SHARPS REDMORE

ACOUSTIC CONSULTANTS • Established 1990

Report

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24 Priory Road, Camden, NW6 4SG

Environmental Noise Report

Prepared by
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Project No 2120445

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Contents

Appendices

1.0 Introduction

1.1 Sharps Redmore (SR) have been instructed to undertake a noise assessment for a new external air conditioning unit a/c at Flat 1 and Flat 2, 24 Priory Road, Camden. The site location is shown in Figure 1 below:

Figure 1: Site Location

1.2 The new a/c unit will be located on the ground floor at the rear of the site. The purpose of this report is to consider the impact of noise from operation of the a/c unit on nearby noise sensitive properties including the Flat 3, 24 Priory Road, and the neighbouring property at 26 Priory Road.

1.3 In determining the noise impact SR have considered the existing background noise levels along with national and local planning policy objectives.

1.4 Section 2.0 contains a discussion of the available methods of assessment and assessment criteria.

1.5 Section 3.0 of this report contains details of the environmental noise survey.

1.6 An assessment of the impact from the proposed a/c unit based on manufacturer's data and drawings is included in Section 4.0.

1.7 A guide to the acoustic terminology used within the report is included in Appendix A.

2.0 Assessment Methodology and Criteria

Policy Requirements

2.1 The National Planning Policy Framework (NPPF), February 2019, sets out the Government's planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 180 of the NPPF states the following:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation".

2.2 Guidance on the interpretation of the policy aims contained within the NPPF is contained within National Planning Policy Guidance (NPPG). The NPPG introduces the concept of a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in the table below:

TABLE 1: Noise Exposure Hierarchy

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise.	Observed Adverse Effect	Mitigate ad reduce to a minimum

Response	Examples of Outcomes	Increasing Effect Level	Action
	Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.		
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.3 The NPPF and NPPG reinforce the March 2010 DEFRA publication, "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

2.4 Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"… all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

National Policy

2.1 The National Planning Policy Framework (NPPF), March 2012, sets out the Government's planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 123 of the NPPF state the following:

"Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

2.2 Guidance on the interpretation of the policy aims contained within the NPPF is contained within National Planning Policy Guidance (NPPG). The NPPG introduces the concept of a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in the table below:

TABLE 2: Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.3 The NPPF and NPPG reinforce the March 2010 DEFRA publication, "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

2.4 Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"… all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

Local Policy

2.5 With regard to local policy, consideration is given to the Camden Local Plan 2017 policy A1 which states that the "Council will seek to protect the quality of life of occupiers and neighbours" including noise.

2.6 Further guidance on noise and vibration is contained Policy A4 'Noise and Vibration' which states the following:

"*The Council will seek to ensure that noise and vibration is controlled and managed.*

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant unacceptable noise and vibration impacts; or

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity."

2.7 Details of the thresholds for plant and machinery in Appendix 3 are discussed below.

2.8 Taking an overview of national and local policy it is clear that when considering the impact of noise, one must consider the significance of any impact. The presence of an adverse impact in itself is not sufficient to refuse permission.

2.9 It is possible to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:

i. The effect may be determined by reference to guideline noise values. British Standard (BS) 8233:1999 and World Health Organisation "Guidelines for Community Noise" contain such guidelines.

ii. Alternatively, the impact may be determined by considering the change in noise level that would result from the proposal, in an appropriate noise index for the characteristic of the noise in question. There are various criteria linking change in noise level to effect. This is the method that is suited to, for example, the assessment of noise from road traffic because it is capable of displaying impact to all properties adjacent to a road link irrespective of their distance from the road.

iii. Another method is to compare the resultant noise level against the background noise level (L_{A90}) of the area. This is the method employed by BS 4142:1997 to determine the likelihood of complaint from noise of an industrial or industrial type nature. It is best suited to the assessment of steady or pseudo-steady noise and is commonly used for the assessment of mechanical plant. The use of this standard is considered appropriate in this case.

BS 4142:2014

2.10 This BS described a method for rating and assessing sound of industrial and/or commercial nature according to the following summary process:

i) Determine the background sound levels, in terms of $L_{A90,}$ at the receptor locations of interest.

ii) Determine the specific sound level of the source being assessed, in terms of L_{AeqT} level (T = 1 hour for day or 15 minutes at night), at the receptor locations.

iii) Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent or other characteristic which attract attention.

iv) Compare the rating sound level against the background noise level; the greater the difference between the two, the higher the likelihood of complaints of the noise.

i) Differences (rating – background) of around +10 dB is likely to be an indication of significant adverse impact (SOAEL) depending on context; a difference of +5 dB is likely to be an indication of adverse impact, depending on context. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon context.

2.11 The general intent of the planning system is to ensure that a development does not result in 'significant adverse impacts on health and quality of life' (NPPF para 123). BS

4142:2014 considers that the threshold of 'significant adverse impact' is likely to be around 10 dB or more… depending upon the context.

2.12 As can been seen above the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound exceeds the background sound level and the context in which it is placed.

2.13 As discussed in paragraph 2.5 above, Camden Council's Local Plan, Appendix 3, contains thresholds for plant and machinery at which planning permission will not be granted. These thresholds are based on the requirements of the previous version of BS 4142:1997 which assessed the 'likelihood of complaint' rather than the significance of impact. The noise thresholds contained within Appendix 3 of the Local Plan.

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

3.0 Survey Details

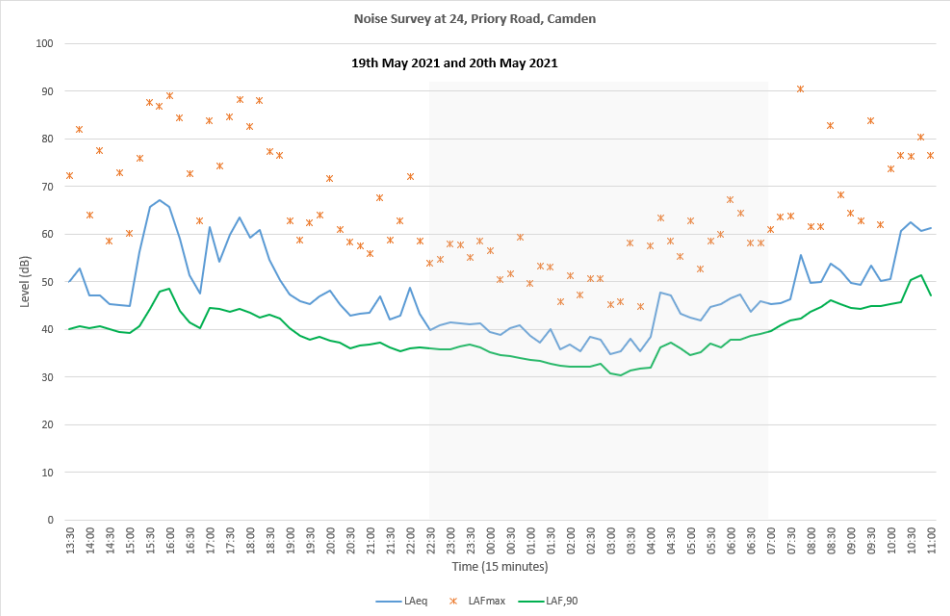
3.1 To determine existing baseline noise levels a series of noise measurements were taken between 19th and 20th May 2021 at 24 Priory Road. Then measurement location was chosen to be representative of the nearest residential properties to the proposed a/c unit.

3.2 Noise measurements were taken continuously from 1330 hrs on 19th May until 1100 hrs on 20th May 2021. Weather conditions during the survey were dry, warm westerly/southerly breeze (<5m/second). Weather conditions satisfied the requirements of BS 4142:2014.

3.3 The measurements were taken using a Norsonic 118 sound level meters fitted with an environmental microphone kit. The sound level meter was calibrated at the start and end of the survey and no variation in level noted. The sound level measurements were set up to continuously store 15 minute samples over the duration of the survey. All measurements were taken in free field conditions.

3.4 The steady noise level dB $L_{Aeq(5min)}$, non-steady noise level dB L_{Amax} and background noise levels dB, $L_{A90(5min)}$ were recorded during the survey. Full details of the survey are included in Appendix B to this report and summarised in Figure 2 below.

FIGURE 2: Survey Results

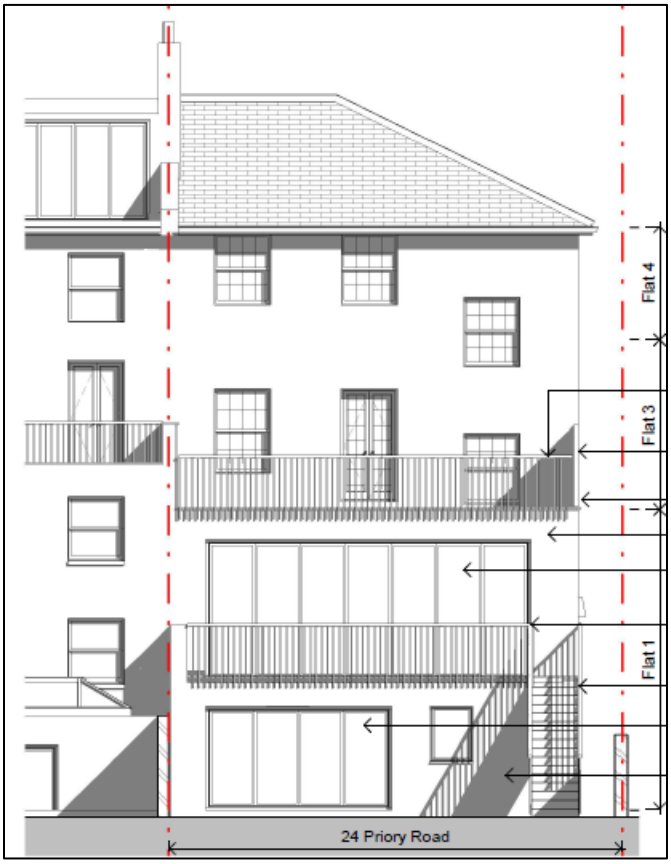


3.5 Based on survey the representative background sound level during the noise sensitive times that the plant will operate is considered to be 40 dB $L_{A90,}$ during daytime period and 35 dB L_{A90} during the night time period.

4.0 Noise Assessment

4.1 The proposed system will be fitted with a Fujitsu a/c unit. The external condenser (model number ARXG12KLLAP) will be installed at rear of the property, underneath the stairs, as shown in Figure 3 below.

FIGURE 3: Plant location



4.2 Based on manufacturers data the Sound Pressure Level (SPL) of the proposed unit will be 46 dB at 1m.

4.3 Using the manufacturer's data, the predicted noise level at the nearest noise sensitive properties, Flat 3, 24 Priory Road (R1) and first floor window at 26 Priory Road (R3) has been calculated.

TABLE 3: Calculations

	Receptor	
	R1	R2
Source Level at 1m	47 dB	47 dB
Distance to receptor (m)	7m	5m
Distance attenuation	-17 dB	-14 dB
Reflections	+3 dB	+3 dB
Angle of view	--	-3 dB
Screening	-10dB	--
Specific Level (L_{Aeq1hr})	23 dB	33 dB

4.4 Appendix 3 Table C requires that where the rating noise level from plant should be at least 10 dB below the background noise levels (15dB if tonal components are present). Based on the background noise levels measured noise from plant should therefore not exceed 30 dB during the day and 25 dB during the night time period.

4.5 Further advice is provided for small pieces of plant such as air conditioning units the Council will require a NR curve of NR35 or below. There is no direct relationship between A weighted noise levels and NR curves, however as a general rule the NR value = dBA- 5dB. Therefore, a NR curve of 35 will be approximately equivalent to 40 dBA.

4.6 Based on our experience and taking into account the manufacturers noise data this type of equipment tends to be bland in nature and does not contain any distinguishable tones which would mean the application of a character correction in this case. Therefore, the specific level predicted above, can be considered the rating level in this case.

4.7 At R1, the terrace of the upper flat, the predicted noise level from the operation of the a/c unit at the rear of the site will be within the suggested criteria during both the daytime. At R1 during the night time period and at R2 (the first floor window at 26 Priory Road) predicted noise levels will exceed the night time criteria by up to 8 dB.

4.8 To reduce noise levels from the a/c unit localised screening can be provided around the unit. Any solid barrier which just breaks the line of sight between the receptor and noise source will reduce noise levels by 5dB and will reduce noise levels below the night time criteria at R1 and below the daytime criteria at R2. Noise levels will marginally exceed the night time criteria at R2, by 3dB. However, noise from plant will still be 7 dB below the existing night time background noise level and also significantly below the suggested criteria of NR35 for small pieces of plant such as a/c units.

4.9 Therefore it is considered a marginal exceedance of the recommended criteria at night will not cause adverse impact to adjacent local residents. However, if further reduction is required noise from the a/c unit can be reduced by using a purpose built acoustic enclosure. An example of acoustic enclosure is shown in Appendix C.

4.10 Therefore, noise from the proposed a/c unit will not compromise the Government's noise policy vision, as stated in the NPPF and NPSE or the local design guidelines.

APPENDIX A

ACOUSTIC TERMINOLOGY

Acoustic Terminology

A1 Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sounds is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. 50 dB + 50 dB = 53 dB. Increases in continuous sound are perceived in the following manner:

1 dB increase - barely perceptible

3 dB increase - just noticeable

10 dB increase - perceived as twice as loud

A2 Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz (Hz) = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.

A3 To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability automatically to weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).

A4 The second important characteristic of sound is amplitude or level. Two units are used to express level, a) sound power level - L_w and b) sound pressure level - L_p. Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity, etc. The sound level that is measured on a meter is the sound pressure level, L_p.

A5 External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to different noises has been found to vary dependent on the type and temporal distribution of a particular type of noise. A set of statistical indices have been developed for the subjective response to these different noise sources.

A6 The main noise indices in use in the UK are:

L_{A90}: The sound level (in dBA) exceeded for 90% of the time. This level gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background sound level" of an area.

L_{Aeq}: The equivalent continuous sound level in dBA. This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the intermittent noise". In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as aircraft and trains.

L_{A10}: The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given

sample. It has been used over many years to measure and assess road traffic noise.

L_{AMAX} The maximum level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

A7 The sound energy of a transient event may be described by a term SEL - Sound Exposure Level. This is the L_{Aeq} level normalised to one second. That is the constant level in dBA which lasting for one second has the same amount of acoustic energy as a given A weighted noise event lasting for a period of time. The use of this unit allows the prediction of the L_{Aeq} level over any period and for any number of events using the equation;

$$L_{AeqT} = SEL + 10 \log n - 10 \log T \text{ dB}.$$

Where

n = Number of events in time period T.

T = Total sample period in seconds.

A8 In the open, known as free field, sound attenuates at a rate of 6 dB per each doubling of distance. This is known as geometric spreading or sometimes referred to as the Inverse Square Law. As noise is measured on a Logarithmic scale, this attenuation in distance = 20 Log (ratio of distances), e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

$$60 - 20 \text{ Log } {}^{160}/_{10} = 60 - 24 = 36 \text{ dB}.$$

APPENDIX B

SURVEY RESULTS

Appendix B: Survey Results

Date	Noise Level dB				
	L_{Aeq}	L_{AFmax}	L_{AFmin}	$L_{Af,10}$	$L_{AF,90}$
(2021/05/19 13:30:00.00)	50	72.2	37.4	52.8	40.1
(2021/05/19 13:45:00.00)	52.8	81.9	37.4	52.9	40.6
(2021/05/19 14:00:00.00)	47	64	37.7	49.6	40.3
(2021/05/19 14:15:00.00)	47.1	77.4	38.4	48.2	40.6
(2021/05/19 14:30:00.00)	45.2	58.5	37.5	48.3	40
(2021/05/19 14:45:00.00)	45	72.9	37.2	47.6	39.4
(2021/05/19 15:00:00.00)	44.8	60.1	35.6	47.5	39.2
(2021/05/19 15:15:00.00)	56.2	75.8	38.3	51.4	40.6
(2021/05/19 15:30:00.00)	65.6	87.7	41.2	67.6	44.2
(2021/05/19 15:45:00.00)	67	86.7	41.9	69.9	48
(2021/05/19 16:00:00.00)	65.7	89	39.5	68.8	48.6
(2021/05/19 16:15:00.00)	59	84.3	40.5	57.3	43.9
(2021/05/19 16:30:00.00)	51.4	72.6	38.6	53.7	41.4
(2021/05/19 16:45:00.00)	47.6	62.7	37.1	50.5	40.2
(2021/05/19 17:00:00.00)	61.4	83.8	39.8	63.8	44.4
(2021/05/19 17:15:00.00)	54.2	74.2	39.6	57.3	44.3
(2021/05/19 17:30:00.00)	59.9	84.5	38.2	61.3	43.7
(2021/05/19 17:45:00.00)	63.4	88.3	39.3	64.2	44.2
(2021/05/19 18:00:00.00)	59.3	82.5	39.3	60.9	43.4
(2021/05/19 18:15:00.00)	60.9	88.1	38.7	57.3	42.5
(2021/05/19 18:30:00.00)	54.5	77.2	40.2	55.1	43.1
(2021/05/19 18:45:00.00)	50.3	76.4	38.1	51.6	42.3
(2021/05/19 19:00:00.00)	47.3	62.7	37	51	40.2
(2021/05/19 19:15:00.00)	45.9	58.8	36.1	50	38.6
(2021/05/19 19:30:00.00)	45.3	62.3	34.4	48.8	37.8
(2021/05/19 19:45:00.00)	46.9	64	35.3	50.1	38.4
(2021/05/19 20:00:00.00)	48.1	71.7	34.6	49.8	37.6
(2021/05/19 20:15:00.00)	45.3	60.9	34.3	49.3	37.2
(2021/05/19 20:30:00.00)	42.8	58.3	32.5	45.2	35.9
(2021/05/19 20:44:59.00)	43.2	57.6	33	45.8	36.5
(2021/05/19 21:00:00.00)	43.5	55.8	34.6	46.4	36.8
(2021/05/19 21:15:00.00)	46.9	67.6	34.3	49.7	37.2
(2021/05/19 21:29:59.00)	42	58.7	32.5	45.2	36.2
(2021/05/19 21:45:00.00)	42.8	62.7	32.3	44.4	35.3
(2021/05/19 22:00:00.00)	48.7	72.1	33.8	46.1	36
(2021/05/19 22:15:00.00)	43.2	58.6	33.5	47.2	36.2
(2021/05/19 22:30:00.00)	39.8	53.9	33.6	43.2	36
(2021/05/19 22:44:59.00)	40.8	54.6	33.9	43.9	35.8
(2021/05/19 23:00:00.00)	41.5	57.9	33.6	44.3	35.7
(2021/05/19 23:15:00.00)	41.3	57.8	34.7	44.2	36.3
(2021/05/19 23:30:00.00)	41.1	55	35	44.1	36.8
(2021/05/19 23:45:00.00)	41.3	58.6	33.8	44	36.2
(2021/05/20 00:00:00.00)	39.5	56.5	33.2	42.2	35.1

Date	Noise Level dB				
	L_{Aeq}	L_{AFmax}	L_{AFmin}	$L_{Af,10}$	$L_{AF,90}$
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(2021/05/20 00:45:00.00)	40.9	59.3	32	43.2	34
(2021/05/20 01:00:00.00)	38.6	49.7	32.2	43.2	33.6
(2021/05/20 01:15:00.00)	37.3	53.3	31.8	40.1	33.3
(2021/05/20 01:30:00.00)	40	53	30.9	43.1	32.8
(2021/05/20 01:45:00.00)	35.8	45.7	30.9	37.2	32.3
(2021/05/20 02:00:00.00)	36.7	51.2	30.5	39.8	32.2
(2021/05/20 02:15:00.00)	35.4	47.2	30.6	36.2	32.1
(2021/05/20 02:30:00.00)	38.4	50.7	30.5	43.2	32.1
(2021/05/20 02:45:00.00)	37.8	50.7	30.8	42.3	32.7
(2021/05/20 03:00:00.00)	34.8	45.2	29.2	36.4	30.7
(2021/05/20 03:15:00.00)	35.3	45.8	28.6	37.5	30.4
(2021/05/20 03:30:00.00)	38.1	58.2	29.9	38.6	31.4
(2021/05/20 03:45:00.00)	35.4	44.7	29.9	35.9	31.7
(2021/05/20 04:00:00.00)	38.5	57.5	30	42.9	32
(2021/05/20 04:15:00.00)	47.8	63.3	32.1	51.3	36.1
(2021/05/20 04:30:00.00)	47.2	58.6	32.3	50.4	37.1
(2021/05/20 04:45:00.00)	43.3	55.2	32.2	46.8	35.9
(2021/05/20 05:00:00.00)	42.5	62.8	31.8	44.2	34.5
(2021/05/20 05:15:00.00)	41.9	52.7	33	45.1	35.2
(2021/05/20 05:30:00.00)	44.6	58.5	33.9	49	37
(2021/05/20 05:45:00.00)	45.2	59.9	33.8	49.2	36.1
(2021/05/20 06:00:00.00)	46.5	67.2	35	49	37.8
(2021/05/20 06:14:59.00)	47.3	64.4	35.8	51.5	37.8
(2021/05/20 06:30:00.00)	43.6	58.1	36.1	46.4	38.6
(2021/05/20 06:45:00.00)	45.8	58.1	36.9	49.9	39.1
(2021/05/20 07:00:00.00)	45.2	60.9	37.3	47.8	39.6
(2021/05/20 07:15:00.00)	45.5	63.6	38.9	48.2	40.9
(2021/05/20 07:30:00.00)	46.2	63.7	40	48.9	41.8
(2021/05/20 07:45:00.00)	55.6	90.4	40.5	51.5	42.3
(2021/05/20 08:00:00.00)	49.7	61.5	41.2	53.3	43.6
(2021/05/20 08:15:00.00)	49.9	61.5	42.2	53.4	44.7
(2021/05/20 08:29:59.00)	53.7	82.8	42.4	55.7	46
(2021/05/20 08:45:00.00)	52.3	68.3	42	55.8	45.2
(2021/05/20 09:00:00.00)	49.8	64.3	42.1	52.7	44.4
(2021/05/20 09:15:00.00)	49.4	62.7	42	52.2	44.3
(2021/05/20 09:30:00.00)	53.3	83.8	42.5	54.1	44.8
(2021/05/20 09:45:00.00)	50.2	62	41.8	53.3	44.9
(2021/05/20 10:00:00.00)	50.6	73.6	43.1	53.1	45.3
(2021/05/20 10:15:00.00)	60.7	76.5	43.3	60.5	45.6
(2021/05/20 10:30:00.00)	62.5	76.3	45.4	62.6	50.3
(2021/05/20 10:45:00.00)	60.6	80.3	44.8	63.3	51.3
(2021/05/20 11:00:00.00)	61.2	76.5	44.3	62.7	47.2

APPENDIX C

ACOUSTIC ENCLOSURE

Environ Technologies Ltd
Regus House, 1010 Cambourne Business Park
Cambourne, Cambridgeshire, UK, CB23 6DP
Tel: +44 (0)870 383 3344
Fax: +44 (0)1223 598001
www.environ.co.uk

environlite ELV1.1.25AC Acoustic Performance Data (March 2010)

Noise Measurement Information:

Test: Environ Lite Acoustic Enclosure — W 1700mm x D 1000mm x H 1550mm

Test Standard:

BS EN ISO 140-3 Acoustics - Measurement of Sound Insulation in Buildings and of Building Elements - Part 1: Airborne Sound Insulation

Sound Level Measuring Equipment:

Norsonic 830 RTA Precision Sound Analyser Type 1
CEL 284/2 Acoustic Calibrator Type 1
JBL Loudspeaker driven by CEL Loudspeaker driven by 830 White Noise Source

Transmission Loss Data:

Transmission Loss — Environ ELV1.1.25AC Acoustic Enclosure							
Octave Frequency in Hertz (dB ref 2 x 10^{-5} Pascal's)							
63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
14	16	23	30	37	39	38	39
Summary							
Transmission Loss Equates to an Overall Reduction of 26 dB(A)							

Support Information:

Monitoring was carried out using the BS3740 technique, insofar as measurements were taken in each quadrant and the results averaged. Internal Test Room: W 6m x D 16m x H 5m. Background noise in the semi-reverberant test room was such as not to interfere with the practical measurements

environ™
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SELECTION MATRIX

environlite 1.1.25AC Series 2 SP1

12 November 2013

Acoustic enclosures for Split AC Applications

CUSTOMER:	SITE / LOCATION / REFERENCE

ORIGINAL EQUIPMENT MANUFACTURERS PUBLISHED DATA

MAKE / MODEL / DIMENSIONS / AIRFLOW & SOUND PRESSURE LEVEL @ 1.0M FREEFIELD

MAKE:	MODEL:	AIR IN	AIR OUT
Mitsubishi Electric	MUZ-SF25VE	Rear & 1 Side	Front

WIDTH (MM)	DEPTH (MM)	HEIGHT (MM)	AIRFLOW (M S⁻¹)	SPL dB(A)	DISTANCE (M)
800	285	550	0.57	48	1

INNER CUBE DIMENSIONS		
850	400	735
WIDTH (MM)	DEPTH (MM)	HEIGHT (MM)
0.57	1.0	48
AIRFLOW (M S⁻¹)	DISTANCE (M)	SPL dB(A)

ENCLOSURE DETAIL		
1500	900	800
WIDTH (MM)	DEPTH (MM)	HEIGHT (MM)
0.57	1.0	22-28
AIRFLOW (M S⁻¹)	DISTANCE (M)	SPL RANGE dB(A)

INLET AIRWAYS		
735	225	1
WIDTH (MM)	HEIGHT (MM)	NO.

DESIGN CRITERIA		
OK	OK	OK
UNIT SIZE	OUTLET	INLET

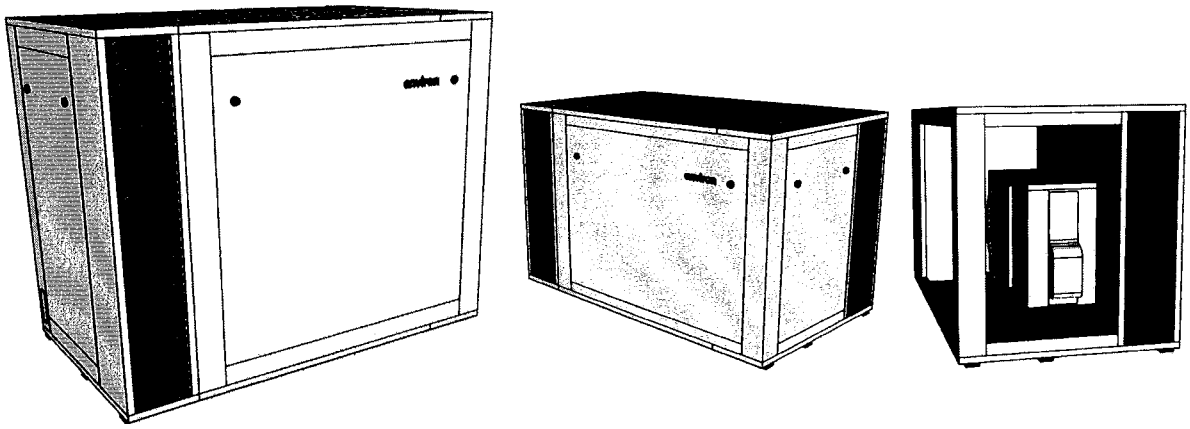
OUTLET AIRWAYS		
225	735	1
WIDTH (MM)	HEIGHT (MM)	NO.

AIRFLOW INFORMATION		
14	3.4	3.4
PD (NM⁻²)	OUTLET (MS⁻¹)	INLET (MS⁻¹)

Select Inlet & Outlet Airway Sizes to Ensure Airflows are kept Below 6.0m/s

ENCLOSURE INFORMATION	WIDTH (MM)	DEPTH (MM)	HEIGHT (MM)
INLET AIRWAY	225		735
OUTLET AIRWAY	225		735
EXTERNAL SIZE	1500	900	800
SOUND LEVEL RANGE @ 1 M (Free Field	22-28	SPL dB(A) SOUND PRESSURE	

NOTES CONCERNING ENCLOSURE DESIGN



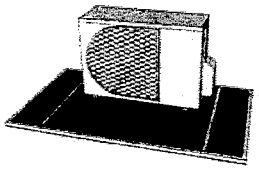
GENERAL NOTES:

ENVIRON TECHNOLOGIES LTD ACOUSTIC DESIGNS ARE PROTECTED UNDER PATENT

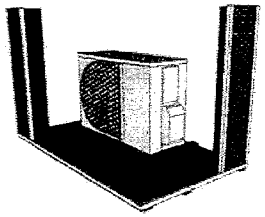
GENERAL TOLERANCE ± 0.25mm
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN MILLIMETRES

ASSEMBLY PROCESS

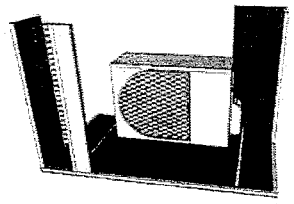
Base located on a flat level floor



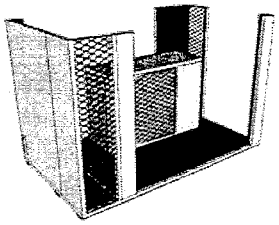
ASHP located on Anti Vibration Mounts



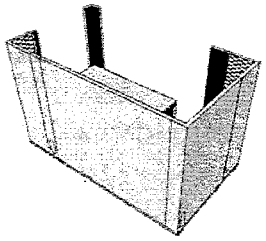
Air Grills located to suit air flow orientation



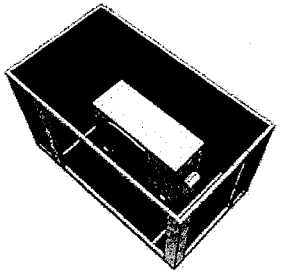
Support Pillars fitted



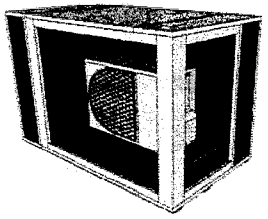
Corner Panels fitted



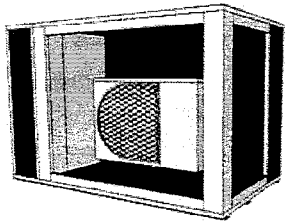
Rear Panel fitted



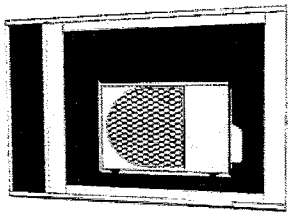
'Picture Frame' Mullions provide support and an acoustic seal for doors



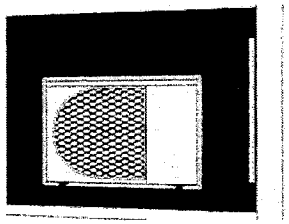
Roof Assembly fitted



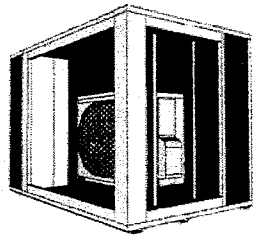
Air On Inner Side Walls



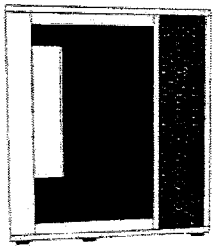
Internal Plenum Seals to stop air re-circulation



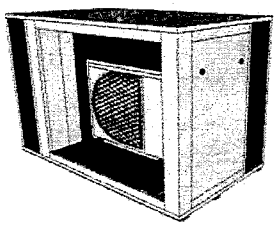
Internal Plenum Seals to stop air re-circulation



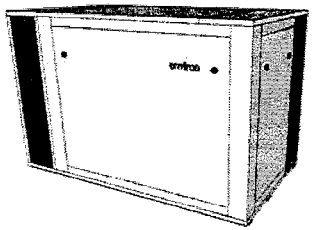
Air Off Inner Side Walls Rear



Air Off Inner Side Walls Front



Side Access Door



Front Access Door

environ™ Acoustic Enclosures

Environ Technologies Ltd
Regus House, 1010 Cambourne Business Park
Cambourne, Cambridgeshire, UK, CB23 6DP
Tel: +44 (0)870 3833344
www.environ.co.uk

MATERIAL SPECIFICATION

DESCRIPTION

ASHP ACOUSTIC ENCLOSURE DESIGN
Assembly Process

Ecovision Enclosure Review Document

SCALE	DATE:	DRAWN BY
NTS	19/05/2010	SAC
REV NO		
Rev		

DRAWING/PART NUMBER

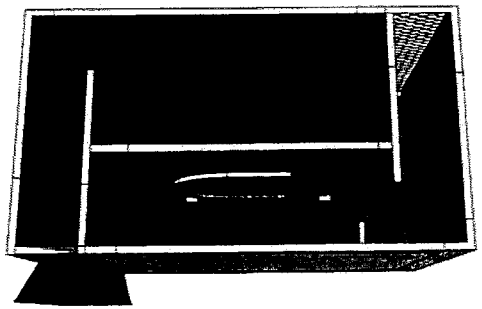
GENERAL NOTES:

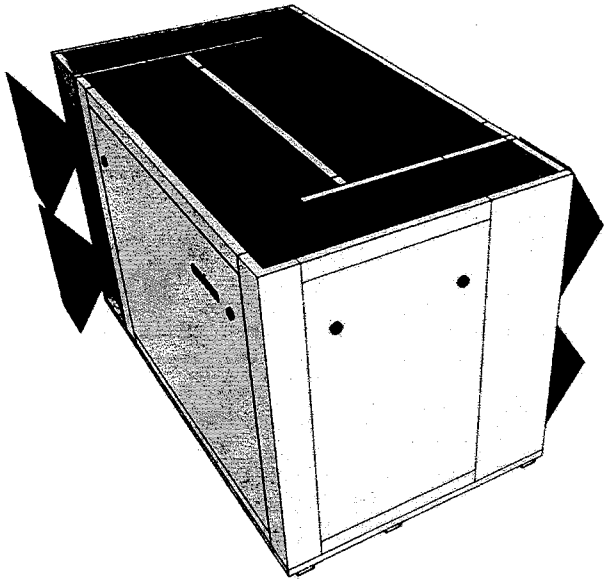
ENVIRON TECHNOLOGIES LTD ACOUSTIC DESIGNS ARE PROTECTED UNDER PATENT

GENERAL TOLERANCE ± 0.25mm
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN MILLIMETRES

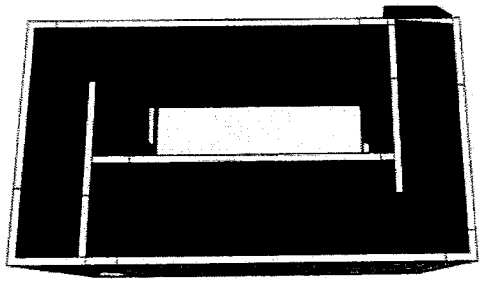
HOW AIR FLOW IS CONTROLLED

Air Inlet - Air ways of Environ acoustic enclosures are sized to suit the ASHP, minimising internal static pressure and maintaining full operational performance

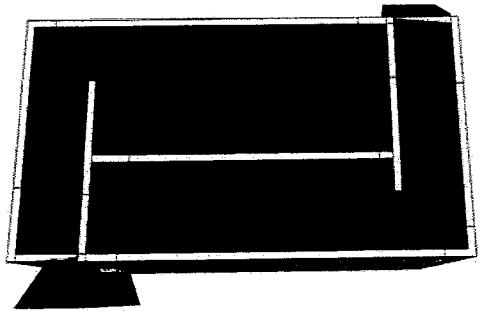


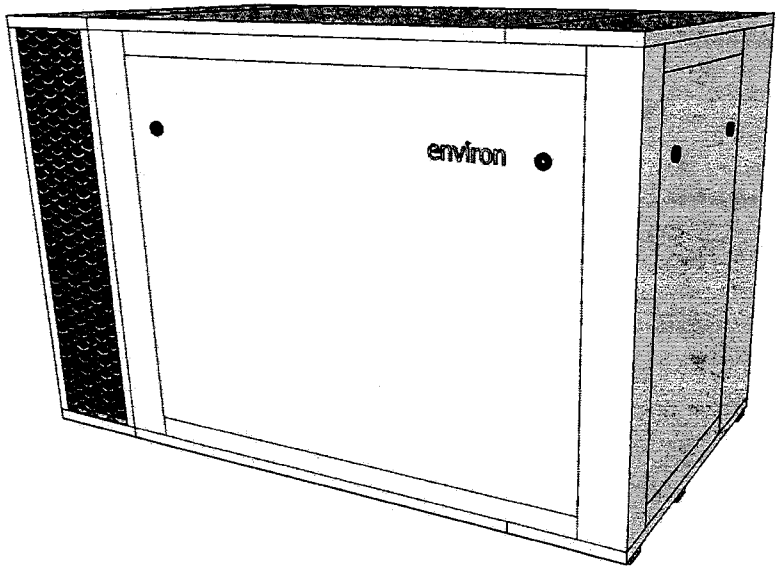


Air Outlet - A Mirror image of the Air Inlet to maintain a 'balanced' air flow through the enclosure



Operating Mode - AInternal walls and plenum panels separate Air On and Off the ASHP to ensure no air is re-circulated within the enclosure





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MATERIAL SPECIFICATION

DESCRIPTION

ASHP ACOUSTIC ENCLOSURE DESIGN
Air Flow Mechanism

Ecovision Enclosure Review Document

SCALE	DATE:	DRAWN BY
NTS	19/05/2010	SAC
REV NO		
Rev		

DRAWING/PART NUMBER