

Ecovent[®] *Acoustic*

- ▶ Independent Acoustic Testing to BS EN ISO 3744:2010
- ▶ Low noise to help meet acoustic requirements, including BB93
- ▶ High efficiency Heat Recovery 70% +
- ▶ Low Specific Fan Powers
- ▶ BlueSense Intelligent Controls



Ecovent Acoustic Unit

Ecovent[®] Acoustic
part of a complete range of innovative,
flexible products from the HVAC experts

Ecovent[®] *Acoustic Unit*



The Ecovent Acoustic high efficiency, low noise, heat recovery unit with duties up to 0.45 m³/s, low Specific Fan Power and low energy / high efficiency fans.

Refer to pages 1-5.

Ecovent[®] *Acoustic Guidance*



The Ecovent Acoustic is suitable for many installations including schools, offices, libraries, hotels and retail establishments.

Refer to pages 6-21.



Energy Efficient

Energy efficient units with low SFPs to help achieve L2 Building Regulations. Units are fully tested to BS EN ISO 5801:2008, BS 848-1:2007 (airside performance) and DIN 45635-38 (acoustic performance).



Heat Recovery

Cross flow plate heat exchanger which has no cross contamination of moisture, smells or fumes. Up to 75% efficiency to BS EN 308:1997 specification.



Integrated Controls

BlueSense energy saving packages combine intelligent technologies with energy saving products, services and engineering expertise.



Noise Reduction

Our quietest heat recovery unit has been independently tested to BS EN ISO 3744:2010 and can help meet acoustic requirements for sensitive applications including BB93; Building Bulletin 93 - School Acoustics.



High Performance Fans

Backward curve EC fans offering maximum efficiency, minimum energy consumption, fully controllable and ErP2015 compliant.



Bypass Damper

Modulating damper to efficiently control the heating / cooling recovery and available free heating / cooling.



Pre-wired Controls

The unit is pre-wired to an integral controls package or isolator to reduce onsite wiring requirements.



'Plug & Play' Fans

Fan motor assembly is internally anti-vibration isolated and fitted with a quick change plug connector for easy maintenance.



Airflow Commissioning

The unit air volume can automatically be commissioned when purchased with a VES control panel, through the inlet eye pressure tapping. Individual volumes for supply and extract can be adjusted easily at the user interface also allowing more control of demand ventilation and night set back volume.



Filter Maintenance

A range of high efficiency filtration with side access panels for easy and safe filter maintenance. If a VES control panel is ordered it will provide conditional based servicing information, calculating the efficient optional filter change point.



Multi-Access

Plantroom units suitable for top and bottom access, left or right hand side to suit site and or installation requirements.



Heating Options

A variety of modulating LPHW and electric heater options are available to suit the required application.



Construction

Double skinned plantroom cases, available in flat configuration. All units built with an aluminium tubular frame, and galvanised steel sheet panels, with resin bonded mineral wool slab infill.



BlueSense Complete Ventilation Package

VES offer the expertise, products and services to provide a complete ventilation package including heat recovery unit, integrated controls and site assistance, providing peace of mind through reliable products and expert knowledge.

BlueSense Energy Saving Package



Ecovent unit with integral controls



EC fan - with full control



Sensor options



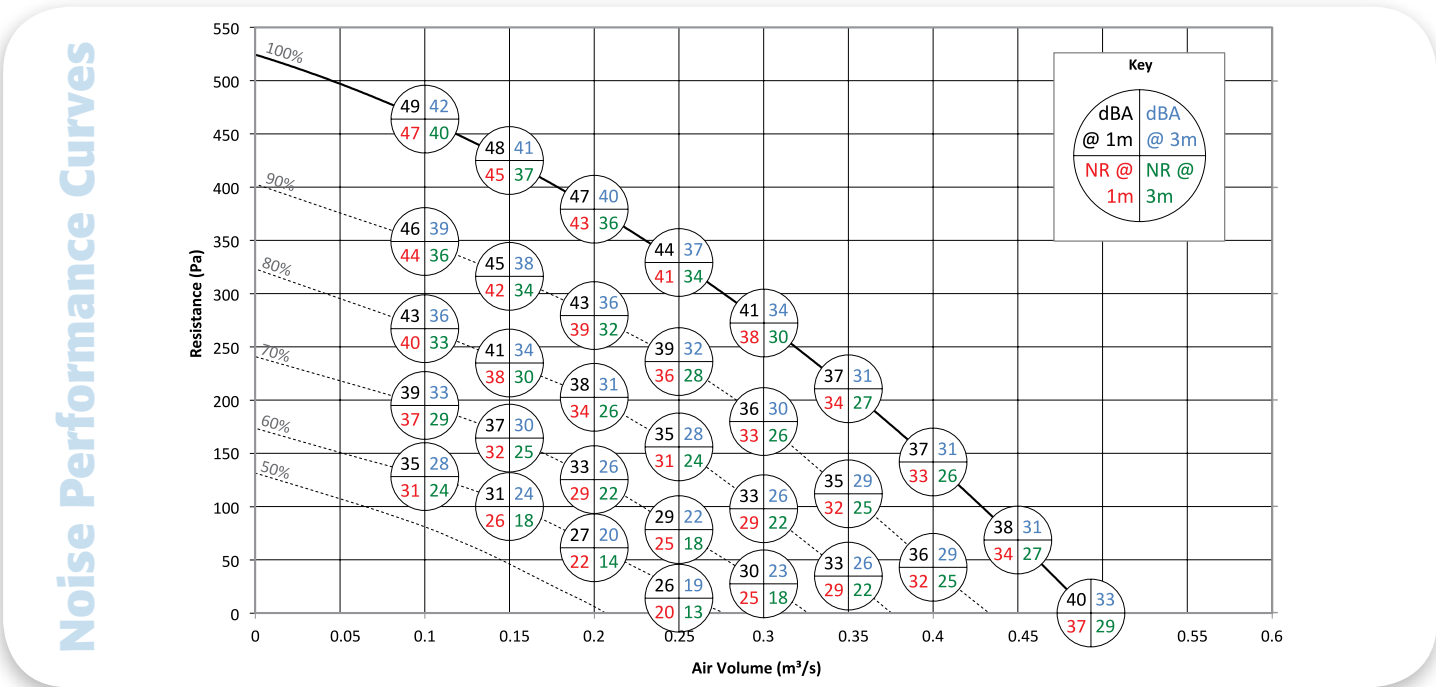
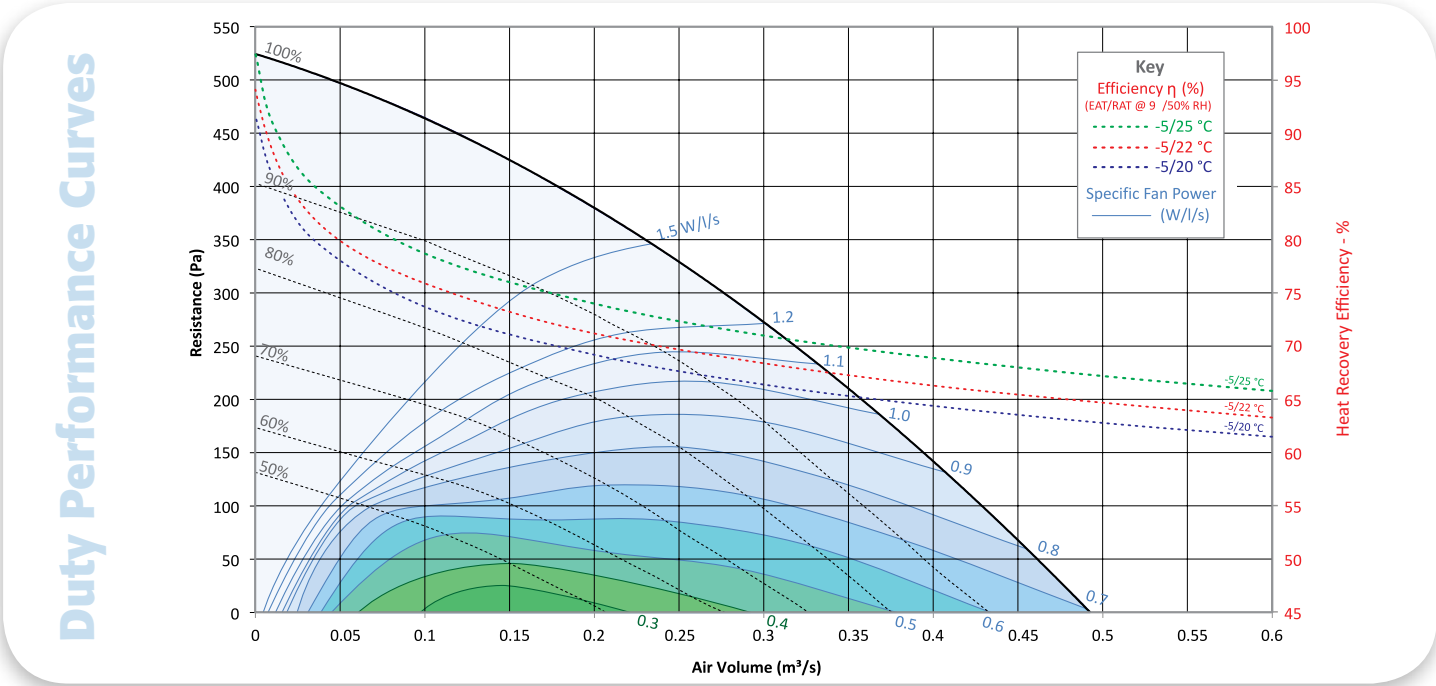
The sign of energy saving products, services and expertise

Selection Data

Unit Size 2 EAX244-1

1a Performance

Size	Phase	Motor Size	Voltage	Fan Speed	Full Load Current	Speed Control
EAX244-1	1 Phase	0.32 kW	230 VAC	2270 rpm	1.7 A	EC



SFP = $\frac{\text{Electrical input power (Watts)}}{\text{Air volume flow rate (litres/second)}}$

Notes: SFP figures quoted at voltages tested in accordance with BS EN ISO 5801:2008, BS 848-1:2007 for each of the two fans. The fan performance is calculated using standard G4 filters. Alternative F7 will add a maximum of 150 Pa. NR levels are dependent upon environmental conditions. Tolerances: On flow rates: +/- 5% On acoustic power and pressure: Levels: +/- 3 dB By octave band: +/- 5 dB

Note: Data for design guidance only. For full details, outline drawings are available upon request.

1b Heating and Controls

Heating
EAX244-1 / FP - **W** / **EE** / **LT** **RB** / **G4** / **ISC**
E **RT** **LB** **F7** **CPSC**
null

	Technical Data						Heating and Control Options	
	Air Volume m³/s	Maximum Leaving Air Temp °C	Maximum kW Output	Water Flow Rate l/s	Water Pressure kPa	Coil Connection Size BSP	Control Panel	Valve & Actuator Kit
LPHW Heating	0.150	36.0	7.46	0.166	3.0	1"	CPB0-1/W/P/CC/C	EAXCWKT200
	0.175	35.1	8.50	0.189	3.0			
	0.200	34.3	9.51	0.212	3.0			
	0.225	33.5	10.49	0.234	3.2			
	0.250	32.8	11.45	0.255	3.7			
	0.275	32.1	12.37	0.275	4.2			
	0.300	31.5	13.26	0.295	4.7			
	0.325	30.9	14.13	0.314	5.3			
	0.350	30.3	14.96	0.333	5.8			
	0.375	29.7	15.77	0.351	6.4			
	0.400	29.1	16.55	0.368	7.0			

LPHW coil, designed for LPHW 82/71 °C, EAT -5 °C, LAT 25 °C, coil construction copper tubes, aluminium fins, coil connections 1" BSP.
Note: If no control panel is purchased the unit will be supplied with a main isolator.

	Technical Data			Heating and Control Options			
	Air Volume m³/s	Maximum Leaving Air Temp °C	Maximum kW Output	1ph - Electric Heater		3ph - Electric Heater	
				Electric Heater	Control Panel	Electric Heater	Control Panel
Electric Thyristor Heating	0.150	28.1	6.00	EHEAX2/6KW/1X1	CPB0-1/6KW-1/P/CC/C	EHEAX2/6KW/1X3	CPB0-1/6KW-3/P/CC/C
	0.175	23.3	6.00				
	0.200	32.2	9.00	EHEAX2/9KW/1X1	CPB0-1/9KW-1/P/CC/C	EHEAX2/9KW/1X3	CPB0-1/9KW-3/P/CC/C
	0.225	28.1	9.00				
	0.250	24.8	9.00				
	0.300	22.0	9.00				
	0.325	28.1	12.00	N/A	N/A	EHEAX2/12KW/1X3	CPB0-1/12KW-3/P/CC/C
	0.350	25.5	12.00				
	0.375	21.3	12.00				
	0.400	28.1	15.00			EHEAX2/15KW/1X3	CPB0-1/15KW-3/P/CC/C
0.400	26.0	15.00					

Air off temperature based upon entering air of -5 °C. Power = Air Volume x Constant x Temperature Rise. kW = m³/s x 1.21 x ΔT °C
Note: If no control panel is purchased the unit will be supplied with a main isolator.

1c Noise Data

Fan Voltage	Fan Speed rpm	Sound Spectrum dB re 10 ⁻¹² W PWL Centre Frequency (Hz)								Casing Noise Breakout			
		63	125	250	500	1k	2k	4k	8k	NR@ 1m	NR@ 3m	dBA @ 1m	dBA @ 3m
100%	2270	66	68	69	70	70	68	63	55	33	26	37	30
90%	2043	64	66	68	67	67	65	60	53	32	25	35	29
80%	1816	62	64	65	64	63	62	56	49	29	22	33	26
70%	1589	60	61	61	61	60	57	51	44	25	18	29	22
60%	1362	57	58	57	57	55	53	47	37	20	13	25	19
50%	1250	56	57	55	54	53	50	43	32	18	11	24	17

Centre Frequency	63	125	250	500	1k	2k	4k	8k
Case Insertion Loss	-1	-6	-11	-24	-27	-30	-31	-28

Note: Independently acoustic tested to BS EN ISO 3744:2010.

Silencer Option	Sound Spectrum dB re 10 ⁻¹² W PWL Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
EAXVA200/1200/P	63	125	250	500	1k	2k	4k	8k
Induct Loss	-6	-11	-18	-22	-25	-17	-22	-20

Note: Each silencer will add a maximum of 30 Pa to the external resistance.



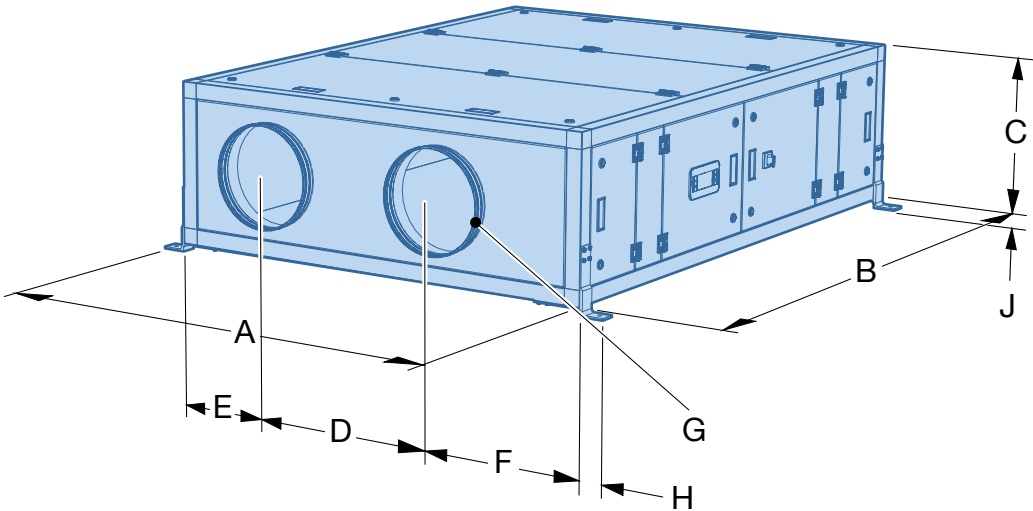
Available on
vedirect.co.uk

Note: Data for design guidance only. For full details, outline drawings are available upon request.

1d Configuration

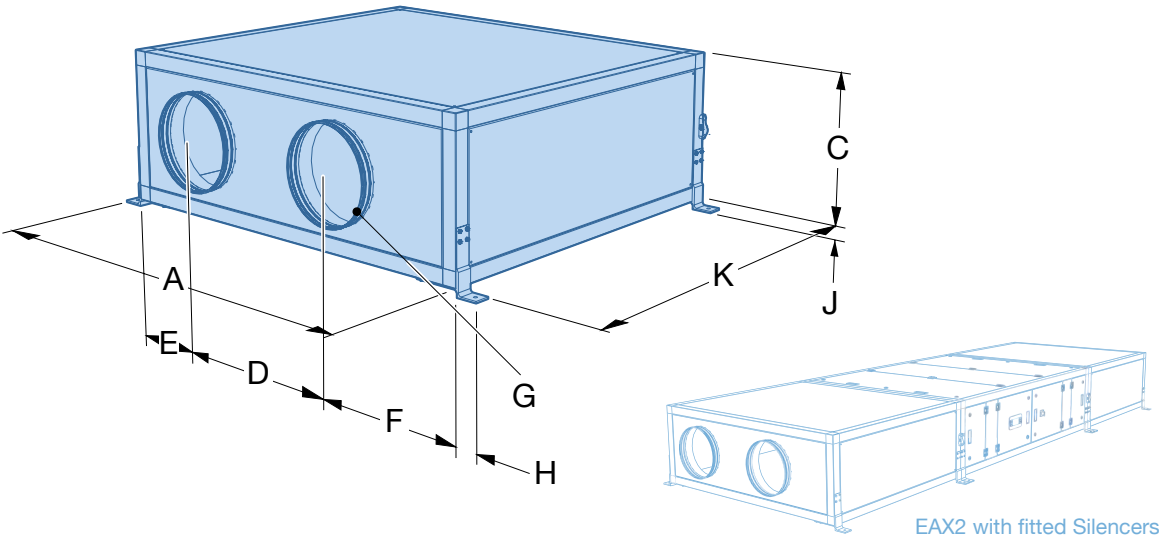
Configuration and Handling
EAX244-1 / **FP** / **EE** / **LT** **RB** /
RT **LB**

FP Flat Plantroom



Unit Type	Dimensions mm									Weight kg	Configuration Options			
	A	B	C	D	E	F	GØ	H	J		LT	LB	RT	RB
EAX2 Flat Plantroom	1400	1850	500	600	325	475	315	75	25	240	✓	✓	✓	✓

Silencer



Unit Type	Dimensions mm									Weight kg
	A	C	D	E	F	GØ	H	J	K	
EAX2 Silencer	1400	500	600	325	475	315	75	25	1200	135

Ecovent[®] Controls
Extended Features
CPB Range

The Ecovent unit with integrated controls is specifically designed for use in heat recovery applications. The CPB control system can be supplied fully integrated into an Ecovent air handling unit or in a remote stand alone enclosure.

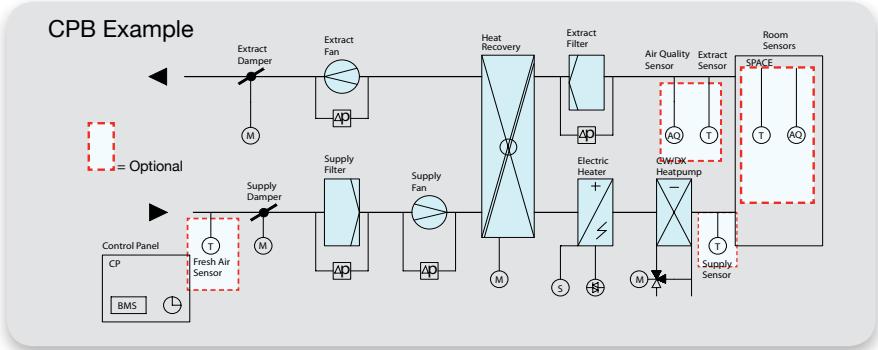
Features

- 2 Versatile AHU mounted LCD display with adjustable control parameters for operation and commissioning.
- 2 Extensive built in safety features, isolation, airflow monitoring and thermal protection.
- 2 Energy monitoring and optimisation providing real-time energy consumption, heat recovery efficiency and automatic parameter adjustment between comfort and Economy: setpoints, deadband, air quality, fan speed, optimal start / stop etc.
- 2 A choice between local or external source 0-10 VDC control (e.g BMS). Optional unit control through a variety of user interfaces or communication via BACnet or Modbus.

Specification for CPB Control Panel for Heat Recovery Application

Features	Model	CPB
Supply fan control, monitoring and commissioning	230 VAC 50 Hz or 400 VAC 50 Hz	✓
Extract fan control, monitoring and commissioning	230 VAC 50 Hz or 400 VAC 50 Hz	✓
Electric modulating Thyristor heating	230 VAC 50 Hz or 400 VAC 50 Hz	O
LPHW modulating heating & frost protection		O
Heating and cooling recovery	Modulating	✓
	On/Off	✓
Chilled water modulating cooling		O
Volt Free Remote Start/Stop		✓
24 VDC fire alarm shutdown		✓
Supply & Extract Damper Control (24 VDC or 230 VAC)		✓
Volt free common run & trip indication		✓
Energy Optimisation		O
Intelligent Start/Stop		✓
Filter Dirty Indication and optional change point		✓
Panel Display Unit		✓
365 day time clock		✓
External Source Control (eg BMS)		✓
Sensors	Supply air	✓
	Extract air	✓
	Fresh air	✓
	Heat Exchanger Recovery Sensor	✓
Internal or external locations		✓
BlueSense - Energy Saving Package		
Energy efficient speed control		✓
Air quality sensor (CO ₂ & VOC)		✓
Post installation optimising		✓

O = Option



Introduction

There is a greater awareness of ventilation noise issues across many situations, in particular for education applications via the *Building Bulletin 93 - Acoustics for Schools*. This is a key challenge for an HVAC manufacturer hoping to analyse and provide detailed information about something that is relative and subjective in nature. The complication of decibels, the usual confusion about volume, power and logarithmic scales all make it tricky for customers to know how a noise number translates into the user experience.

Along with the challenges of designing low noise products, comes accurately displaying the information in a meaningful way. Acoustic testing is important as it provides useful data about the noise emitted by our product, helping specifiers to make informed decisions when selecting our products for installation in real life applications.

Often a comparison is made between manufacturers, to determine who has the better unit and meets stated regulations. Therefore making the information concise, understandable and transparent is our number one aim.

In addition, we know that it is highly unlikely for most applications, where low noise is extremely important, that there will be one single solution. There is generally no direct relationship between room noise level and the sound level generated by the mechanical ventilation system. Alongside this, specifiers and designers have to find a balance between costs, energy, legislation and maintenance; sometimes generating conflicting issues.

It is always recommended to seek the expert advice of an acoustic specialist for noise sensitive applications.

Definition of Sound (Noise)

- ▶ Sound is any pressure in the air that the human ear can detect
- ▶ Noise is any sound that is undesirable by the recipient
- ▶ The terminology of noise and sound are used interchangeably

Noise Categories

Any moving or vibrating parts in a product can produce noise; this varies with the operation of the product. The noise is generated by the mechanical system i.e. the fan noise and can be classified into 5 categories:

- 1

Airborne

Radiated from the air handling unit/fan, the noise is transmitted through the air and directly through walls, windows, doors or ceilings into adjoining spaces.
- 2

Case Breakout

The first type of break out noise is generated by high speed or turbulent air in ducts that cause the duct walls to vibrate and radiate a low frequency noise. The second is low frequency noise from a remote source, such as a fan in the AHU and can traverse down the duct into spaces or breaks out through the case or ductwork itself.
- 3

Duct-borne

Originated at a noise-generating source (i.e. the fan) the noise is carried down the ducted air path to receivers in rooms located remote from the source.
- 4

Self-generated

Produced as air moves through a confined duct system, noise is generated at points of turbulence such as dampers, elbows, t-junctions and air terminal devices. Self-generated noise increases with air velocity and the number of turbulent air points within a system.
- 5

Structure-borne

Generated from rotating or vibrating equipment such as framework or doors, which vibrates part of a building.

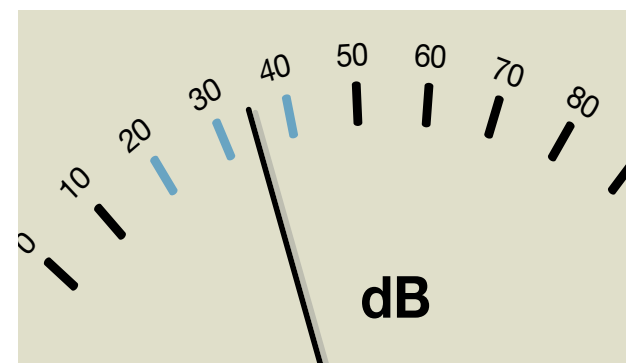
Noise

- ▶ Noise produced might be broadband, containing sound energy in several frequency bands, but no audibly distinct components in one frequency band.
- ▶ Noise that whines or hums at particular frequencies can produce an audible tone that can be annoying to the receiver.
- ▶ In ventilation the rotational fan speed causes an annoying low frequency hum between 100-250 Hz known as fan 'Blade Pass Frequency'.
- ▶ The fan 'Blade Pass Frequency' noise can be very intense - varying with the number of blades and rotation velocity.
- ▶ Understanding the noise sources and frequency pitches allows for a better understanding of how that particular noise will be transmitted in a real application.

Sound Definition

A sound source emits a sound power, which is expressed in Watts (W). The sound power radiates away from the source, causing small fluctuations in the air pressure through the room. Sound power cannot be measured directly, but the small fluctuations in the air pressure can be, expressed in Pascals (Pa).

The Decibel (dB)



Sound power levels and sound pressure levels are stated using the decibel unit (dB). The decibel is a logarithmic unit that indicates the ratio of two quantities; a measured value and a reference value. As the range of sound power and sound pressure can be so large a logarithmic scale provides a convenient way to display the data.

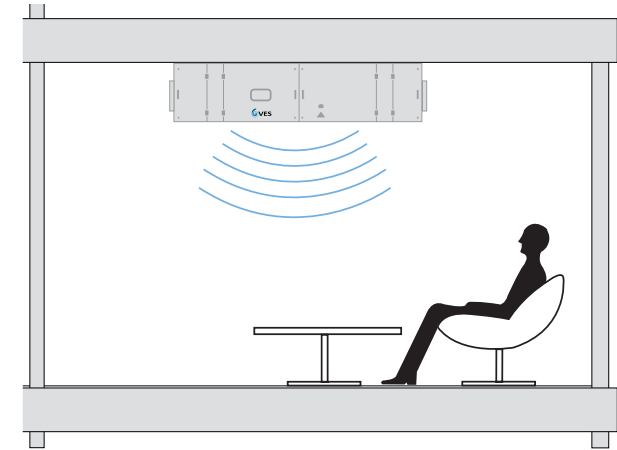
Decibel equation:

$$dB = 10 \log \left(\frac{P_1}{P_2} \right)$$

"Sound power level and sound pressure level are stated using the decibel (dB) unit, but they are NOT the same decibel"

Sound Pressure Level

Sound pressure level (SPL) is a logarithmic pressure of the effective sound pressure of a sound relative to a reference value.



Where p is the absolute level of the sound pressure and the reference pressure is $20 \mu\text{Pa}$ (Approximation of the faintest sound that can be heard by a human ear). Abbreviation SPL is often used to represent sound pressure level, and the notational L_p is normally used in equations.

Sound Pressure Level equation:

$$L_p = 10 \log \frac{p^2}{(20 \mu\text{Pa})^2}$$

Sound Power Level

Sound power level (PWL) is a measurement of the total noise radiated by the source in all directions.

Sound Power Level equation:

$$L_w = 10 \log \frac{P}{10^{-12} \text{ W}}$$

Where P is the absolute level of the sound power and the sound power reference is 10^{-12} W . It is essential the power level values always follow the notation "dB re 10^{-12} W ". Abbreviation PWL is often used to represent sound power level, and the notational L_w is normally used in equations.

Frequency (Hz)

The number of pressure fluctuations per second, or frequency, of the sound is measured in Hertz (Hz). These frequency changes cause pitch changes similar to a musical note having different pitches from different instruments - low frequency has a low tone and high frequency has a high tone.

The normal hearing frequency range for most people extends from a low frequency of about 20-50 Hz (a 'rumbling' sound), up to a high frequency of about 10,000-15,000 Hz (a 'hissy' sound).

Sounds are typically a combination of a range of different frequencies. It is beneficial to separate the sound levels for different frequencies, in order to show how and at what frequency a particular sound source produces more noise.

Different pieces of electrical equipment and mechanical equipment produce different amounts of low, medium and high frequency noise. Usually low frequency is more difficult to control and therefore more expensive.

When an electrical or mechanical device operates at a constant speed and has some repetitive mechanism, noise can be concentrated at the principle frequency of operation of the device. In ventilation the rotational fan speed causes an annoying low frequency hum, generally between 100-250 Hz, known as the fan 'Blade Pass Frequency' (BPF). These frequencies are designated 'discrete frequencies' or 'pure tones', when the sounds are clearly tonal in character, where the frequency is usually calculable.

fan Blade Pass Frequency equation:

$$BPF = n t / 60$$

BPF = Blade Pass Frequency (Hz)
 n = rotation velocity (rpm)
 t = number of blades



"Providing information for each frequency band means that noise migration solutions can be tailored to individual products"

Acoustic Testing

Octave Bands

The most commonly measured frequencies are octave band frequencies between 100-10,000 Hz. The amount and frequency distribution of the total noise is determined by measuring it with an octave band analyser; *A set of contiguous filters covering essentially the full frequency range of human hearing.*

An octave represents a frequency interval of a factor of two.

Octave	1	2	3	4	5	6	7	8
Frequency (Hz)	63	125	250	500	1K	2K	4K	8K

For finer resolution of data, narrower band filters are used and as a result, each octave band can be further divided and the 1/3 octave is regularly used.

Noise Rating (NR)

For convenience it has become common practice to denote sound values into one single number. Noise Rating (NR) curves help to express this single figure as NR curves use the 1,000 Hz octave band as a reference point; for example NR35 has a level of 35 dB at 1,000 Hz. However a number of products could have an identical NR level, but be audibly very different i.e. broadband or powerful hum/whine at a specific frequency.

Providing this information for each frequency band means that noise migration solutions can be tailored to the individual products, effectively implementing a solution to combat low or high level frequency issues.

"The amount and frequency distribution of the total noise is determined by measuring it with an octave band analyser"



"Different products could have an identical Noise Rating (NR), but be audibly very different"

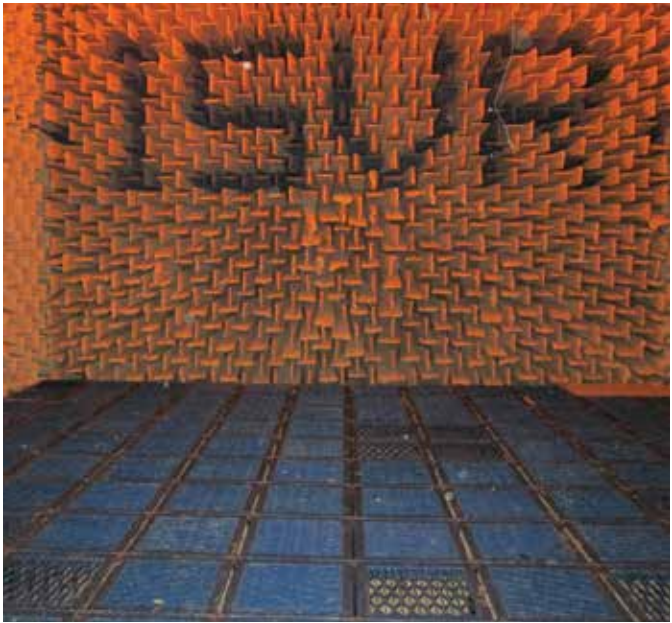
Unit Measurement & Testing

Our purpose is to provide transparent data that allows acoustic judgments to be made. Independent testing of our air handling unit was undertaken at the University of Southampton Institute of Sound and Vibration Research facilities.

The units were tested in an anechoic chamber in accordance to BS EN ISO 3744:2010 which is part of the ISO3740 Series - *Determination of Sound Power Levels of noise sources, using sound pressure for machine, equipment and their sub-assemblies.*

In accordance to BS EN ISO 3744:2010 test method, the sound power level was determined. The units being tested were placed with anti-vibration mounts on the floor of the test chamber. A total of nine individual microphones were positioned around the unit where each microphone measured the sound pressure level at their respective position. These sound pressure values were then averaged and converted into octave bands so that the Noise Rating (NR) could be determined for the different operating conditions.

The sound power levels are an accurate measurement from the unit as a whole, giving a good idea of the sound levels of normal operating conditions independent to the environment they are ventilating.



Unit testing chamber at Southampton University.

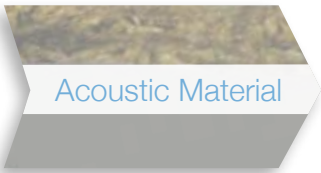


"The tests provided conclusive results for a variety of conditions and equipment specifications"

Acoustic Results

Results

Initial results suggested that the noise sources within our range of products generated a higher and unwanted power level in the 100-250 Hz range, this is directly related to the fan ‘Blade Pass Frequency’. Once this was understood and the problematic frequency identified, it allowed us to experiment with the design of the product to reduce the sound power generated and reduce the sound migration through the case, this included assessing:



Noise Data

Ideally, acoustic data should provide as much information as possible about the results, measurements and associated standards. It also has the added advantage of making accurate comparisons between products.

Acoustic results for the Ecovent Acoustic unit:

Fan Voltage	Fan Speed rpm	Sound Spectrum dB re 10 ⁻¹² W PWL Centre Frequency (Hz)								Casing Noise Breakout			
		63	125	250	500	1k	2k	4k	8k	NR @ 1m	NR @ 3m	dBA @ 1m	dBA @ 3m
100%	2270	66	68	69	70	70	68	63	55	33	26	37	30
90%	2043	64	66	68	67	67	65	60	53	32	25	35	29
80%	1816	62	64	65	64	63	62	56	49	29	22	33	26
70%	1589	60	61	61	61	60	57	51	44	25	18	29	22
60%	1362	57	58	57	57	55	53	47	37	20	13	25	19
50%	1250	56	57	55	54	53	50	43	32	18	11	24	17

Centre Frequency	63	125	250	500	1k	2k	4k	8k
Case Insertion Loss	-1	-6	-11	-24	-27	-30	-31	-28

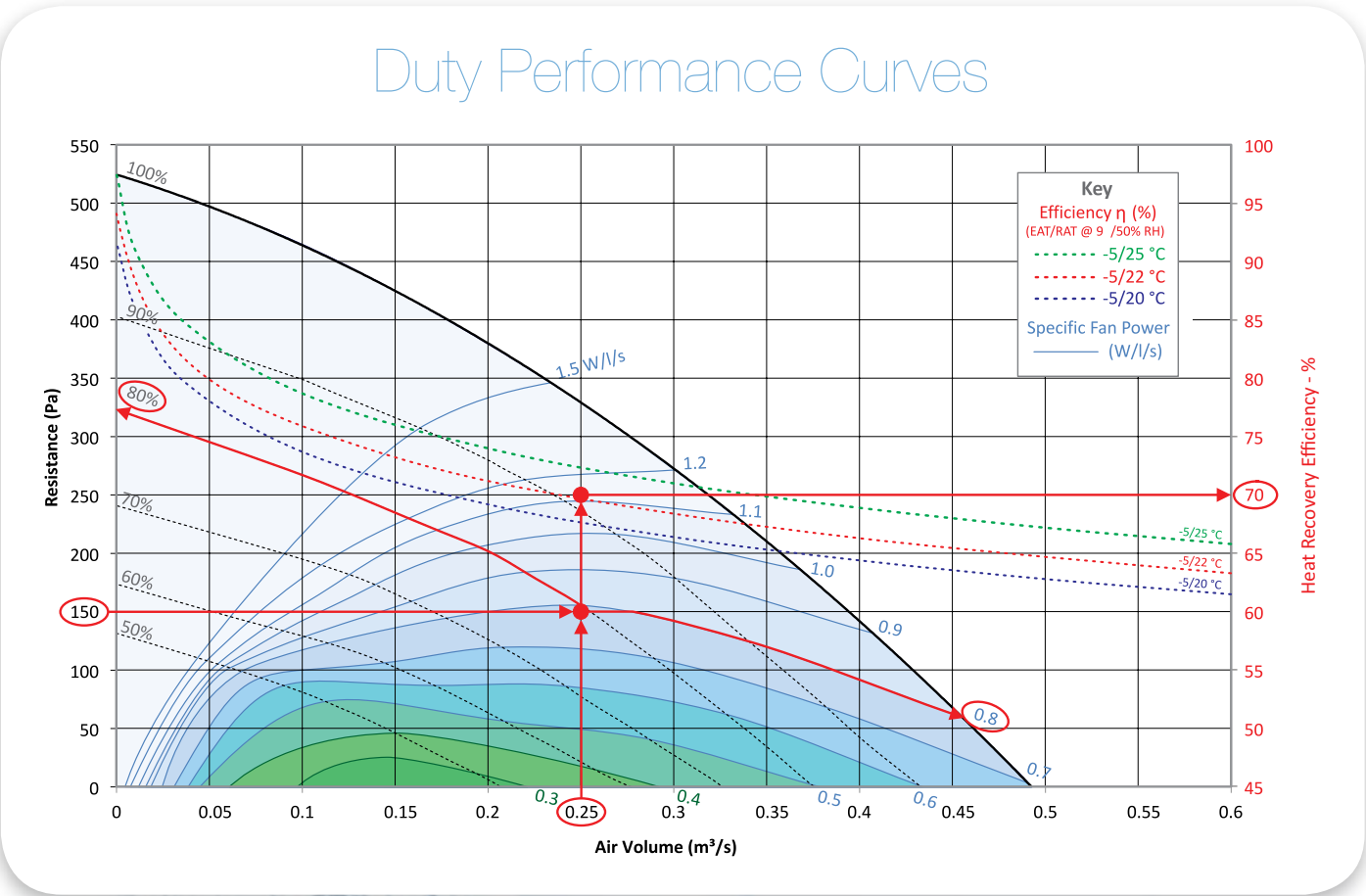
Note: Independently acoustic tested to BS EN ISO 3744:2010.

Parameter	Description
1 Noise Level Description	Sound power level, sound pressure level or a sound insulation quantity such as sound reduction index or insertion loss.
2 Measurement Unit	dB or dBA unit.
3 Distance	In the case of sound pressure levels the distance the measurement was carried out at typically 1m, 3m or 10m. Note sound power levels are stated independently of distance from source.
4 Test Standard	The test standard used to carry out the measurements and the installation and test conditions that measurements were carried out for.
5 Noise Level	The overall noise level and noise level in each one-third octave band centre frequency.
6 Mode of Operation	The noise level at each operation of the product (e.g. different fan speed). If the noise level for only one mode of operation is given then the operating condition should be clearly stated.

Note: Data for design guidance only. For full details, outline drawings are available upon request.

Unit Performance

Typical performance selection example:



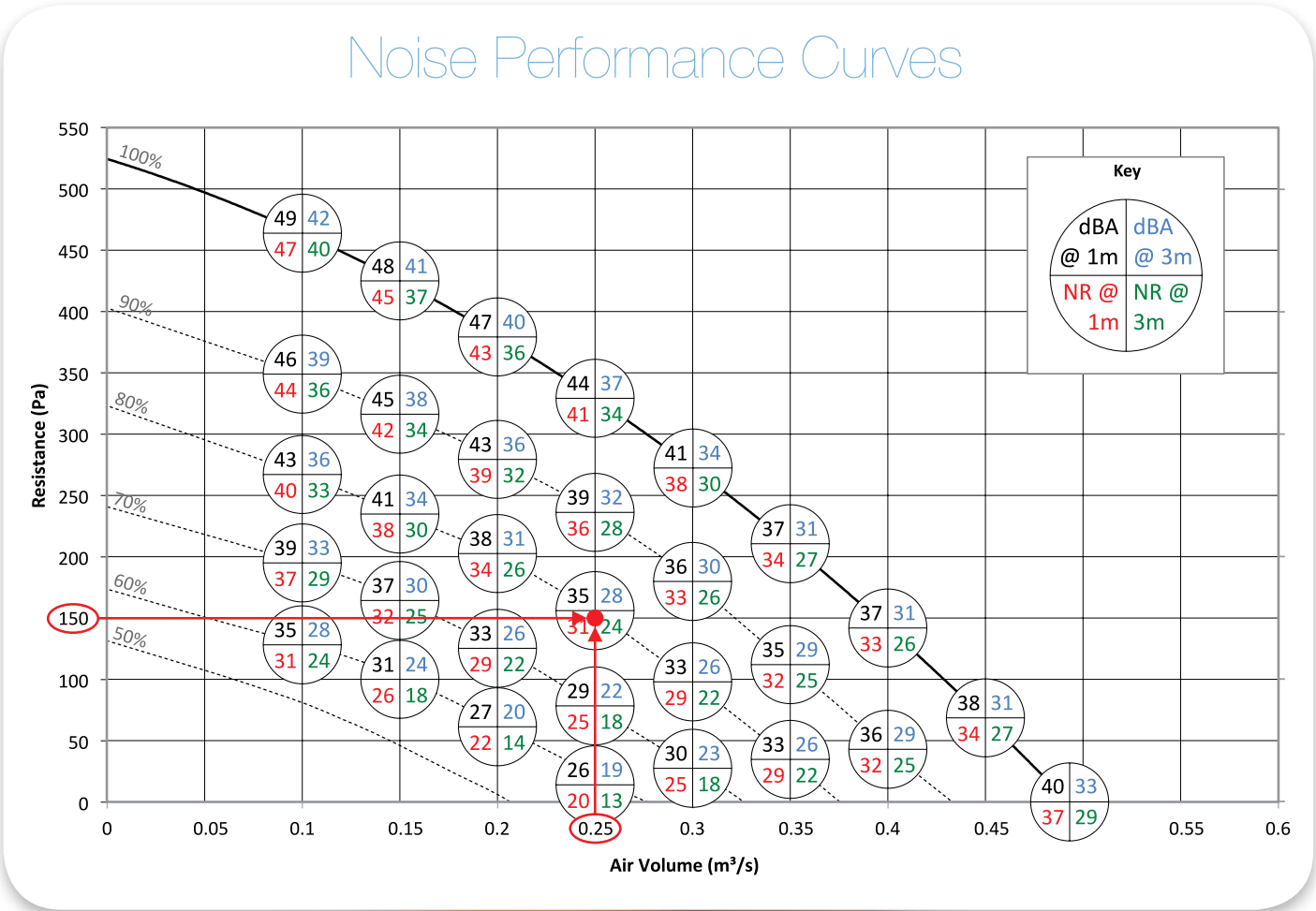
Example Details

Air Volume - 0.25 m³/s
Resistance - 150 Pa
Fan Speed - 80%
Specific Fan Power - 0.8 W/l/s for each fan - 1.6 W/l/s for the system
Heat Recovery Efficiency - 70%

Note: Data for design guidance only. For full details, outline drawings are available upon request.

Noise Performance

Typical performance selection example:



Example Details

Air Volume - 0.25 m³/s
Resistance - 150 Pa
Noise Level - 35 dBA @ 1m
Noise Level - 28 dBA @ 3m
Noise Rating - NR31 @ 1m
Noise Rating - NR24 @ 3m

"Communication between those involved in the design process must include consideration for the HVAC system earlier, to favour a quiet solution"

Note: Data for design guidance only. For full details, outline drawings are available upon request.

Acoustic Design Process

Many stages of the testing process affects the acoustic performance of the building, from design right through to proactive maintenance. Each stage has a responsibility to ensure that the acoustic performance meets the desired expectations by applying the most effective noise solution.

Co-ordinate mechanical equipment selection

- Balance must be struck between loudness of the sound source and distance located from the space.
- Required coordination between mechanical engineering (system selection) and the architect (space planning).

Reduce source sound levels to the extent possible

- Try and reduce sound levels particularly close to the receiver.
- Avoid low frequency producing equipment, like forward curve fans, as low frequencies are difficult and costly to attenuate.
- Design constant volume fans to operate at peak efficiency and use viable frequency/ EC fans to control fan speed for variable volume units, replacing the need for inlet guide vanes/throttling dampers.

Install duct-borne noise control devices as required

- It can be difficult to meet noise level requirements using standard inline sheet ducts.
- Some combination of sound attenuation, sound plenums and acoustic flex duct will be required to achieve conformance with the standard specified.

Follow guidelines related to air velocities, air flow and air balancing

- Larger duct that allows slower air velocities and a duct system designed for smooth airflow to help reduce self-generating noise through air turbulence.
- Install flex without kinks and hard bends.
- Avoid opposed blade dampers on terminal devices.
- Select air terminal devices (grilles, diffusers) with NR rating of 18 or less.

Avoid common duct routing pitfalls

- Don't use unducted/plenum returns/exhausts.
- Route noise ducts away from sound sensitive spaces.
- Route common duct away from adjacent sound sensitive spaces - avoid cross talk phenomenon.

Correct HVAC equipment

- Correctly specify, install and commission HVAC equipment.

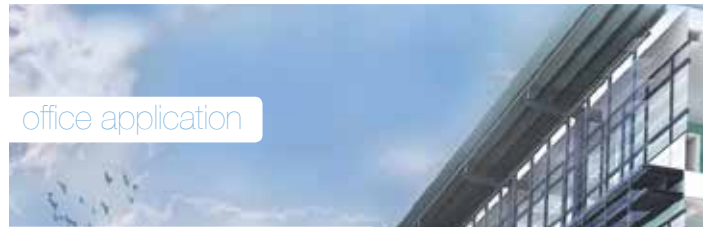
Monitor the engineering process

- Avoid value engineering noise critical parts.
- Monitor the construction and installation process with regular reviews.
- Ensure site specific reviews are carried out.

Acoustic Applications

inspire... create... working environments

office application



Boardroom / Offices



Library



library application



Environment

The environment surrounding the sound source will affect how sound power radiates away from the source, also sound pressure will vary within the environment, as when sound reaches a surface it will either reflect or absorb - but probably a mixture of both.

If sound is reflected then the pressure measurement will include both the source sound energy and the reflected sound energy.

If the same sound source, emitting identical sound power is in a different environment the sound pressure within the space will be different.

Understanding sound power emitted from the product and the type of environment allows for an accurate interpretation of acoustic data.



school application



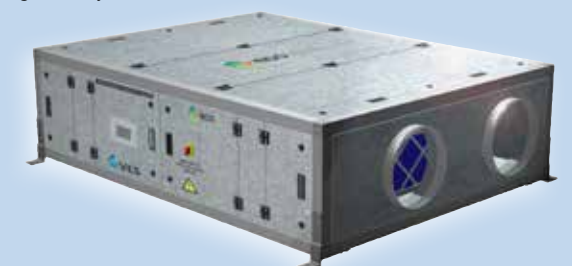
Classroom

Ecovent Acoustic (EAX) Unit Specification

The Ecovent Acoustic is suitable for many installations including schools, offices, libraries, hotels and retail establishments. The unit has been independently acoustic tested to BS EN ISO 3744:2010 - *Determination of Sound Power Levels of noise sources, using sound pressure for machine, equipment and their sub-assemblies.*

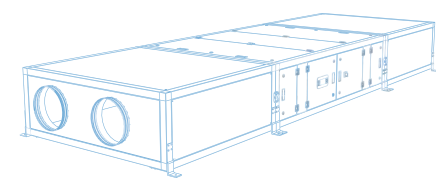
Ecovent Acoustic - low noise heat recovery ideal for noise sensitive applications:

- Low noise to meet acoustic requirements, including BB93
- Independent acoustic testing to BS EN ISO 3744:2010
- Up to 75% heat recovery efficiency and modulating damper to control heating / cooling recovery
- Duties up to 0.45 m³/s
- 50mm tube and panel with acoustic infill
- 500mm in height
- NR35 at full speed
- High efficiency fans with low SFPs to achieve L2 Building Regulations
- Inbuilt BlueSense intelligent controls technology for performance and efficiency
- Variety of options to suit unit requirements
- Quick change plug connections for easy electrical maintenance
- Multi access plantroom units with top, bottom, left or right access
- Automatic air volume commissioning
- Conditional based servicing, calculating the efficient optimal filter change point.

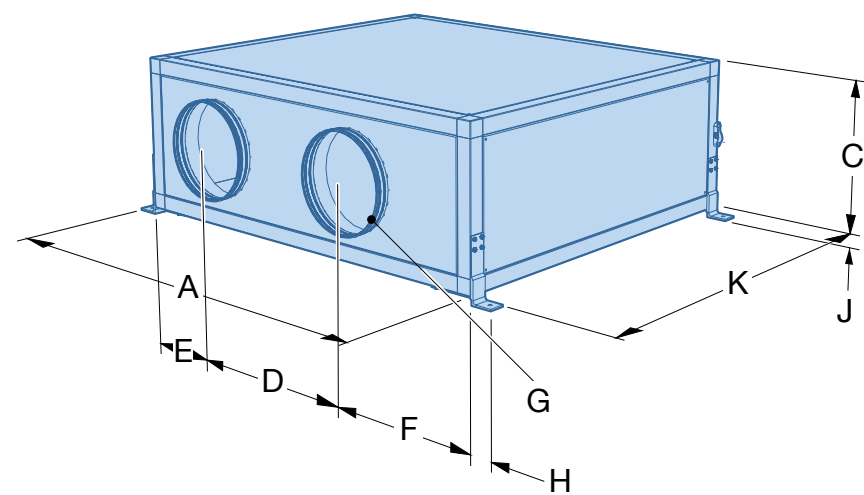


Silencer Model

To reduce Duct-borne and Airborne noise VES have developed a matching duct Silencer for the Ecovent Acoustic unit.



EAX2 with fitted Silencers



Unit Type	Dimensions mm										Weight kg
	A	C	D	E	F	GØ	H	J	K		
EAXVA200/1200/P	1400	500	600	325	475	315	75	25	1200	135	

Note: Dimensions for guidance only. For full details, outline drawings are available upon request.



Noise Surveys

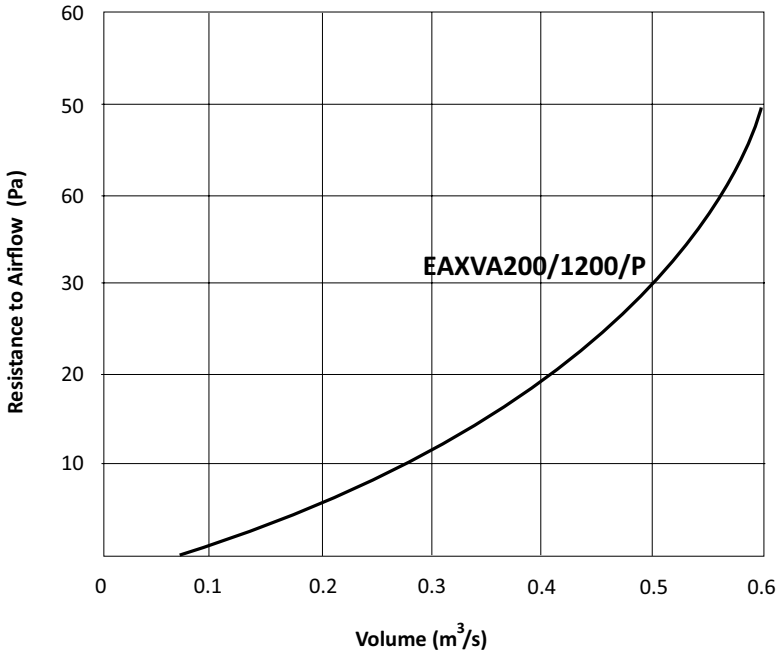
VES also have the knowledge and expertise to conduct noise surveys onsite, to help resolve any noise related issues.

Silencer Option	Sound Spectrum dB re 10 ⁻¹² W PWL Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
EAXVA200/1200/P	63	125	250	500	1k	2k	4k	8k
Induct Loss	-6	-11	-18	-22	-25	-17	-22	-20

Note: Each silencer will add a maximum of 30 Pa to the external resistance.

Performance Curves

- Fits directly to the air handling unit
- Low air pressure loss
- Helps meet low 'in room' noise levels



VES Sales Support

If you require any further design assistance please do not hesitate to contact our technical sales team on 08448 15 60 60.

Note: Data for design guidance only. For full details, outline drawings are available upon request.

Bespoke Solutions

As well as offering a wide range of standard Ecovent Acoustic units VES are able to build bespoke versions for special applications and requirements.

Our experience with controls also enables high level of integration with Building Management Systems or existing solutions, as well as matching to niche applications.

With VES you really get the full package without needing to mix and match suppliers.

Bespoke Options:

- Controls Integration
- Aesthetic requirements and paint colour finishes
- Further cooling/heating options
- Specific filtration applications i.e. Carbon, Grease, HEPA
- Flat packing and site assistance

Specialist Site Services

VES operates a Specialist Site Services division, which is a market leader in the repair and refurbishment of any make or model of air handling equipment. For buildings with faulty and deteriorating ventilation plant, the obvious choice may appear to be replacement. However there are many reasons, not least economic ones, why the repair or refurbish alternatives should also be explored.

Features of Specialist Site Services



In addition to being a First Class ISO Certified Manufacturer, the VES Specialist Site Services Division is the largest on-site solutions provider in the country.

Assistance in all Market Sectors



For all enquires about our services please contact us on +44 (0)8448 15 60 60 or email sssales@ves.co.uk



10% Online Discount

100s of Ventilation Products



Sales Freephone
0800 31 66 000
vesdirect.co.uk

Product Specification

Ecovent[®] Acoustic High Efficiency Low Noise Heat Recovery Unit

1.1. General

A. Provide a heat recovery air handling unit to meet the performance and configuration as indicated in the schedule and detail drawings. The heat recovery air handling unit shall be tested to BS EN ISO 5801:2008, BS 848-1:2007 and shall be independently acoustic tested to BS EN ISO 3744:2010 and shall be of the Ecovent type as manufactured by VES Andover Ltd a company accredited with BS EN ISO 9001:2008.

1.2. Unit Construction

A. The unit shall be provided pre-assembled comprising of a rigidly constructed 50mm tubular aluminium case, double skinned galvanised sheet steel panels, supply and extract centrifugal backward curved fans with direct drive motor, supply and extract G4 pleated panel filters, and plastic plate heat exchanger incorporating drain pan.

B. The unit shall be supplied in one section.

C. The units shall be available with optional fitted electric or hot water heating as indicated in the schedule and detail drawings.

D. The units shall be available in plantroom construction as indicated in the schedule and detail drawings.

E. The units shall be fitted with a heat exchanger bypass duct, incorporating a bypass damper to allow heating / cooling recovery and free heating / cooling.

F. The unit shall have circular 'safe fit' duct spigots complete with rubber gasket seals.

G. The unit casework shall incorporate high quality leak resistant neoprene gaskets seals on service doors and panels.

H. Access for maintenance shall be via a removable lid or panels, allowing access for the cleaning or removal of internal components as indicated in the detail drawings. The filters can be withdrawn through side access panels.

I. The casework shall incorporate mounting brackets compatible with drop-rod systems.

J. The unit shall be compatible with optional self-levelling feet as provided by VES Andover Ltd.

K. The units shall be supplied with access and handling as indicated in the schedule and detail drawings.

1.3. Fans

A. The unit fan impellers shall be of PA6 glass-fiber reinforced, backward curved plastic blade construction with galvanised steel mounting plate.

B. The impellers shall be statically and dynamically balanced to G 2.5 / G 6.3 according to ISO1940 part 1.

C. The fan impellers shall be mated with aerodynamic bell inlet eyes for high efficiency and low noise generation.

D. The fan impellers are supplied as standard in natural uncoated finish. Acrythane coating shall be available for galvanised steel fans as indicated in the schedule.

1.4. Motors

A. The fans shall incorporate external rotor motors to insulation class F, IP44 environmental protection rating and shall be supplied with thermal protection cut-out as standard.

B. The integrated motor shall be supplied epoxy painted grey to RAL7032.

1.5. Plate Heat Exchanger

A. The unit shall be supplied with a full PVC plate heat exchanger with an efficiency up to 75% to BS EN 308:1997 specification.

B. The plate heat exchanger shall incorporate a 100% recycled exchange matrix and heavy gauge PVC framework as standard.

C. The plate heat exchanger matrix shall be aerodynamically designed, with built-in spacers ensuring a constant plate separation.

D. The plate heat exchanger shall be available with optional virgin plastic exchange matrix for corrosive environments as indicated in the schedule.

1.6. Drain Pan

A. The unit shall include a built-in condensate drain pan as standard.

B. The drain pan discharge connection shall be 15mm plain PVC stub type, terminated through the case onsite by others.

Product	Unit Size	Fan Type	Fan Size	Fan Phase	Unit Config	Main Heating	Infill	Handling	Main Filter	Control Panel Section	Name	Part No.
EAX	2	4	4	-1	/FP	-W [null]	/EE	/RT /RB /LT /LB	/G4 /F7	/ISC /CPSC	Control Panel	CPB0-1/W/P/CC/C
											Electric Heater Battery	EHEAX2/6KW/1X1
											Valve & Actuator Kit	EAXCMT200
											Silencer	EAXVA200/1200/P
											Feet	NRGX9000

Product Unit Config Main Heating Infill Handling Main Filter Control Panel Section

EAX

/FP= Flat Plantroom

-W=Water Heating
-E=Electric Heating

EE (50mm)

Plantroom /RT=Right Top
Flat /RB=Right Bottom
/LT=Left Top
/LB=Left Bottom

/G4
/F7

/ISC=Isolator and built in
Speed Control
/CPSC=Control Panel and
built in Speed Control



Example Coding

Plantroom EAX 244-1/FP-E/EE/RT/G4/CPSC

1.7. Filtration

- A. The filters shall be 100mm pleated filter media as standard, with rigid wax treated cardboard moisture resistant frame.
- B. Filters shall be to BS EN 779 Classification Grade G4 as standard, grade as indicated in the schedule and detail drawings. F7 alternative available.

1.8. Heating

- A. The units shall be available with hot water or electric element heating as indicated in the schedule and detail drawings.
- B. The hot water heater battery shall be of copper tube, aluminium fin block construction, with galvanised sheet steel casework. The flow and return pipe connections shall be handed as indicated in the schedule and detail drawings.
- C. The hot water heater battery shall be available with alternative fin coatings by special order, as indicated in the schedule.
- D. The electric heater battery shall be suitable for single or three phase supply and compatible with thyristor control as indicated in the schedule and detail drawings.
- E. The electric heater battery shall consist of an element array sized to suit the steps and phases as indicated in the schedule and detail drawings. The elements shall consist of a tubular incoloy shroud containing compressed magnesium oxide powder packed around a Nickel Chromium resistance wire. The element array shall be evenly spread across the open area of the duct.
- F. Where multiple elements are required to achieve the steps and phases as indicated in the schedule, elements shall be linked by copper busbar or terminated with electrical connectors.
- G. The electric heater battery shall be fitted as standard with a 130 °C non-adjustable thermal safety cutout, with manual reset.
- H. All electric heaters shall be 1500 V flash tested, and resistance tested for correct component assembly. Test certificates shall be available on request.

1.9. Operation Environment

- A. The unit shall be designed to operate in ambient temperatures from -20 °C up to 40 °C, and can run continuously at up to 80% humidity level.

2.0. Controls

- A. The unit shall be fitted as standard with EC or Inverter fan speed control system to match fan type with max/min speed and 0-10 v BMS control, i.e Air Quality or Temperature sensor.
- B. The unit shall be available with optional unit mounted CPB control panel as manufactured and factory fitted by VES Andover Ltd. to suit electric or hot water heating, or alternative loose CPB panel for installation by others. If no control panel is ordered the unit will be supplied with local isolator for unit mains connections.
- C. Fitted Controls shall be positioned as indicated in the schedule and detail drawings.
- D. Controls shall be supplied with internally mounted circuit breakers, run, trip and panel live indication and lockable door isolation switch.
- E. Control panels shall have individual circuit breakers for Supply, Extract, Control and Electric Heater Battery where indicated in the schedule and detail drawings.
- F. Fitted controls shall be supplied with a supply air duct sensor to be fitted on-site by others as indicated in the schedule.
- G. Fitted controls shall be supplied with a wired AHU mounted LCD controller. Optional room user interfaces are available.
- H. Fitted controls shall be fully pre-wired to internal components. Hot water controls shall be pre wired to a local junction box for easy electrical connection to optional four port valve actuator supplied by VES Andover LTD as indicated in the schedule.

2.1 Ancillaries

- A. The unit shall be fully compatible with a standard range of spigot mounted silencers. The silencers shall be suitable for direct mounting to the unit.
- B. The silencer shall be a rigidly constructed 50mm double skinned galvanised sheet steel case lining incorporating internal splitting vanes lined with resin bonded mineral wool.
- C. The silencer casework shall be provided naturally finished in high quality galvanised steel as standard. Internal and external powder coat available as indicated in the schedule. Colour to be in accordance with schedule.

Ecovent® *Acoustic* Applications

The Ecovent *Acoustic* is suitable for many installations including schools, offices, libraries, hotels and retail establishments.

The unit has been independently acoustic tested to BS EN ISO 3744:2010 - Determination of Sound Power Levels of noise sources, using sound pressure for machine, equipment and their sub-assemblies.

Ecovent *Acoustic* - low noise heat recovery ideal for noise sensitive applications:



School Application



Office Application



Library Application

“Communication between those involved in the design process must include consideration for the HVAC system earlier, to favour a quiet solution”

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 wheels and run-around coils.
- Plantroom or weatherproof, flat or stacked.
- Fitted silencers, 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, axial and mixed flow fans.
- Fitted silencers available on 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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VES reserves the right to amend product specifications and details without notice



VES Head Office

Eagle Close, Chandlers Ford Industrial Estate, Chandlers Ford, Eastleigh, Hampshire SO53 4NF
Tel: 08448 15 60 60 Fax: 023 8026 1204

VES Manchester Office

Unit 6, Willan Enterprise Centre, 4th Avenue, The Village, Trafford Park, Manchester M17 1DB
Tel: 0161 848 8711 Fax: 0161 848 7268

VES Glasgow Office

Unit 15, Evans Business Centre, Springhill Parkway, Glasgow Business Park, Glasgow G69 6GA
Tel: 0141 771 6823 Fax: 0141 771 6892



Better air for the built environment

ves.co.uk vesdirect.co.uk info@ves.co.uk