heated by the radiant transfer. Room air is indirectly heated by convection across the heated surfaces.

When using radiant heat, space air temperatures can be kept around 3°C below the temperatures used for convective systems with no reduction in perceived comfort. The result of this and the system's rapid response times combine to reduced energy bills.

Can I use **Heat Cloud for cooling?**

By supplying chilled water to the panels, the internal surfaces of the room can be lowered below those of the space and its occupants (typically 14-19°C). The Heat Cloud panels then provide an efficient and comfortable radiant cooling system for use in the summer months. These relatively high water temperatures for cooling mean chillers can offer increased efficiency and reversible heat pumps can be incorporated for low cost cooling and year round operation.

What are the benefits **of using Heat Cloud?**

Comfort and well-being

Low inertia and rapid response time ensure that rooms conditioned by Heat Cloud offer a constant, high level of comfort. Opportunities for zoning areas are almost endless and stratification within zones is radically reduced when using radiant heating. Heat Cloud provides a naturally healthy environment with lower air temperatures, no draughts with reduced movement of pollutants and germs, reduced dust displacement and is completely silent in operation.

Energy efficiency

Energy savings of 30-50 % can be achieved when using the Heat Cloud product. The savings accrue from the adoption of lower space temperatures, quicker start up and response times and reduced system temperatures. As Heat Cloud heats the surfaces rather than directly heating air, the heat losses through doors and windows are reduced along with losses through ceilings which would otherwise be subject to elevated air temperatures. The use of lower system temperatures mean boilers offer greater efficiency and the system lends itself perfectly to the use of heat pumps. The rapid response and controllability of the system further add to the energy savings available.

Install costs

Installation is simple and extremely cost-effective. The panels clip into existing wall and ceiling structures as a first fix item and the system requires minimal maintenance, providing a long service life.

Functionality

Heat Cloud provides a single, low maintenance system for heating and/or cooling with no intrusion into the living space. Because Heat Cloud is hidden behind room surfaces there is no reduction in the room dimensions or a need for increased ceiling height to accommodate ducting. Heat Cloud is silent in operation - no fans and it offers no interference with curtains or blinds.

Why is there a **need for Radiant Conditioning?**

Carbon Emissions

Data published by the Technology Strategy Board indicates that 45% of the UK's total carbon emissions come from the built environment (27% domestic, 18% non-domestic). Furthermore, 73% of domestic emissions are estimated to result from space heating and from the production of domestic hot water. Along with rising fuel prices and security of supply, these figures have given rise to increasingly stringent regulations with regard to insulation and airtightness of buildings. The challenge is to maintain, or increase, indoor comfort whilst simultaneously improving the energy efficiency of systems; radiant conditioning is the most effective means of achieving this.

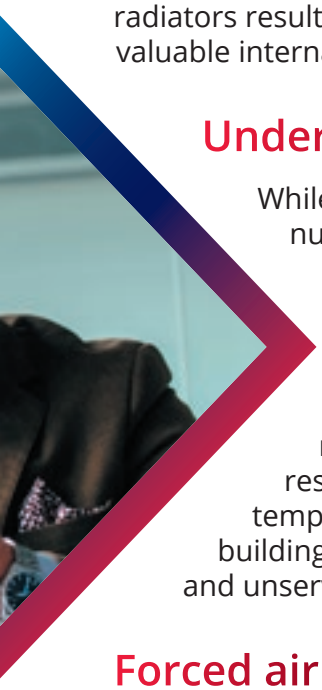
Sustainability

When considering the current changes to energy efficiency standards (Part L of the building regulations) along with the recently announced government initiatives i.e. clean growth strategy, designers are driven towards incorporating heating systems which operate at lower temperatures. The continuous innovation in today's energy efficient heat sources, and by incorporating them with radiant heating, result in these systems having the ability to heat spaces more evenly and at a more constant level whist using much lower water temperatures. The benefits mean our systems become more eco-friendly, energy efficient and costing less to run.

Why use Heat Cloud instead of other **low system temperature systems**

Radiators/convectors

Being highly convective emitters (typically 80%), using low water temperatures with conventional radiators result in increased inefficiencies. Size then becomes increasingly prohibitive reducing valuable internal space. They also become unresponsive in use offering no benefits to the user.



Underfloor Heating

While underfloor heating systems employ low water temperature, they suffer from a number of well publicised shortcomings and limitations. The responsiveness of the systems is very poor taking excessive time to warm spaces and not cooling as rapidly as required. Not only do these characteristics reduce comfort but they are wasteful of energy. A warmed floor has a higher percentage of convective heating than would a warmed ceiling (typically 50%) so the radiant savings are reduced and in some circumstances the warmed floor can cause discomfort. It is more appropriate to provide radiant heating from above as there are fewer items of restrictive furniture/finishings etc. to interfere with the generation of a homogenous temperature. As the underfloor heating system is integral to the floor structure the building programme can be compromised to facilitate its installation. Also, it is inaccessible and unserviceable once fitted.

Forced air system

Air distribution systems require large volume flow rates of air in order to transfer heat at rates commensurate to those that hydronic systems are capable of handling via small bore pipes. Large, space consumptive ductwork, needing increased ceiling height and offering attendant losses, introduce inefficiencies and such systems also suffer from vertical stratification. Fan and air movement noise, along with the circulation of dust and allergens, reduce comfort and health levels therefore increasing the need for regular maintenance and servicing.

Using Wet Systems Radiant Panels in conjunction with lower system temperatures

For some time now, design engineers have accepted that combining radiant panels with lower system temperatures offers the best means of optimising the efficiency of heating systems. Using larger conventional radiant panels however, means reduced space and aesthetic issues. Placing the larger radiant panels hidden within the structure (Heat Cloud) provides all the benefits of radiant without the compromises associated with all other alternatives. As these panels can also be used for efficient low cost cooling they provide a year round solution on a single shared system.

Radiant Heating

The principle of radiant heating involves the warm surfaces radiating heat to cooler surfaces in the space without any loss, passing through the air which is transparent to the radiation. The space air is then indirectly heated by convection as it flows across the heated surfaces. Radiant heating allows the use of lower air temperatures to provide the same resultant, perceived temperature (CIBSE B1-B3) and, combined with rapid response times, reduces energy consumption. While using radiant panels with reduced water temperatures increases the size required, the lower surface temperatures allow the panels to be installed behind plasterboard for activation.

Radiant panels have the quickest response time of any heating technology and because the panels can be individually controlled for each room the quick response feature can result in cost and energy savings compared with other systems. When entering a room the occupant can increase the temperature setting and be comfortable within minutes.

(Source Department of Energy – Radiant Heating)

Radiant Cooling

Uses relatively high temperature chilled water to ensure than there is no interstitial or surface condensation. These higher temperatures ensure that energy savings can be achieved by running chillers or reversible heat pumps in the most efficient part of their envelope.

Radiant cooling operates in reverse to heating whereby the reduced temperature surfaces absorb radiant heat from the warmer surfaces and occupants in the room. The space air in this instance is indirectly cooled as it convects across the surfaces. As the majority of the cooling is provided radiantly the same perceived temperature can be achieved with air temperatures higher than for convective cooling systems.

Where can I use **Heat Cloud**?

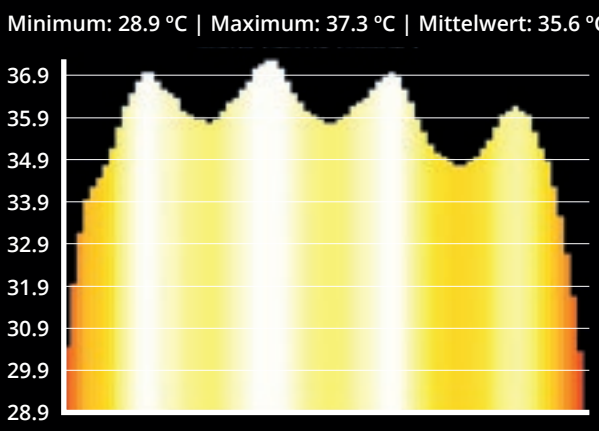
Heat Cloud is suitable for all building sector applications and is used to 'activate' plasterboard finished ceilings, walls or a combination of both. Plasterboard panels used can be plain or perforated and from a range of thicknesses (output will vary with board thickness). There are also special materials available with carbon impregnation designed to enhance performance if required.

The Heat Cloud panels are manufactured to bespoke sizes to match the structural arrangement and the internal waterways can be engineered to accommodate particular applications, required flow rates and pressure drop. Individual Heat Cloud panels can be readily linked together using flexible connectors or other hydraulic linkages.

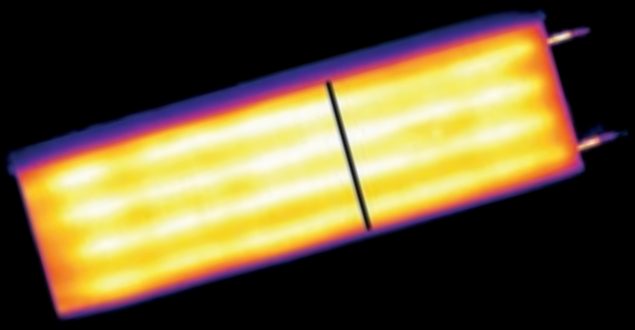
As ceiling and wall arrangements tend to have common features, the supply of the radiant panels can often be standardised to simplify the installation. A range of fitting options: edge profiles and clips can be supplied to match common plasterboard ceiling/wall construction methods and materials.

Performance

The plain aluminium face plate offers guaranteed direct heat transfer to the plasterboard in a uniform manner (max 2°C fluctuation across the board).



The above graph shows the surface temperature across a plasterboard Heat Cloud element.



The above image shows the heat radiating through plasterboard for a Heat Cloud element.

Heating Output W/m²

	Standard	Perforated	Graphite Board	12mm Board	15mm Board
DT (°C)	10mm	10mm	Plus 10%	Minus 8%	Minus 12%
22	150	156	165	138	132
20	133	140	146	122	117
18	121	125	133	111	106
16	106	109	117	97	93
15	99	102	109	91	87

Cooling Output W/m²

	Standard	Perforated	Graphite Board
DT (°C)	10mm	10mm	Plus 10%
15	110	116	121
12	82	86	90
10	75	79	83
8	64	67	70

DT is temperature difference between mean water temperature and room temperature.

Using and specifying Heat Cloud

A correctly designed and installed radiant conditioned living or work space creates a neutrally comfortable, healthy, energy efficient indoor climate under both heating and cooling modes and this can be achieved using a single system.

The SPC Heat Cloud is mechanically budgeted, designed, purchased and installed just as with any standard specification of radiant panels or radiators.

When selecting Heat Cloud the engineer is able to design their own preferred control arrangement in line with the appropriate number of zones. The ceiling and/or wall sub-structure is as standard and the plasterboard is installed in line with normal building practice.

All disciplines involved retain their individual budgets, responsibilities and liabilities.

Let us help you **with your design**

With you every step of the way.

Our team of specialists are ready to help with your Heat Cloud project at every single phase. To begin with we offer a full, free site survey and design service. Our specialist will visit your project or design office to provide a detailed survey and expert guidance. From this a fully costed and detailed proposal is provided on a rapid turn-round.

For installers looking for extra support on how to implement Heat Cloud additional training and on-site guidance is also available.

Carefully selected delivery partners mean your Heat Cloud products will arrive on site safely and at your specified time and location. Your project specialist will be on-hand for any additional support throughout your installation phase and beyond.

Because SPC have been supporting the HVAC industry for over 30 years not only can you rely on our products, you can trust in our unrivalled service too.

The Heat Cloud **Selection and Design Presentation**

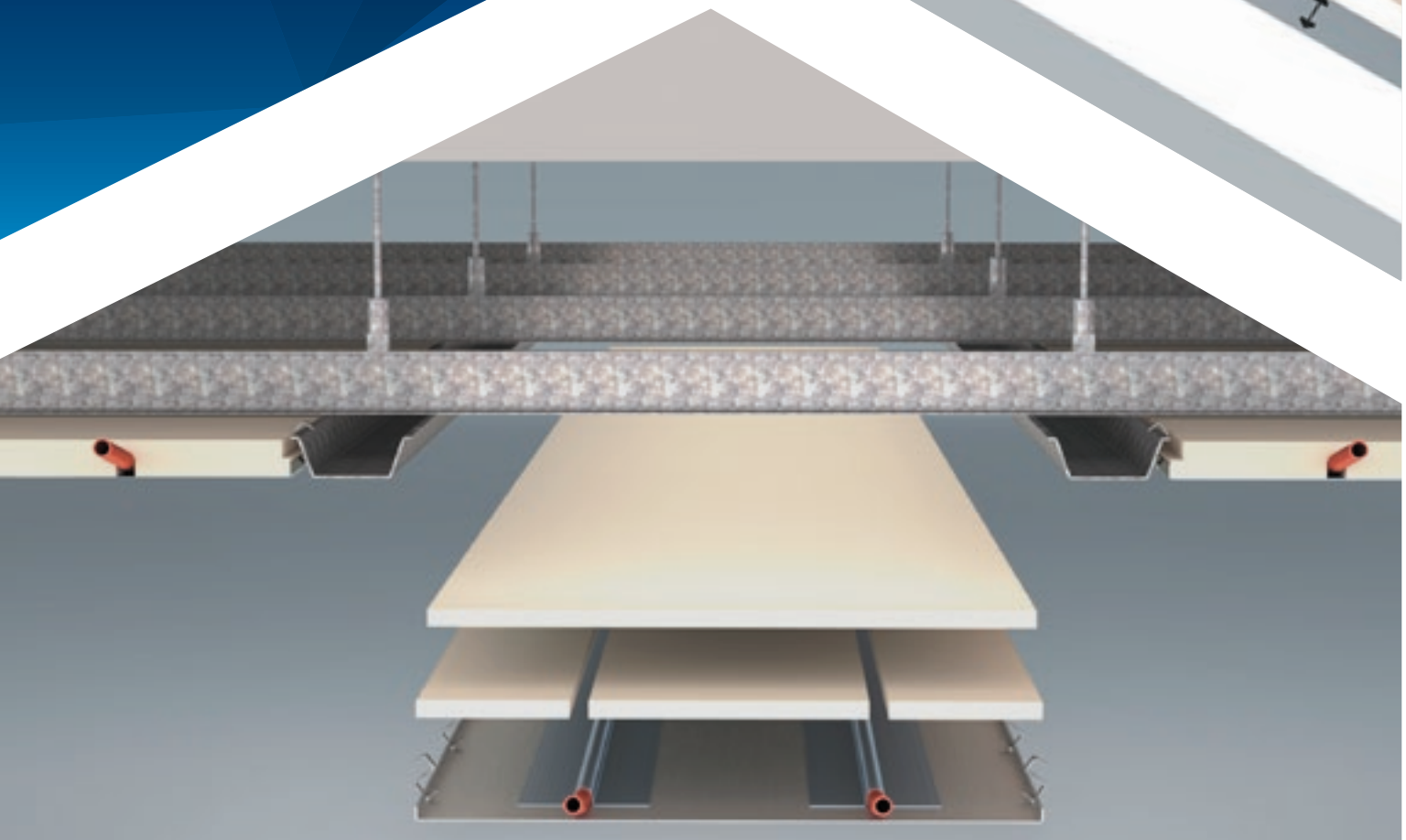
For further information and advice on Heat Cloud why not book one of our free Heat Cloud Selection and Design presentations? Designed especially to suit the needs of designers and engineers our short but informative presentation will tell you everything you need to know to make Heat Cloud and all of its benefits part of your next project.

Available at a time and location to suit you the Heat Cloud presentation is the easiest way to learn more this innovative new technology. Whether you have a particular project in mind or whether you just want to keep your knowledge up to date, our Heat Cloud specialists can answer all of your questions.

You can also request a site survey or tailored design advice in conjunction with the presentation.

Please contact our team at heatcloud@spc-hvac.co.uk

Typical **ceiling installations**



Typical **wall installations**

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