iTWELVE INDUSTRIAL

RADIANT HEATING & COOLING

SPC iTWELVE INDUSTRIAL RADIANT PANEL

SPC

GENERAL

The SPC iTwelve Industrial Radiant Panel is a high performance heating (and cooling when specified) solution which takes advantage of its copper/aluminium construction to provide increased outputs and reduced weights compared to conventional industrial panels. Patented tube shape and collector designs allow minimal numbers of on-site connections and simple hanging options, all combine to make this the most user-friendly and effective industrial panel on the market.

Panel arrangements will be bespoke designed by SPC engineers to suit the customer's needs in terms of output rates, pressure drops, connection positions and parallel/series piping configurations. Options for same end or opposite end connections and parallel piping are available.

RADIANT CONDITIONING

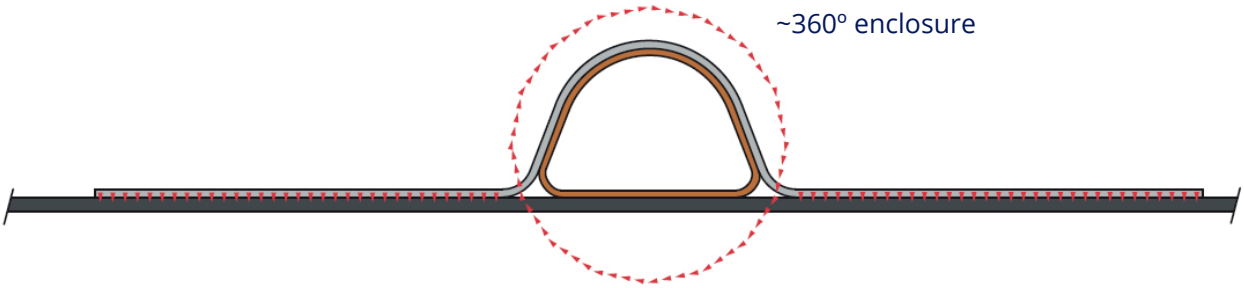
Whereas industrial facilities have traditionally been heated by high temperature direct-fired fossil fuel heaters, low temperature hydronic radiant heating panels such as iTwelve solve the carbon conundrum as they lend themselves perfectly to being coupled to high efficiency heat pump generators.

As well as savings accrued with heat pumps, radiant heat provides additional savings as a result of directly heating objects rather than the space air. Space air temperature can be held at significantly lower temperatures than when using convective systems while maintaining the same resultant temperature. This effect reduces the rate of heat losses from the space, along with the stratification in the height of the building that is associated with high temperature and heated air systems.

PRODUCT DESCRIPTION

The iTwelve technology is based around the use of innovative 'D' shaped 12mm copper tubes wrapped in aluminium saddles and adhered to the 1mm aluminium radiating panel. The downward facing radiating surface of the panel is powder coated to RAL 9016 to maximise the radiant emissivity, and the upper surface is covered in an insulated blanket to minimise upward convection.

The combination of the 'D' tube profile and aluminium saddle means that there is an effective 360° contact between the copper tube and the radiating panel. The effect is to minimise the heat transfer resistance and temperature drop between the hot water and the surface of the panel; this ensures that the panel is considerably more efficient than competing copper/steel arrangements.

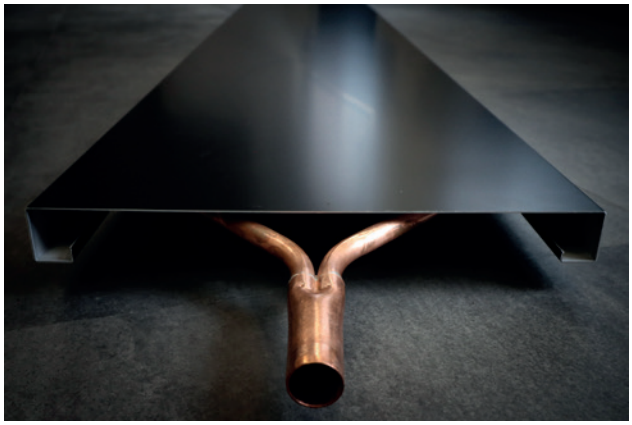


The individual copper tubes on the back of the panel are joined in specially designed splitting and joining manifolds. In order to match systems to pressure drop requirements the manifolds can accommodate either two or three tubes and both terminate in a plain 22mm copper tail. Long runs of panels will be made up of individual panels end to end and each panel will only have a single final connection pipe so the number of interconnecting joints are minimised. The 22mm copper tails are ideal for joining with commercially available crimp fittings though flexible hoses could be used as an alternative; either way there is no requirement to weld connections together.

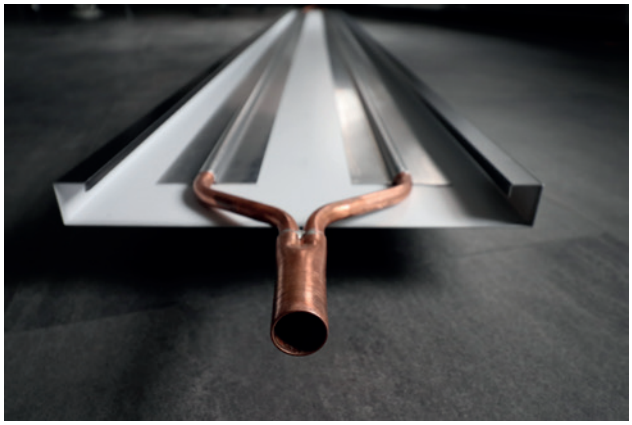
Panels are modular in width and are best suspended using a so-called 'multi suspension bar' that can be supplied loose with the panels. The multi-suspension bar is fixed to adjacent panels leaving a 50mm shadow gap between - it attaches to the panel and hanging wires via simple carabiner clips.

DIMENSIONS

The panels are modular, supplied in either the DSP300-2 pattern or the DSP300-3 pattern with maximum individual panel lengths of 3m. The 300mm modules can be hung in parallel to give effective widths of 300, 600, 900 and 1200mm (plus 50mm gaps between modules when using multi-suspension bar). Individual panels can be connected in length to give runs along the length of the building. Run lengths are only limited by pressure drop considerations, which, in turn, will vary with the flow and return water temperature and flowrates. Typically, runs of up to 40m would be practical for a single water circuit, but if several circuits are piped in parallel, then the physical lengths of runs are limited only by the length of the building.



DSP300-2 underside



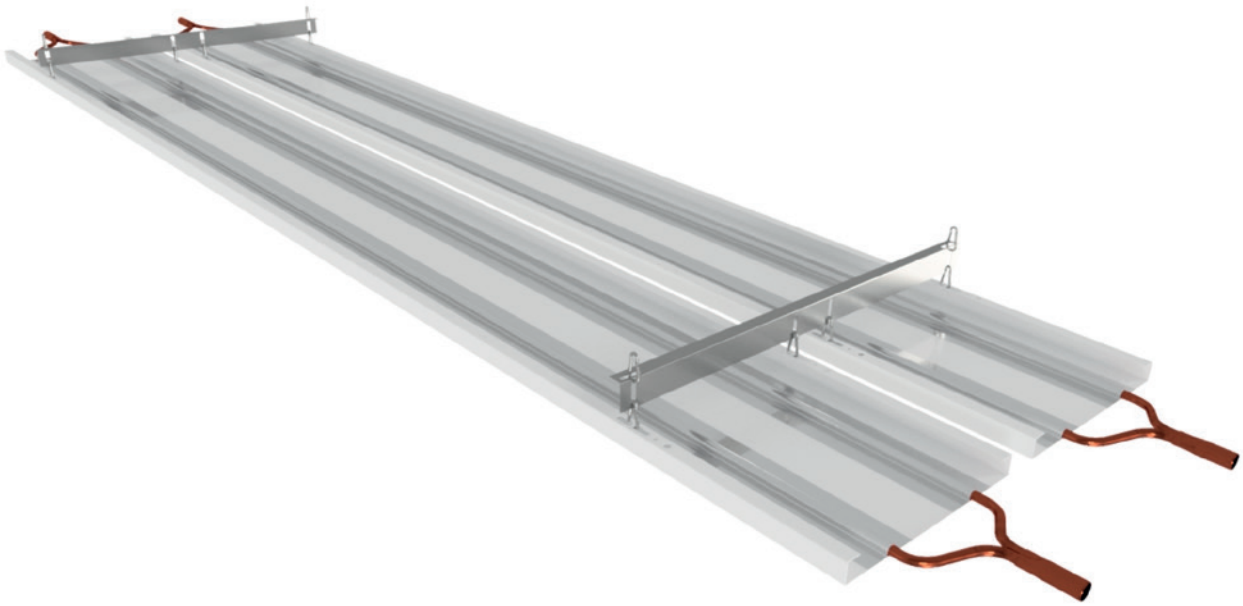
DSP300-2 topside

DSP300-3 underside

DSP300-3 topside

BENEFITS OF RADIANT HEATING

- Radiant heating minimises rate of heat losses and optimises heat distribution
- Radiant panels ideally coupled to heat pumps, negate the need to burn fossil fuels on site
- Copper and aluminium iTwelve construction maximises thermal conductivity and rates of heat output
- Copper and aluminium construction minimises weight and internal volume. iTwelve typically 5.5kg for a 3m module compared to 20kg for a conventional steel tube panel
- Tube manifolding minimises the joints required between panels (typically less than half the quantity required for conventional steel tube panels)
- Simple hanging via multi-suspension bar carabiner hooks and wire - no need for rigid threaded bar arrangements
- Panels can be used for cooling via connection to a reversible heat pump – chilled water temperatures must be held above dewpoint of space air



SPECIFICATION

- 12mm copper primary tubes, flattened to give D shaped profile
- 22mm copper final panel tails
- 1mm edge flanged aluminium radiating panel with copper tubes adhered to back via 0.5mm aluminium saddles
- Required width and length to suit particular requirements – modules available in 300mm widths and up to 3m lengths
- Individual panels are suitable for joining in runs via 22mm copper crimp connectors – panels may also be joined via 22mm compression/push-fit flexible hoses
- Panels are supplied with 25mm foil backed insulation
- Downward facing radiating panel is finished in white RAL 9016
- Multi-suspension bars and carabiner clips available for hanging the panels from the ceiling or steelwork via wires
- Joining plates available to cover the gap between adjacent panels in a run if required – these are fitted after crimping panels together

RATES OF HEAT OUTPUT

The heat output rates vary with the excess temperature – this is calculated as the difference between the mean hot water temperature and the room air temperature. The figures below are given on the basis of the rate of heat transfer versus excess temperature and are intended as a guide. The output figures are Watts per metre squared of panel area. SPC will calculate precise outputs at the design stage, along with pressure drops that would be expected. Outputs from the radiant panels are approximately 70-75% radiant and 25-30% convective.

Excess temp (°C)	W/m2
15	154
20	216
25	281
30	349
35	419
40	490
45	563
50	639
55	715

SPC DESIGN SUPPORT

- Support from the earliest stages of design to ensure optimal results when introducing the iTwelve system
- Technical consultation and site visits can be arranged
- Assistance with logistics, delivery and installation
- Ongoing after sales support
- CPDs and presentations available

SPC

PART OF THE CARVER GROUP

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