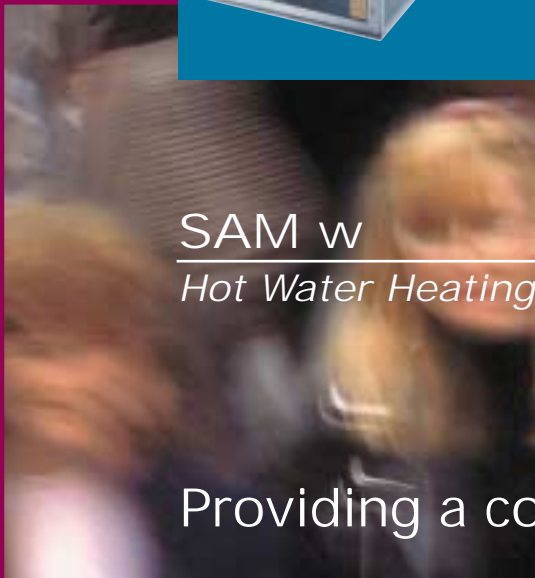
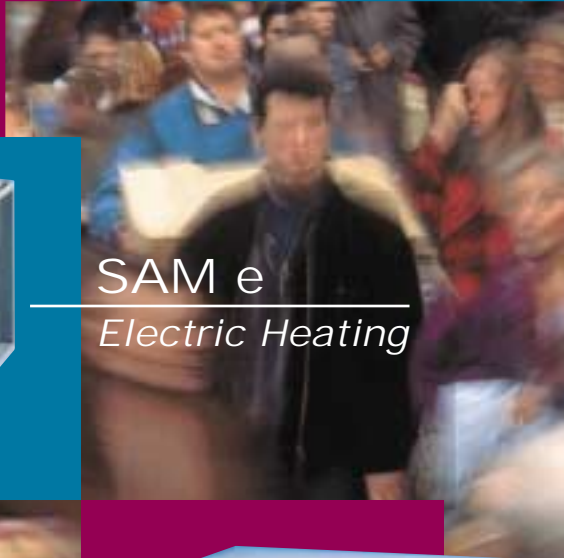


SAM™



SAM e
Electric Heating



SAM w
Hot Water Heating



Providing a comfortable environment

small

AIR MOVERS

0.05m³/sec to 2.4m³/sec

Powerful yet quiet

Extensive options

Quick delivery



We care about air

SAM small air movers are ideal for installation in commercial and public buildings. From a basic range of units comprising fan, filter and heater, there is an extensive range of additional options providing the designer with the components he would normally only expect to find in belt driven air handling units.

Low noise is often an important factor. Both fan sound power and breakout noise levels are detailed and attenuation options include silencers and double skinned cases.

Quick delivery required? Many of the basic fan, filter, heater units are available on FAST TRACK - delivery to site within 48 hours of placing order. Most other options are available within two weeks.

Design Features

- Five sizes of unit with air volumes up to 2.4m³/sec.
- Single or double skinned case.
- Double inlet centrifugal fans with high temperature thermal cut-out protection.
- Options include:
 - Inlet damper
 - Mixing box
 - Frost heater - hot water or electric
 - Panel filter to EU3 or EU4
 - Bag filter to EU7
 - Chilled water or DX cooling coil
 - Main heater - hot water or electric.
- Units have galvanised sheet steel cases as standard with the option of synthetic powder coat paint finish in light grey to BS 00A05.
- Fitted silencers.
- Matching control panels.
- Access panels and coil connections can be either side of unit. Top or bottom access is available on some sections.
- Units can be vertically mounted - except those with cooling coils.
- Easy maintenance - all components side withdrawable.
- All fans speed controllable.
- Easy duct connection using proprietary flange systems.
- All units tested in accordance with BS 848.
- All equipment manufactured under ISO 9001 quality system.

small

AIR MOVERS

Contents

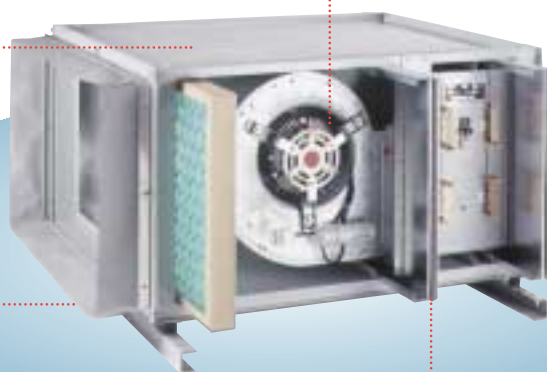
Selection Curves	4
Standard Unit Dimensions	6
Electric & Hot Water Heaters	8
Introduction to Options	9
Additional Sections	
Inlet Damper	10
Mixing Box	10
Frost Coil - LPHW	11
Frost Coil - Electric	11
Bag Filters	12
Cooling Coils	13
Sound Data	13
Silencers	14
Control Panels for SAM units.	15
Specifications	16

Single or double skinned cases, galvanised or powder coat finished

Thermistor protected motors as standard

Single or double flanged flexible connections available

Mounting feet extended beyond case to enable easy fitting to drop rods or onto a base



Components on slide out plates to facilitate wiring and maintenance

AIR MOVERS

How to select the unit you require.

The fan curves have been produced from testing the units containing the standard panel filter and LPHW heating coil. Should you require electric heating there will be slightly more pressure available at the duty point. Add the resistance to airflow of any optional extra components you require to your external resistance when selecting unit.

Specify your requirements in the order shown in the following example.

Case Size	Fan Size	Electric Heater
SAM 2	3	E

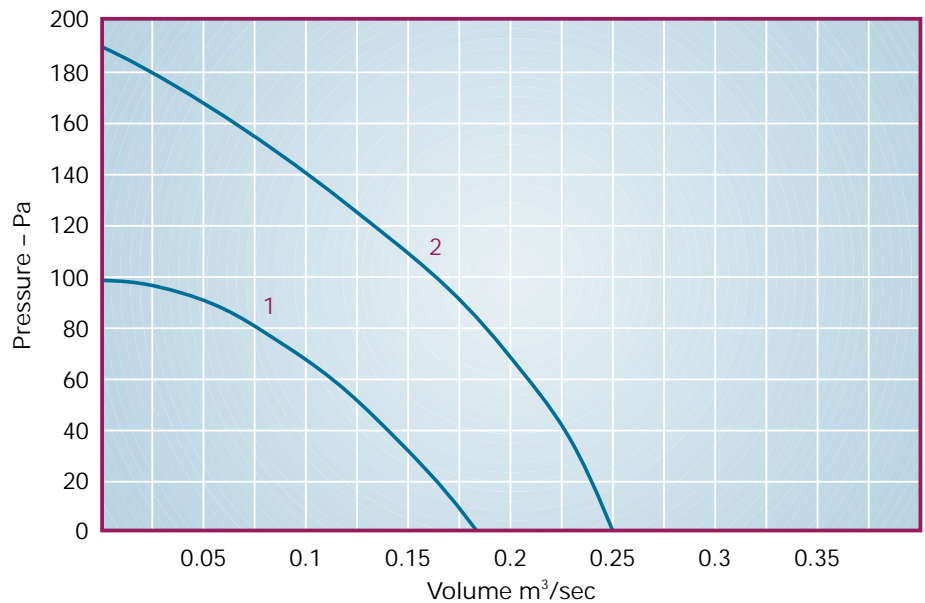
Detail the heater output e.g. 9.0kW EHB in 3 x 1 phase steps.

Double skinned case required? Add the suffix DS to unit selected - SAM 23-E/DS.

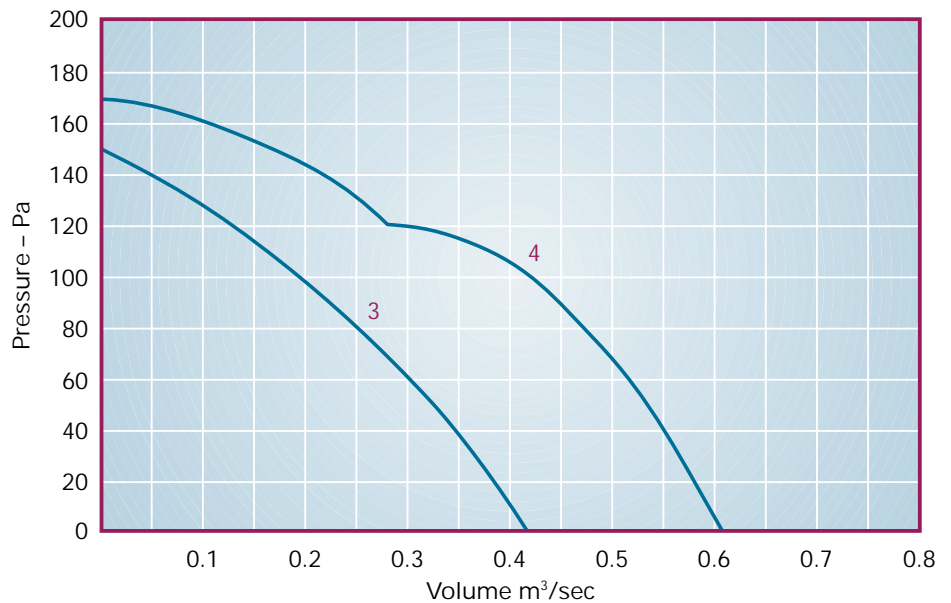
Units with hot water heater SAM 23-W.

Detail optional extra components as required.

SAM 1



SAM 2

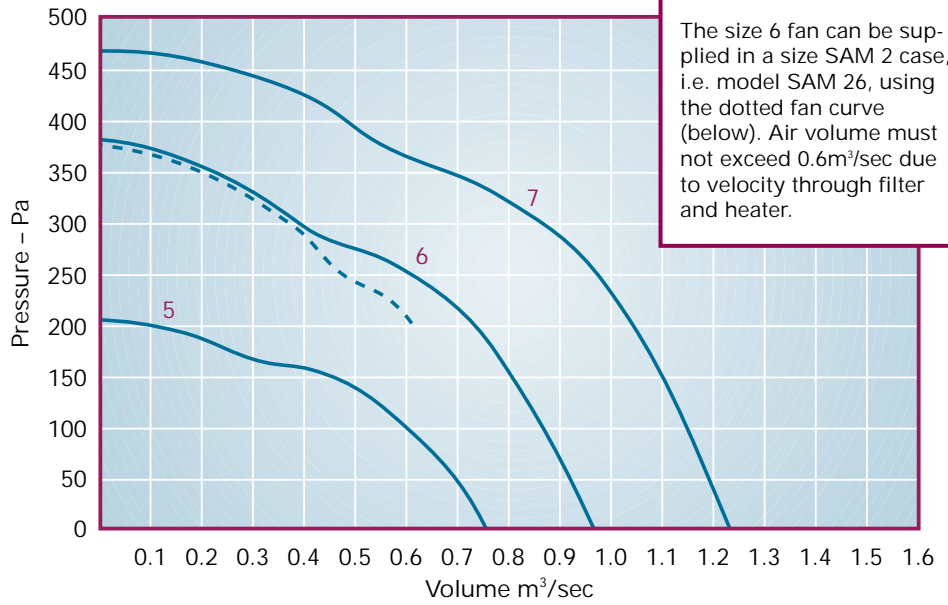


small

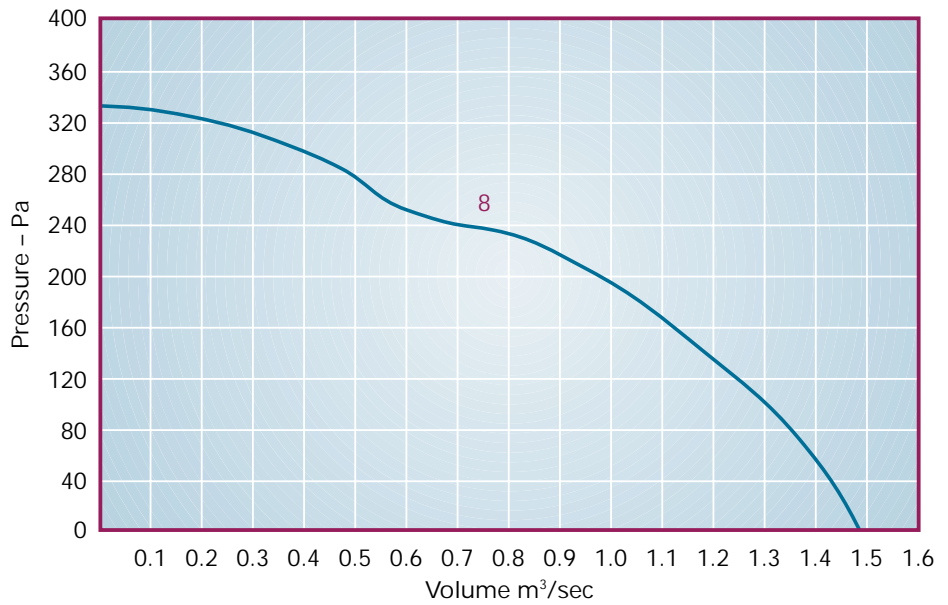
AIR MOVERS

Selection Curves

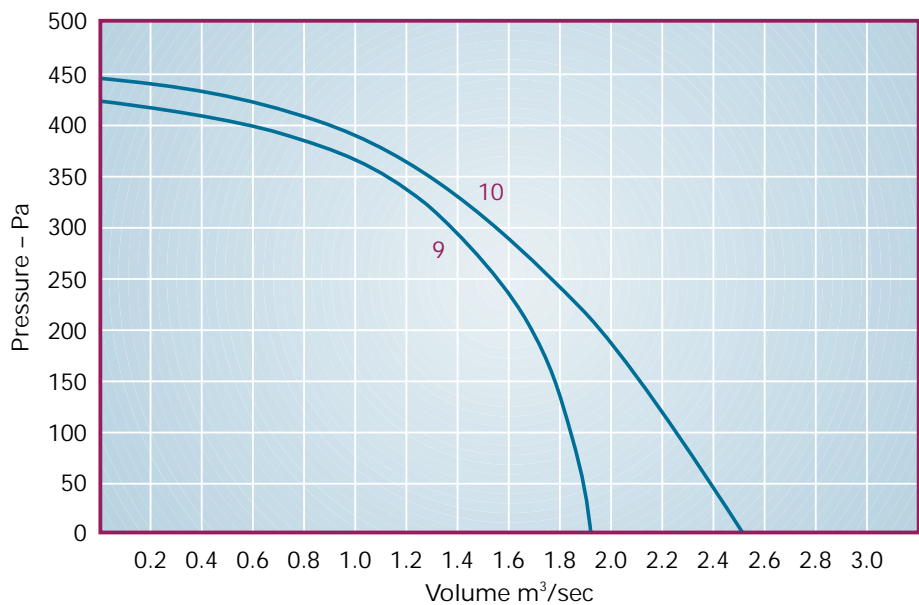
SAM 3



SAM 4



SAM 5



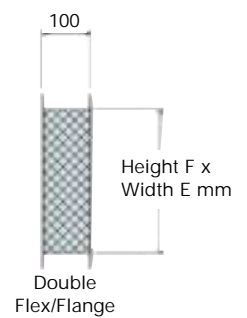
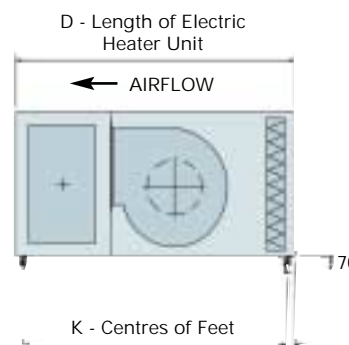
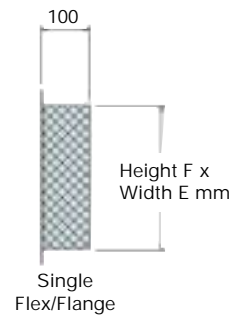
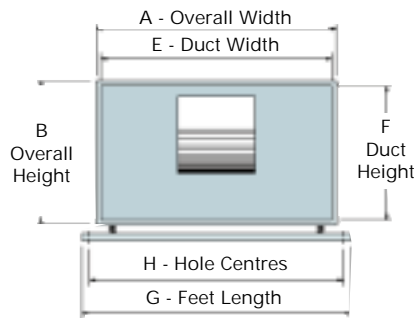
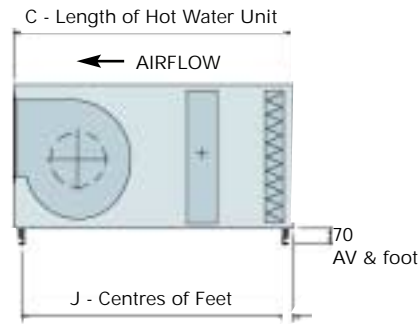
small

Standard Unit Dimensions

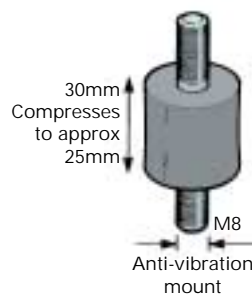
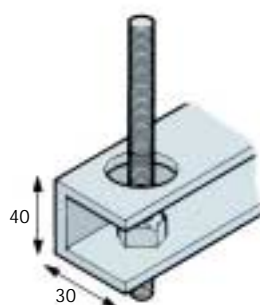
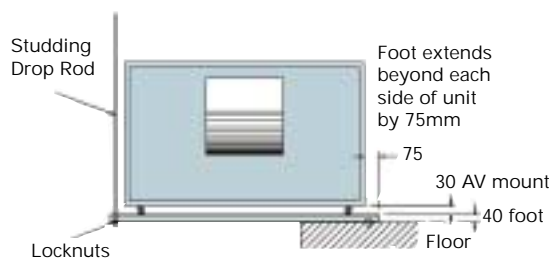
AIR MOVERS

SAM 1 - 4

Access panels, electrical and coil connections are available either left or right hand side looking in the direction of the airflow.



SAM Model	Dimensions - mm										Weights - Kg	
	A	B	C	D	E	F	G	H	J	K	Single skinned	Double skinned
1	600	325	700	700	550	275	750	670	620	620	30	51
2	750	480	850	850	700	430	900	820	770	770	55	87
3	850	550	1190	1190	800	500	1000	920	1110	1110	90	128
4	950	650	1500	1500	900	600	1100	1020	1420	1420	125	178



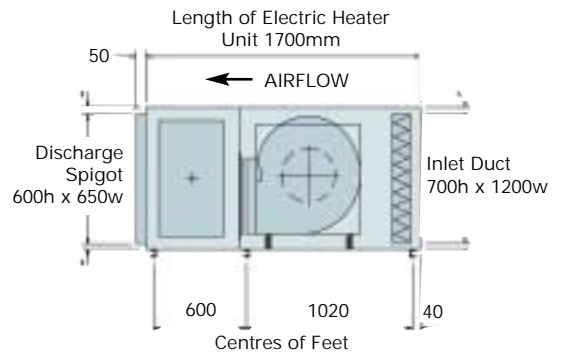
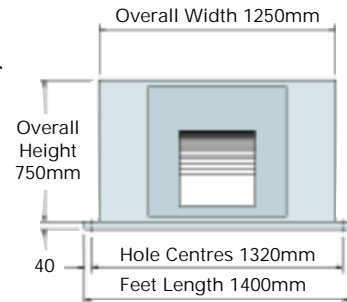
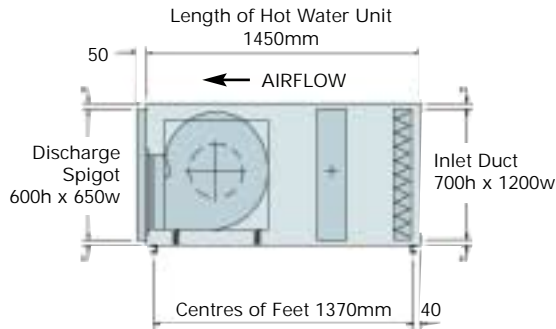
small

Standard Unit Dimensions

AIR MOVERS

SAM 5

Access panels, electrical and coil connections are available either left or right hand side looking in the direction of the airflow.

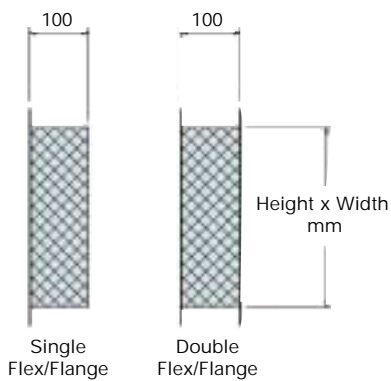


Weights - Kg	
Single skinned	146
Double skinned	175

Fan internally isolated with AV mounts and flexible connection.

Silencer model VA5 fits directly to unit outlet or onto inlet plenum. Silencer fits over discharge spigot onto unit case.

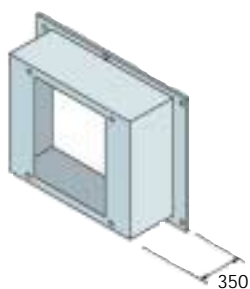
Flexible connections



Location	Height	Width
To unit inlet	700	1200
To silencer	700	800
To discharge spigot	600	650

Inlet plenum box

Model SAMPL5



SAM model	Filter size	VES part no.
1	550x270x50	SAMDF 1
2	700x425x50	SAMDF 2
3	800x495x50	SAMDF 3
4	900x595x50	SAMDF 4
5	695x598x100 (2NO)	SAMDF 5

small

Electric & Hot Water Heaters

AIR MOVERS

The maximum size of electric heater each unit can accommodate is as follows:

SAM 1 6.0kW **SAM 2** 12.0kW **SAM 3** 24.0kW **SAM 4** 36.0kW **SAM 5** 54.0kW

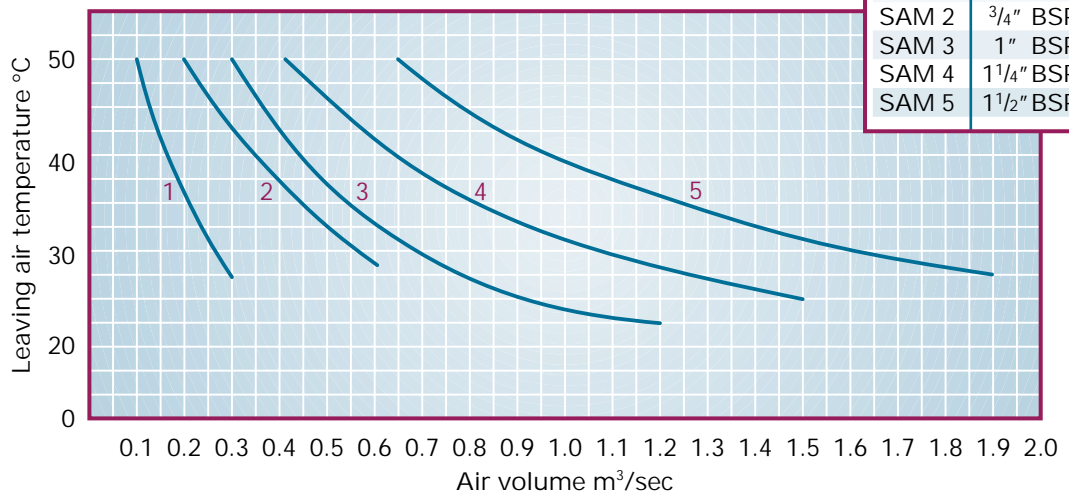
Electric heater sizes and steps

230 Volt single phase steps						
kW Rating	Number of available steps					
	1	2	3	4	5	6
0.50	●					
1.00	●	●				
1.25	●					
1.50	●		●			
2.00	●	●		●		
2.50	●	●			●	
3.00	●	●	●			●
3.75	●		●			
4.00	●	●	●	●		
4.50	●	●	●			
5.00	●	●	●	●	●	
6.00	●	●	●	●		●
7.50	●	●	●		●	●
8.00	●	●	●	●	●	●
9.00	●	●	●	●	●	●
10.00	●	●	●	●	●	●
12.00	●	●	●	●	●	●
15.00	●	●	●	●	●	●
18.00	●	●	●	●	●	●
20.00	●	●	●	●	●	●
24.00	●	●	●	●	●	●
30.00	●	●	●	●	●	●

400 Volt three phase steps (star)						
kW Rating	Number of available steps					
	1	2	3	4	5	6
1.50	●					
3.00	●	●				
3.75	●					
4.50	●		●			
5.00	●					
6.00	●	●		●		
7.50	●	●			●	
9.00	●	●	●			●
10.00	●	●				
11.25	●		●			
12.00	●	●	●	●		
13.50	●	●	●			
15.00	●	●	●	●	●	
18.00	●	●	●	●	●	●
20.00	●	●	●	●	●	●
22.50	●	●	●		●	●
24.00	●	●	●	●	●	●
27.00	●	●	●	●		●
30.00	●	●	●	●	●	●
36.00	●	●	●	●		●
45.00	●	●	●	●	●	●
54.00	●	●	●	●	●	●

LPHW heating coil duties

Low pressure hot water 82/71°C - Performance based on EAT -5°C



To calculate the size of heater output required:

$$\begin{aligned}
 &\text{Air volume} \times \text{Constant} \times \text{Temperature difference} = \text{Heat output} \\
 &\text{M}^3/\text{Sec} \times 1.21 \times \Delta\text{T}^\circ\text{C} = \text{kW} \\
 \text{or } &\text{CFM} \times 1.08 \times \Delta\text{T}^\circ\text{F} = \text{BTU/HR}
 \end{aligned}$$

To determine water flow rate through heating coil:

$$\frac{\text{Total Duty kW}}{45 \text{ Constant}} = \text{L/sec}$$

Inlet damper - mixing box - frost coil - bag filter - cooling coil

An important consideration when selecting additional sections is the resistance to air flow of the components. This is stated for each item on the following pages.

The final overall length of the unit will depend on the mix of components required, certified drawings are readily available from the VES Standard Products Sales Department. The dimensions on the following pages will be accurate for most sections.

All cases are available single skinned, double skinned with mineral fibre or plasterboard infill as necessary.

Some sections can be supplied with top or bottom access. This applies to SAM 1 - 4 but not SAM 5 which is side access only. Bag filters, hot water heaters and cooling coils are also only available with side access.

The standard EU3 panel filter can be replaced with a washable filter if required.

Special layouts - no problem!



Vertical unit with inlet damper, bag filter, fan and electric heating battery.



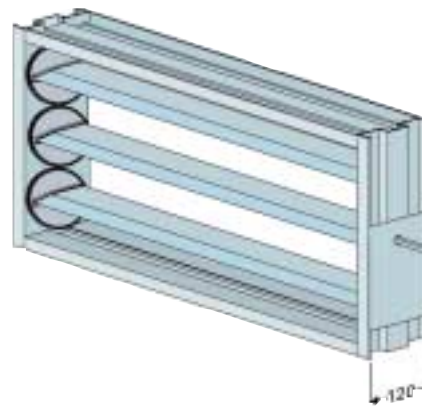
Stacked unit with REX extract fan, three way mixing box, filter, heater and supply fan.

AIR MOVERS

Inlet Damper

The inlet damper is opposed blade type with edge seals and aerofoil blades, suitable for motorising or hand operation.

SAM model	Damper size - mm	
	Duct height	Duct width
1	265	540
2	420	690
3	490	790
4	590	890
5	690	1190



Notes

Damper flange size 30mm.

The overall damper size is the same as the SAM case allowing standard flexible connections, silencers etc. to be fitted direct to the damper.

Mixing Box

Dampers can be located to either side, top, bottom, or end of unit, and are suitable for motorising or hand operation.

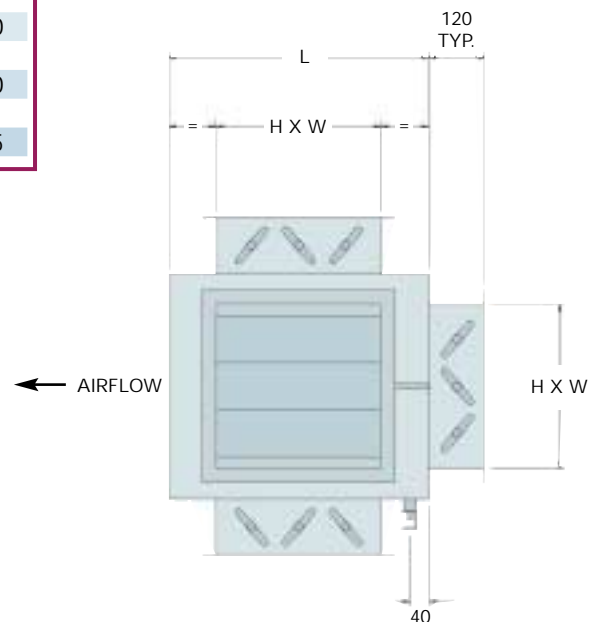
SAM model	Damper size - mm			Weight kgs	
	Length 'L'	Height 'H'	Width 'W'	Single skinned	Double skinned
1	320	200	200	15	20
2	470	350	350	20	30
3	520	400	400	25	40
4	620	500	500	30	50
5	760	585	585	45	65

Notes

All dampers are central on case.

Damper flange size 30mm.

A.V. mounts not necessary with mounting foot on SAM 5 unit.

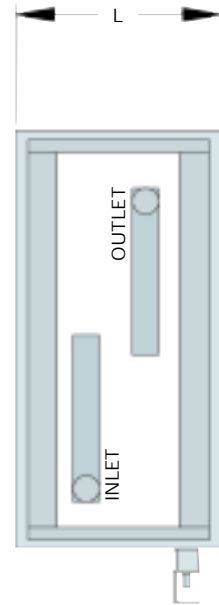


AIR MOVERS

Frost Coil - LPHW

Coil has one row of tubes with fins spaced at 6mm, and will raise the air from -5°C to +5°C. The resistance to airflow through the LPHW frost coil will not exceed 10Pa.

SAM model	Dim L mm	Weight kgs		Typical duty details			Coil connect size
		Single skin	Double skin	kW	Flow Rate l/sec	Water pressure KPa	
1	300	10	15	2.00	0.05	0.50	3/4" BSP
2	300	12	18	5.00	0.11	4.00	3/4" BSP
3	300	14	22	9.00	0.19	11.00	3/4" BSP
4	300	15	25	10.00	0.24	14.00	3/4" BSP
5	250	40	48	13.00	0.42	14.00	3/4" BSP

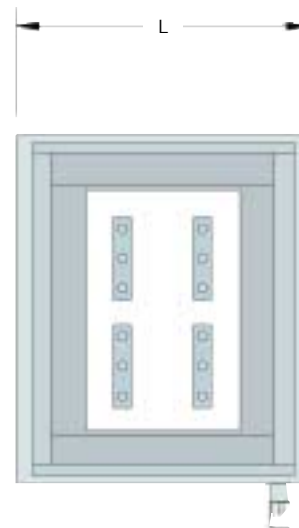


Frost Coil - Electric

Select the kW rating and number of steps from the table on page 8.

The resistance to airflow through the electric frost heater is negligible.

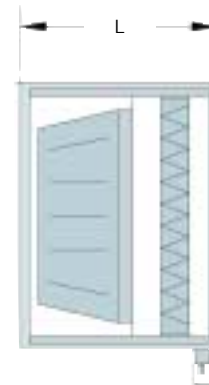
SAM model	Dim L mm	Weight kgs		Typical Duty kW @ 10°C ΔT
		Single skin	Double skin	
1	400	10	21	2.00
2	400	12	23	5.00
3	400	15	26	10.00
4	450	18	29	12.00
5	350	22	33	20.00



Additional Sections

Bag Filters

Bag filter sections for EU5 and above have provisions for a prefilter within the stated length. EU4 bag filters slide in channels. EU5 and above are front mounted and clipped onto the bulkhead.



EU4 Bag Filter

SAM model	Section Length L mm	Rated volume V1 m ³ /sec	Clean resistance P1 at rated volume - Pa
1	300	0.20	10
2	300	0.50	10
3	475	1.00	17
4	475	1.20	15
5	250	2.00	44

EU5 Bag Filter

SAM model	Section Length L mm	Rated volume V1 m ³ /sec	Clean resistance P1 at rated volume - Pa
1	475	0.20	30
2	475	0.50	35
3	625	1.00	55
4	625	1.20	39
5	600	2.00	62

EU6 Bag Filter

SAM model	Section Length L mm	Rated volume V1 m ³ /sec	Clean resistance P1 at rated volume - Pa
1	625	0.20	31
2	625	0.50	35
3	850	1.00	70
4	850	1.20	60
5	850	2.00	97

EU7 Bag Filter

SAM model	Section Length L mm	Rated volume V1 m ³ /sec	Clean resistance P1 at rated volume - Pa
1	625	0.20	31
2	625	0.50	35
3	850	1.00	70
4	850	1.20	60
5	850	2.00	110

To determine the clean resistance of the bag filter at your required air volume, use the following formula.

$$P2 = \frac{P1}{(V1)^2} \times (V2)^2$$

When: V1 = Rated volume m³/sec

P1 = Resistance at rated volume Pa

V2 = Required volume m³/sec

P2 = Resistance at required volume Pa

e.g. If the clean filter resistance at 1.2m³/sec is 60Pa, what is it at 0.9m³/sec?

$$P2 = \frac{60Pa}{(1.2m^3/sec)^2} \times (0.9m^3/sec)^2 = 33.75 Pa$$

$$P2 = \frac{60}{1.44} \times 0.81 = 33.75 Pa$$

This fan law formula can be used for any other volume and air pressure change.

AIR MOVERS

Cooling Coils

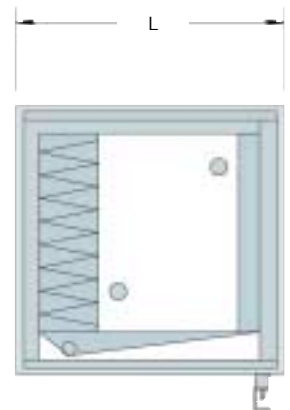
Chilled water and DX cooling coils are selected to meet your exact duty requirements. They consist of copper tubes expanded into plate type aluminium fins, with a boxed and insulated case. Moisture eliminators are fitted to all coils with a face velocity of 2.0m³/sec and above. Drain pan fitted with condensate connection which will require trapping at time of installation. DX coils will have been purged and sealed with a nitrogen charge. Chilled water coils are not supplied with air vent and drain to headers, these should be installed on the adjacent connection pipework.

VES recommends that you specify double skinned cases for units with cooling coils. Section lengths are generally 650 mm or 850 mm long depending on duty and adjacent components. The VES standard product sales office will advise.

Selection guide

Based on DX evaporating at 5°C or chilled water 5°C - 11°C, with entering air at 28°Cdb/20.5°Cwb, leaving air 15.4°Cdb/14.5°Cwb.

SAM model	Air volume m ³ /sec	kW Cooling	Airflow resistance Pa	Number of coil rows	Case length L - mm
1	0.075	1.65	15	4	650
	0.125	2.75	39	4	650
	0.175	3.85	86	5	850
2	0.20	4.40	14	3	650
	0.30	6.60	32	4	650
	0.40	8.80	76	4	850
	0.50	11.00	126	5	850
3	0.50	11.00	56	5	650
	0.65	14.30	126	6	850
	0.80	17.60	187	6	850
4	0.80	17.60	83	5	850
	1.00	22.00	143	5	850
5	0.80	17.60	26	3	850
	1.20	26.40	43	4	850
	1.60	35.20	124	5	850
	1.80	39.60	203	6	850



Sound Data

Sound levels - Sound power level dB ref 10⁻¹²w PWL

Fan size	SPL *dBA	Centre frequency - Hz							
		63	125	250	500	1000	2000	4000	8000
1	44	65	61	56	55	55	53	51	47
2	46	69	66	58	57	57	55	53	49
3	47	69	66	59	58	58	56	54	50
4	58	69	70	64	69	69	57	65	61
5	58	71	70	64	68	69	57	66	60
6	64	75	76	70	72	75	75	73	67
7	62	73	75	68	72	74	73	70	65
8	64	76	77	70	72	72	71	70	64
9	64	75	76	71	74	74	75	73	68
10	71	83	84	80	81	82	81	79	72

* At 3 metres from outlet, free field

Noise breakout - Sound pressure levels SPL dBA at 1 and 3 metres from case

Fan size	Single skin case				Double skin case			
	dBA @ 1m	NR @ 1m	dBA @ 3m	NR @ 3m	dBA @ 1m	NR @ 1m	dBA @ 3m	NR @ 3m
1	37	35	32	30	32	30	27	25
2	39	35	34	30	34	30	29	25
3	40	35	35	30	35	30	30	25
4	51	45	46	40	46	40	41	35
5	51	45	46	40	46	40	41	35
6	57	55	52	50	52	50	47	45
7	55	50	50	45	50	45	45	40
8	55	50	50	45	50	45	47	40
9	57	55	52	50	52	50	47	45
10	64	60	59	55	59	55	54	50

small

Silencers

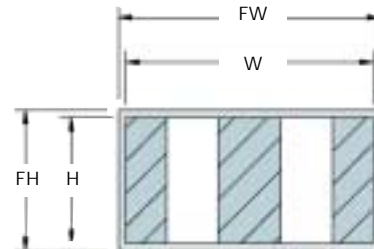
AIR MOVERS

Silencers

The standard VA silencers are designed to fit straight on to the SAM unit, on both the inlet and outlet. The splitters and side liners are non-combustible resin bonded mineral fibre slab faced with bonded glass tissue to prevent erosion of the attenuating material. The silencer case is galvanised sheet steel with 25mm proprietary duct flanges.

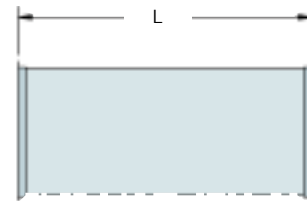
Silencer model	To fit SAM	Dimensions					Weight kg
		Width	Height	Length	FW	FH	
VA1	1	550	275	1000	600	325	23
VA2	2	700	430	1000	750	480	37
VA3	3	800	500	1000	850	550	44
VA4	4	900	600	1000	950	650	62
VA5	5	800	700	1200	850	750	60

The VA5 silencer is narrower than the SAM5 case, and is located centrally. Should an inlet silencer be required, a 350mm long inlet plenum, part number SAMPL5, is to be fitted between the unit and silencer.

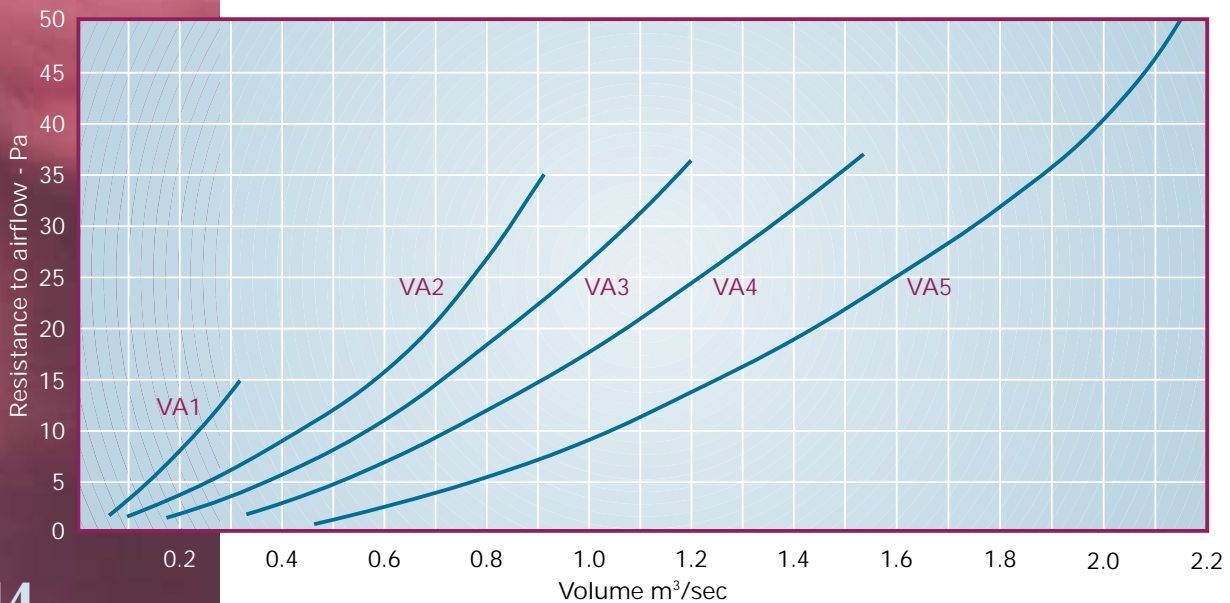


Attenuation

Model	Centre frequency - Hz							
	63	125	250	500	1000	2000	4000	8000
VA1	4	8	14	28	36	36	28	22
VA2	4	7	13	25	32	32	23	18
VA3	5	9	16	30	39	39	31	26
VA4	4	8	14	28	36	36	28	22
VA5	4	7	13	25	32	32	23	18



Silencer air pressure loss



Hot water heater units

Model CPW-1 See leaflet no.774.

Model ECO-W A more comprehensive panel which includes operation of extract fan, dampers or mixing box, seven day time clock, volt free contacts.

Electric units (refer to leaflets 764 and 766)

Model CPEH-1 Single step heating for up to 3.0kW.

Model CPEH-2 Low cost control for upto 6.0kW in two 1 phase steps.

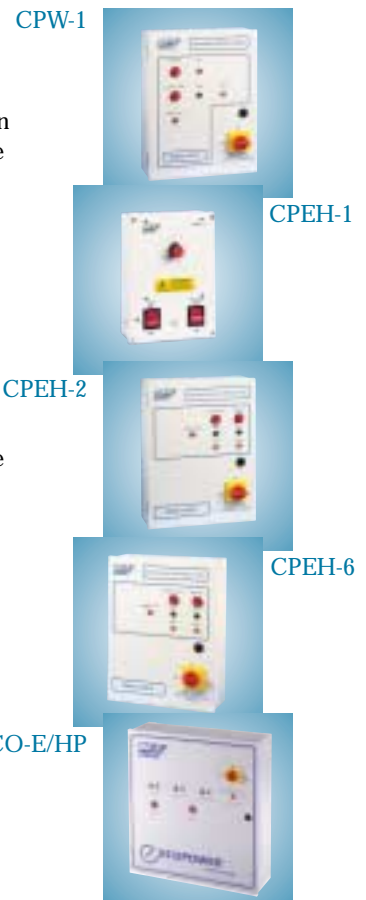
Model CPEH-6 Upto 18.0kW of heater output in up to 6 steps.

Model ECO-E/STD A more comprehensive panel including operation of extract fan, dampers or mixing box, seven day time clock, volt free contacts. Up to 18.0kW of heater output in up to six steps.

Model ECO-E/HP Similar to panel ECO-E/STD but with heater output up to 30.0kW in six steps.

Notes

All control panels include fan and heater switches, neon indicators, door isolator, temperature set point adjustment between 0-40°C, 10 metres of cable with a duct or room sensor. Electric heater panels include fan run-on timer and thermal cutout connection. Hot water panels include a frost stat. All that is required on site is to wire between panel and fans, heater and sensor.



Electrical details and fan speed controllers

Fan	Motor output watts	FLC amps max	Speed rpm	Speed regulator
1	73	0.4	900	T1
2	92	1.1	1300	V2
3	125	1.3	850	T1
4	250	2.8	910	V63
5	250	3.4	910	V63
6	550	6.1	1380	V63
7	550	8.0	1380	T8
8-1ph	750	5.8	910	T8
8-3ph	1100	3.5	910	SC310
9-1ph	2600	12.2	820	T12
9-3ph	2700	6.3	850	SC310
10-3ph	2700	6.5	850	SC310

Model	Dimensions (mm)		
	Width	Height	Depth
V2	90	150	45
V63	95	145	50
T1	120	190	65
T8	160	230	120
T12	190	250	130
SC 310	220	353	130



small

Specifications

AIR MOVERS

Quality standards

VES is a British Standards Institution registered company operating a quality system to BS ISO 9001, certificate number Q 5375. All units are tested to BS 848 part 1.

Case

The SAM unit casings are rigidly constructed using galvanised sheet steel, single skinned or double skinned with an infill of mineral fibre slab or plasterboard. The units can be powder coat paint finished externally if required in light grey to BS00A05. All components are easily removed from the SAM Unit, with the fan, heater and panel filter mounted in channels to enable them to be side withdrawn. Sufficient room should be allowed adjacent to the unit for maintenance access. Should the unit be required for vertical mounting this should be stated on the order or specification. The unit is suitable for fitting directly to 25mm proprietary flange duct connections.

Fans

Forward curved centrifugal fans, multi-vane, double inlet double width, direct driven by hub mounted motors. All motors are fitted with high temperature automatic cut-out protection.

Heater - Electric

Electric heater batteries consist of sheathed elements mounted on removable terminal plates and fitted into galvanised mild steel cases. For control purposes they are split into any number of required stages. Safety cut-outs are fitted. Fan over-run timers should always be incorporated into the control system where electric heaters are used. We also recommend the fitting of an air-flow pressure switch.

Heater - Hot Water

The standard low pressure hot water heating coils consist of two rows of copper tubes mechanically expanded into plate type aluminium fins. The headers and return bends are also copper and the connections are standard BSP fittings. Frost coils have one row of copper tubes with fins spaced at 6mm.

All coils are subjected to an air under water test of 250PSI. Neither a coil drain nor an air vent is fitted and should be installed on the adjacent connecting pipework.

Filters

The standard filter panel is a continuously spun glass fibre filament, non hydroscopic and flame retardant, with a dust arrestance of 84% to EU3 at a velocity of 1.5m/sec.

The standard panel filters and EU4 bag filters are fitted into slide-in channels. EU5 bag filters and above are front mounting and clipped onto the bulkhead.



VES Andover Limited
Eagle Close, Chandlers Ford Industrial Estate,
Chandlers Ford, Eastleigh, Hampshire SO53 4NF

Tel: 08702 40 43 40
Fax: 08702 40 45 50
e-mail: vesltd@ves.co.uk
www.ves.co.uk



ISO 9001-2000
Cert. No. Q5375