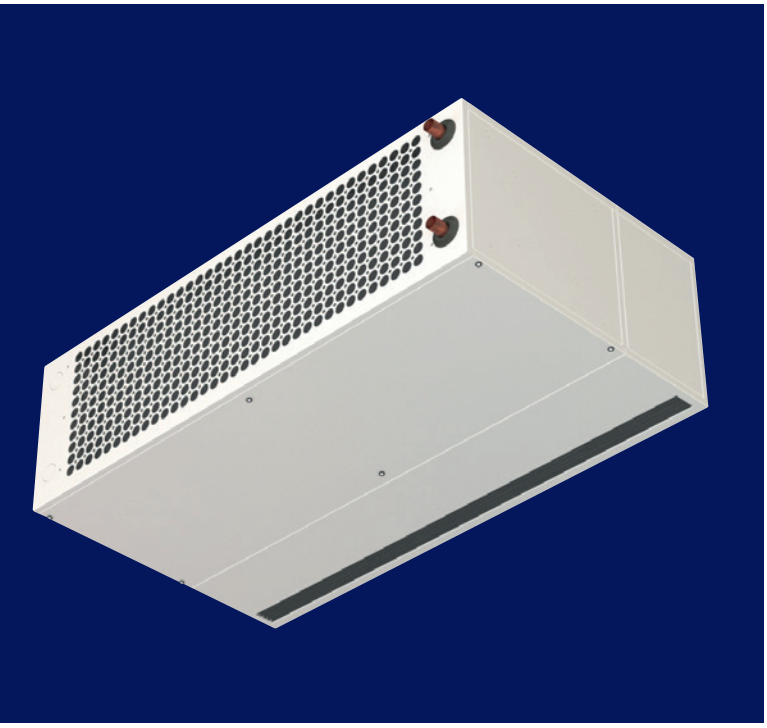

SPC
INDUSTRIAL

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iTWELVE INDUSTRIAL
RADIANT HEATING & COOLING

iTwelve Industrial Radiant Panels

The SPC iTwelve Industrial Radiant Panel is a high-performance heating (and cooling, when specified) solution. Its copper and aluminium construction delivers increased outputs and reduced weight compared with conventional industrial panels, while a patented tube shape and collector design keep on-site connections to a minimum and hanging simple.

Low temperature hydronic radiant panels such as iTwelve are ideally suited to heat pump systems, helping to decarbonise commercial and industrial heating. Radiant heat also brings additional savings by warming objects directly rather than the surrounding air, holding space air temperature lower while maintaining the same resultant comfort, and reducing both heat loss and stratification within the building.

Panel arrangements are bespoke designed by SPC to suit each customer's requirements in terms of output rates, pressure drops, connection positions, and parallel or series piping configurations.

iTwelve Industrial Radiant Panels installed at St Mary's Community and Leisure Centre, Southampton.

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1.1 Construction

iTwelve technology is built around innovative 'D' shaped 12mm copper tubes, wrapped in aluminium saddles and adhered to a 1mm aluminium radiating panel. The combination of the 'D' tube profile and aluminium saddle gives an effective 360° contact between the copper tube and the panel, minimising heat transfer resistance and ensuring the panel is considerably more efficient than competing copper/steel arrangements.

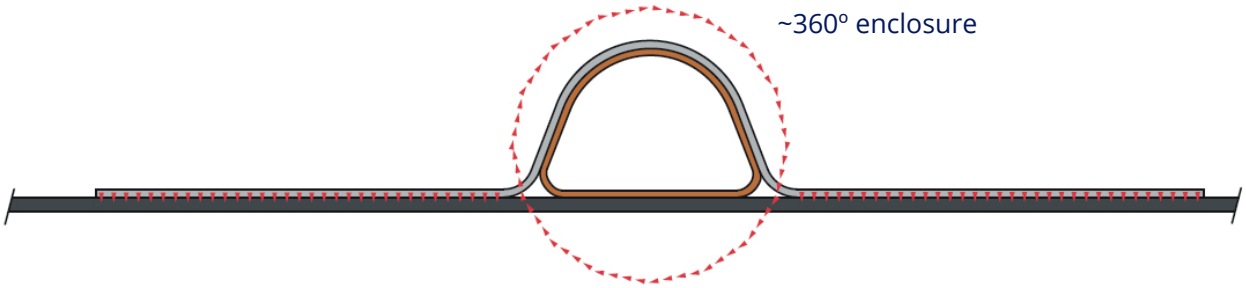
The downward-facing radiating surface is powder coated in white RAL 9016 to maximise radiant emissivity, and the upper surface is covered with a 25mm foil-backed insulated blanket to minimise upward convection.

Individual copper tubes on the back of the panel are joined in splitting and joining manifolds, available in two or three tube versions, each terminating in a plain 22mm copper tail. This keeps the number of interconnecting joints to a minimum along a run. Panels join via 22mm copper crimp connectors or 22mm compression/push-fit flexible hoses, with no welding required. Joining plates are available to cover the gap between adjacent panels once crimped together, if required.

Panels are modular in width and length:

Feature	Detail
Pattern	DSP300-2 (2 tubes) or DSP300-3 (3 tubes)
Module width	300mm
Combined widths	300, 600, 900, or 1,200mm (300mm modules hung in parallel, plus a 50mm gap between modules)
Maximum module length	3m
Typical weight	Approximately 5.5kg dry per 3m module
Suspension	Multi-suspension bar with carabiner clips, fixed to adjacent panels via hanging wires

Long runs are made up of individual panels joined end to end, with each panel requiring only a single final connection pipe. Run length is limited only by pressure drop: typically up to 40m on a single water circuit, though piping several circuits in parallel allows runs limited only by the length of the building.



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1.2 Outputs

Heat output rates vary with excess temperature, calculated as the difference between the mean hot water temperature and the room air temperature. Figures below are given as a guide, in Watts per square metre of panel area; SPC calculates precise outputs and pressure drops at the design stage. Output from the panels is approximately 70–75% radiant and 25–30% convective.

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

Panels can also be used for cooling via connection to a reversible heat pump. Chilled water temperatures must be held above the dewpoint of the space air.

CiRRUS
UNIT HEATERS

CiRRUS Unit Heaters

CiRRUS Unit Heaters consist of a powerful axial fan with an EC motor which draws in space air, blows it across an optimised heat exchanger (coil) and discharges the air through a series of adjustable, angled louvre blades. The casing is powder-coated steel and holds the motor/fan basket grille on the back and the coil towards the front with the pipe connections protruding through the casing. The electrical box is located on the side of the unit and several hanging bracket options are available.

The EC fan is continuously controllable via a 0-10V signal allowing the fan to rotate and move air at a rate commensurate with the height at which the units are required to be mounted.

2.1 Performance Data

Size	Ci5			Ci6			Ci7			Ci8		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Airflow (m3/s)	0.23	0.35	0.46	0.40	0.60	0.79	0.55	0.81	1.10	0.85	1.26	1.69
Output (kW)	6.6	8.2	9.2	12.4	15.1	17.2	17.1	20.8	24.0	26.6	32.4	37.0
Water flow (kg/s)	0.16	0.20	0.22	0.30	0.36	0.41	0.41	0.50	0.57	0.63	0.77	0.88
Water pressure drop (kPa)	5.2	7.7	9.3	23.4	33.5	42.2	8.7	12.5	15.6	24.2	34.4	44.0

Table 1. Performance of units fitted with the standard 2 row coil and operating against conventional boiler flow and return temperatures of 80/70°C and an air temperature of 18°C.

Size	Ci5*			Ci6			Ci7			Ci8		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Airflow (m3/s)	0.22	0.33	0.44	0.38	0.57	0.75	0.53	0.77	1.05	0.81	1.20	1.61
Output (kW)	3.4*	4.7*	5.6*	6.9	8.9	10.2	11.5	14.1	16.4	15.3	19.5	22.7
Water flow (kg/s)	0.05	0.07	0.09	0.08	0.11	0.12	0.14	0.17	0.20	0.18	0.23	0.27
Water pressure drop (kPa)	0.4	0.6	1.0	1.1	2.1	2.3	3.9	5.5	7.2	1.5	2.1	2.8

Table 2. Performance of units fitted with the 3 row coil and operating against flow and return temperatures of 60/40°C and an air temperature of 18°C.

*Ci5 at 60/45°C

Size	Ci5*			Ci6			Ci7			Ci8		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Airflow (m3/s)	0.21	0.31	0.42	0.36	0.54	0.71	0.51	0.73	1.00	0.77	1.14	1.53
Output (kW)	4.0*	5.1*	6.0*	5.9	7.7	9.1	9.5	11.8	14.1	14.9	18.8	22.1
Water flow (kg/s)	0.19	0.24	0.29	0.14	0.18	0.22	0.23	0.28	0.34	0.36	0.45	0.53
Water pressure drop (kPa)	2.7	3.9	5.6	2.2	3.3	4.8	6.0	8.8	12.0	18.0	26.6	35.3

Table 3. Performance of units fitted with the 4 row coil and operating against flow and return temperatures of 45/35°C and an air temperature of 18°C.

*Ci5 at 45/40°C

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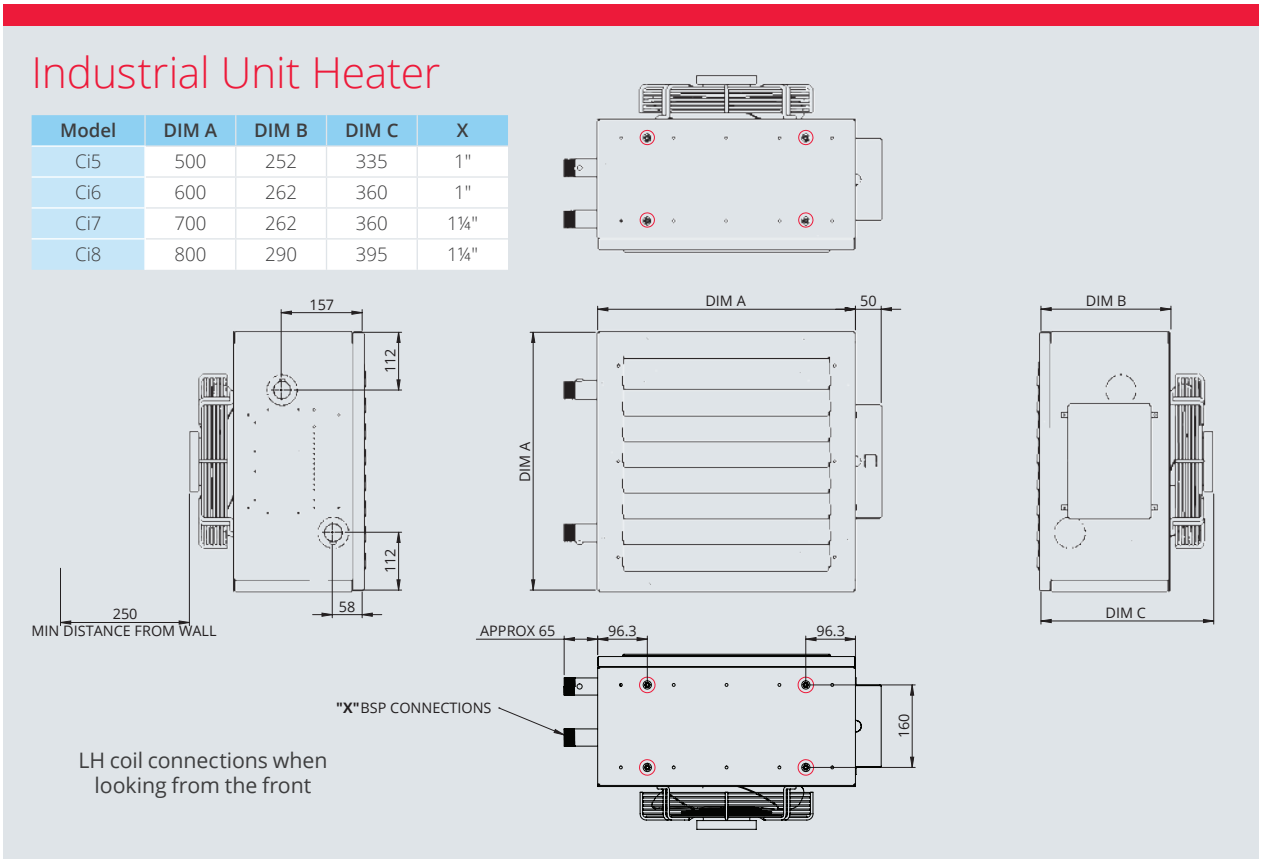
2.2 Electric Heated Units

A version of the Ci5 unit is available with a direct electric heating element rather than hot water coil. This is only available for horizontal mounting. The heating element is rated at 9kW (3 phase) and is available with a two speed medium/high switch.

Size	Ci5	
Supply	400V/3Ph/50Hz	
Speed	Medium	High
Airflow (m3/s)	0.35	0.46
Output (kW)	9.0	9.0
Max power draw/phase (kW)	3.1	3.2
Max current/phase (A)	13.5	13.9

Table 4. Ci5 electric heated unit

2.3 Dimensions



Model	DIM A	DIM B	DIM C	X
Ci5	500	252	335	1"
Ci6	600	262	360	1"
Ci7	700	262	360	1¼"
Ci8	800	290	395	1¼"

Figure 1. Major dimensions

Unit weights are approximate as given in the table below, depending on bracketry arrangement and optional extras.

Unit size	Ci5	Ci6	Ci7	Ci8
Approx. dry weight (kg)	30	45	55	70
Int. vol. 2 row coil (l)	0.9	1.5	2.7	3.7
Int. vol. 3 row coil (l)	1.2	2.0	3.5	4.9
Int. vol. 4 row coil (l)	1.5	2.5	4.3	6.0

Table 5. Unit weights/volumes

2.4 Mounting Height/Coverage

Unit heaters are intended to be mounted outside the occupied area of the conditioned space and to blow a jet of warm air into the area(s) where it is required. The performance and comfort levels achieved are a function of the positions in which the units are installed and in particular their heights above floor level. Higher fan speeds generate greater volumes of airflow and higher momentum jets which will cover greater areas. Smaller units are more suited to mounting in limited areas with reasonably low mounting heights while the larger units lend themselves to greater mounting heights covering greater floor areas. If units are selected with excess airflow then there will be greater than necessary levels of draught and noise.

The figures shown in the table below are for guidance/indication only and should not be considered inflexible. If the application falls close to the range indicated then satisfactory operation will result.

Size	Ci5			Ci6			Ci7			Ci8		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Minimum height (m)	2.0	2.5	2.5	2.5	2.5	3.0	2.5	3.0	3.0	2.5	3.0	3.5
Maximum height (m)	3.0	3.5	3.5	3.5	4.5	4.5	3.5	5.0	5.5	4.0	5.0	6.0
Throw (m)	7	9	13	10	13	19	13	16	25	15	18	27
Coverage (mxm)	6	7	12	9	12	18	11	13	23	12	15	25

Table 6. Recommended mounting heights

Throw represents the range of effectiveness of horizontal units mounted against a wall and blowing downwards at a 30 to 45° angle. If horizontal units are mounted along opposite walls it is helpful to stagger their positions to maximise and homogenise the field of effect. Coverage represents the corresponding area of effect for vertical units blowing downwards.

As mentioned, the figures in the above tables only provide guidance and coverage/throw is affected by mounting height, leaving air temperature and any special outlet louvre arrangements. Ideal leaving air temperatures for unit heaters are in the range of 30 to 45°C. Leaving air temperature is calculated in line with the equation below:

LAT(°C) = EAT(°C)+[Output(kW)/Airflow(m3/s)/1.2]

LAT = leaving air temperature, EAT = entering air temperature

2.5 Noise Data

Size	Ci5			Ci6			Ci7			Ci8		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
dBA	41	47	57	41	50	60	43	52	62	48	54	66

Table 7. Noise levels

2.6 Electrical Data

All hot water heated units are suitable for operation against a 230V/1Ph/50Hz supply. The power draw figures for the units at various speeds are shown below.

Size	Ci5			Ci6			Ci7			Ci8		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Power draw (W)	70	110	200	90	150	300	100	180	380	230	420	700

Table 8. Unit electrical power consumption

*See section 2.2 above for the electric heated unit which requires a 3 phase, 400V, 50Hz supply.

2.7 Control Options

SPC offer a wide range of options for local and automatic controls. Please contact SPC for more information.

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iFORCE INDUSTRIAL AIR CURTAIN

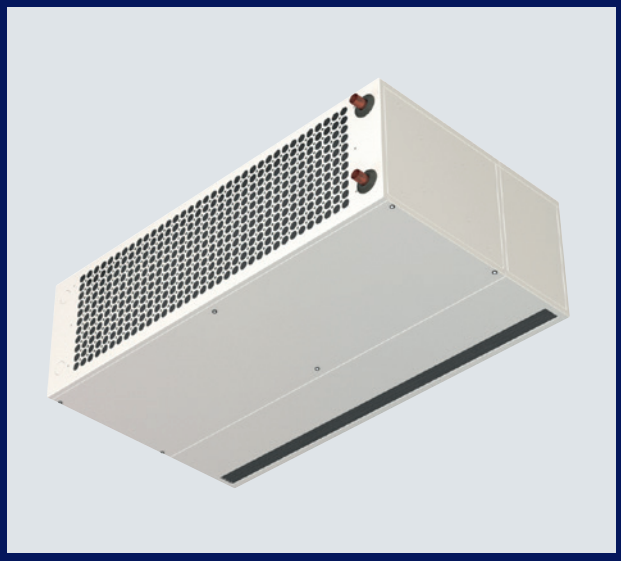
iForce Industrial Air Curtains

iForce Industrial Air Curtains are designed to protect door-ways up to 6m in height and can be mounted either hori-zontally above the door or vertically along the sides of the door. We offer units in widths of 1.5m, 2.0m, and 2.5m. Horizontal units can be installed side by side to cover doorways of any length, while vertical units can be in-stalled on the left, right, or both sides of the doorway and can be stacked.

We have three versions available:

- Ambient units without heat exchangers
- Units with electric heating elements
- Units with low-pressure hot water coil heat ex-changers

The latter can come with a 2-row coil to suit conventional boiler temperatures or an en-hanced 3-row coil to suit lower water temperatures associated with condensing boilers or heat pumps, ideal for decarbonisation efforts.



Our casings are made from heavy gauge, powder-coated steel, and our units come with a range of mounting and control options.

3.1 Performance Data

Size	IAC15			IAC20			IAC25		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High
Airflow (m3/s)	1.00	1.47	1.83	1.22	1.72	1.95	1.83	2.58	2.93
Output (kW)	29.6	35.7	39.5	38.4	45.8	49.0	54.1	63.9	67.9
Water flow (kg/s)	0.71	0.85	0.94	0.92	1.09	1.17	1.29	1.53	1.62
Water pressure drop (kPa)	32.9	46.5	55.9	30.0	41.9	47.7	35.3	48.0	53.7

Table 9. Details of airflows and heat outputs using conventional hot water temperatures of 80/70°C. These are based on an air temperature of 18°C and the standard 2 row coil.

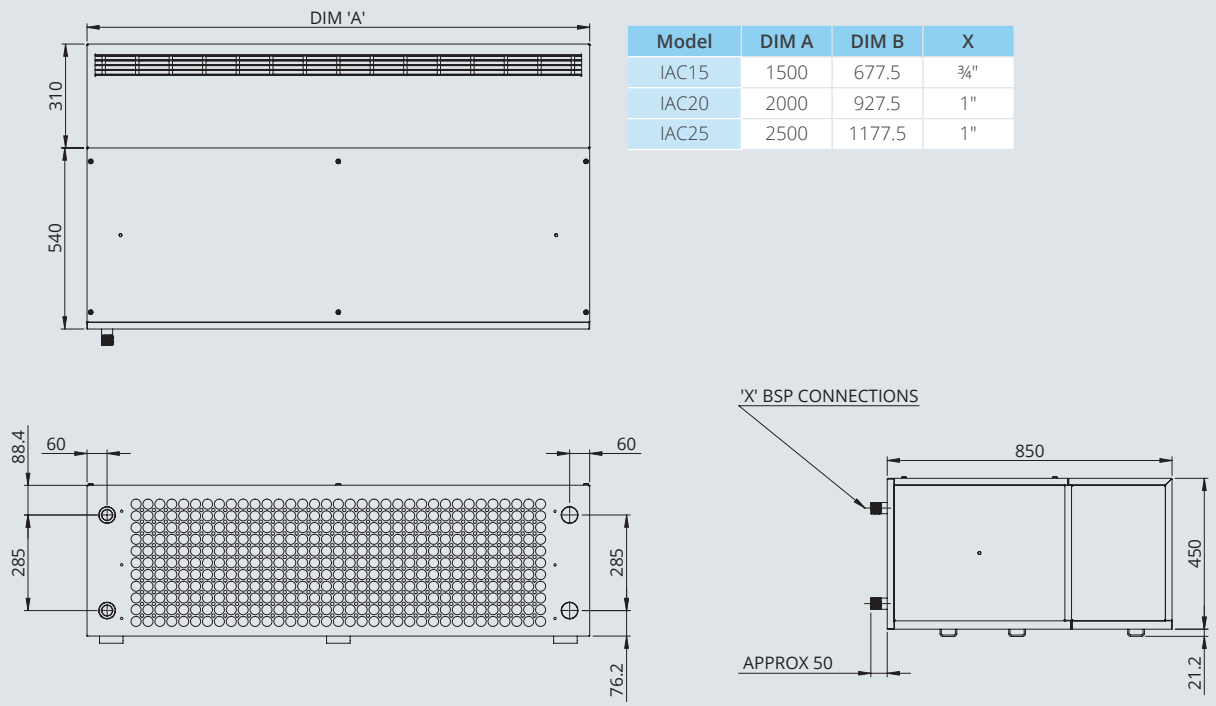
Size	IAC15			IAC20			IAC25		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High
Airflow (m3/s)	0.95	1.40	1.74	1.16	1.63	1.85	1.74	2.45	2.79
Output (kW)	20.1	24.5	27.4	25.9	30.8	33.1	36.7	43.8	46.7
Water flow (kg/s)	0.24	0.29	0.33	0.31	0.37	0.39	0.44	0.52	0.56
Water pressure drop (kPa)	6.6	9.5	11.6	5.3	7.3	8.3	6.8	9.4	10.5

Table 10. Performance of units equipped with a 3 row heat exchanger. Performance is based on 18°C air temperature and 60/40°C hot water temperatures typical of a condensing boiler.

Size	IAC15			IAC20			IAC25		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High
Airflow (m3/s)	0.95	1.40	1.74	1.16	1.63	1.85	1.74	2.45	2.79
Output (kW)	14.1	17.3	19.3	17.9	21.7	23.1	25.8	30.5	32.7
Water flow (kg/s)	0.34	0.41	0.46	0.43	0.52	0.55	0.62	0.73	0.78
Water pressure drop (kPa)	12.7	18.3	22.4	9.9	14.1	15.7	13.0	17.7	20.1

Table 11. Performance of units equipped with a 3 row heat exchanger. Performance is based on 18°C air temperature and 45/35°C hot water temperatures typical of an air source heat pump.

3.2 Dimensions



Model	DIM A	DIM B	X
IAC15	1500	677.5	¾"
IAC20	2000	927.5	1"
IAC25	2500	1177.5	1"

Figure 2. Major dimensions

Unit weights are approximately as given in the table below:

Unit size	IAC15	IAC20	IAC25
Approx. dry weight (kg)	125	155	200
Int. vol. 2 row coil (l)	3.2	4.4	6.0
Int. vol. 3 row coil (l)	4.7	6.4	8.6

Table 12. Unit weights/volumes

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3.3 Mounting Height

Size	Speed		
Speed	Low	Medium	High
Minimum height (m)	3.0	3.5	4.0
Maximum height (m)	4.5	5.0	6.0

Table 13. Recommended mounting heights

The mounting heights shown above are for guidance only. Minimum mounting heights are intended to prevent excessive discomfort when walking below the curtain and to prevent excessive heat loss to the outside for a heated curtain. Maximum mounting heights are those recommended to provide an effective curtain to floor level; units can be mounted at higher levels but some ingress of cold air at floor level will be experienced despite the curtain still providing protection across most of its height.

If air curtains are mounted vertically then the mounting height becomes the effective range of the curtain from the side of the door. For particularly wide doors curtains may be mounted at both sides.

3.4 Noise Data

Industrial air curtains are intended to blow powerful jets of air over considerable distances. As such they handle high flowrates of air and the fans generate considerable levels of noise. The noise is high in the immediate vicinity of the curtain and falls away with distance from the door. If the area to be protected is noise sensitive then high powered curtains should not be used and physical barriers will need to be considered but as this is rarely the case in industrial applications curtains can just be selected based on door sizes and heating requirements. The various noise levels are a consequence of the rate at which air is moved to protect doors of varying sizes.

Size	IAC15			IAC20			IAC25		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High
dBA	45	53	61	47	55	63	50	58	66

Table 14. Noise levels

The figures shown for noise levels in the table above are for indication/guidance only and represent what should be expected based on free field conditions and at a distance of 5m from the curtain. Actual noise levels will depend on the reverberant nature of the installation.

3.5 Electrical Data

Size	IAC15			IAC20			IAC25		
Speed	Low	Medium	High	Low	Medium	High	Low	Medium	High
Power draw (W)	250	750	1300	300	900	1500	450	1350	2250

Table 15. The above table is valid for ambient and low pressure hot water units. All 230V/1Ph/50Hz.

Size	IAC15		IAC20		IAC25	
Speed	Medium	High	Medium	High	Medium	High
Fan power draw (W)	750	1300	900	1500	1350	2250
Heating element power (kW)	12	18	18	24	24	36
Heating element current/phase (A)	18	26	26	35	35	53

Table 16. The above table is valid for electric heated units. All 400V/3Ph/50Hz.

3.6 Control Options

SPC offer a wide range of options for local and automatic controls. Please contact SPC for more information.

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