

# SAM

## SMALL AIR HANDLING UNITS

Wide duty range  
0.05m<sup>3</sup>/sec to 2.4m<sup>3</sup>/sec

Powerful yet quiet

Extensive options



## VES SMALL AIR HANDLERS

*part of a complete range of innovative,  
flexible products from the HVAC experts*

## Why choose VES

VES has been supplying products for the HVAC industry for over 40 years, and have the in-depth knowledge and resources to provide solutions to all ventilation related requirements. We are a substantial British manufacturing company with over 200 employees, several factories plus a regional base in the north of England, and sales engineers located throughout the UK.

## Complete range of products

The product range encompasses all types of ventilation products, including those required for commercial, industrial, public and domestic buildings. The emphasis is on low energy products and sophisticated controls to meet the requirements of the Building Regulations.

The range extends from a small bathroom extract fan up to a mighty central station air handling unit.

There are specialist heat recovery units, high temperature fans for kitchen hood extract; duct, wall, ceiling and roof units; low noise products and silencers; fitted controls.

## High quality, flexible solutions

VES operate a quality assurance system to ISO 9001, monitored by the BSI. The air movement products are tested in-house to BS 848 Part 1, and submitted for external testing and approval when necessary.

VES specialise in bespoke designs for ventilation units, and whatever the issue, be it space, noise, temperature etc, can provide a design solution to meet the requirements of the project.

## Superior customer service

From the moment we receive your enquiry to delivery and beyond, we have the people in place to give excellent customer service. The VES after sales service covers the whole of the UK and is among the best in the industry.

## Experience and expertise

VES employ a range of experts in disciplines including air movement, noise control, air conditioning, controls, electrics and product refurbishment, and we have key staff who have worked at VES for many years.

## Manufactured in the UK

VES has over 12000m<sup>2</sup> of manufacturing and stores space, and has state of the art sheet metalworking equipment, plus a large powder coating plant. VES also has a substantial controls department, and makes components such as dampers and electric heaters in-house. This not only provides employment for local people, but also many suppliers around the UK.



Better air for the built environment

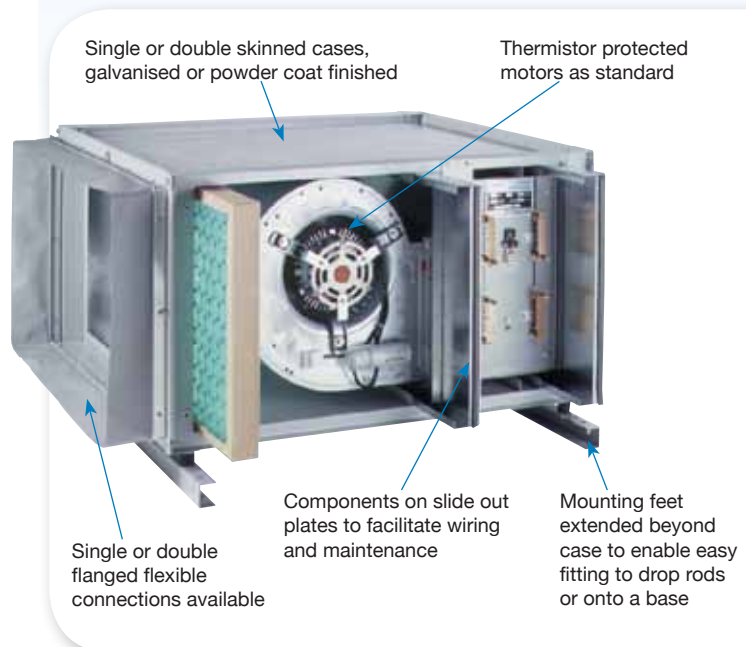
## Introduction

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.

## Features and Benefits

- ▶ Five sizes of unit with air volumes up to 2.4m<sup>3</sup>/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 RAL 7004.
- ▶ 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.



## SAM Air Handling Unit with EHB



- ▶ Single or double skinned case.
- ▶ Double inlet centrifugal fans with high temperature thermal cutout protection.
- ▶ Wide range of electric heaters available.
- ▶ Options include inlet damper, bag filters, frost heater, fitted silencer, matching control panel.
- ▶ All fans speed controllable.

## SAM Air Handling Unit with LPHW



- ▶ Single or double skinned case.
- ▶ Double inlet fans with high temperature thermal cutout protection.
- ▶ Two row hot water coil provides maximum heat output.
- ▶ Options include inlet damper, bag filters, frost coil, fitted silencer, matching control panel.
- ▶ All fans speed controllable.

### SAM EHB & LPHW

#### Selection Charts

Refer to pages 4 & 5



### SAM EHB & LPHW

#### Dimensions

Refer to pages 6 & 7



### SAM

#### Fan Speed Controllers

Refer to page 8

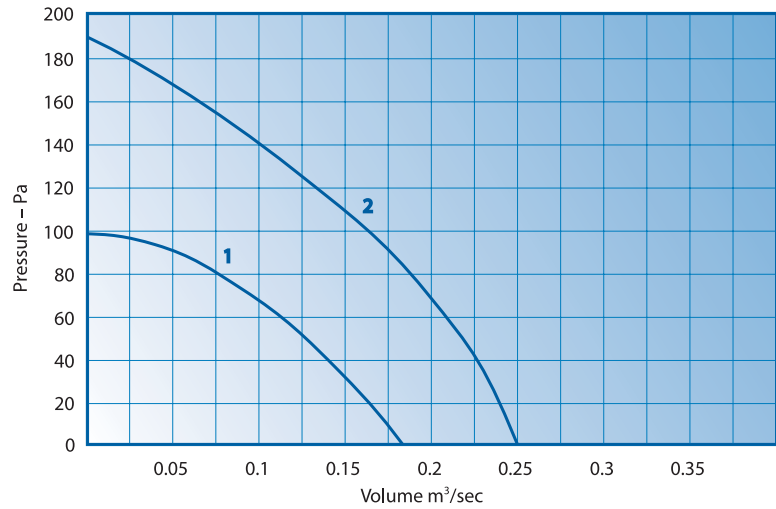


## SAM EHB & LPHW Selection Charts

### SAM 1

To specify the **EHB** unit you require:  
Case size + fan size + E = **SAM 12-E**

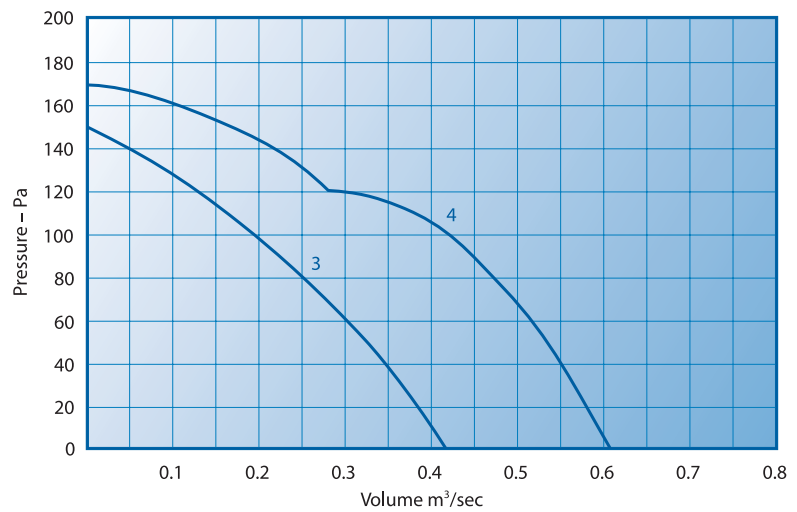
To specify the **LPHW** unit you require:  
Case size + fan size + W = **SAM 12-W**



### SAM 2

To specify the **EHB** unit you require:  
Case size + fan size + E = **SAM 23-E**

To specify the **LPHW** unit you require:  
Case size + fan size + W = **SAM 23-W**

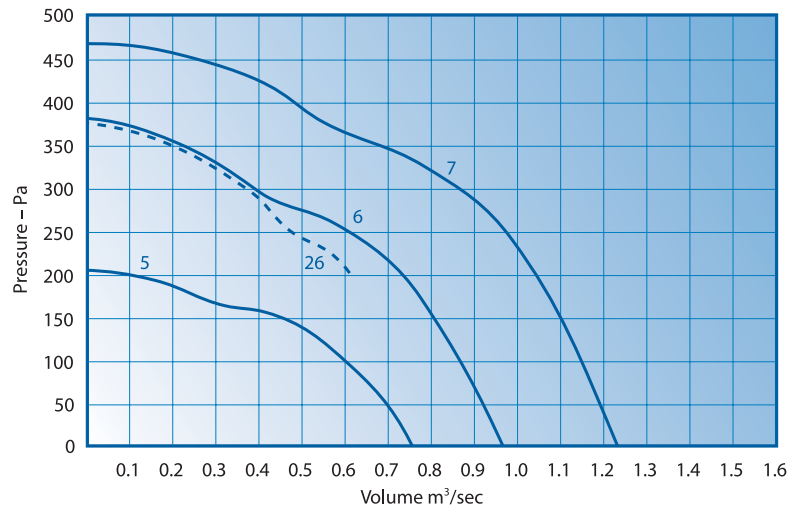


### SAM 3

The size 6 fan can be supplied in a size SAM 2 case, i.e. Model SAM 26, using the dotted fan curve (above). Air volume must not exceed 0.6m³/sec due to velocity through filter and heater.

To specify the **EHB** unit you require:  
Case size + fan size + E = **SAM 36-E**

To specify the **LPHW** unit you require:  
Case size + fan size + W = **SAM 36-W**



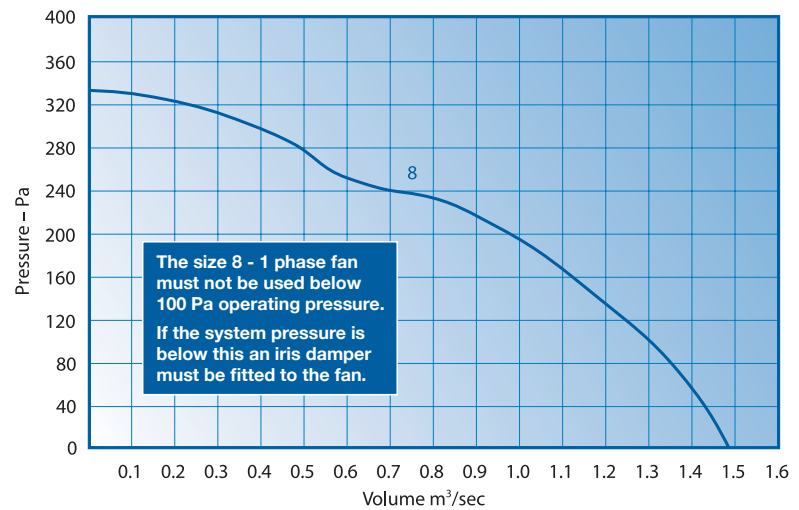
# SAM EHB & LPHW Selection Charts

## SAM 4

The size 8 - 1 phase fan must not be used below 100 Pa operating pressure. If the system pressure is below this an iris damper must be fitted to the fan.

To specify the **EHB** unit you require:  
Case size + fan size + E = **SAM 48-E**

To specify the **LPHW** unit you require:  
Case size + fan size + W = **SAM 48-W**

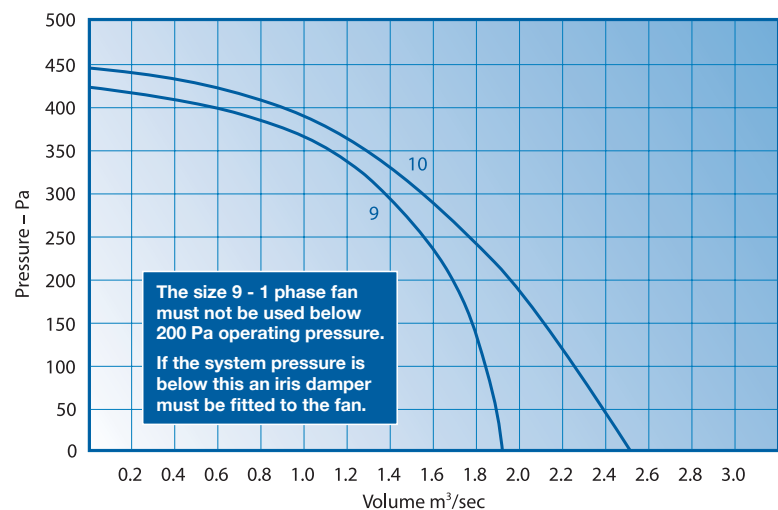


## SAM 5

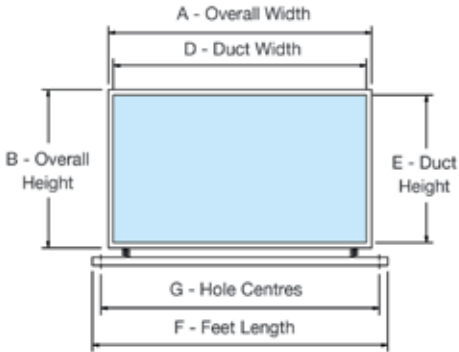
The size 9 - 1 phase fan must not be used below 200 Pa operating pressure. If the system pressure is below this an iris damper must be fitted to the fan.

To specify the **EHB** unit you require:  
Case size + fan size + E = **SAM 59-E**

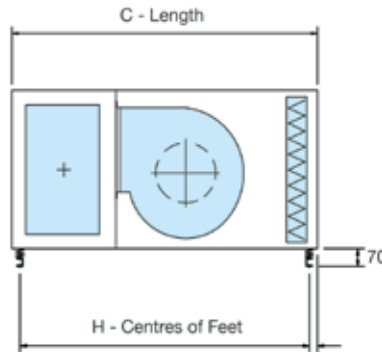
To specify the **LPHW** unit you require:  
Case size + fan size + W = **SAM 59-W**



## Dimensions SAM EHB Units



Outlet



Side Elevation



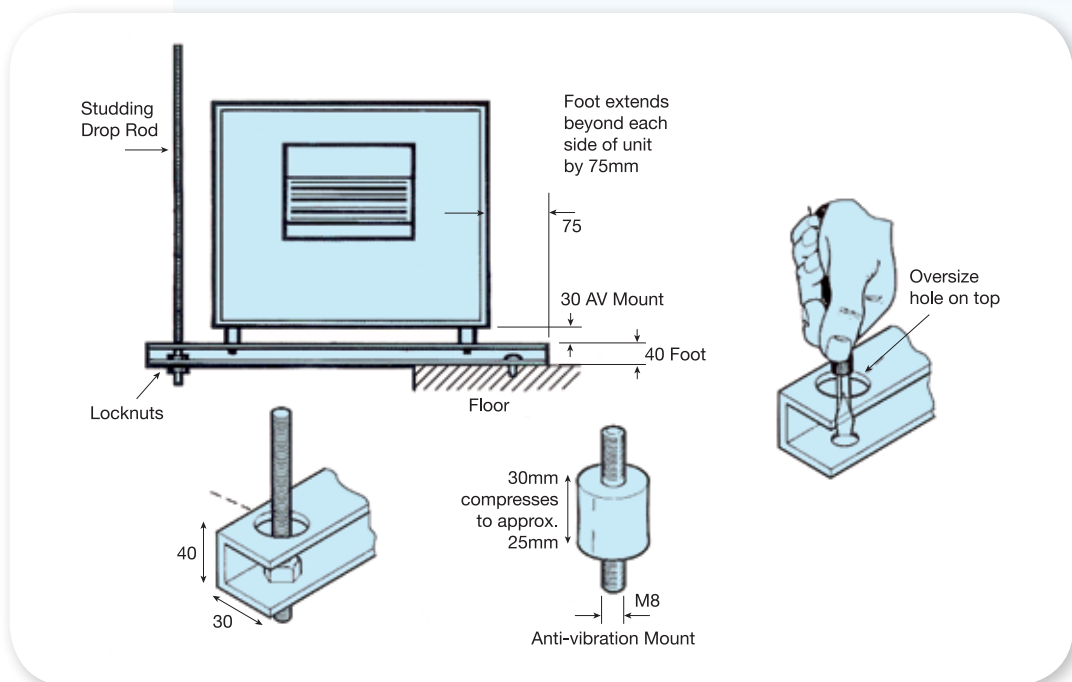
Inlet Damper

### SAM EHB Units 1-5 Dimensions - mm

| SAM Model | Dimensions - mm |     |      |     |     |      |      |      | Weights - Kg |             |
|-----------|-----------------|-----|------|-----|-----|------|------|------|--------------|-------------|
|           | A               | B   | C    | D   | E   | F    | G    | H    | Single Skin  | Double Skin |
| 1         | 600             | 325 | 700  | 550 | 275 | 750  | 670  | 620  | 30           | 51          |
| 2         | 750             | 480 | 850  | 700 | 430 | 900  | 820  | 770  | 55           | 87          |
| 3         | 850             | 550 | 1190 | 800 | 500 | 1000 | 920  | 1110 | 90           | 128         |
| 4         | 950             | 650 | 1500 | 900 | 600 | 1100 | 1020 | 1420 | 125          | 178         |
| 5         | 1250            | 750 | 1700 | 650 | 600 | 1400 | 1320 | 1620 | 146          | 214         |

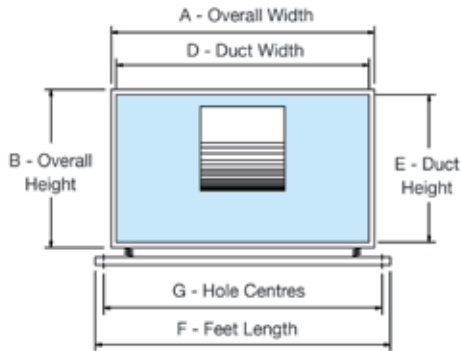
- Note:
- Outlet to SAM 5 is a 50mm spigot (D x E).
  - Single and double flange/flexes available size 1 - 4.
  - Size 5 fan fully vibration isolated within case.
  - Feet can be used with drop rods or fastened to floor.
  - Access panels and electrical connections available left or right hand side.

### Mounting Feet and Anti-Vibration Mounts

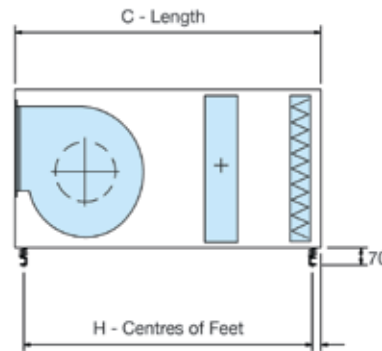


# Dimensions

## SAM LPHW Units



Outlet



Side Elevation



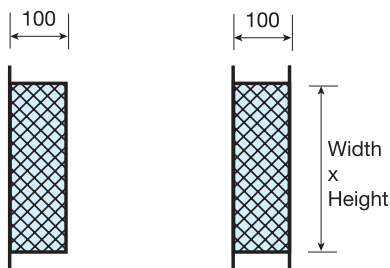
Inlet Damper

### SAM LPHW Units 1-5 Dimensions - mm

| SAM Model | Dimensions - mm |     |      |     |     |      |      |      | Weights - Kg |             | Coil Connection Size BSP |
|-----------|-----------------|-----|------|-----|-----|------|------|------|--------------|-------------|--------------------------|
|           | A               | B   | C    | D   | E   | F    | G    | H    | Single Skin  | Double Skin |                          |
| 1         | 600             | 325 | 700  | 550 | 275 | 750  | 670  | 620  | 30           | 51          | 3/4"                     |
| 2         | 750             | 480 | 850  | 700 | 430 | 900  | 820  | 770  | 55           | 87          | 3/4"                     |
| 3         | 850             | 550 | 1190 | 800 | 500 | 1000 | 920  | 1110 | 90           | 128         | 1"                       |
| 4         | 950             | 650 | 1500 | 900 | 600 | 1100 | 1020 | 1420 | 125          | 178         | 1 1/4"                   |
| 5         | 1250            | 750 | 1450 | 650 | 600 | 1400 | 1320 | 1620 | 146          | 175         | 1 1/2"                   |

- Note:
- Outlet to SAM 5 is a 50mm spigot (D x E).
  - Single and double flange/flexes available size 1 - 4.
  - Size 5 fan fully vibration isolated within case.
  - Feet can be used with drop rods or fastened to floor.
  - Access panels and electrical connections available left or right hand side.

### Flexible Connections



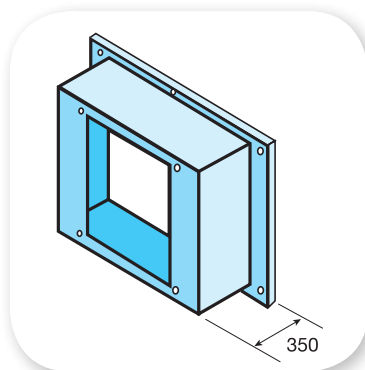
Single Flex/Flange

Double Flex/Flange

| Location            | Width (mm) | Height (mm) |
|---------------------|------------|-------------|
| To unit inlet       | 1200       | 700         |
| To silencer         | 800        | 700         |
| To discharge spigot | 650        | 600         |

### Inlet Plenum Box

Model SAMPL5



| SAM Model | Filter Size (mm)        | VES Part Number |
|-----------|-------------------------|-----------------|
| 1         | 550 x 270 x 50          | SAMDF 1         |
| 2         | 700 x 425 x 50          | SAMDF 2         |
| 3         | 800 x 495 x 50          | SAMDF 3         |
| 4         | 900 x 595 x 50          | SAMDF 4         |
| 5         | 695 x 598 x 100 (2 No.) | SAMDF 5         |

## SAM Electrical Details - EHB Units

| SAM Fan | Motor output watts | FLC amps max. | Speed rpm | Speed regulator | Main EHB Max kW | No. 1 phase steps | No. 3 phase steps | Matching Control Panel |                        |
|---------|--------------------|---------------|-----------|-----------------|-----------------|-------------------|-------------------|------------------------|------------------------|
|         |                    |               |           |                 |                 |                   |                   | EHB with 1 phase steps | EHB with 3 phase steps |
| 1       | 73                 | 0.4           | 900       | T1              | 3.0             | 2                 | -                 | CPE4/1ES/7TC/D         | -                      |
| 2       | 92                 | 1.1           | 1300      | VS2             | 6.0             | 4                 | -                 | CPE4/1ES/7TC/D         | -                      |
| 3       | 125                | 1.3           | 850       | T1              | 10.0            | 4                 | -                 | CPE4/1ES/7TC/D         | -                      |
| 4       | 250                | 2.8           | 910       | VS6             | 12.0            | 4                 | -                 | CPE4/1ES/7TC/D         | -                      |
| 5       | 250                | 3.4           | 910       | VS6             | 18.0            | 6                 | 6                 | CPE9/1ES/7TC/D         | CPC4-1/842/6-3/C/D     |
| 6       | 550                | 6.1           | 1380      | VS6             | 24.0            | 8                 | 6                 | CPE9/1ES/7TC/D         | CPC6-1/842/6-3/C/D     |
| 7       | 550                | 8.0           | 1380      | T8              | 24.0            | 8                 | 6                 | CPE9/1ES/7TC/D         | CPC6-1/842/6-3/C/D     |
| 8-1ph   | 750                | 5.8           | 910       | T8              | 36.0            | -                 | 6                 | -                      | CPC6-1/842/6-3/C/D     |
| 8-3ph   | 1100               | 3.5           | 910       | SC310           | 36.0            | -                 | 6                 | -                      | CPC4-3/842/6-3/C/D     |
| 9-1ph   | 2600               | 12.2          | 820       | T12             | 54.0            | -                 | 9                 | -                      | CPC7-1/842/6-3/C/D     |
| 9-3ph   | 2700               | 6.3           | 850       | SC310           | 54.0            | -                 | 9                 | -                      | CPC6-3/842/6-3/C/D     |
| 10-3ph  | 2700               | 6.5           | 850       | SC310           | 54.0            | -                 | 9                 | -                      | CPC6-3/842/6-3/C/D     |

Electric heater batteries are fitted with a manual reset high temperature cutout, these MUST be wired into the control circuit. VES also recommend that an airflow pressure switch is also fitted and wired in series with the high temperature cutout. A fan run on timer should always be incorporated into the control circuit where electric heaters are used.

## SAM Electrical Details - LPHW Units

### Fan Speed Controllers

| Model | Dimensions (mm) |        |       |
|-------|-----------------|--------|-------|
|       | Width           | Height | Depth |
| VS2   | 90              | 150    | 45    |
| VS6   | 95              | 145    | 50    |
| T1    | 120             | 190    | 65    |
| T8    | 160             | 230    | 120   |
| T12   | 190             | 250    | 130   |
| SC310 | 223             | 320    | 110   |

| SAM Fan | Motor output watts | FLC amps max. | Speed rpm | Speed regulator | Matching Control Panel |
|---------|--------------------|---------------|-----------|-----------------|------------------------|
| 1       | 73                 | 0.4           | 900       | T1              | CPW/1ES/7TC/D          |
| 2       | 92                 | 1.1           | 1300      | VS2             | CPW/1ES/7TC/D          |
| 3       | 125                | 1.3           | 850       | T1              | CPW/1ES/7TC/D          |
| 4       | 250                | 2.8           | 910       | VS6             | CPW/1ES/7TC/D          |
| 5       | 250                | 3.4           | 910       | VS6             | CPW/1ES/7TC/D          |
| 6       | 550                | 6.1           | 1380      | VS6             | CPW/1ES/7TC/D          |
| 7       | 550                | 8.0           | 1380      | T8              | CPW/1ES/7TC/D          |
| 8-1ph   | 750                | 5.8           | 910       | T8              | CPW/1ES/7TC/D          |
| 8-3ph   | 1100               | 3.5           | 910       | SC310           | CPC4-3/642/W/C/D       |
| 9-1ph   | 2600               | 12.2          | 820       | T12             | CPW/1ES/7TC/D          |
| 9-3ph   | 2700               | 6.3           | 850       | SC310           | CPC6-3/642/W/C/D       |
| 10-3ph  | 2700               | 6.5           | 850       | SC310           | CPC6-3/642/W/C/D       |

VS2



VS6



T1



T8/T12



SC310

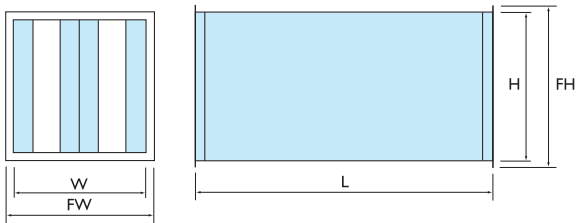




# Silencers

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.

The VA5 silencer is narrower than the SAM 5 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.



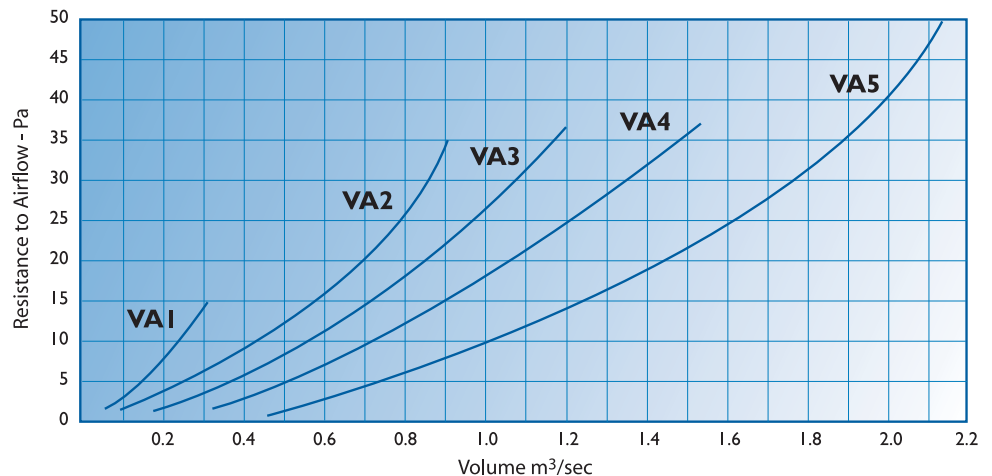
| Silencer Model | To fit REX | Dimensions - mm |        |        |     |     | Weight Kg |
|----------------|------------|-----------------|--------|--------|-----|-----|-----------|
|                |            | Width           | Height | Length | FW  | FH  |           |
| VA1            | 1          | 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        |

# Attenuation

Insertion Loss, dB

| 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



# SAM Sound Data - EHB & LPHW Units

Sound levels - Sound power level dB ref 10<sup>-12</sup>w 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   |

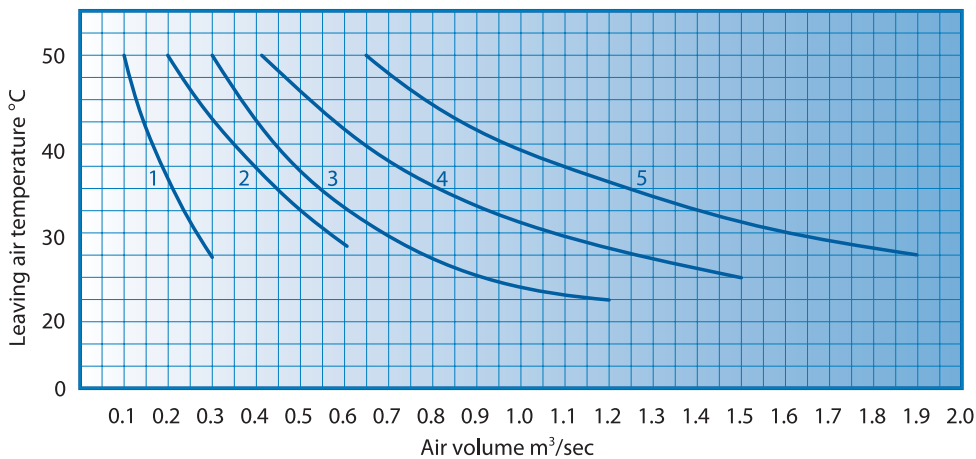
\*At 3 metres from outlet, free field

To calculate size of electric heater if required:

$$\begin{array}{rclclcl} \text{Air} & \times & \text{Constant} & \times & \text{Temperature} & = & \text{Heat} \\ \text{Volume} & & & & \text{Difference} & & \text{Output} \\ \text{m}^3/\text{sec} & \times & 1.21 & \times & \Delta\text{T}^\circ\text{C} & = & \text{kW} \end{array}$$

# SAM Main LPHW Heating Coil Duties

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



To calculate size of electric heater if required:

$$\begin{array}{rclclcl} \text{Air} & \times & \text{Constant} & \times & \text{Temperature} & = & \text{Heat} \\ \text{Volume} & & & & \text{Difference} & & \text{Output} \\ \text{m}^3/\text{sec} & \times & 1.21 & \times & \Delta\text{T}^\circ\text{C} & = & \text{kW} \end{array}$$

To determine water flow rate through heating coil:

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

# Product Specification

## SAM Small Air Handlers

### 1.1 Quality Standards

VES is a British Standards Institution registered company operating a quality system to BS ISO 9001, certificate no Q5375. All units tested to BS 848 Part 1.

### 1.2 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.

### 1.3 Fan

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..

### 1.4 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 airflow pressure switch.

### 1.5 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.

### 1.6 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.



## Other products and services from the complete range of VES HVAC solutions:

### Air Handling Units:

- Supply and extract, combined or separate.
- Heat recovery including crossflow plate heat exchangers, thermal wheel, run-around coils.
- Plantroom or weatherproof, flat or stacked.
- Fitted silencers, fitted inverters and controls.
- Matching DX condensing units.
- Various case constructions including EN 1886 certified units.

### Duct Fans:

- In-line centrifugal, with forward or backward curved impellers.
- Round fans, axial and mixed flow fans.
- Fitted silencers available all units.
- Manual and automatic speed controllers available.

### Twin Fans:

- For ceiling void, plantroom, and weatherproof.
- Many models and configurations.
- Fitted auto-changeover system.

### Roof Extract Units:

- Three ranges for volume and pressure.
- Curb and soaker sheet bases.

### Wall and Ceiling Fans:

- All types for commercial, industrial and domestic premises.

### Kitchen Hood Extract Fans:

- Heavy duty high temperature fans for hot greasy air.
- Motors out of airstream.
- Single inlet fans, in-line and vertical jet roof units.

### Control Panels:

- Off the shelf and built to order panels.
- Air quality sensors and energy savers.
- Intelligent control software.
- A range of remotes including touch screen.

### Noise Control:

- Matching silencers available for all ventilation products.
- Silencers designed to meet noise criteria.
- Cleanable silencers.
- Weatherproof silencers.

### Specialist Site Services:

- Plant refurbishment.
- Energy saving upgrades.
- Noise reduction.
- Site surveys.
- Kitchen ventilation.
- AHU flat pack installation.
- Maintenance.
- Spares.



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ISO 9001:2008  
Cert. No. Q05375



VES reserve the right to amend product specifications and details without notice.