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Project: J 04267
AC Noise Impact Assessment:
178 Regents Park Road NW1

Consultants: Sound Planning Ltd
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[

Client: Michaelis Boyd

Prepared by: D. M. Thomas

Signed:

D. M. Thomas MSc M.I.O.A
Acoustic Consultant

Dated: Friday 6th September, 2020

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CONTENTS

1.0 BACKGROUND

1.1 Planning permission is sought for the installation of an air conditioning system at 178 Regents Park Road NW1; the air conditioning system will have 1 external condenser unit located to the front elevation lower ground floor lightwell.

See APPENDIX 2 – Site Location/Plans

1.2 The proposed location for the external condenser unit would be overlooked by windows belonging to 176 Regents Park Road (nearest window would be the ground floor window - approximately 5m from the proposed external condenser unit position).

See APPENDIX 3 - Site Photographs

1.3 The location falls under the jurisdiction of the London Borough of Camden; a noise impact assessment should be carried out in accordance with the Camden Local Plan 2017.

1.4 Sound Planning has been retained to evaluate potential noise impact on the nearest noise sensitive receivers using appropriate methodologies and assessment criteria and design a suitable noise mitigation strategy

1.4.1 Participating Acoustic Consultant

Dan Thomas is a Member of the Institute of Acoustics (M.I.O.A) having attained appropriate qualifications in acoustics and experience within the workplace.

1.4.2 Qualifications

Dan has been working within the noise and vibration industry for thirteen years and has attained the following qualifications within the field of acoustics:

- Institute of Acoustics (IOA) Diploma
- Post Graduate Diploma in Applied Acoustics and Noise Control (University of Surrey)
- Masters Degree in Applied Acoustics and Noise Control (University of Surrey)

2.0 ASSESSMENT CRITERIA

2.1 Noise emissions from mechanical plant should be assessed in accordance with the requirements of the Local Planning Authority; and relevant national standards:

2.2 Camden Local Plan 2017 - Policy A4 - Noise and Vibration

2.2.1 The council will seek to ensure that noise and vibration is controlled and managed.

2.2.2 Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

a. Developments likely to generate unacceptable noise and vibration impact; or

b. Developments sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.

2.2.3 We will only grant planning permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of the development.

2.3 Camden Local Plan 2017 - APPENDIX 3 - Noise Thresholds

2.3.1 A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142: 2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating level' of 10 dB below background (15 dB if tonal components are present) should be considered as the design criteria.

2.3.2 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 SAOEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10 dB below background	'Rating level' between 9 dB below and 5 dB above background	'Rating level' greater than 5 dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10 dB below background and no events exceeding 57 dB L_{Amax}	'Rating level' between 9 dB below and 5 dB above background or noise events between 57 dB and 88 dB L_{Amax}	'Rating level' greater than 5 dB above background and/or events exceeding 88 dB L_{Amax}

* 10 dB should be increased to 15 dB if the noise contains audible tonal elements (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

* Levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.

The periods in Table C correspond to 07:00 hours to 23:00 hours for the day and 23:00 to 07:00 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amending according to the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS 4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependent on the room (based upon measured or predicted $L_{eq,\ 5mins}$ noise levels in octave bands) 1 metre from the facade of the noise sensitive premises is located in a quiet background area.

2.4 British Standard 4142: 2014.[1]

2.4.1 BS 4142: 2014 – Scope

This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

a) sound from industrial and manufacturing processes;

b) sound from fixed installations which comprise mechanical and electrical plant and equipment;

c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and

d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

This standard is applicable to the determination of the following levels at outdoor locations:

[1] British Standard 4142: 2014 – Methods for rating and assessing industrial and commercial sound.

a) rating levels for sources of sound of an industrial and/or commercial nature and

b) ambient, background and residual sound levels, for the purposes of:

- investigating complaints;
- assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
- assessing sound at proposed new dwellings or premises used for residential purposes.

2.4.2 BS 4142: 2014 – Assessment of Impacts

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 source exceeds the background sound level and the context in which the sound occurs.

Evaluation of Adverse Impact

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. 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 on the context.

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

2.5 Noise Measurement Protocol - British Standard 7445-1: 2003[2]

2.5.1 The methods and procedures described in BS 7445 are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site.

2.5.2 The aim of the BS 7445 series is to provide authorities with material for the description of noise in community environments. Based on the principles described in this standard, acceptable limits of noise can be specified and compliance with these limits can be controlled.

2.5.3 BS 7445 does not specify limits for environmental noise.

3.0 METHODOLOGY

3.1 Existing Noise Climate

3.1.1 178 Regents Park Road NW1 is situated on a mixed residential and commercial street including houses, retail shops, cafes etc; the dominant source of noise is road traffic passing by.

See APPENDIX 2 – Site Location/Plans

3.1.2 The property is currently under development with construction activity taking place between Monday and Friday (no activity at weekends).

3.2 Background Noise Measurements

3.2.1 An extended 72 hour background noise assessment (incorporating the weekend where no construction activity was undertaken) was conducted over the period: 11:30 hours, Friday 9th October – 12:15 hours, Monday 12th October, 2020.

[2] Description and measurement of environmental noise. Part 1 – Guide to quantities and procedures.

3.2.2 The external heat pump is for residential air conditioning purposes and will therefore be potentially operational at any time during a 24 hour period.

3.2.3 The microphone was located 1m outside a first floor window (balconette) in a position representative of the nearest noise sensitive receivers i.e. noise sensitive windows to properties on either side.

See APPENDIX 3 – Site Photographs

3.2.4 Measurements were undertaken in accordance with BS 7445[3] and BS 4142[4].

3.2.5 The Sound Level Meter (SLM) used for the assessment is Class 1 with real time octave band measurement capability; and compliant to IEC 61672[5].

3.2.6 The A-weighted L_{90}, L_{eq} and L_{max} descriptors were measured every 15 minutes using the Fast (F) setting, and logged periodically over the extended measurement period.

3.3 Instrumentation/Equipment

3.3.1 Equipment

Equipment	Make	Model	Type	Serial Number	UKAS Calibration
SLM	Norsonic	Nor 140	1	1405819	U34833 (27/5/20)
Field Calibrator	Casella	CEL 110/1	1	077948	U34831 (27/5/20)
Environmental Tripod					
Wind/Weather Shield					
Laser Measurer	Leica	Disto A5		1073750838	
Digital Camera	Samsung				

[3] British Standard 7445-1: 2003 – *Description and measurement of environmental noise.* © BSI 1997. ISBN 0 580 19736 0.
[4] British Standard 4142: 1997 – *Method for rating industrial noise affecting mixed residential and industrial areas.* © BSI 1997. ISBN 0 580 28300 3.
[5] International Standard IEC 61672-1: 2002. Electroacoustics – Sound level meters – Part 1: Specifications.

3.3.2 Field Calibration

A field calibration was conducted for the SLM microphone; no deviation was detected (1kHz). UKAS calibration certificates are available on request.

4.0 RESULTS

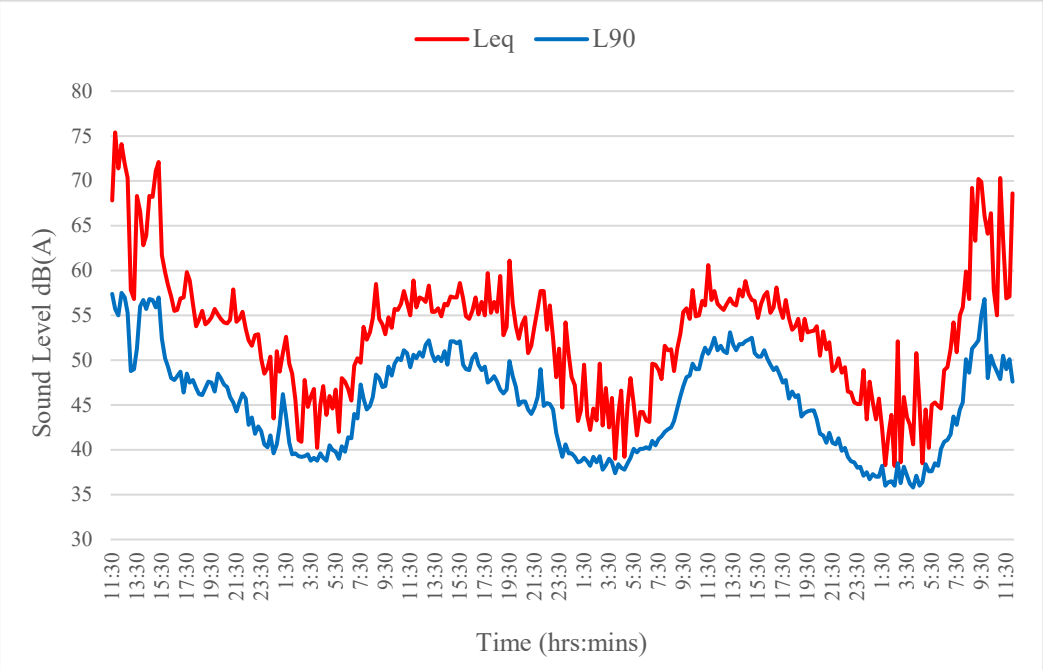
4.1 Background Noise Levels

4.1.1 Table – Lowest Background Noise Levels (including weekend)

Time Period (hours)	Description	Lowest Background Noise Level dB $L_{A90,\ 15mins}$	Time Period Occurred (hours)
07:00 - 23:00	Daytime	39.2	22:45 – 23:00 (Sunday)
23:00 - 07:00	Night Time	35.8	04:00 - 04:15 (Sunday Night)

See APPENDIX 5 – Background Noise Levels for full results.

4.1.2 Graph – Existing Noise Levels 72 hours (including weekend)



4.2 External Condenser Unit - Sound Pressure Level (1m)

Equipment	Make	Model	Sound Pressure Level[6] Cooling/Heating dB(A) @ 1m
External Condenser Unit	Daikin	4MXM80N9	48/49

4.3 Meteorological Conditions

Day / Night	Day 1	Night 1	Day 2	Night 2	Day 3	Night 3	Day 4
Wind Speed/Direction	Var 1m/s	SW 1m/s	Var 1m/s	Calm	Var 1m/s	Calm	SSW 1m/s
Likelihood of Temperature Inversion[7]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Precipitation	No	No	1mm	1mm	No	No	No
Fog	No	No	No	No	No	No	No
Wet Ground	No	No	Yes	Yes	No	No	No
Frozen Ground/Snow Coverage	No	No	No	No	No	No	No
Temperature (°C)	7 - 14	7 - 9	7 - 14	6 - 7	6 - 14	7 - 8	7 - 13
Cloud Cover	Partial	Partial	Yes	Yes	Partial	Partial	Partial

[6] Sound pressure level measured in anechoic chamber.
[7] i.e. Calm night with little cloud cover.

4.4 Levels of Uncertainty

Category	Notes
Complexity of Sound Source	Air Supply - Radiator Coil Main Casing - Compressor Air Exhaust - Front Fan
Complexity of Acoustic Environment (Residual)	Road Traffic/Residential/Commercial Noise
Level of Residual Sound (including Specific)	n/a
Measurement Locations	Representative of nearest noise sensitive receivers
Distance Between Sound Source & Measurement Position	n/a
Number of Measurements Taken	72 hours (15 min periods) (including weekend)
Measurement Time Intervals	Continuous
Range of Times	Representative of quietest likely times of proposed operation
Range of Suitable Weather Conditions	1 measurement period – Suitable weather conditions
Measurement Method/Practitioners	1 measurement period (Dan Thomas)
Level of Rounding	Rounded to nearest DP; 0.5 rounded up
Instrumentation	Type 1 SLM (suitable)

5.0 CRITERIA ASSESSMENT

5.1 Noise Impact at Nearest Noise Sensitive Window

Noise Sensitive Window – Ground Floor - 176 Regents Park Road [8]

Daikin 4MXM80N9	49 dB L_{Aeq} @ 1m
Directivity Index (DI)	+ 6 dB[9]
Receiver Distance	5 metres
NSR Window Level	= AC SPL – 20 log($r_{2\text{-}1}/r_1$)[10] + DI
Specific Level at NSR Window	49 - 20 log (5/1) + 6
	= 41 dB L_{Aeq}
Lowest Background Level (24 hours)	36 dB L_{A90}
Rating Level Excess over Background	5 dB(A)
Attenuation required	15 dB(A)

6.0 NOISE MITIGATION STRATEGY

6.1 Noise Mitigation Measures

6.1.1 The level of attenuation required to meet target noise levels (Camden) is 15 dB(A).

See paragraph 2.3

6.1.2 In order to achieve a sound reduction (attenuation) of 15 dB(A) the external condenser unit should be full enclosed within an acoustic enclosure.

[8] Worst affected noise sensitive receiver.
[9] Junction of 2 adjacent surfaces Q = 4; Directivity Index +6 dB.
[10] 'r_1' = Measurement radius. 'r_2' = Radius to nearest window distance.

6.1.3 Acoustic Enclosures

The acoustic enclosure should achieve a minimum insertion loss of 15 dB(A); provide adequate ventilation into and out of the enclosure (enclosed space); and facilitate servicing requirements (removable access panels).

Suitable acoustic enclosures include acoustic louvre enclosures[11].

See APPENDIX 6 – Noise Mitigation Options

7.0 CONCLUSIONS

7.1 Sound Planning has carried out an environmental noise impact assessment in accordance with BS 7445: 2003 and BS 4142: 2014.

See Section 3.0 - METHODOLOGY

7.2 A 72 hour noise assessment measured the following lowest background noise levels:

Time Period (hours)	Description	Lowest Background Noise Level dB $L_{A90, 15mins}$
07:00 - 23:00	Daytime	39
23:00 - 07:00	Nigh Time	36

See Section 4.0 - RESULTS

7.3 Predicted Sound Levels

7.3.1 The external condenser unit has a predicted level of 41 dB(A) at the nearest noise sensitive window; this level is 5 dB(A) above the lowest measured background level.

See Section 5.0 - CRITERIA ASSESSMENT

[11] Acoustic louvre enclosures will comprise of acoustic louvres and acoustic panels, with removable panels for service and maintenance access.

7.3.2 A sound reduction of 15 dB(A) is required in order to comply with the Camden Local Plan 2017 - Policy A4 - Noise and Vibration.

See Section 2.0 - ASSESSMENT CRITERIA

7.4 Noise Mitigation Measures

In order to meet the target noise criteria at the nearest noise sensitive windows the noise mitigation measures detailed within this report should be introduced i.e. suitable acoustic enclosure.

See Section 6.0 - NOISE MITIGATION STRATEGY

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APPENDIX 1

Glossary of Acoustic Terms

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2×10^{-5} pascals) and the threshold of pain is around 120 dB. The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in watts. The sound power level, L_w is expressed in decibels, referenced to 10^{-12} watts.

Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules that transmit the sound and is measure as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

Noise Rating

The Noise Rating (NR) system is a set of octave band sound pressure level curves used for specifying limiting values for building services noise. The Noise Criteria (NC) and Preferred Noise Criteria (PNC) systems are similar.

A-weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).

Noise Descriptors

Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms. Some commonly used descriptors follow.

$L_{Aeq, T}$ *The most widely applicable unit is the equivalent continuous A-weighted sound pressure level ($L_{Aeq, T}$). It is an energy average and is defined as the level of a notional sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound.*

L_{AE} *Where the overall noise level over a given period is made up of individual noise events, the $L_{Aeq, T}$ can be predicted by measuring the noise of the individual noise events using the sound exposure level, L_{AE} (or SEL or L_{AX}). It is defined as the level that, if maintained constant for a period of one second, would deliver the same A-weighted sound energy as the actual noise event.*

L_{A1} *The level exceeded for 1% of the time is sometimes used to represent typical noise maxima.*

L_{A10} *The level exceeded for 10% of the time is often used to describe road traffic noise.*

L_{A90} *The level exceeded for 90% of the time is normally used to describe background noise.*

Sound Transmission Descriptors

D_{nT} Standardised level difference

$D_{nT, w}$ Weighted standardised level difference

L_1 The average sound pressure level in the source room

L_2 The average sound pressure level in the receiving room

T Reverberation time (receiving room)

T_0 Reference reverberation time = 0.5s

C_{tr} Adaption spectrum which takes account for low to medium speed road/rail/air traffic; disco music; and factory noise (medium to low frequency noise).

C Adaptation spectrum which takes account of domestic activities including speech, music, radio and television.

Frequency Analysis

Octave Band	*A band of frequencies the upper limit of which is twice the lower limit. They are known by their centre frequency, e.g., 63, 125, 250, 500, 1000, 2000 Hz…*
One Third Octave	*The logarithmic frequency interval between a lower frequency f_2, when f_2/f_1 equals $2^{1/3}$ apart. Frequencies include: 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000Hz.*

Sound Transmission in the Open Air

Most sources of sound can be characterised as a single point in space. The sound energy radiated is proportional to the surface area of a sphere centred on the point. The area of a sphere is proportional to the square of the radius, so the sound energy is inversely proportional to the square of the radius. This is the inverse square law.

In decibel terms, every time the distance from a point source is doubled, the sound pressure level is reduced by 6 dB. Road traffic noise is a notable exception to this rule, as it approximates to a line source, which is represented by the line of the road. The sound energy radiated is inversely proportional to the area of a cylinder centred on the line. In decibel terms, every time the distance from a line source is doubled, the sound pressure level is reduced by 3 dB.

Factors Affecting Sound Transmission in the Open Air

Reflection

When sound waves encounter a hard surface, such as concrete, brickwork, glass, timber or plasterboard, it is reflected from it. As a result, the sound pressure level measured immediately in front of a building façade is approximately 3 dB higher than it would be in the absence of the façade.

Screening and Diffraction

If a solid screen is introduced between a source and receiver, interrupting the sound path, a reduction in sound level is experienced. This reduction is limited, however, by diffraction of the sound energy at the edges of the screen. Screens can provide valuable noise attenuation however. For example, a timber boarded fence built next to a motorway can reduce noise levels on the land beyond, typically by around 10 dB(A). The best results are obtained when a screen is situated close to the source or close to the receiver.

Meteorological Effects

Temperature and wind gradients affect noise transmission, especially over large distances. The wind effects range from increasing the level by typically 2 dB downwind, to reducing it by typically 10 dB upwind – or even more in extreme conditions. Temperature and wind gradient are variable and difficult to predict.

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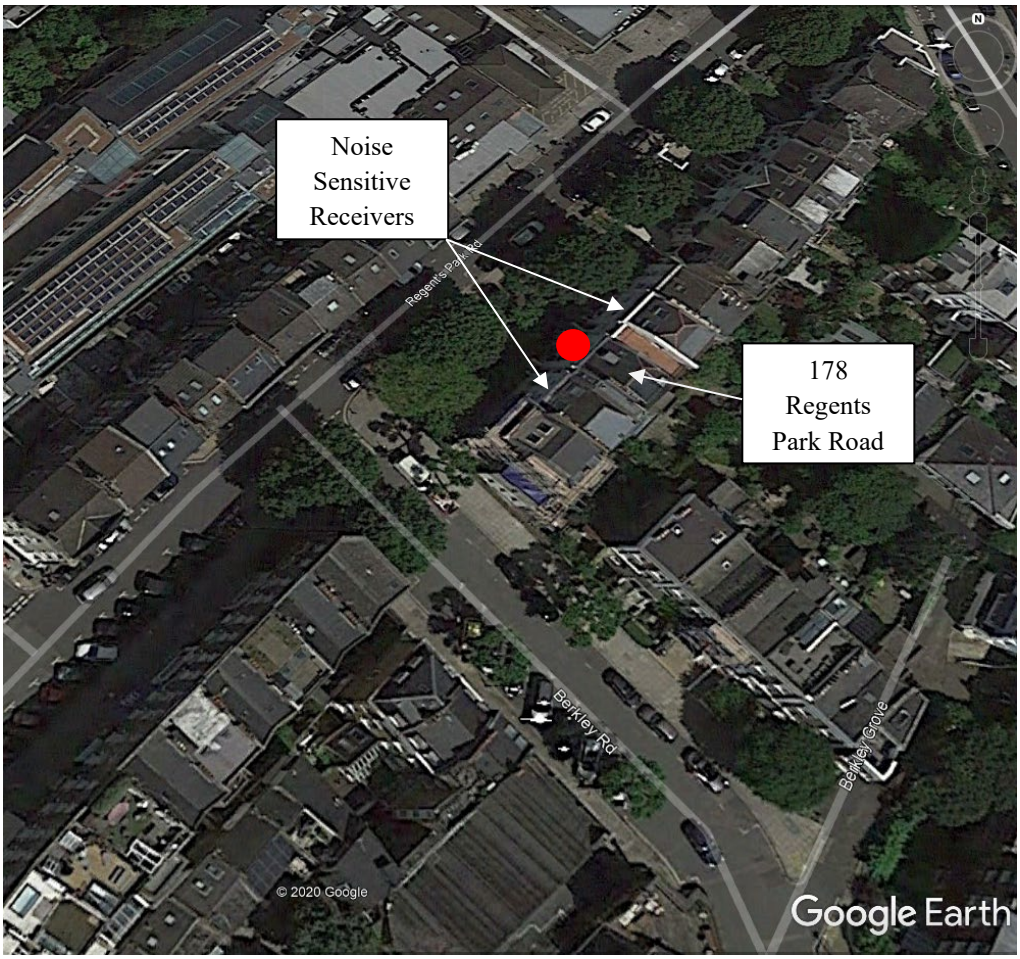
APPENDIX 2

Site Location/Plans

178 Regents Park Road NW1



Key

● Microphone position (background noise measurements)

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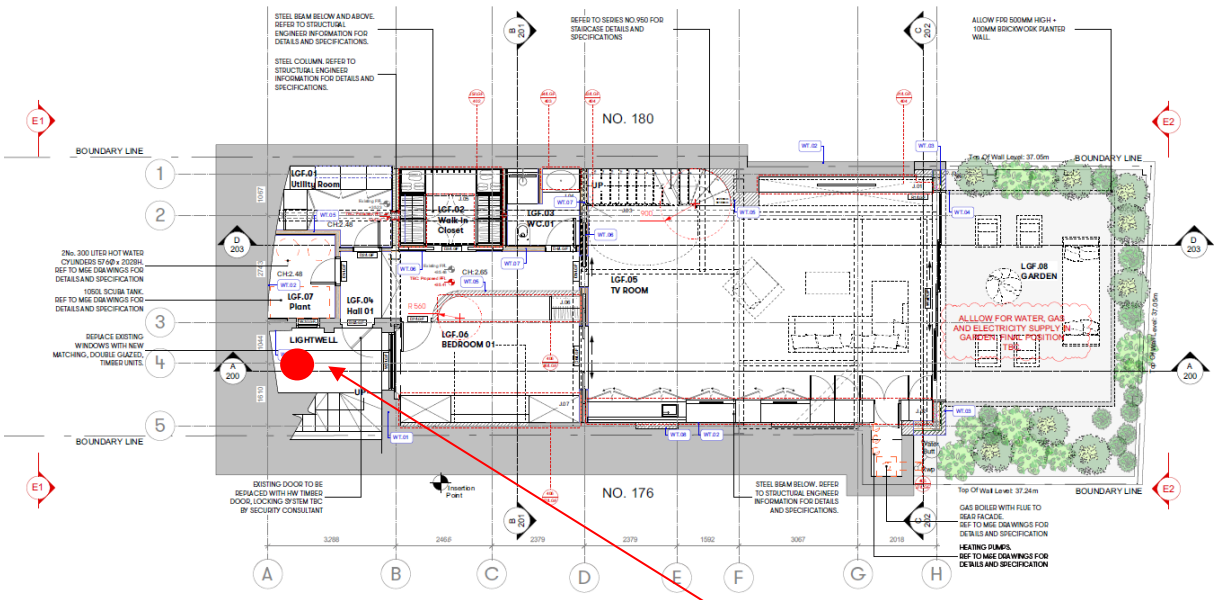
Site Location/Plans

Lower Ground Floor Plan



Proposed external condenser unit location – Lower Ground Floor Lightwell

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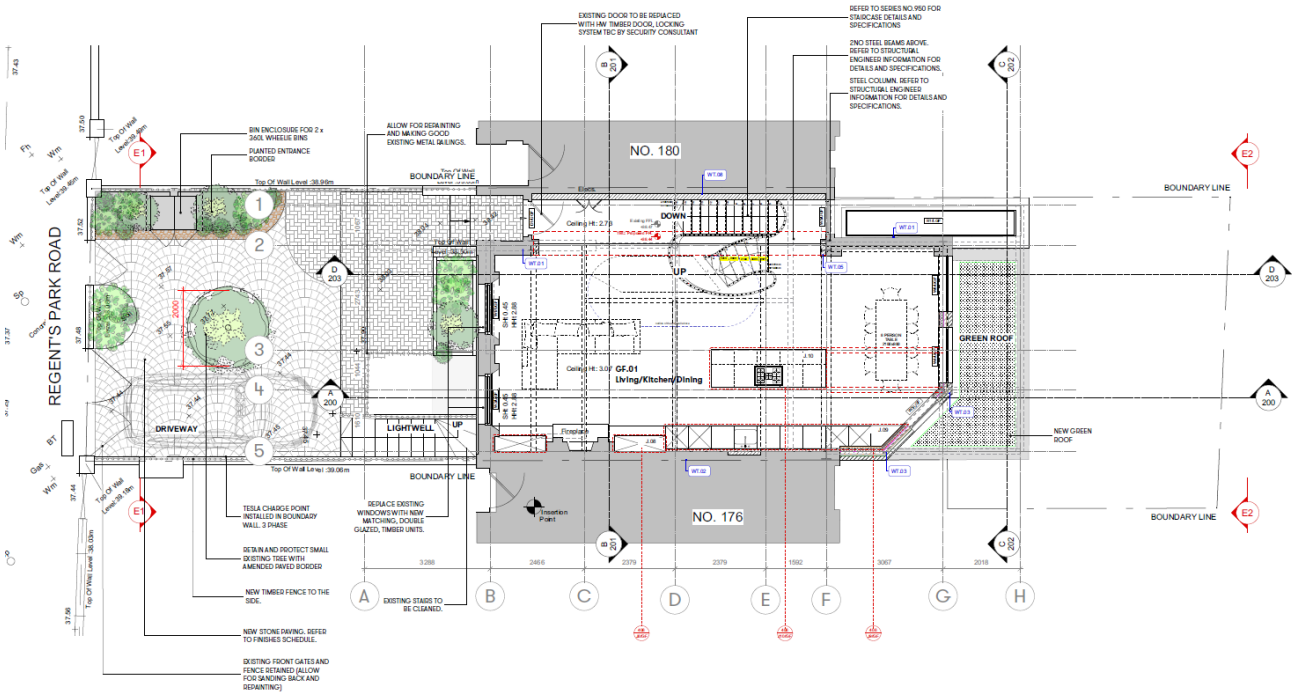
Site Location/Plans

Ground Floor Plan



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APPENDIX 3

Site Photographs

Front Elevation

Microphone Position (1st Floor Balcony)

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APPENDIX 4

AC Equipment

Daikin 4MXM80N9

DAIKIN

Multi model application Technical data book

4MXM-N9

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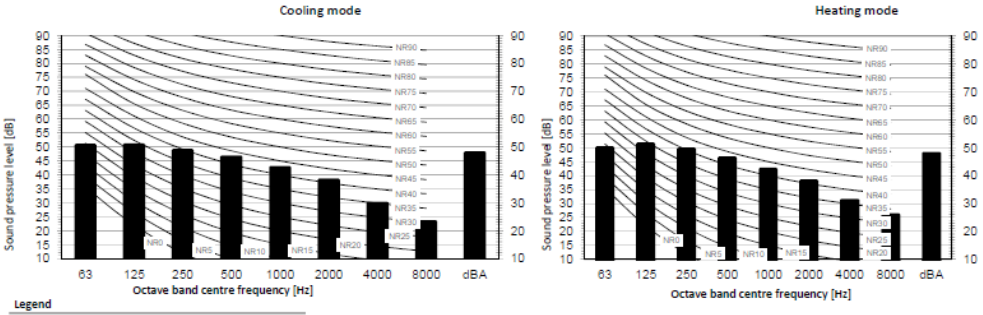
AC Equipment

Daikin 4MXM80N9

4MXM80N9



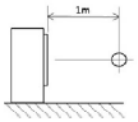
Legend

dBA = A-weighted sound pressure level (A scale according to IEC).

A Scale

B Fan speed: High

Location of microphone



Cooling Total dB

A	B
dBA	48

Heating Total dB

A	B
dBA	49

Notes

1. Operating conditions: power source 220-240 V/220 V 50/60 Hz; JIS standard
2. Background noise already taken into account.
3. Operating noise varies depending on operation and ambient conditions.
4. The operation noise measuring method is in accordance with JISC9612.
5. Measuring location: anechoic chamber
6. The values above are for connecting with the following indoor unit types:

   1.5, 2.0, 2.5, 3.5, 4.2, 5.0, 6.0, 7.1 kW Class

3D106225B

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APPENDIX 5

Background Noise Measurements

Table

Date	Time	L_{Aeq}	L_{AFmax}	L_{AFmin}	L_{AF50}	L_{AF90}
	(hrs:mins)	(dB)	(dB)	(dB)	(dB)	(dB)
9/10/2020	11:30	67.8	92.7	51.5	61.2	57.4
9/10/2020	11:45	75.4	95.1	49.2	60.5	55.7
9/10/2020	12:00	71.4	94.4	47.8	58.9	55
9/10/2020	12:15	74.1	94.1	53.4	61	57.5
9/10/2020	12:30	71.9	93.9	51.7	61.7	57
9/10/2020	12:45	70.3	90.2	50.4	58.4	55.3
9/10/2020	13:00	57.8	81.2	45.4	53.1	48.8
9/10/2020	13:15	56.8	75	45.3	53.3	49
9/10/2020	13:30	68.3	91.9	46.1	58.2	51.3
9/10/2020	13:45	66.6	87.8	47.8	59.3	56
9/10/2020	14:00	62.8	88.3	48.6	59.5	56.7
9/10/2020	14:15	63.9	84.6	48.3	59.3	55.7
9/10/2020	14:30	68.3	96.1	50.4	59.8	56.8
9/10/2020	14:45	68.2	87.1	51.7	59.8	56.7
9/10/2020	15:00	71.1	94.7	47.5	59.4	55.9
9/10/2020	15:15	72.1	96.7	49.4	62.2	57
9/10/2020	15:30	61.7	84.5	48.8	56.8	52.4
9/10/2020	15:45	59.8	86.6	45.5	55.9	50.2
9/10/2020	16:00	58.4	75.2	43.8	54.4	49.3
9/10/2020	16:15	57.1	70.9	43.8	52.8	48
9/10/2020	16:30	55.5	69.9	45.4	51.9	47.8
9/10/2020	16:45	55.6	78	43.5	52.4	48.2
9/10/2020	17:00	56.9	73.8	43.7	53.5	48.7
9/10/2020	17:15	57	77.5	42.5	51.7	46.4
9/10/2020	17:30	59.8	74	42.7	56.8	48.5
9/10/2020	17:45	58.9	76.4	42.9	53.8	47.5
9/10/2020	18:00	56.3	69.8	43.1	52.6	47.8
9/10/2020	18:15	53.8	65.9	43	51	46.9
9/10/2020	18:30	54.5	69	42.9	50.9	46.2
9/10/2020	18:45	55.5	73.1	42.8	50.2	46.1
9/10/2020	19:00	54	73.5	43.6	51.2	46.9
9/10/2020	19:15	54.3	69.3	42.4	51.7	47.6

9/10/2020	19:30	54.8	74.4	42.6	51.9	47.5
9/10/2020	19:45	55.7	72.4	43.3	51.7	46.5
9/10/2020	20:00	55.1	70	44.3	52.7	48.5
9/10/2020	20:15	54.6	72	43.9	51.3	48
9/10/2020	20:30	54.2	73.7	43.5	51.3	47.3
9/10/2020	20:45	54.1	69.5	43.7	49.8	47
9/10/2020	21:00	54.5	72.7	41.4	49.9	45.9
9/10/2020	21:15	57.9	77.5	41.3	51	45.3
9/10/2020	21:30	54.3	71.4	40.6	48.7	44.3
9/10/2020	21:45	54.6	72	40.2	49.7	45.3
9/10/2020	22:00	55.4	81.9	42.4	50.6	46.3
9/10/2020	22:15	53.5	70.9	40	49.6	45.7
9/10/2020	22:30	52.2	68.8	39.7	46.7	42.8
9/10/2020	22:45	51.6	71.3	41.4	47.3	43.6
9/10/2020	23:00	52.8	70	40	45.1	41.8
9/10/2020	23:15	52.9	72.1	40.3	47.7	42.6
9/10/2020	23:30	50.2	73.9	40.1	46	42.1
9/10/2020	23:45	48.5	62.4	39.1	43.6	40.6
10/10/2020	0:00	49.1	70	39.3	41.5	40.3
10/10/2020	0:15	50.4	65.6	40	45.7	41.6
10/10/2020	0:30	43.5	67.5	38.7	41.3	39.6
10/10/2020	0:45	51	79.4	39.2	42.6	40.6
10/10/2020	1:00	48.7	65.2	40.8	46.5	42.7
10/10/2020	1:15	50.8	65.7	41.6	49.7	46.2
10/10/2020	1:30	52.6	71	41.5	50.2	43.7
10/10/2020	1:45	49.6	68.3	39.4	44.6	40.8
10/10/2020	2:00	48.5	65.7	38	44.4	39.5
10/10/2020	2:15	45.6	63	38.1	40.6	39.6
10/10/2020	2:30	41.1	52.8	38	40.3	39.3
10/10/2020	2:45	40.9	53.2	38	40.3	39.2
10/10/2020	3:00	47.8	72.7	38	40.6	39.3
10/10/2020	3:15	44.8	62.2	38.5	40.3	39.5
10/10/2020	3:30	45.9	65.8	37.9	40.8	38.8
10/10/2020	3:45	46.8	67.4	37.9	40.6	39.1
10/10/2020	4:00	40.2	48.8	37.4	40	38.8
10/10/2020	4:15	45	61.7	38.3	40.3	39.6
10/10/2020	4:30	47.1	67.8	38	40.3	39.1
10/10/2020	4:45	43.9	64	37.8	40.3	38.8
10/10/2020	5:00	46	65.7	38.8	41.7	40.5
10/10/2020	5:15	44.6	56.5	38.5	44.3	40
10/10/2020	5:30	46.7	62.9	38.8	45.1	39.8
10/10/2020	5:45	42	61.6	36.7	41	39

10/10/2020	6:00	48	64.6	36.6	43.2	40.4
10/10/2020	6:15	47.6	66.8	38.3	42	39.8
10/10/2020	6:30	46.8	63.3	39.1	42.6	41.4
10/10/2020	6:45	45.5	68	39.3	42.7	41.3
10/10/2020	7:00	49.4	64.5	40	46.8	44
10/10/2020	7:15	50.2	76.7	41.1	48.1	43.5
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10/10/2020	7:45	53.7	80.2	42.8	49.6	45.7
10/10/2020	8:00	52.3	65.1	42.3	48.8	44.5
10/10/2020	8:15	53.1	72.9	43.2	48.2	44.9
10/10/2020	8:30	54.7	76.2	43.7	50.2	45.9
10/10/2020	8:45	58.5	78.5	44.4	55	48.4
10/10/2020	9:00	54.6	70.3	44.2	51.3	48
10/10/2020	9:15	54	73.1	44.2	51.2	47
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10/10/2020	10:00	53.6	73.6	45.6	51.7	48.3
10/10/2020	10:15	55.7	73.5	45.6	52.8	49.6
10/10/2020	10:30	55.6	69.7	47.1	53.7	50.2
10/10/2020	10:45	56.3	71.4	46.8	54.1	50
10/10/2020	11:00	57.7	74.2	47.5	55	51.1
10/10/2020	11:15	56.4	75.2	46.9	54.5	50.8
10/10/2020	11:30	55	69.6	45.7	52.8	49.2
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10/10/2020	12:30	56.8	78.7	46.1	54.1	50.4
10/10/2020	12:45	56.5	72.6	47.2	54.9	51.7
10/10/2020	13:00	58.3	84.7	47.8	55.7	52.2
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10/10/2020	13:30	55.4	71.3	46.2	53.2	49.9
10/10/2020	13:45	55.8	76.5	46.5	54	50.4
10/10/2020	14:00	54.9	65.8	46.6	53.4	49.9
10/10/2020	14:15	56.3	79.9	46.8	54.5	51
10/10/2020	14:30	56.1	79.7	45.3	54.1	49.5
10/10/2020	14:45	57.1	68.4	48	55.1	52.1
10/10/2020	15:00	57	80.8	48.4	54.6	52.1
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10/10/2020	15:45	56.9	79.9	45.7	53.5	49.5
10/10/2020	16:00	54.9	69.2	44.6	52.6	49
10/10/2020	16:15	54.6	72.2	45.8	52.4	48.9

10/10/2020	16:30	55.5	68.8	46.3	53.7	50.2
10/10/2020	16:45	57	73.3	46.1	54.3	50.7
10/10/2020	17:00	55.1	70.5	45.9	52.8	49.5
10/10/2020	17:15	56.5	81	44.7	52.6	48.9
10/10/2020	17:30	55	72.2	44.7	53.3	49.3
10/10/2020	17:45	59.7	91.3	43.1	51.8	47.5
10/10/2020	18:00	55.3	70.9	44.3	52.4	47.8
10/10/2020	18:15	56.5	76.5	44.7	53.6	48.2
10/10/2020	18:30	55.4	73.3	44	51.3	47.6
10/10/2020	18:45	59.4	87.3	43.8	51	46.7
10/10/2020	19:00	52.8	73.8	43.1	49.9	46.3
10/10/2020	19:15	53.7	69.9	43.6	50.4	46.7
10/10/2020	19:30	61.1	85.1	47	53.3	49.9
10/10/2020	19:45	56.3	76.5	45.5	52.6	48.2
10/10/2020	20:00	53.8	75	42.7	50.9	47
10/10/2020	20:15	52.4	67.9	42.4	48.7	45
10/10/2020	20:30	54	68.7	42.9	49.2	45.4
10/10/2020	20:45	54.8	79	41.9	48.7	45.4
10/10/2020	21:00	50.8	68.2	42.4	47.4	44.5
10/10/2020	21:15	51.6	69.5	41.6	47.3	44
10/10/2020	21:30	53.8	71.3	42	49.2	44.7
10/10/2020	21:45	55.8	74.5	41.2	52	45.9
10/10/2020	22:00	57.7	81.2	44.6	54.4	49
10/10/2020	22:15	57.7	76.2	40.1	52.6	44.9
10/10/2020	22:30	53.4	68.6	41.5	49.9	45.2
10/10/2020	22:45	56.1	68.4	42	51.9	45.1
10/10/2020	23:00	52.5	66.3	41	47.7	44.5
10/10/2020	23:15	48.1	62.8	39.8	45.6	41.9
10/10/2020	23:30	51.3	68.5	38.4	46.7	40.6
10/10/2020	23:45	44.7	64.6	37.8	40.8	39.2
11/10/2020	0:00	54.2	70.9	38.1	44.3	40.6
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11/10/2020	0:45	47.2	66.3	37.7	40.7	39.2
11/10/2020	1:00	43.2	57.7	37.2	43.3	38.6
11/10/2020	1:15	44.4	63.8	37.1	40.2	38.7
11/10/2020	1:30	49.5	68.1	38.2	40	39.1
11/10/2020	1:45	43.8	62.1	36.7	39.7	38.7
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11/10/2020	2:15	44.6	64.1	37.6	40.1	39.2
11/10/2020	2:30	43.3	62.6	36.6	39.8	38.6
11/10/2020	2:45	49.6	71.7	36.7	43.4	39.3

11/10/2020	3:00	42.7	60.3	36.4	39.5	37.8
11/10/2020	3:15	46.9	64.7	36.9	40	38.3
11/10/2020	3:30	42.5	60.8	37.6	39.8	39
11/10/2020	3:45	45.8	74	36.5	40.1	38.6
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11/10/2020	4:30	46.6	65.2	36.7	40.2	38
11/10/2020	4:45	39.2	47.9	36.4	39.3	37.8
11/10/2020	5:00	45.1	64.6	37	39.7	38.5
11/10/2020	5:15	48	66.1	37.2	41	39.1
11/10/2020	5:30	45.1	64.3	38.7	41	40.1
11/10/2020	5:45	41.6	62.2	38.1	40.7	39.7
11/10/2020	6:00	44.2	62	38.5	43.9	40.1
11/10/2020	6:15	44.2	61.9	38.8	41.4	40.1
11/10/2020	6:30	43.3	63.2	38.8	41.4	40.3
11/10/2020	6:45	43.1	61.6	38.5	41.5	40.1
11/10/2020	7:00	49.6	68.2	38.5	42.9	41
11/10/2020	7:15	49.5	78.5	38.6	42	40.5
11/10/2020	7:30	48.9	64.3	39.8	43	41.2
11/10/2020	7:45	47.9	66	39.5	45.3	41.5
11/10/2020	8:00	51.6	79.1	40.3	45.5	42
11/10/2020	8:15	51.1	74.4	39.9	45.4	42.3
11/10/2020	8:30	51.2	69.3	40.4	46.1	42.5
11/10/2020	8:45	48.8	63.6	39.9	45.9	43.2
11/10/2020	9:00	51.3	72.7	41.7	47.6	44.6
11/10/2020	9:15	53	68.1	42.6	49.9	46
11/10/2020	9:30	55.4	77.9	43.3	51.2	47.1
11/10/2020	9:45	55.8	77.3	44.2	51.6	48.1
11/10/2020	10:00	54.6	73.9	43.5	52.1	48.3
11/10/2020	10:15	57.8	84.9	45.2	54	49.6
11/10/2020	10:30	54.9	69.9	45.1	52.7	49
11/10/2020	10:45	55	68.2	44.9	52.5	49
11/10/2020	11:00	56.6	72.5	47.1	54.2	50.5
11/10/2020	11:15	56.1	73.9	47	54.4	51.4
11/10/2020	11:30	60.6	81.5	46.3	54	50.7
11/10/2020	11:45	56.7	71.6	46.5	55	51.5
11/10/2020	12:00	57.7	71.3	48.5	55.7	52.5
11/10/2020	12:15	56.3	75.3	47.2	54.5	51.1
11/10/2020	12:30	55.9	69.1	47.2	54.1	51.6
11/10/2020	12:45	55.6	67.3	47.1	54.1	51
11/10/2020	13:00	56.3	78.4	47.3	54.2	50.8
11/10/2020	13:15	56.9	78.5	49.1	55.7	53.1

11/10/2020	13:30	56.3	72.4	47	55	51.7
11/10/2020	13:45	56.1	72.6	47.1	54.3	51.1
11/10/2020	14:00	57.9	75.4	47.7	55.3	51.8
11/10/2020	14:15	57.1	78.8	47.8	54.9	51.8
11/10/2020	14:30	58.8	75.4	48.3	55.4	52.1
11/10/2020	14:45	57.4	74.1	47.4	55.5	52.3
11/10/2020	15:00	56.7	72	48.9	55.5	52.5
11/10/2020	15:15	56.6	71.2	46.3	54.5	50.8
11/10/2020	15:30	54.7	67.3	46.3	53.3	50.4
11/10/2020	15:45	56.3	71.2	47.3	54.3	50.4
11/10/2020	16:00	57.2	77.3	47	54.8	51.1
11/10/2020	16:15	57.6	75.5	46.2	54.1	50.2
11/10/2020	16:30	55.3	64.7	45.3	53.5	49.5
11/10/2020	16:45	55.9	70.9	44.8	53	48.9
11/10/2020	17:00	58.1	76.4	45.7	53.4	49.2
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11/10/2020	17:30	54.7	70.7	44.2	51.9	47.5
11/10/2020	17:45	56.7	76.1	43	53.5	47.8
11/10/2020	18:00	54.7	71.1	42.5	51.1	45.7
11/10/2020	18:15	53.4	65.3	42.7	51	46.5
11/10/2020	18:30	53.8	71	41.8	50.6	45.9
11/10/2020	18:45	54.6	71.7	42	50.7	46.1
11/10/2020	19:00	52.2	66.4	39.6	48.8	43.7
11/10/2020	19:15	54.6	71.5	40.4	49.9	44.1
11/10/2020	19:30	53.1	74.9	41.2	47.2	44.3
11/10/2020	19:45	53.2	71.3	41.1	48.1	44.4
11/10/2020	20:00	53.3	70.2	41.4	48.1	44.4
11/10/2020	20:15	53.8	72.9	40.4	47.6	43.4
11/10/2020	20:30	50.5	65.6	39.5	45.9	41.8
11/10/2020	20:45	53.2	75.3	39.1	45.6	41.6
11/10/2020	21:00	51.2	69.7	38.4	45.4	40.8
11/10/2020	21:15	52	71.1	39.4	45.7	41.9
11/10/2020	21:30	48.8	71.8	38.6	42.8	40.8
11/10/2020	21:45	49.2	73.1	38	42.9	40.6
11/10/2020	22:00	50.2	72.5	39.2	44.5	41.3
11/10/2020	22:15	48.6	67.6	37.8	44.1	39.9
11/10/2020	22:30	49.2	66	38	42.8	40.2
11/10/2020	22:45	46.5	68.2	37.5	41.9	39.2
11/10/2020	23:00	46.4	67.7	37	41.4	38.7
11/10/2020	23:15	45.3	64.5	36.7	40.5	38.6
11/10/2020	23:30	45.1	66.1	36.3	39.5	38
11/10/2020	23:45	45.1	65.7	36.1	39.8	38.1

12/10/2020	0:00	48.9	71.9	35.3	40.7	37.1
12/10/2020	0:15	43.4	60.3	35.8	39.3	37.5
12/10/2020	0:30	47.6	64.3	35	43.9	36.7
12/10/2020	0:45	45.3	63.6	35.5	40.7	37.3
12/10/2020	1:00	43.4	63	35.2	39.1	37
12/10/2020	1:15	45.7	67.5	35.1	38.8	37
12/10/2020	1:30	42.4	64.5	37.2	40	38.2
12/10/2020	1:45	38.3	52.7	34.8	38.3	36
12/10/2020	2:00	41.7	57.6	34.7	38.3	36.4
12/10/2020	2:15	43.9	63.6	34.6	39.9	36.5
12/10/2020	2:30	38.2	48.9	34.4	38	36
12/10/2020	2:45	52.1	71.8	37	42.5	38.5
12/10/2020	3:00	38.6	45.8	34.7	38.5	36.3
12/10/2020	3:15	45.9	67.1	35.3	38.8	38.1
12/10/2020	3:30	43.6	63.6	35.5	38.6	37.1
12/10/2020	3:45	42.8	59.1	34.7	39.3	36.2
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12/10/2020	4:15	50.8	72.5	35	38.7	37.1
12/10/2020	4:30	45	66.5	34.6	38.2	36
12/10/2020	4:45	38.5	49.4	35	38.4	36.4
12/10/2020	5:00	44.5	66	35.6	39.3	38.4
12/10/2020	5:15	40.2	51.5	35.6	38.8	37.6
12/10/2020	5:30	45	57.1	35.5	44.4	37.6
12/10/2020	5:45	45.3	63.9	36.2	40.5	38.5
12/10/2020	6:00	44.9	61	36.6	40.6	38.2
12/10/2020	6:15	44.6	66.3	38.5	41.9	40.1
12/10/2020	6:30	48.9	67.6	39	42.7	40.9
12/10/2020	6:45	49.2	65.3	39	43.1	41.1
12/10/2020	7:00	51.2	78.6	40.4	44.8	41.7
12/10/2020	7:15	54.2	75.7	41.4	48.8	43.7
12/10/2020	7:30	50.9	76.2	40.8	46.4	42.8
12/10/2020	7:45	55	85.7	41.3	48.3	44.5
12/10/2020	8:00	55.9	78.1	42.4	50.6	45.3
12/10/2020	8:15	59.9	82.8	45.7	54	50.1
12/10/2020	8:30	56.8	82.4	43.5	53.9	48.6
12/10/2020	8:45	69.2	95.9	46.6	55.1	51.3
12/10/2020	9:00	63.3	85.8	47.8	54.8	51.7
12/10/2020	9:15	70.2	90.7	45.8	57.2	52.2
12/10/2020	9:30	69.9	90	45.6	60.6	55
12/10/2020	9:45	66.1	93.9	50.6	59.9	56.8
12/10/2020	10:00	64.1	92.4	43.2	54.7	48
12/10/2020	10:15	66.4	92.1	44.3	56.9	50.5

12/10/2020	10:30	57.8	80.9	46.2	53	49.5
12/10/2020	10:45	55	80.7	44.8	52.1	48.7
12/10/2020	11:00	70.3	101.3	44	52	47.9
12/10/2020	11:15	63.5	91.1	46.1	54.2	50.5
12/10/2020	11:30	56.9	82.7	43.5	53.6	49
12/10/2020	11:45	57.1	78.2	44.5	53.8	50.1
12/10/2020	12:00	68.6	102.5	43.9	52.8	47.6

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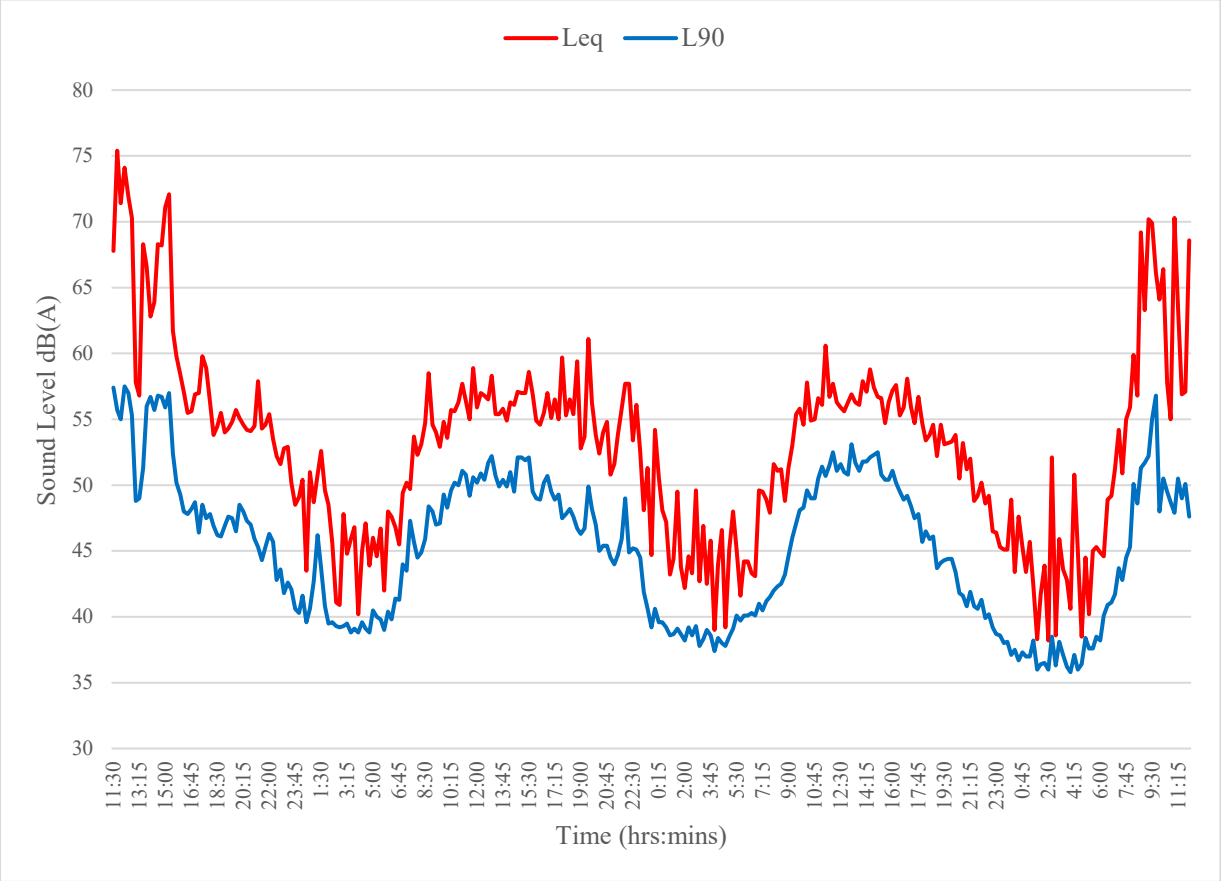
Background Noise Measurements

Graph



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APPENDIX 6

Noise Mitigation Options

Acoustic Louvre Enclosure

External Condenser Unit

Condenser inside an Acoustic Louvre Enclosure

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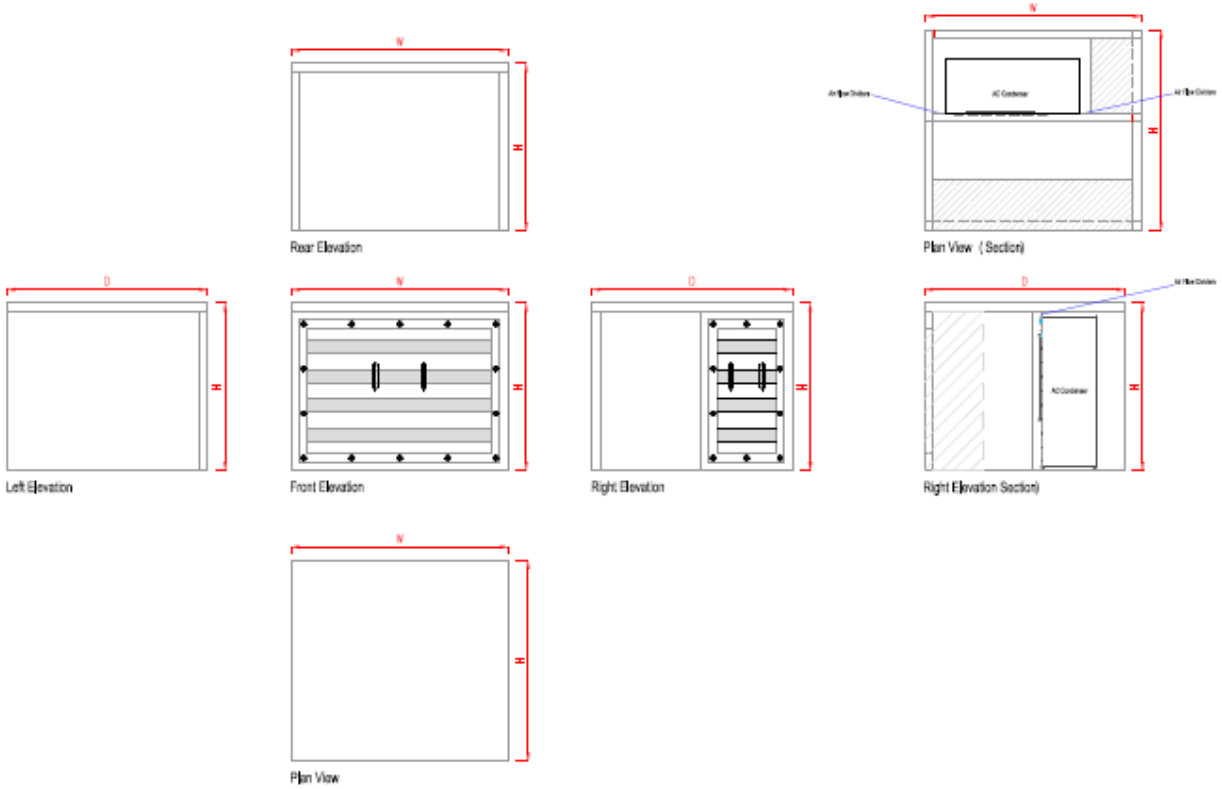
Noise Mitigation Options

Acoustic Louvre Enclosure



Notes:

- Includes 2 removable sevice panels
- Includes septum plates / air flow dividers
- Supplied with acoustic louvres with acoustic performance: 10 dB -17 dB $R_w + C_{tr}$
- Inlet air louvre can be repositioned
- Access positions can be altered to suit requirements

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Noise Mitigation

Acoustic Louvre

Acoustic Louvre
Single Blade
150mm deep

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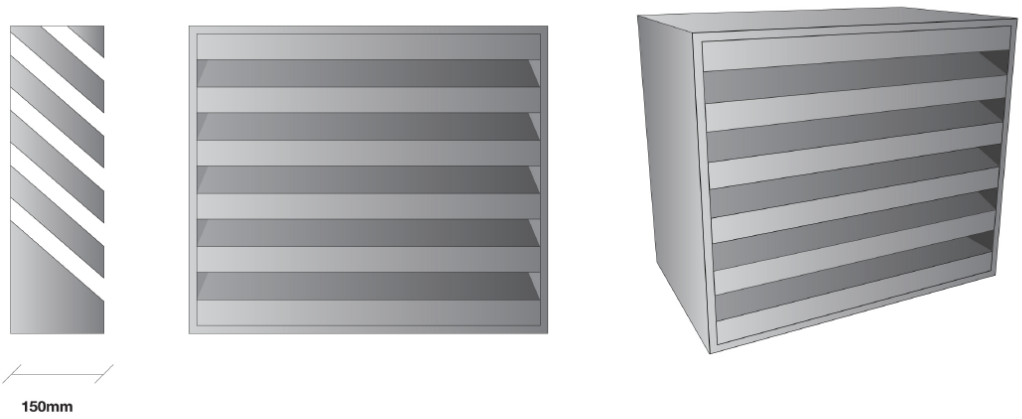

CONSTRUCTION DETAIL:

- 1.2mm folded galvanised sheet steel frame
- 0.9mm folded galvanised sheet steel blade section
- Birdmesh/insect mesh guard where required
- 0.9mm blanking to rear of dummy bottom blade
- Material Options: Stainless Steel 316 & 304 Grade, and Aluminium
- 0.9mm galvanised perforated sheet retaining controlled density mineral wool infill
- Modules to be bolt fixed together on site by others
- Suitable, non-hardening sealant by others around the perimeter on louvre

CONTACT:

Sound Planning Ltd
Farnham
Surrey
Tel: 01252 711972
E: enquiries@soundplanning.co.uk

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Noise Mitigation

Acoustic Louvre

Acoustic Performance Certificate (15 dB $R_w + C_{tr}$)[12]

SRL

UKAS TESTING 0444

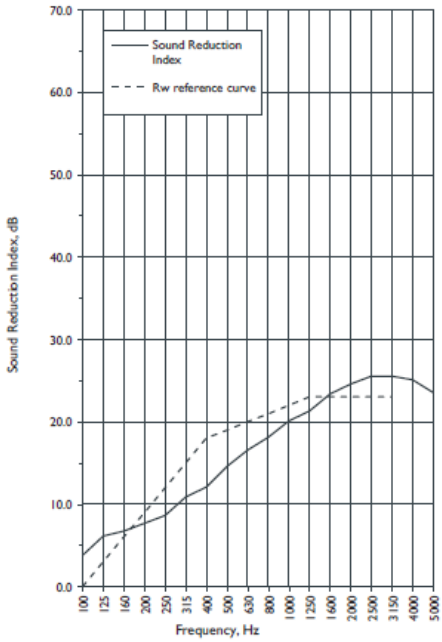
Test Report No: 24567-SRL-RP-XT-002-P1
Page 18 of 40
Date: 12/05/2020

Data Sheet 9

			Source	Receiving
Test Number:	10	**Test Room:**		
Client:	Sound Planning Ltd	**Air Temperature:**	10.7 °C	11.4 °C
Test Date:	17/02/2020	**Air Humidity:**	65 %	59 %
Sample Height:	1.1 m	**Volume:**	55 m³	50 m³
Sample Width:	1.1 m			
Sample Weight:	N/A kg/m²	**Air Pressure:**	999 mbar	

Product Identification: Louvre AL300 100/75 P45

Freq, f Hz	Sound Reduction Index, dB	
	⅓ Oct	Octave
50+	20.5	12.7
63+	19.3	
80+	8.6	
100	3.8	5.4
125	6.1	
160	6.7	
200	7.7	8.9
250	8.6	
315	10.9	
400	12.1	14.0
500	14.6	
630	16.6	
800	18.1	19.6
1000	20.1	
1250	21.3	
1600	23.4	24.4
2000	24.6	
2500	25.5	
3150	25.5	24.7
4000	25.1	
5000	23.6	
6300+	21.7	20.1
8000+	20.1	
10000+	18.8	
Average 100-3150	15.4	Version v3.1



Rating according to BS EN ISO 717-1:2013

$R_w(C;C_{tr})$= 19 (-1 ; -4) dB

* shows measurement corrected for background
> shows measurement limited by background
+ shows Frequency beyond standard and not UKAS accredited

Template Ref: Lab Edition 3 – 14/10/2019

[12] C_{tr} Adaption spectrum which takes account for low to medium speed road/rail/air traffic; disco music; and factory noise (medium to low frequency noise).

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Noise Mitigation

Acoustic Panel

Panel
50mm deep

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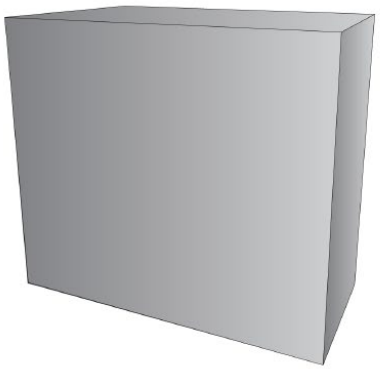
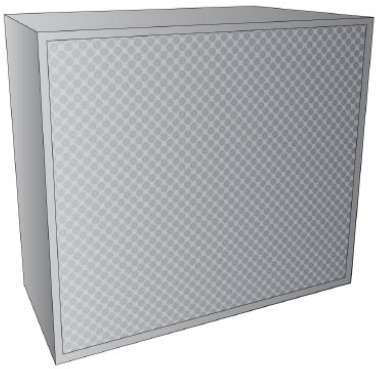
50mm



Front



Back

CONSTRUCTION DETAIL:

- 1.2mm folded galvanised sheet steel frame
- 0.9mm galvanised steel perforated sheet retaining controlled density mineral wool infill
- Stainless Steel (grade 316 & 304) and Aluminium options
- Suitable, non-hardening sealant around the perimeter, by others

CONTACT:

Sound Planning Ltd
Farnham
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Tel: 01252 711972
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Noise Mitigation

Acoustic Panel

Laboratory measurements of airborne sound insulation of building elements
Octave bands
ISO 140-3 (1995)

Client: Sound Planning Limited
48 Windermere Way
Farnham
Surrey
GU9 0DE

Object: "50mm Panel"

Size (m^2): 1.01
Thickness (mm): 50
Mass per unit area (kg/m^2): 16.3

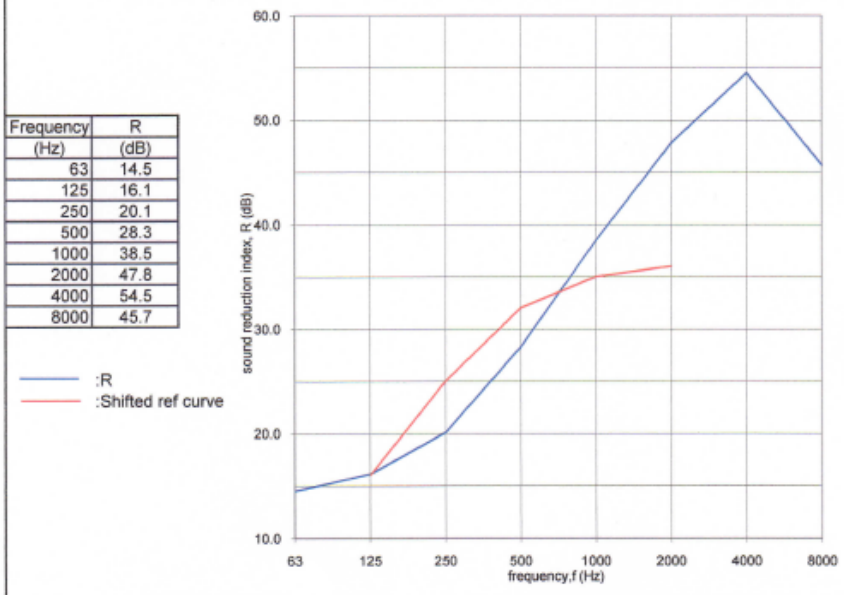
Source room:		Receiving room:	
Volume (m^3):	136	Volume (m^3):	217
Temperature [°C]:	20.3	Temperature [°C]:	19.8
Humidity [%]:	36.2	Humidity [%]:	35.7

Rating according to ISO 717-1 (1996):

R_W 32 dB

f range (Hz)	125-2000	63-4000
C (dB)	-1	-1
C_{tr} (dB)	-6	-7

Frequency (Hz)	R (dB)
63	14.5
125	16.1
250	20.1
500	28.3
1000	38.5
2000	47.8
4000	54.5
8000	45.7



Test reference No.: 254-173
University of Salford, School of Computing, Science & Engineering

Date: 21/02/2011
Signature:
SSV1

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APPENDIX 7

Vibration Isolation

CMS – Kinetics Model AC[13]

KINETICS™
Fiberglass
Isolators
Model AC

Description

Model AC Fiberglass Isolators consist of a molded inorganic fiberglass isolation pad bonded to a steel load transfer plate and to a formed steel bolt-down bracket and include an equipment anchor bolt with a neoprene grommet to prevent metal-to-metal contact. Fiberglass pads are fine (0.00027"/6.8 microns diameter) bonded annealed glass fibers which are stabilized by pre-compressing the material during manufacture and then coated with a flexible moisture-impervious elastomeric membrane. Fiberglass is unique in that the natural frequency is constant over a wide operating load range and the stiffness increases proportionately with load applied. Model AC Fiberglass Isolators are available in sizes with capacities from 40 to 900 lbs. (18 kg-409 kg) and deflections of 0.18" to 0.70" (4mm-18mm). Kinetics Model AC Isolators are recommended for the isolation of vibration produced by utility ventilating fans, vane axial fans, high speed motors, roof-mounted exhaust fans, and similar mechanical equipment.

Features

- Inorganic fiberglass media
- Flexible elastomeric coating
- Constant natural frequency over a wide load range
- Predictable dynamic response
- High energy dissipation
- Controlled viscous damping
- Load capacities 40 lbs. to 900 lbs. (18kg-409kg)
- Rated static deflection 0.18" to 0.70" (4mm-18mm)
- Steel load transfer plate
- Steel bolt and hold-down support bracket

Application

Kinetics Model AC Fiberglass Isolators can be used for any application requiring isolation of audible frequency vibration, or noise, or for vibration isolation of mechanical equipment with lowest operating speeds of 1750 RPM when mounted on a grade-supported slab or pier.

Model AC isolators are typically used when the predictable dynamic response and permanent load support characteristics of fiberglass are desired in conjunction with a bolt-down and vertical lift control feature.

Typical uses of Model AC isolators include the support and isolation of utility ventilating fans, vane axial fans, motors, roof-mounted exhaust fans, and similar mechanical equipment.

Special application of Model AC isolators have included use as both an isolator and wind lift hold-down support for isolated precast concrete roof systems used to reduce transmitted noise from fly-over aircraft.

Use Model AC mounts when Kinetics fiberglass isolators are recommended and it is desirable to bolt equipment to supporting structures.

[13] Supplied by CMS Acoustics (UK).

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Vibration Isolation

CMS – Kinetics Model AC

Specifications

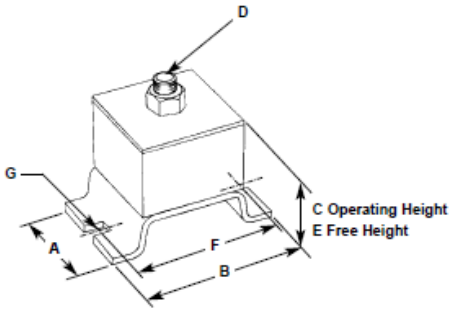
Vibration isolators shall be precompressed molded fiberglass pads individually coated with flexible, moisture-impervious elastomeric membrane. Vibration isolation pads shall be molded from glass fibers with fiber diameters not exceeding 0.00027" (6.8 microns) and with a modulus of elasticity of 10.5 million PSI (750,00 kg per sq. cm).

Natural frequency of fiberglass vibration isolators shall be essentially constant for the operating load range of the supported equipment.

Vibration isolators shall be bonded to a steel load transfer plate and a formed steel bolt-down bracket and shall also include an equipment mounting bolt with a neoprene grommet to prevent metal-to-metal contact.

Vibration isolators shall be selected by the manufacturer for each specific application to comply with deflection requirements as shown on the Vibration Isolation Schedule or as indicated on the project documents.

Vibration isolators shall be model AC, as manufactured by Kinetics Noise Control, Inc.



Isolator Type	Capacity Range	Maximum Deflection	Dimensions A	B	C*	D	E	F	G
AC-221L	40-200 lbs.	0.27"	2.50"	4.75"	1.98"	0.38"	2.25"	3.75"	0.44"
AC-221Q	100-400 lbs.	0.18"	2.50"	4.75"	2.07"	0.38"	2.25"	3.75"	0.44"
AC-331L	90-450 lbs.	0.35"	3.00"	4.75"	1.90"	0.38"	2.25"	3.75"	0.44"
AC-331Q	225-900 lbs.	0.27"	3.00"	4.75"	1.98"	0.38"	2.25"	3.75"	0.44"
AC-222G	20-100 lbs.	0.69"	2.50"	4.75"	2.56"	0.38"	3.25"	3.75"	0.44"
AC-222L	40-200 lbs.	0.54"	2.50"	4.75"	2.71"	0.38"	3.25"	3.75"	0.44"
AC-222Q	100-400 lbs.	0.36"	2.50"	4.75"	2.89"	0.38"	3.25"	3.75"	0.44"
AC-332-L	90-450 lbs.	0.70"	3.00"	4.75"	2.55"	0.38"	3.25"	3.75"	0.44"
AC-332Q	225-900 lbs.	0.54"	3.00"	4.75"	2.71"	0.38"	3.25"	3.75"	0.44"
AC-221L	18-91 kg	6 mm	63 mm	121 mm	50 mm	9.6 mm	57 mm	95 mm	11 mm
AC-221Q	46-182 kg	4 mm	63 mm	121 mm	52 mm	9.6 mm	57 mm	95 mm	11 mm
AC-331L	41-205 kg	9 mm	75 mm	121 mm	48 mm	9.6 mm	57 mm	95 mm	11 mm
AC-331Q	102-409 kg	6 mm	75 mm	121 mm	50 mm	9.6 mm	57 mm	95 mm	11 mm
AC-222G	9-46 kg	17 mm	63 mm	121 mm	65 mm	9.6 mm	83 mm	95 mm	11 mm
AC-222L	18-91 kg	14 mm	63 mm	121 mm	69 mm	9.6 mm	83 mm	95 mm	11 mm
AC-222Q	46-182 kg	9 mm	63 mm	121 mm	73 mm	9.6 mm	83 mm	95 mm	11 mm
AC-332-L	41-205 kg	18 mm	75 mm	121 mm	65 mm	9.6 mm	83 mm	95 mm	11 mm
AC-332Q	102-409 kg	14 mm	75 mm	121 mm	69 mm	9.6 mm	83 mm	95 mm	11 mm

*Operating height varies with applied load.

KINETICS Noise Control

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Phone: 905-670-4922
Fax: 905-670-1698

www.kineticsnoise.com
sales@kineticsnoise.com

AC 2/04

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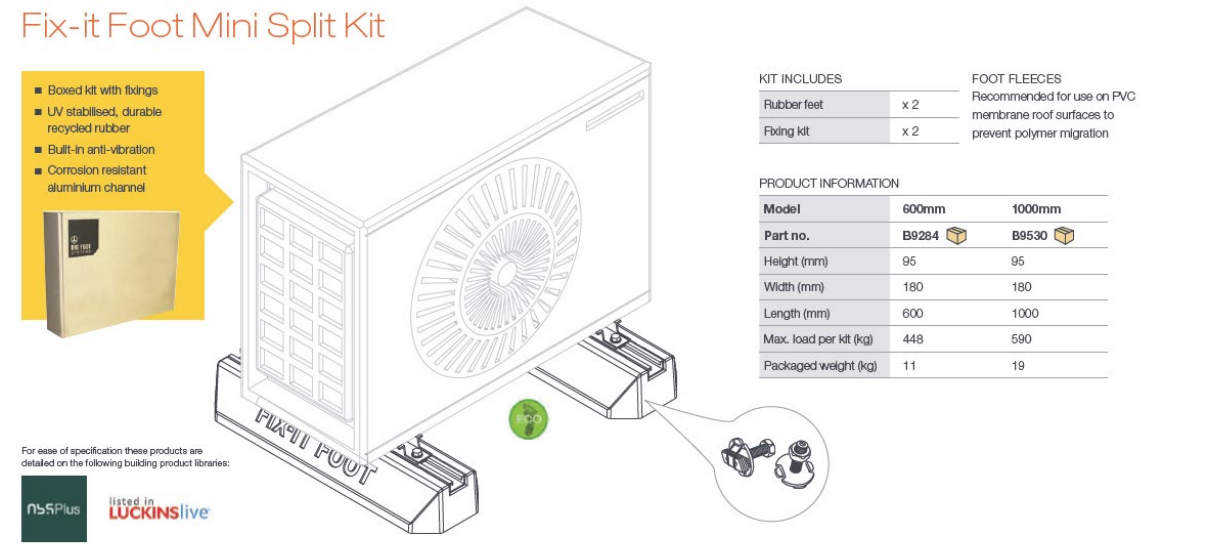
Vibration Isolation

Big Foot Systems[14]

Mini Split Kit






[14] Big Foot Systems – TEL 01323 844355.