

ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 3447

18 July 2023

Dex Construction Group Ltd
Second Floor
Northern Assurance Building
9-21 Princess Street
MANCHESTER
M2 4DN

COLLYHURST VILLAGE, MANCHESTER – SOUTHERN SITE

SUPPLEMENTARY NOTE 1

ACOUSTIC CONSULTANCY REPORT ADT 3447/S1

Revision	Date	Issued By	Checked by	Revision Notes
-	18 July 2023	Chris Middleton	-	-

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1.0 INTRODUCTION

Planning permission 130514/VO/2021 has been granted for 'the erection of 14 three storey dwellinghouses (Use Class C3a) and a four storey building comprising 16 residential apartments (Use Class C3a); highways improvements, including the formation of a new road, extension of Kingsfold Avenue including the formation of on-street car parking spaces, formation of new pavements and re-surfacing of existing roads; and associated car parking; cycle and refuse storage; landscaping; public realm; and infrastructure'.

A scheme of sound insulation measures has previously been submitted towards discharge of planning condition 16, as set out in the report ADT 3447/SSM2 dated 13 March 2023.

Comments on that report have been received from Manchester City Council environmental protection service, and following subsequent discussions it was agreed that sample calculations of noise from the MVHR plant would be submitted. This report provides those calculations.

2.0 PLANT NOISE ASSESSMENT

2.1 Assessment Criteria

The indoor ambient noise criteria from planning condition 16 are a day time level of ≤ 35 dB $L_{Aeq, 16 \text{ hour}}$ and a night time level of ≤ 30 dB $L_{Aeq, 8 \text{ hour}}$. There is also an L_{Amax} requirement, although that would not normally be applicable to a steady noise source such as the MVHR unit. Compliance with these criteria is to be determined under Approved Document F 'whole dwelling ventilation' conditions.

2.2 Plant Details

The MVHR units serving the apartments and the houses will be from the same Vent Axia 'Lo-Carbon Sentinel Kinetic' range. For the purposes of the assessment a typical apartment bedroom and living room have been selected, and the manufacturer's noise data for the MVHR unit, the associated roomside attenuators and the apartment ventilation layout are provided in Appendix B.

2.3 Calculations

Sample calculations of the resultant noise levels in the apartment are provided in Appendix A. The bedroom has a supply duct only, with make up air coming from an undercut door, while the living room has both supply and extract ducts. The casing breakout noise from the unit has not been calculated in detail, there is a manufacturer's noise level of 34 dB(A) at 3 metres, and it is located in a cupboard off the hallway, where the resultant noise level should be ≤ 30 dB(A). The resulting noise levels in habitable rooms should be negligible.

The noise levels in the sample bedroom are as follows, including the environmental noise intrusion and the MVHR supply duct noise:

	L _{eq,T} (dB) at octave band centre frequency (Hz)								L _{Aeq,T} dB
	63	125	250	500	1k	2k	4k	8k	
External noise intrusion (from previous report)	44	34	30	16	16	8	-5	-13	25
MVHR supply	27	32	29	20	4	-11	-31	-18	23
Cumulative	44	36	33	21	16	8	-5	-12	27

The cumulative noise level is within the required limit of 30 dB L_{Aeq, 8 hour}.

The same calculation for a sample living room is as follows, again taking into account the external noise intrusion, and this time the supply and extract ducts to the room:

	L _{eq,T} (dB) at octave band centre frequency (Hz)								L _{Aeq,T} dB
	63	125	250	500	1k	2k	4k	8k	
External noise intrusion	50	40	38	23	12	12	1	-4	32
MVHR supply	25	31	29	21	4	-10	-29	-15	23
MVHR extract	23	24	33	26	8	-12	-22	-4	27
Cumulative	50	41	40	29	14	12	1	-1	34

The cumulative noise level is within the required limit of 35 dB L_{Aeq, 8 hour}.

On that basis it is reasonable to conclude that noise from the proposed MVHR plant would be within the noise criteria in planning condition 16, with the proposed roomside attenuation, and taking into account the cumulative effect of external noise intrusion and plant noise.

FOR ACOUSTIC DESIGN TECHNOLOGY

APPENDIX A
CALCULATION DETAILS

BEDROOM – SUPPLY ONLY

	Octave Band Centre Frequency - Hz								dB(A)	NR
	63	125	250	500	1k	2k	4k	8k		
Fan sound power level	52	57	60	60	55	50	33	33	60	57
Unlined duct (60mm x 60mm x 4mm)	-1	-1	-2	-1	-1	-1	-1	-1		
Split (67%)	-2	-2	-2	-2	-2	-2	-2	-2		
Vaned bend (204mm x 60mm)	0	0	0	0	0	-1	-2	-3		
Split (50%)	-3	-3	-3	-3	-3	-3	-3	-3		
Vaned bend (204mm x 60mm)	0	0	0	0	0	-1	-2	-3		
204x60x920silencer	0	-3	-12	-24	-38	-49	-50	-36		
In duct sound power level	46	48	41	30	11	-7	-27	-15		
End reflection	-19	-15	-10	-6	-3	0	0	0		
Radiated sound power level	27	33	31	24	8	-7	-27	-15	25	20
Direct correction	-12	-11	-10	-9	-8	-7	-7	-6		
Direct L _p	15	22	21	15	0	-14	-34	-21	16	10
Reverberant correction	0	-1	-3	-5	-6	-7	-7	-7		
Reverberant L _p	27	32	28	19	2	-14	-34	-22	22	17
Total L _p	27	32	29	20	4	-11	-31	-18	23	18
Required insertion loss	-	-	-	-	-	-	-	-		

LIVING ROOM – SUPPLY

	Octave Band Centre Frequency - Hz								dB(A)	NR
	63	125	250	500	1k	2k	4k	8k		
Fan sound power level	52	57	60	60	55	50	33	33	60	57
Unlined duct (60mm x 60mm x 4mm)	-1	-1	-2	-1	-1	-1	-1	-1		
Split (33%)	-5	-5	-5	-5	-5	-5	-5	-5		
Vaned bend (204mm x 60mm)	0	0	0	0	0	-1	-2	-3		
204x60x920silencer	0	-3	-12	-24	-38	-49	-50	-36		
In duct sound power level	46	48	41	30	11	-6	-25	-12		
End reflection	-19	-15	-10	-6	-3	0	0	0		
Radiated sound power level	27	33	31	24	8	-6	-25	-12	25	20
Direct correction	-12	-11	-10	-9	-8	-7	-7	-6		
Direct L _p	15	22	21	15	0	-13	-32	-18	16	10
Reverberant correction	-3	-3	-3	-4	-6	-7	-7	-7		
Reverberant L _p	24	30	28	20	2	-13	-32	-19	22	17
Total L _p	25	31	29	21	4	-10	-29	-15	23	18
Required insertion loss	-	-	-	-	-	-	-	-		

LIVING ROOM – EXTRACT

	Octave Band Centre Frequency - Hz								dB(A)	NR
	63	125	250	500	1k	2k	4k	8k		
Fan sound power level	50	49	56	52	40	35	33	39	52	49
Unlined duct (60mm x 60mm x 2mm)	0	-1	-1	-1	-1	-1	-1	-1		
Split (50%)	-3	-3	-3	-3	-3	-3	-3	-3		
Vaned bend (204mm x 60mm)	0	0	0	0	0	-1	-2	-3		
204x60x620 silencer	-3	-4	-7	-13	-21	-38	-45	-33		
In duct sound power level	44	41	45	35	15	-8	-18	-1		
End reflection	-19	-15	-10	-6	-3	0	0	0		
Radiated sound power level	25	26	35	29	12	-8	-18	-1	29	25
Direct correction	-12	-11	-10	-9	-8	-7	-7	-6		
Direct L _p	13	15	25	20	4	-15	-25	-7	20	16
Reverberant correction	-3	-3	-3	-4	-6	-7	-7	-7		
Reverberant L _p	22	23	32	25	6	-15	-25	-8	26	21
Total L _p	23	24	33	26	8	-12	-22	-4	27	22
Required insertion loss	-	-	-	-	-	-	-	-		

APPENDIX B

MANUFACTURERS' DATASHEETS AND TYPICAL APARTMENT VENTILATION LAYOUT

Domestic & Commercial

Sales Tel: 0844 856 0590

Tech Support Tel: 0844 856 0590

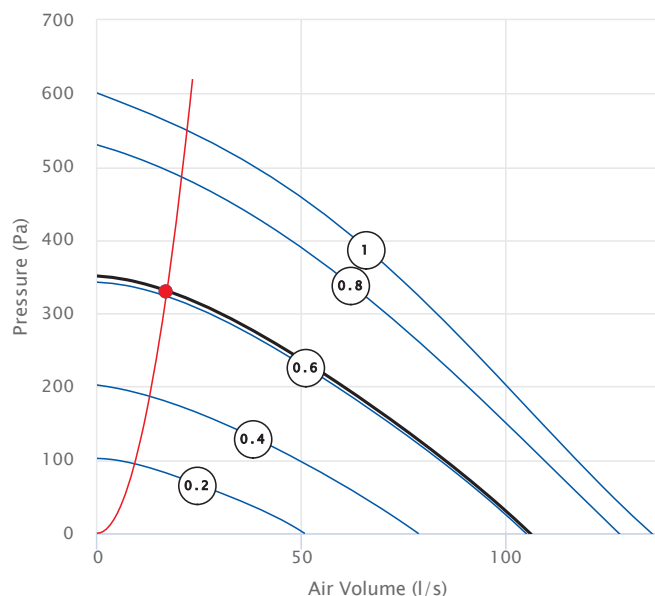
Industrial

Sales Tel: 0844 856 0594

Tech Support Tel: 0844 856 0595

Vent-Axia®**Product Information**

Heat Recovery - Lo-Carbon Sentinel Kinetic Plus B Right

**Performance Chart****Sound Information at Duty Point**

	63	125	250	500	1k	2k	4k	8k	Total	dB(A) @ 3m
Inlet	50	49	56	52	40	35	33	39	59	34
Outlet	52	57	60	60	55	50	33	33	65	40
Breakout	55	49	59	54	46	39	33	39	62	34

Sound Power Level Spectra dB (re 10^{-12} Watts)

For ducted units, sound power is given as In Duct with end reflections added.

Stated dB(A) levels at 3m with spherical propagation at a reference level of 2×10^{-12} Pa**Technical Information**

Customer Reference	HT01 Kinetic Plus trickle
Requested Duty	17 l/s @ 330 Pa
Actual Duty	17 l/s @ 331 Pa
Stock Reference	443028
Product Type	Heat Recovery
Product Range	Heat Recovery
Casing	ABS
Airstream Temperature	-20 - 45°C
Specific Fan Power	3.9
dBA	34 dBA @ 3m
Warranty	Up to 5 years

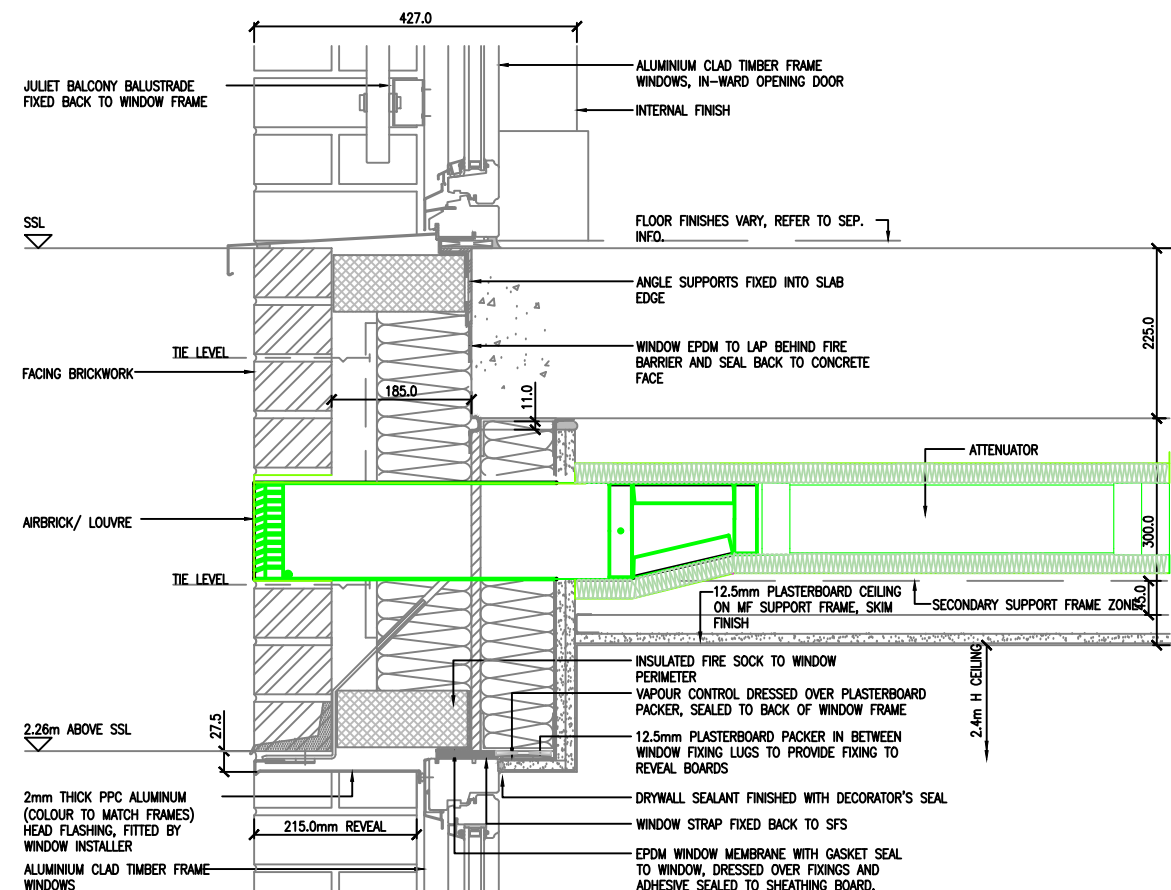
Electrical Information

Motor Rating	0.07
Selection Power	0.07
Supply Voltage	220-240V/1/50Hz
Full Load Current	0.00 A
Starting Current	0.00 A
Starting Method	-
Motor Poles	-
Insulation	-
IP Rating	IP22
S.T.O.P. Protection	Yes
Speed Controllable	In Built
Integral Controller	-

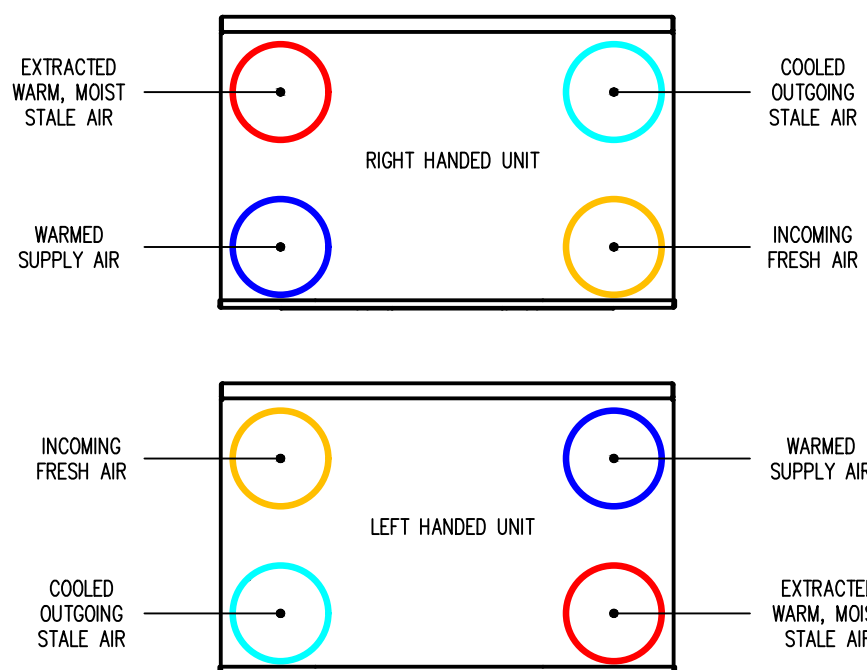
SAP Appendix Q Table 2012

	Thermal Efficiency	SFP (W/l/s)
K+1	91	0.42
K+2	91	0.44
K+3	90	0.52
K+4	90	0.63
K+5	90	0.76
K+6	91	0.9
K+7	91	1.05

DETAIL 'B' - UNVENTED HOT WATER CYLINDER DISCHARGE DETAIL



DETAIL 'C' - TYPICAL INTAKE/EXHAUST FACADE CONNECTION



FA	-	FROM ABOVE	
FB	-	FROM BELOW	
RTA	-	RISE TO ABOVE	
DTB	-	DROP TO BELOW	
H/L	-	HIGH LEVEL	
L/L	-	LOW LEVEL	
SP	-	CONCEALED SPRINKLER HEAD	
MF	-	PIPEWORK MANIFOLD	

1. ALL DOWNS PIPEWORK SHALL BE INSULATED IN ACCORDANCE WITH THE PROJECT SPECIFICATION.
2. ALL BOWS PIPEWORK SHALL BE INSULATED AND VAPOUR SEALED IN ACCORDANCE WITH THE PROJECT SPECIFICATION.
3. ALL MAIN DISTRIBUTION PIPEWORK SHALL BE COPPER WITH PRESS FIT FITTINGS. PIPEWORK WITHIN APARTMENT SHALL BE M/CUP PIPEWORK WITH CONTINUOUS JOINTLESS PIPE RUNS WITHIN CEILINGS AND PARTITIONS. EXPOSED PIPEWORK AND FITTINGS IN ROOM SERVING SANITARY FITTINGS OR EQUIPMENT SHALL BE CHROME PLATED COPPER.
4. ALL INDIVIDUAL BRANCH PIPES TO ITEMS OF SANITARY WARE SHALL BE COMPLETE WITH BALL-OFF-FIX TYPE ISOLATION VALVES.
5. ALL PIPEWORK DROPPES TO BE CONTAINED IN IPS PANELS/STUD PARTITIONING TO BE INSULATED. AIR VENTS TO BE FITTED AT ALL HIGH POINTS IN SYSTEM PIPEWORK.
6. DRAIN COCKS SHALL BE FITTED AT LOW POINTS IN SYSTEM PIPEWORK.
7. ALL SERVICES DROPPING TO LOW LEVEL TO BE IN W/APS IF POSSIBLE. BOILING OUT TO BE PROVIDED (BY OTHERS) WHERE PIPEWORK CAN NOT BE CONCEALED.
8. FLOW RESTRICTORS TO BE PROVIDED ON HOT & COLD WATER TO EACH BATHROOM SERVICE VOID & KITCHEN SINKS. C/W ISOLATING VALVES, FLOW TO BE LIMITED TO THE FOLLOWING:
KITCHEN SINKS 5/4min, SHOWERS 6/4min, W/ 5/4min
INSTALLED IN W/APS SHALL BE PROVIDED FOR EXTERNAL USE
SPDR 1/2" (1/4" IS 1/2" MIN) PRESSURE IN W/APS

1. SPRINKLER SYSTEM DESIGN SHALL BE IN ACCORDANCE WITH THE BS STANDARDS AND THE REQUIREMENTS OF THE BUILDING REGULATIONS AND FIRE OFFICER.
2. SPRINKLER HEADS SHALL BE PROVIDED IN THE NUMBERS AND SPACINGS AS REQUIRED TO SATISFY THE REQUIRED STANDARDS.
3. VALVES, PRESSURE REDUCING VALVES, FLOW SWITCHES AND INTERFACES ETC. SHALL BE PROVIDED AS NECESSARY AND AS SPECIFIED.
4. PIPEWORK SHALL BE CONCEALED WHEREVER POSSIBLE. ANY EXPOSED PIPEWORK SHALL BE AGREED WITH THE SERVICES CONSULTANT AND ARCHITECT PRIOR TO INSTALLATION.

EXTRACT	Trickle (l/s)	Boost (l/s)
Kitchen	7.6	13.0
Cupboard	4.7	8.0
Bathroom	4.7	8.0
Total	17.0	29.0
SUPPLY	Trickle (l/s)	Boost (l/s)
Bedroom 1	4.7	8.0
Bedroom 2	4.7	8.0
Living Area	7.6	13.0
Total	17.0	29.0

COMMISSIONING TABLE NOTES:
BOOST RATE TO BE PROVIDED IN ACCORDANCE
WITH BUILDING REGULATION PART F 2010.

Index	Description	Drawn & Chk by	Rev'd by	Date
P1	ISSUE FOR COMMENT	MJF	WL	28.06.23

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATIONS.

1. ALL MVR DUCTWORK SHALL BE MANUFACTURED IN RIGID PLASTIC & IN ACCORDANCE WITH THE DOMESTIC VENTILATION COMPLIANCE GUIDE
2. MVR UNIT IS TO RUN AT CONTINUOUS TRICKLE WITH BOOST BEING ACTIVATED VIA AN INTERNAL BOOST HUMIDISTAT AND KITCHEN BOOST SWITCH.
3. ALL AIR VALVES SHALL BE:
 - 3.1. EG/SG 125 = 125mm
4. FLEXIBLE DUCTWORK SHALL BE USED FOR FINAL CONNECTIONS ONLY. NO FLEXIBLE DUCTWORK SHALL BE MORE THAN 1m IN LENGTH. FLEXIBLE DUCTWORK SHALL BE ACOUSTIC TYPE ON MVR CONNECTIONS.
5. THE SUB-CONTRACTOR SHALL ALLOW FOR A VISUAL SITE

7. MVHR BOOST SWITCH SHALL BE INSTALLED IN KITCHEN WHICH SHALL BE UTILIZED WHEN KITCHEN IS IN OPERATION.
8. DOOR UNDERCUTS TO BE PROVIDED THROUGHOUT WITH MINIMUM SIZE OF 10MM PROVIDED ACROSS EACH DOOR.
9. FIRE SLEEVE/ FIRE COLLAR/ FIRE DAMPER SHALL BE PROVIDED ON ALL DUCTWORK WHERE PASSING THROUGH A FIRE COMPARTMENT

1. FIRE COLLARS TO BE PROVIDED WHERE ALL NEW SOIL & WASTE PIPEWORK 500mm & ABOVE PENETRATES FIRE COMPARTMENT WALLS/FLOOR SLAB.
2. EACH APPLIANCE SHALL BE PROVIDED WITH ANTI-VACUUM TYPE DEEP SEAL BOTTLE TRAPS.
3. WHERE AIR ADMITTANCE VALVES ARE INDICATED THEY SHALL BE INSTALLED ABOVE THE APPLIANCE SPILL OVER LEVEL.
4. ALL AIR AROUND DRAINAGE SHALL COMPLY WITH THE REQUIREMENTS OF BS EN 12056 AND BUILDING REGULATIONS APPROVED DOCUMENT PART H.
5. ALL HIGH LEVEL DRAINAGE PIPEWORK SHALL BE LAID AT A MINIMUM FALL OF 1:80 UNLESS OTHERWISE STATED.
6. RODDING EYES SHALL BE PROVIDED AT CHANGES OF DIRECTION ON ALL WASTE PIPE & SHALL BE FULLY ACCESSIBLE FOR MAINTENANCE PURPOSES.
7. ALL SUMP STACKS WHICH DISCHARGE AT ROOF LEVEL WILL TERMINATE TO ATMOSPHERE (500MM NOMINAL) ABOVE FINISHED ROOF LEVEL WITH CONE & BALLS IN CASE TERMINAL.
8. REFER TO ARCHITECTS SANITARY DETAILS FOR APPLIANCE CONNECTIONS.

- WASH HAND BASIN-32ø (MAX LENGTH 1.7M & 0 BENDS)
- WASH HAND BASIN-40ø (MAX LENGTH 3.0M & 2 BENDS)
- SHOWER - 40ø
- KITCHEN SINK - 40ø
- DISHWASHER - 40ø (MAX LENGTH 3.0M)

FOR WASTE PIPE GRADIENTS REFER TO BS EN 12056 PART 2: TABLE 6

BUTTRESS

DEX
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Project Title

COLLYHURST VILLAGE
MANCHESTER

Drawing Title

MECHANICAL SERVICES TYPICAL APARTMENT LAYOUT APARTMENT TYPE A1-A01

Project No L6101

Drawn & Checked by

Reviewed by

Date JUNE 2023

Scale 1:50

Drawing No

Rev.

6A1

P1

Wholehouse Attenuators

- Reduces induct noise
- Variety of sizes to suit specified noise requirements
- Compatible with both 204x60mm² and 220x90mm² rectangular ductwork
- Central and offset spigot options to suit each installation
- Rigid galvanized steel construction
- Easy installation
- Suitable for almost any ventilation system
- Low pressure loss



The Vent-Axia Wholehouse Attenuator has been developed to reduce induct noise in both residential and commercial ducting systems.

Technical Details

The Wholehouse Attenuator is compatible with either 204x60mm² or 220x90mm² ducting. It also offers two spigot options to suit the installation and design requirements. The Wholehouse Attenuator is available with either a standard centralised spigot or, for instances when the ducting is installed flat to a concrete slab, an offset spigot. As well as saving the need for additional ducting components, this allows for a much easier and quicker installation.

Noise Reduction

Offering excellent sound reduction over a range of frequencies, the Wholehouse Attenuator is available in two lengths depending on the noise suppression requirements. For MVHR systems the attenuator can be fitted on the supply side to habitable rooms, reducing airborne in-duct noise. For MVHR and extract-only systems, the attenuator may be placed on the extract side to limit 'cross-talk' through ductwork between rooms.

Models

Attenuator with Central Spigot

Model	Stock Ref
204x60 Duct 620mm Length	477369
204x60 Duct 920mm Length	407915
204x60 Duct 1220mm Length	407916
220x90 Duct 620mm Length	477370
220x90 Duct 920mm Length	407920
220x90 Duct 1220mm Length	407921

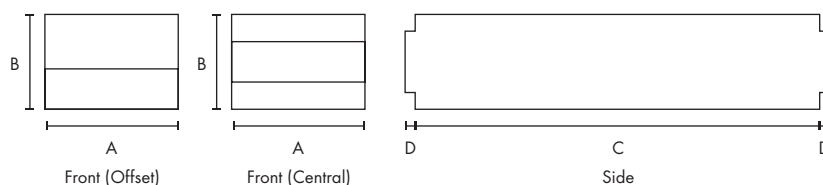
Attenuator with Offset Spigot

Model	Stock Ref
204x60 Duct 620mm Length	477371
204x60 Duct 920mm Length	475427
204x60 Duct 1220 Length	475428
220x90 Duct 620mm Length	477372
220x90 Duct 920mm Length	475429
220x90 Duct 1220mm Length	475430

Acoustic Flexible Ducting

Model	Stock Ref
125mmØ Duct 1m Length	443793
150mmØ Duct 1m Length	443274

Dimensions (mm)



Model	Stock Ref	A	B	C	D	kg
204x60 Duct 620mm Length	477369/477371	196	125	620	50	10
204x60 Duct 920mm Length	407915/ 475427	200	120	920	50	13
204x60 Duct 1220mm Length	407916/475428	200	120	1220	50	17
220x90 Duct 620mm Length	477370/477372	207	148	620	50	10
220x90 Duct 920mm Length	407920/ 475429	210	145	920	50	14
220x90 Duct 1220mm Length	407921/475430	210	145	1220	50	17

Acoustic Performance

Model	Stock Ref	Insertion Loss (dB)							
		63	125	250	500	1k	2k	4k	8k
204x60 Duct 620mm Length/ 220x90 Duct 620mm Length	477369/477370/ 477371/477372	3	4	7	13	21	38	45	33
204x60 Duct 920mm Length	407915/475427	0.3	3.2	11.6	24.2	38	49.1	50.3	36.4
204x60 Duct 1220mm Length	407916/475428	0.3	1.8	14.1	21.3	35.4	46.9	50.4	36.4
220x90 Duct 920mm Length	407920/475429	7.3	10.2	13.1	26.2	34.9	47.6	52.2	38.9
220x90 Duct 1220mm Length	407921/475430	1.2	7.4	18.6	30.2	39.1	51	45.2	38.6
125mmØ Duct 1m Length	443793	5.5	11.5	17	19.9	19.1	25.6	20	21.6
150mmØ Flexible Duct 1m Length	443274	-1.2	10.6	19	16.8	15.7	22.2	15.7	17.6

Pressure Loss

Model	Duct Size (mm)	Volume (l/s)	Pressure Loss (Pa)
Attenuator	204x60	15	6
		30	10
		60	25
		80	41
Attenuator	220x90	15	6
		30	10
		60	22
		80	36
Acoustic Flexible Ducting (1m)	125	15	2.8
		30	8.8
		60	19.2
		80	37.5
Acoustic Flexible Ducting (1m)	150	15	1.7
		30	6.4
		60	13.8
		80	28.4