

Consultants in Noise & Vibration
Building Regulations Certification Sound Insulation Testing

REPORT TITLE: NOISE ASSESSMENT FOR A PROPOSED AIR CONDITIONING UNIT
AT 86 MUSWELL ROAD, LONDON N10 2BE

REPORT REF: 23074-002

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DATE: September 2023

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SUMMARY

- This report provides a noise assessment for an air conditioning unit proposed to be installed to serve a residential dwelling at 86 Muswell Road, London N10 2BE. The unit is to be located externally to the rear of the property.
- The assessment is in accordance with the Local Planning Authority (Haringey Council) planning application validation requirements and is conducted with reference to the Council's noise policy, typically imposed noise condition plus guidance of relevant British Standard BS4142:2014.
- As part of the assessment a background noise survey has been conducted over several days including sample weekdays and a full weekend. The survey establishes existing background noise levels during the full range of operational times of the air conditioning unit, at a position representative of outside nearest noise sensitive premises (neighbouring residential properties). Results of the noise survey are used to set a noise limit for the air conditioning unit.
- Using manufacturer noise data, a noise model calculation has been used to determine noise from the air conditioning unit to outside neighbouring residential properties. Details for the air conditioning unit manufacturer noise data and noise model calculation are provided in the report.
- The assessment demonstrates noise from the air conditioning unit (with the specified noise reduction treatment implemented) will be below existing minimum background noise levels and comply with Haringey Council's planning consent noise requirements. Noise from the air conditioning unit would not be expected to be audible, cause disturbance or otherwise be of impact on the amenity of neighbouring properties.
- The noise reduction treatment comprises fitment of the air conditioning unit within an acoustic enclosure / housing. Specification details for the acoustic enclosure noise reduction treatment are provided in Section 7.1 of the report.
- The report also considers vibration from the proposed air conditioning unit. Location of the unit is not structurally linked / connected to any neighbouring properties. Thus it is extremely unlikely that any vibration from the unit would transmit to neighbouring properties. Notwithstanding this, as good practice it is advised the air conditioning unit is installed mounted on vibration isolators. Specification details for example typically suitable vibration isolators are provided in Section 7.2 of the report.

1. INTRODUCTION

An air conditioning unit is proposed to be installed to serve an existing residential dwelling at 86 Muswell Road, London N10 2BE.

The proposed air conditioning unit is a Daikin model RXYSCQ4TV1, to be located externally to the rear of the property.

The Local Planning Authority (Haringey Council) planning application validation requirements include submission of a noise assessment for proposed plant / equipment such as air conditioning units and air source heat pump units etc. This is for reason to enable the Council to assess the potential noise impact of proposed units upon occupiers of neighbouring noise sensitive (residential) properties.

This report provides a noise assessment for the proposed air conditioning unit and includes:

- Qualifications & experience;
- Noise assessment methodology & criterion; with reference to Haringey Council noise policy, typically imposed noise condition and relevant British Standard BS4142:2014;
- Measurement survey of existing background noise levels;
- Details of the proposed air conditioning unit, including location & manufacturer noise data;
- Calculation & assessment of noise from the air conditioning unit;
- Consideration of vibration from the air conditioning unit;
- Specification for noise reduction and vibration isolation measures as necessary.

2. QUALIFICATIONS & EXPERIENCE

This report is prepared and issued by David Philip. David Philip graduated in 1989 from The University of Salford Department of Applied Acoustics with a BEng Honours degree in Electroacoustics. David Philip has been since 1995, and continues to be, a fully elected Member of the Institute of Acoustics (MIOA).

David Philip has been the owner / managing director of Philip Acoustics since the firm was formed in 2002. Prior to the formation of Philip Acoustics, David Philip held senior acoustic consultant positions at Sound Research Laboratories (London office) and Spectrum Acoustic Consultants.

Philip Acoustics has held full membership of the Association of Noise Consultants (ANC) since 2003 and is also a full member of the ANC Registration Scheme of approved independent organisations to undertake Building Regulations Approved Document Part E pre-completion certification sound insulation testing.

David Philip has over 30 years' experience as an Acoustic Consultant both in the UK and internationally and has considerable experience undertaking noise surveys and noise assessments for a wide range of commercial uses and also residential developments.

This experience includes a substantial quantity of noise assessments specifically associated with air conditioning units, air source heat pump units and similar plant / equipment serving commercial/retail premises and also residential properties.

David Philip is fully familiar with the provisions of the current (and previous) editions of British Standard BS4142, as well as other acoustics related standards and guidance documents.

The opinions expressed in this report are the true and professional opinions of David Philip. Neither David Philip nor Philip Acoustics is appointed on any incentive fee basis.

3. NOISE ASSESSMENT METHODOLOGY & CRITERION

A review of Haringey Council's noise policy / planning consent noise requirements, details of relevant British Standard BS4142:2014 and appropriate noise criterion for the proposed air conditioning unit are provided in the following sub-sections.

3.1 Haringey Council Requirements

Policy DM1 and Policy DM23 of Haringey Council Development Management DPD (July 2017) include reference to noise (and vibration) as potentially applicable for planning applications relating to proposed outdoor air conditioning units:

- **DM1: *Delivering High Quality Design;***
- **DN23: *Environmental Protection.***

Neither of these policies nor their supporting paragraphs provide specific technical guidance in terms of noise assessment methodology or noise limit criteria for proposed plant / equipment such as air conditioning units.

In granting planning approval for the installation of outdoor air conditioning units and/or air source heat pump units to serve residential dwellings, Haringey Council typically impose a standard condition including with noise criterion limit for reason including reference to Policy DM1 as the two recent examples reproduced below:

4. The noise level from air source heat pump shall at all times remain 5dB(A) below background levels when measured at any nearby residential window or other noise sensitive receptor.

The plant/ equipment shall be serviced regularly in accordance with the manufacturer's instructions and as necessary to ensure that the requirements of the condition are maintained. If at any time the plant is determined by the local planning authority to be failing to comply with this condition, it shall be switched off upon written instruction from the local planning authority and not used again until it is able to comply.

Reason: In order to protect the amenities of nearby residential occupiers consistent with Policy D14 of the London Plan 2021 and Policy DM1 of The Development Management DPD 2017.

3. The design and installation of the air conditioning unit shall be such that when operating the cumulative noise level LAeq TR arising from the unit, measured or predicated at 1m from the facade of the nearest noise sensitive premises, shall be a rating level of at least 5dB(A) below the background noise level LAF90 Tbg. The measurement and/or predication of the noise should be carried out in accordance with the methodology contained within BS 4142:2014

Reason: To protect neighbouring resident's amenity.

In overview terms, the Council's condition sets a criterion / limit that noise from proposed plant / equipment to serve residential dwellings such as air conditioning units shall be at least 5dBA lower than background noise levels, applicable to outside windows of nearest noise sensitive premises, with reference to the measurement and assessment provisions of BS4142:2014. This is used as noise assessment methodology and criterion for the proposed air conditioning unit at 86 Muswell Road.

Additional information and clarification details associated with the noise assessment methodology and criterion with reference BS4142 as applicable for the proposed air conditioning unit are provided in sub-sections 3.2 & 3.3.

3.2 BS4142:2014

Full title of the current edition of this standard is BS4142:2014+A1:2019 "*Methods for rating and assessing industrial and commercial sound*". Reference throughout this report to BS4142:2014 relates to this current edition.

As an aid to clarity and as consistent with wording of the Council's policy, this report retains use of the more commonly used term "*noise*" as opposed to the replacement term "*sound*" of BS4142:2014.

BS4142:2014 provides a well-established methodology to assess the likely effect (impact) to people regarding noise of an "industrial or commercial" nature including noise from mechanical services plant / equipment. Consequently, in requesting noise assessments for proposed air conditioning units or air source heat pump units and regardless of whether to serve an industrial, commercial or residential property, most Local Planning Authorities routinely refer to BS4142:2014.

In this scenario, the BS4142:2014 assessment method requires that source noise data for the proposed air conditioning unit is established, and pre-existing background noise levels be measured. The assessment is then carried out by comparing the air conditioning unit's noise Rating Level with background noise levels, at position outside nearest neighbouring residential properties.

The air conditioning unit's noise Rating Level is the Specific (actual) Noise Level of the unit plus with any corrections applied to account for subjective characteristics of the noise at the assessment position that might mean it is more noticeable and potentially have more impact.

The BS4142:2014 assessment method then provides guidance on the likely noise impact (effect) to people depending on the magnitude of the excess of the air conditioning unit's noise Rating Level over the pre-existing background noise; the higher the excess the more likely there would be an adverse impact and correspondingly, the lower the excess (or no excess) the less likely there would be an adverse impact.

BS4142:2014 does not provide any specific guidance on suitable noise limits / criteria or standards including for proposed new plant / equipment such as air conditioning units, only guidance on how to determine the likelihood of adverse impact.

In terms of likelihood of adverse (noise) impact, BS4142:2014 advises the following, dependent upon context:

- i) **Where the (air conditioning unit) noise Rating Level is around +10dB or more above the background, this is likely to be an indication of significant adverse impact;**
- ii) **Where the (air conditioning unit) noise Rating Level is around +5dB above the background, this is likely to be an indication of adverse impact;**
- iii) **Where the (air conditioning unit) noise Rating Level does not exceed the background, this is an indication of low impact.**

It is important to note the BS4142:2014 assessment methodology does not have a "no impact" indication categorisation. "Indication of low impact" for where the noise Rating Level does not exceed the pre-existing background is the lowest / least likely noise impact categorisation of BS4142:2014.

Different Local Planning Authorities interpret and apply the guidance of BS4142:2014 differently, some require that the noise Rating Level of proposed new plant/equipment be not higher than +5dB above the existing background, some require not higher than the background, some require a certain amount below the background noise. Some do not have any set requirement and consider each situation / proposed development application individually.

As consistent with Haringey Council's noise condition, then for the purpose of this assessment a noise limit (criterion) is applied that the proposed air conditioning unit's noise Rating Level shall be at least 5dB below the existing background noise at neighbouring noise sensitive (residential) properties.

It is the author's experience of undertaking many noise surveys and assessments of noise from air conditioning units and similar equipment, in similar scenarios and contexts to that as for 86 Muswell Road, that at this level, noise from the air conditioning unit would not be expected to be audible / disturbing or otherwise of impact detrimental to occupiers of neighbouring properties.

3.3 Application of Air Conditioning Unit Noise Limit (Criterion)

Additional clarification points in respect to the assessment and application of the noise limit are provided below.

a) Air Conditioning Unit Operating Condition

The noise limit is cautiously/robustly applied for the air conditioning unit operating at standard (full 100%) duty potentially over a full 24-hour period, i.e. including during the middle of the night.

In practice it is expected the unit would operate at a reduced capacity (and thus with reduced noise output over full duty) for much of the time, if at all, during the late evening and night period.

Manufacturer noise data for the air conditioning unit is provided in Section 4 of the report.

b) Rating Noise Level

The noise limit is applied in terms of a noise Rating Level ($L_{A,T}$ dB) and thus with any corrections (such as for tonal character noise) applied as necessary to the air conditioning unit's noise at the assessment position as per the BS4142:2014 assessment methodology.

c) Assessment Position

As per normal noise assessment procedures / convention, as Haringey Council's typical conditions, plus with reference to BS4142:2014, the noise limit is applied to an assessment position directly outside nearest windows of neighbouring residential properties.

d) Background Noise Level

The noise limit is applied as "worse case", cautiously / robustly based on the representative measured minimum (lowest) background noise level $L_{A90,T}$ dB ($T = 15$ mins), representative of at the assessment position over 24 hours (i.e. including during the night), based on results of a seven day noise survey including sample weekdays and a full weekend (see Section 4 of the report).

e) **Very Low Background Noise Levels**

In accordance with the guidance and assessment provisions of BS4142, then for scenarios of very low background noise it is unreasonable / unnecessary to apply a Rating Level noise limit directly relative to the background level, in terms of ensuring amenity protection such that noise from plant (including such as air conditioning units) does not cause disturbance or is otherwise of adverse / detrimental impact.

This simply due to that there is a lower threshold level at which plant noise would become inaudible / not noticeable to occupiers of neighbouring properties and thus it being unreasonable and unnecessary to further reduce the plant noise below that level.

BS4142:2014 advises "*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*"

Where background levels are very low it is instead appropriate to apply a minimum (lower level) threshold cap plant Rating Level limit of $L_{A_{r,T_r}}$ 30dB at assessment positions. BS4142:1997 advised that noise Rating Levels of below 35dB be considered very low.

Thus a minimum threshold cap plant noise limit (Rating Level) set at $L_{A_{r,T_r}}$ 30dB is significantly below (i.e. as 5dB betterment) to this guidance and for scenarios of very low background noise levels (i.e. regardless of the low background noise) will maintain surety of protection for from loss of amenity due to noise disturbance.

Notwithstanding the above, it is sometimes appropriate to apply a lower plant noise limit (i.e. below the threshold cap) in consideration to avoid "background noise creep". This potentially occurs in scenarios where multiple plant items serving the same or different directly adjacent premises (i.e. multiple air conditioning units etc) are in turn installed in close / immediate proximity to one another and as then cumulatively contributing a higher overall noise level to the same receptor (noise sensitive properties). This scenario does not occur for the proposed air conditioning unit at 86 Muswell Road.

4. BACKGROUND NOISE SURVEY

To assess noise from the proposed air conditioning unit it is necessary to establish representative existing background noise levels outside nearest neighbouring residential properties. Details of the conducted background noise survey are provided in the sub-sections below.

4.1 Survey Instrumentation

Details of instrumentation used for the background noise survey are provided in Appendix A. The sound level meter was calibration verified before and after the survey.

4.2 Survey Details & Procedure

Although the air conditioning unit would tend to operate principally during the daytime and evening periods, as it is to serve a residential dwelling then it will potentially operate at any time over 24 hours. Therefore, the survey was conducted over at least a full 24-hour period to obtain representative samples of the background noise climate during the entire range of possible times of unit operation.

The background noise survey was conducted over an eight day period from Wednesday 06 September 2023 through Wednesday 13 September 2023 to include sample weekdays and also a full weekend. Weather conditions were monitored and were suitable; dry (nil precipitation) with light / calm wind through the survey period.

Measurements of background noise were recorded continually in terms of consecutive samples of overall $L_{A90,T}$ dB values ($T = 15 \text{ minutes}$) for the entire survey duration.

The survey measurement position was externally to the rear of the property, selected as representative of outside nearest noise sensitive properties to proposed location of the air conditioning unit.

Nearest noise sensitive properties are neighbouring residential dwellings (houses) adjacent either side at 84 and 88 Muswell Road.

A site aerial image and proposed layout drawing are provided in Appendix B. These are annotated to indicate proposed location for the air conditioning unit, neighbouring properties and background noise survey position.

4.3 Survey Results, Observations & Air Conditioning Unit Noise Limit

Full raw data results of the eight day background noise survey are provided in Appendix C.

Background noise levels are low / very low, albeit normal for this residential location well away from busy roads, commercial centres and railway lines etc.

Background noise is predominantly due to underlying noise from distant traffic in the wider vicinity. Background noise fluctuates during the day, then gradually reduces during the evening and into the night as traffic reduces, before increasing again in the morning as traffic in the wider vicinity increases.

This diurnal noise climate profile is normal for this location with underlying noise from distant road traffic.

Summary of the representative minimum (lowest) $L_{A90,T}$ background noise level and associated air conditioning unit noise limit requirement as detailed in Section 2 of this report are shown in Table 1.

Description	Assessment Position & Relevant Times	Representative Minimum Background Noise $L_{A90,15min}$	Air Conditioning Unit Noise Limit (Rating Level)
Air conditioning unit operating standard (full 100%) duty potentially over a 24-hour period	Outside windows of nearest neighbouring properties <i>Assessment over 24 hour period</i>	31dB <i>(representative minimum level occurs for a limited time during the night period)</i>	$L_{A,T} \leq 26\text{dBA}$ (5dB below background) $L_{A,T} \leq 30\text{dB}$ (very low background; minimum threshold cap 30dBA applicable)

Table 1: Measured representative minimum background noise & associated air conditioning unit noise limit

5. NOISE FROM AIR CONDITIONING UNIT

Informative (1): Proposed Air Conditioning Unit

This report & noise assessment is based on the proposed Daikin air conditioning unit model RXYSCQ4TV1 as detailed below.

If an alternative make and/or model of unit is selected, including as part of future possible unit replacement, it is important that noise levels for the alternative unit be checked by Philip Acoustics or another Acoustic Consultant to ensure noise emission of the alternative unit remains compliant with the noise limit subject to noise reduction treatment as detailed in Section 7.1 of the report.

The proposed air conditioning unit is a Daikin model RXYSCQ4TV1. This is a modern, efficient and compact (physically small) principally domestic use air conditioning unit with relatively low noise output.

Manufacturer noise data for the air conditioning unit is provided in Appendix D. The noise data is for the unit operating at full normal (100%) duty cooling or heating mode in terms of free-field overall dBA and octave band linear dB sound pressure levels at 1m distance from the unit.

For purpose of the noise assessment, it is cautiously / robustly taken as “worse case” the air conditioning unit is operating at full normal (100%) duty, i.e. with no allowance the unit may likely operate at reduced duty (with consequent lower noise output), if at all, during the late evening and night period.

Manufacturer noise data indicates the unit generates a nominally broadband type noise without strong or dominant tonal characteristics. This correlates with experience of the author in measuring noise levels of installed same and similar model type Daikin air conditioning units in domestic use settings.

Summary of noise data for the air conditioning unit including octave band values is shown in Table 2.

Description	Overall dBA	Octave Band Centre Frequency Hz - Linear dB							
		63	125	250	500	1k	2k	4k	8k
Daikin RXYSCQ4TV1 air conditioning unit <i>Full 100% duty (cooling or heating mode)</i>	51	49	53	49	51	46	40	33	25

Table 2: Air conditioning unit noise data; free-field sound pressure levels at 1m

To calculate the noise contribution from the air conditioning unit to outside nearest neighbouring residential properties (assessment position) a spreadsheet noise calculation model has been used.

The model takes account of the distance between the unit and assessment position, acoustic directivity, acoustic reflections (i.e. non free-field conditions) and any natural / default line of sight acoustic screening (i.e. fences and intervening structures / buildings etc). The noise model calculation also takes account of the noise reduction treatment (acoustic louvre enclosure) applied to the air conditioning unit as specified in Section 7.1 of this report.

Noise model calculation details are provided in Appendix E.

The overall calculated noise level from the proposed air conditioning unit to the assessment position (outside windows of nearest neighbouring residential properties) compared with the noise limit is shown in Table 3.

Noise from the air conditioning unit to other neighbouring properties in the vicinity that are more distant from and/or more screened from, proposed location of the unit will be lower.

Description	Assessment Position	Air Conditioning Unit Overall Noise Level (Rating Level)	Noise Limit (Rating Level)	Comment
Air conditioning unit operating standard (full 100%) duty potentially over a 24-hour period	A) Rear elevation of neighbouring residential property 84 Muswell Road	$L_{A,T,r}$ 24dB	$L_{A,T,r} \leq 26\text{dBA}$ (5dB below background) $L_{A,T,r} \leq 30\text{dB}$ (very low background; minimum threshold cap 30dBA applicable)	Noise from proposed air conditioning unit complies with 5dB below background limit & 30dBA minimum threshold cap limit
	B) Ground floor rear elevation of neighbouring residential property 88 Muswell Road	$L_{A,T,r}$ 26dB		
	C) First floor rear elevation of neighbouring residential property 88 Muswell Road	$L_{A,T,r}$ 19dB		

Table 3: Assessment of air conditioning unit noise to nearest neighbouring properties

The assessment as Table 3 demonstrates noise from the proposed air conditioning unit (with noise reduction treatment implemented) complies with the noise limit.

At this level, noise from the air conditioning unit will be significantly below existing minimum background noise levels as occur during the night period, plus in absolute terms be very low and would not be expected to be audible, cause disturbance or otherwise be of impact detrimental to the amenity of neighbouring residential occupiers.

Additionally, it is important to note the noise model calculation and associated assessment is cautious / robust and in practice noise from the air conditioning unit will be lower and further below the background noise and limit requirement for the following reasons:

- The assessment is based on the air conditioning unit operating as “worse-case” at full 100% duty all the time over 24-hours; including all through the late evening and night period when background noise levels are lowest. This is extremely unlikely to occur for majority of the time. It is likely the unit would operate at a reduced capacity with consequent lower noise output (i.e. low noise mode), if at all, during the late evening and night period;
- The noise limit used for the assessment is cautiously based on the representative minimum background noise level over 24-hours (i.e. including late evening and middle of the night), as measured over an eight-day noise survey including sample weekdays and a full weekend. Background noise for the majority of the time, including during the night period on some days is higher than the measured minimum value used for the assessment. Correspondingly for these times the air conditioning unit noise would be further below the background noise and associated noise limit applicable to these times based on the background noise occurring during these times.

6. VIBRATION FROM AIR CONDITIONING UNIT

Location for the proposed air conditioning unit is separate from (i.e. not structurally attached or otherwise physically connected / fixed to) any neighbouring properties. In addition, vibration generated by modern domestic use air conditioning units is generally low.

It is not expected there would be any vibration transmission from the air conditioning unit to neighbouring properties and it is not necessary to specify vibration isolator mountings to the unit specifically to protect neighbouring properties from potential vibration.

Notwithstanding this, as good practice it is advised the unit is installed mounted on conventional proprietary vibration isolators.

Specification details for typically suitable vibration isolators are provided in Section 7.2 of the report.

6. SPECIFICATION FOR NOISE REDUCTION & VIBRATION ISOLATION MEASURES

6.1 Noise Reduction

Informative (2): Other Considerations Associated With Noise Reduction Treatment

Philip Acoustics can only advise on noise & vibration (acoustic) issues and therefore professional advice from others may need to be sought to confirm aspects of the noise reduction treatment with regard to non-acoustic issues such as visual appearance, maintenance access and airflow ventilation to the air conditioning unit.

To ensure compliance with the noise limit requirement, it is advised the proposed air conditioning unit is installed within an acoustic louvre enclosure, as outline indicated on the annotated part copy layout drawing in Appendix F.

Use of an acoustic louvre enclosure is a normal / conventional method of noise reduction treatment for a domestic use external air conditioning units in this scenario, and in non-technical lay terms essentially forms a "soundproof" outdoor box around the unit.

In terms of noise reduction performance specification, the acoustic enclosure is required to reduce the overall dBA noise level from the air conditioning unit by at least 9dBA.

A typical enclosure would have acoustic louvres to the front and sides to permit airflow to/from the unit and with the remaining non-acoustic louvre parts of the enclosure's outer structure, being formed by normal/standard type proprietary 25mm to 50mm thick acoustic panels.

Normal/standard type proprietary acoustic panels are solid one side (minimum 20swg sheet steel) and perforated the other (typically perforated 22swg sheet steel) with 25mm to 50mm thick acoustic grade mineral wool absorptive lining. The perforated (absorptive) side of the enclosure panels face inwards towards the air conditioning unit.

Proprietary 25mm to 50mm thick acoustic panels as the specification details above are available as standard from most acoustic hardware suppliers.

Cable and pipework entry points into and out of the unit's acoustic enclosure to be sealed airtight.

The acoustic panel parts of the enclosure can be painted or over-clad externally to whatever specification / material as required for visual reasons.

Alternatively, and more commonly used in this domestic setting scenario as visual screening; garden type timber trellising is positioned externally to around an air conditioning unit's enclosure, very often with climbing pot plants to the trellis.

The specification performance requirement for the enclosure acoustic louvres is shown in Table 4 on the following page.

As normal for noise reduction treatments, the performance specification is for different amounts in different frequency bands, but with requirement to achieve an overall noise reduction of at least 9dBA.

Description	Octave Band Centre Frequency (Hz)								Comments
	63	125	250	500	1k	2k	4k	8k	
Acoustic Louvre Sound Reduction Index dB	4	4	6	8	11	13	12	12	Overall dBA noise reduction $\geq$ -9dBA achieved using conventional minimum 150mm depth type acoustic louvres

Table 4: Acoustic louvre performance specification (nominal 150mm depth acoustic louvres)

The Table 4 acoustic louvre specification is based on using conventional proprietary nominal 150mm depth type acoustic louvres as available from many acoustic hardware suppliers. The technical data sheet for an example supplier's 150mm depth acoustic louvres is provided in Appendix F.

Informative (3): Acoustic Louvre Suppliers

Different acoustic hardware suppliers have slightly differing sound reduction performance data for their 150mm depth acoustic louvres. Therefore, some supplier data may indicate slight variation in performance as compared with the octave band specification data in Table 4. This is advised acceptable providing the acoustic louvres are minimum 150mm depth type.

6.2 Vibration Isolation

As detailed in Section 5, it is advised as good practice the air conditioning unit is installed from the ground (typically upon a paving slab or similar) mounted on conventional proprietary vibration isolator mountings.

Typically suitable / appropriate proprietary vibration isolators for the air conditioning unit are rubber or neoprene turret type mountings. 4 x isolators are required; one to under each mounting corner position of the unit.

Details of three example suppliers and their typically suitable vibration isolators are provided below. The stated unit weight (kg) is for the air conditioning unit itself plus with nominal allowance for refrigerant charge (rounded up).

The example suppliers are not listed in any order of preference and copy of each of the supplier's data sheets is provided in Appendix F. Other suppliers will be able to offer similar suitable / equivalent vibration isolators.

Example Supplier 1:

EMTEC: www.emtecproducts.co.uk Isolator type: Neoprene Mountings Series R/RD

Daikin model RXYSCQ4TV1 (weight 98kg) = Isolator R-1 Red (max load per mount 31.7kg)

Example Supplier 2:

Christie & Grey: www.christiegrey.co.uk Isolator type: Rubber Turret Mountings RM

Daikin model RXYSCQ4TV1 (weight 98kg) = Isolator RM 19.100.Y.F Yellow (max load per mount 28kg)

Example Supplier 3:

Fibet Group: www.fibet.co.uk Isolator type: SEM Light Duty Mounts

Daikin model RXYSCQ4TV1 (weight 98kg) = Isolator SEM-8525W (max load per mount 27kg)

A P P E N D I X A

Noise Survey Instrumentation

Site: 86 Muswell Road, London N10 2BE

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NOISE SURVEY INSTRUMENTATION

Instrumentation Used:

- Rion sound level meter type NL-31 Class 1, Rion preamplifier type NH-21, Rion microphone type UC-53A, Rion microphone windshield type WS-10, Rion microphone extension cable type EC-04A and tripod / boom arrangement;
- Bruel & Kjaer calibrator type 4231.
- Speedtech Instruments Skymaster model SM-28 serial number 19370 (sample weather conditions data).

Instrumentation Calibration Certification:

Description	Type Number	Manufacturer	Date of Calibration Expiration	Calibration Certificate Number
Class 1 Sound Level Meter s/n 00773045	NL-31	Rion	05/08/2024	TCRT22/1493
Microphone s/n 313002	UC-53A			
Preamplifier s/n 25056	NH-21			
Calibrator s/n 2642929	4231	Bruel & Kjaer	18/02/2024	TCRT22/1131

Instrumentation On-Site Calibration Check:

Description	Calibrator Reference Level	Measured Level	Comment
Before survey measurements	94.0dB	94.1dB	Pass
After survey measurements		94.1dB	Pass (nil significant drift)

A P P E N D I X B

Aerial image & Proposed Air Conditioning Unit Location Drawing

Site: 86 Muswell Road, London N10 2BE

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AERIAL IMAGE

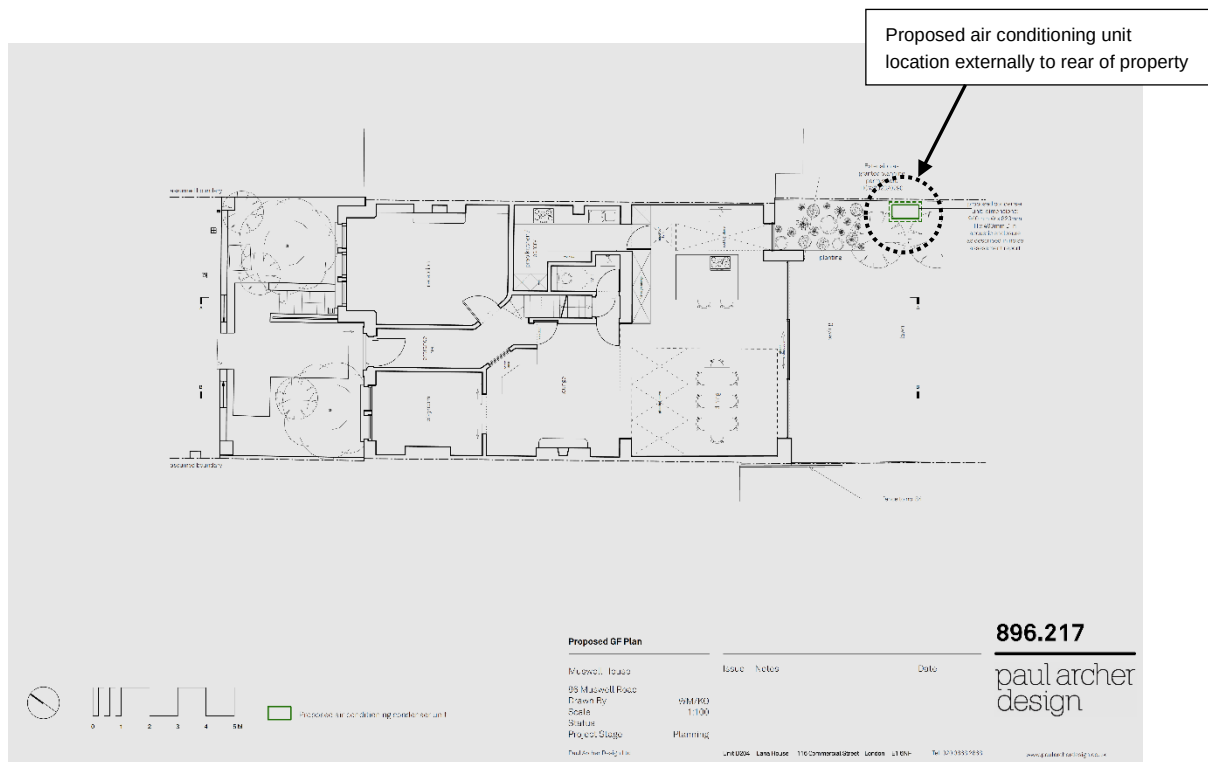


Site: 86 Muswell Road, London N10 2BE

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PROPOSED AIR CONDITIONING UNIT LOCATION DRAWING



APPENDIX C

Background Noise Survey Results

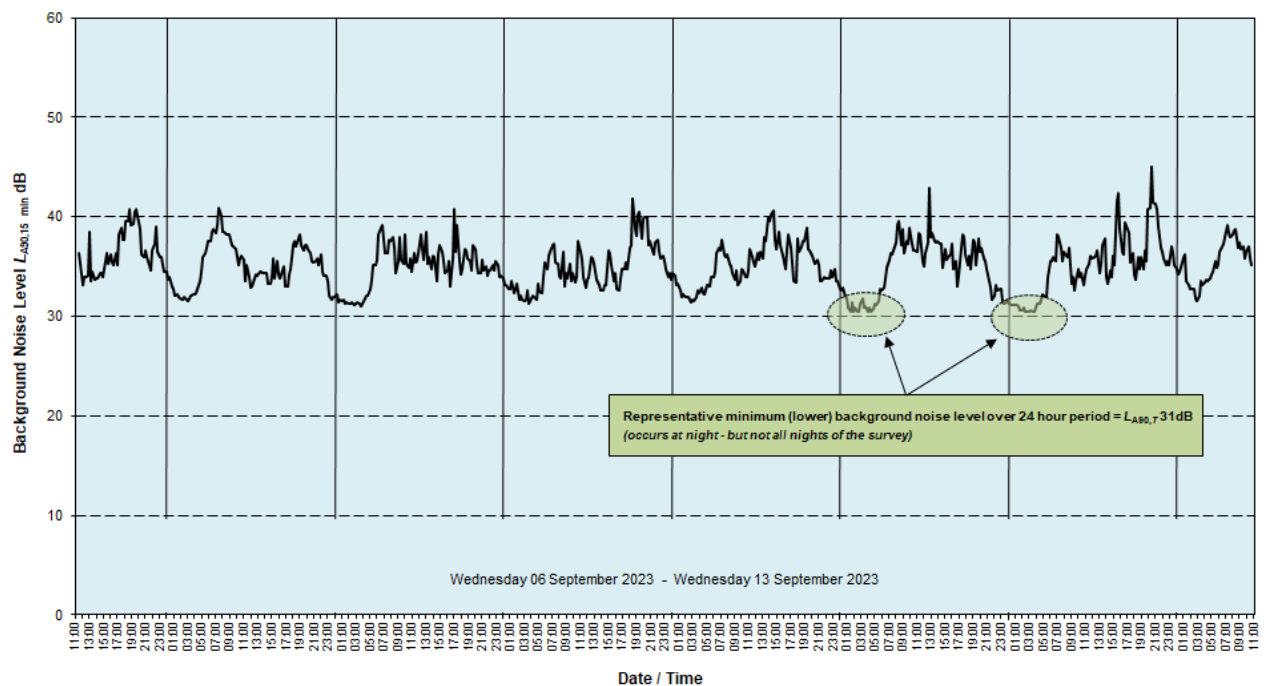
Site: 86 Muswell Road, London N10 2BE

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Date: September 2023

BACKGROUND NOISE SURVEY RESULTS

Raw Data Results For Eight Day Noise Survey Externally To Rear Of The Property:



A P P E N D I X D

Manufacturer Noise Data For Air Conditioning Unit

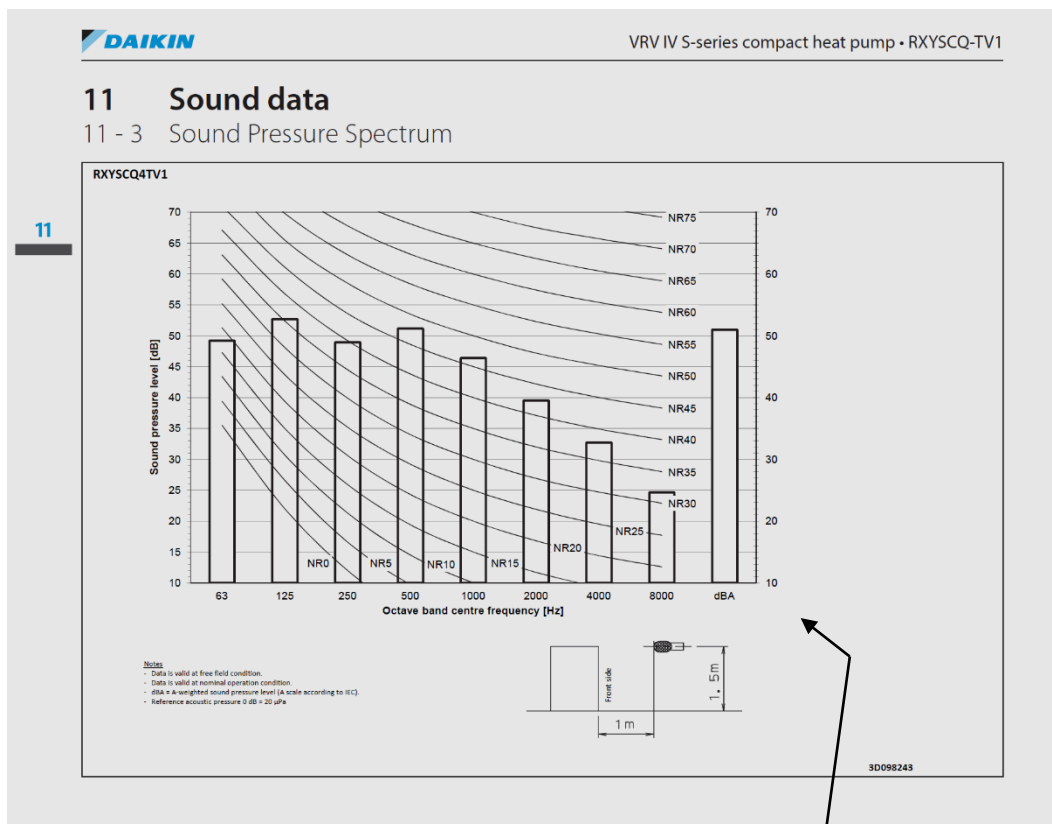
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Date: September 2023

MANUFACTURER NOISE DATA FOR AIR CONDITIONING UNIT

Daikin RXYSCQ4TV1



Manufacturer noise data is in terms of free-field overall dBA & octave band linear dB sound pressure levels at 1m (*unit operating 100% full duty*)

APPENDIX E

Noise Model Calculation For Air Conditioning Unit

Site: 86 Muswell Road, London N10 2BE

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Date: September 2023

NOISE MODEL CALCULATION FOR AIR CONDITIONING UNIT

Assessment Position A: Rear elevation of adjacent neighbouring residential property 84 Muswell Road

Noise Condition: 1 x Daikin RXYSCQ4TV1 air conditioning unit operating full 100% duty

Noise Mitigation: Unit within acoustic louvre enclosure (see Section 7.1 Report 23074-002)

Plant & Description	Overall dBA	Lin dB at Octave Band Centre Frequency Hz							
		63	125	250	500	1k	2k	4k	8k
Air Conditioning Unit: Daikin model RXYSCQ4TV1									
Noise Data: sound pressure level at 1m (free-field); Lp dB unit operating full 100% duty (manufacturer data)	51	49	53	49	51	46	40	33	25
Quantity; 0dB unit quantity correction applicable for 1 x unit		0	0	0	0	0	0	0	0
Noise Mitigation; unit within acoustic louvre enclosure (≥ 150 mm depth type acoustic louvres)		-2	-4	-6	-8	-11	-13	-12	-12
Distance; free-field correction for ≈ 12 m "straight line distance" from unit to assessment position		-22	-22	-22	-22	-22	-22	-22	-22
Screening; nil screening correction applicable		0	0	0	0	0	0	0	0
Directivity; nil propagation directivity correction applicable (unit radiates noise equally all directions)		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; +3dB correction applied for unit adjacent to boundary fence		3	3	3	3	3	3	3	3
Air conditioning unit contribution at assessment position	24	28	30	24	24	16	8	2	-6
Cumulative Contribution All Plant At Assessment Position	24	28	30	24	24	16	8	2	-6

The air conditioning unit's overall sound pressure (Specific Noise) level at the assessment position = 24dBA.

Manufacturer noise data indicates the Daikin model RXYSCQ4TV1 air conditioning unit generates a broadband characteristic noise without strong or dominant tonal characteristics. This correlates with experience of the author in measuring noise from installed same and similar model type Daikin air conditioning units used in domestic settings.

As per BS4142:2014 assessment methodology, the air conditioning unit's noise to the assessment position is a Rating Level $L_{A,r,Tr}$ 24dB.

Site: 86 Muswell Road, London N10 2BE

Report: 23074-002 Appendix E (page 2 of 3)

Date: September 2023

NOISE MODEL CALCULATION FOR AIR CONDITIONING UNIT

Assessment Position B: Ground floor rear elevation of adjacent neighbouring residential property 88 Muswell Road

Noise Condition: 1 x Daikin RXYSCQ4TV1 air conditioning unit operating full 100% duty

Noise Mitigation: Unit within acoustic louvre enclosure (see Section 7.1 Report 23074-002)

Plant & Description	Overall dBA	Lin dB at Octave Band Centre Frequency Hz							
		63	125	250	500	1k	2k	4k	8k
Air Conditioning Unit: Daikin model RXYSCQ4TV1									
Noise Data: sound pressure level at 1m (free-field); Lp dB unit operating full 100% duty (manufacturer data)	51	49	53	49	51	46	40	33	25
Quantity; 0dB unit quantity correction applicable for 1 x unit		0	0	0	0	0	0	0	0
Noise Mitigation; unit within acoustic louvre enclosure (≥ 150 mm depth type acoustic louvres)		-2	-4	-6	-8	-11	-13	-12	-12
Distance; free-field correction for ≈ 3 m "straight line distance" from unit to assessment position		-10	-10	-10	-10	-10	-10	-10	-10
Screening; screening correction applicable (boundary fence to 88 Muswell Road), limit to -10dB		-8	-10	-10	-10	-10	-10	-10	-10
Directivity; nil propagation directivity correction applicable (unit radiates noise equally all directions)		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; +3dB correction applied for unit adjacent to boundary fence		3	3	3	3	3	3	3	3
Air conditioning unit contribution at assessment position	26	32	32	26	26	18	10	4	-4
Cumulative Contribution All Plant At Assessment Position	26	32	32	26	26	18	10	4	-4

The air conditioning unit's overall sound pressure (Specific Noise) level at the assessment position = 26dBA.

Manufacturer noise data indicates the Daikin model RXYSCQ4TV1 air conditioning unit generates a broadband characteristic noise without strong or dominant tonal characteristics. This correlates with experience of the author in measuring noise from installed same and similar model type Daikin air conditioning units used in domestic settings.

As per BS4142:2014 assessment methodology, the air conditioning unit's noise to the assessment position is a Rating Level $L_{A,r,Tr}$ 26dB.

Site: 86 Muswell Road, London N10 2BE

Report: 23074-002 Appendix E (page 3 of 3)

Date: September 2023

NOISE MODEL CALCULATION FOR AIR CONDITIONING UNIT

Assessment Position C: First floor rear elevation of adjacent neighbouring residential property 88 Muswell Road

Noise Condition: 1 x Daikin RXYSCQ4TV1 air conditioning unit operating full 100% duty

Noise Mitigation: Unit within acoustic louvre enclosure (see Section 7.1 Report 23074-002)

Plant & Description	Overall dBA	Lin dB at Octave Band Centre Frequency Hz							
		63	125	250	500	1k	2k	4k	8k
Air Conditioning Unit: Daikin model RXYSCQ4TV1									
Noise Data: sound pressure level at 1m (free-field); Lp dB unit operating full 100% duty (manufacturer data)	51	49	53	49	51	46	40	33	25
Quantity; 0dB unit quantity correction applicable for 1 x unit		0	0	0	0	0	0	0	0
Noise Mitigation; unit within acoustic louvre enclosure (≥ 150 mm depth type acoustic louvres)		-2	-4	-6	-8	-11	-13	-12	-12
Distance; free-field correction for ≈ 7 m "straight line distance" from unit to assessment position		-17	-17	-17	-17	-17	-17	-17	-17
Screening; screening correction applicable (boundary fence to 88 Muswell Road), limit to -10dB		-7	-8	-10	-10	-10	-10	-10	-10
Directivity; nil propagation directivity correction applicable (unit radiates noise equally all directions)		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; +3dB correction applied for unit adjacent to boundary fence		3	3	3	3	3	3	3	3
Air conditioning unit contribution at assessment position	19	26	27	19	19	11	3	-3	-11
Cumulative Contribution All Plant At Assessment Position	19	26	27	19	19	11	3	-3	-11

The air conditioning unit's overall sound pressure (Specific Noise) level at the assessment position = 19dBA.

Manufacturer noise data indicates the Daikin model RXYSCQ4TV1 air conditioning unit generates a broadband characteristic noise without strong or dominant tonal characteristics. This correlates with experience of the author in measuring noise from installed same and similar model type Daikin air conditioning units used in domestic settings.

As per BS4142:2014 assessment methodology, the air conditioning unit's noise to the assessment position is a Rating Level $L_{A,r,Tr}$ 19dB.

APPENDIX F

Details For Noise Reduction

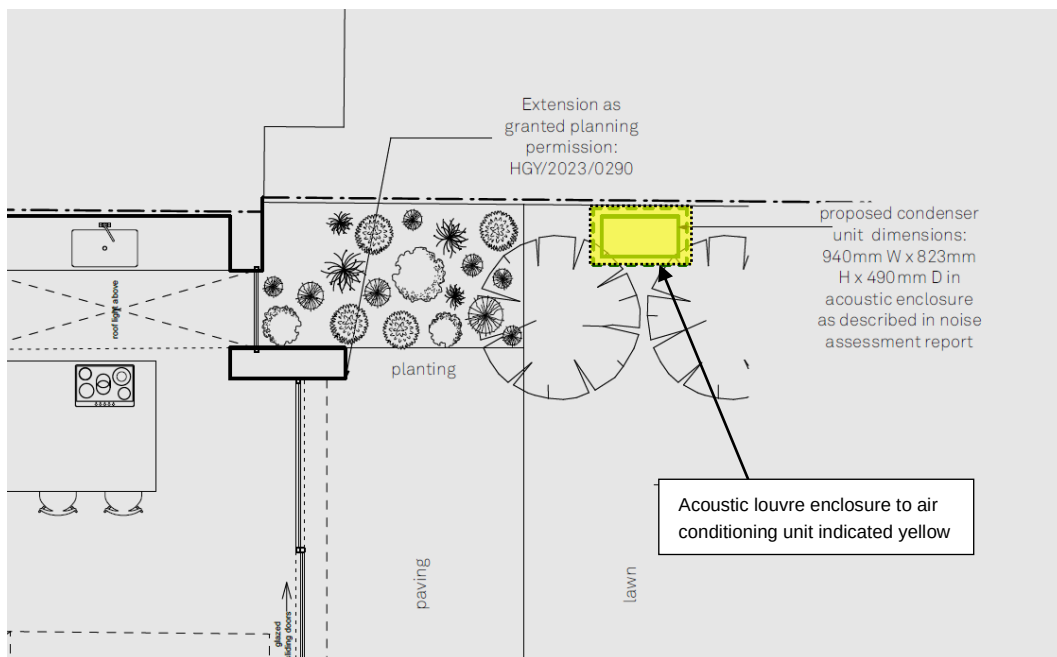
Site: 86 Muswell Road, London N10 2BE

Report: 23074-002 Appendix F (page 1 of 2)

Date: September 2023

DETAILS FOR NOISE REDUCTION

Enlarged Part Copy Layout Drawing Indicating Air Conditioning Unit Acoustic Louvre Enclosure



Photograph of a typical example acoustic louvre enclosure around an external domestic use air conditioning unit serving a residential dwelling. This example enclosure is wall mounted with acoustic panel sides, top & bottom plus acoustic louvre to front. This typical acoustic louvre enclosure was required to be painted black for planning reasons.



Site: 86 Muswell Road, London N10 2BE

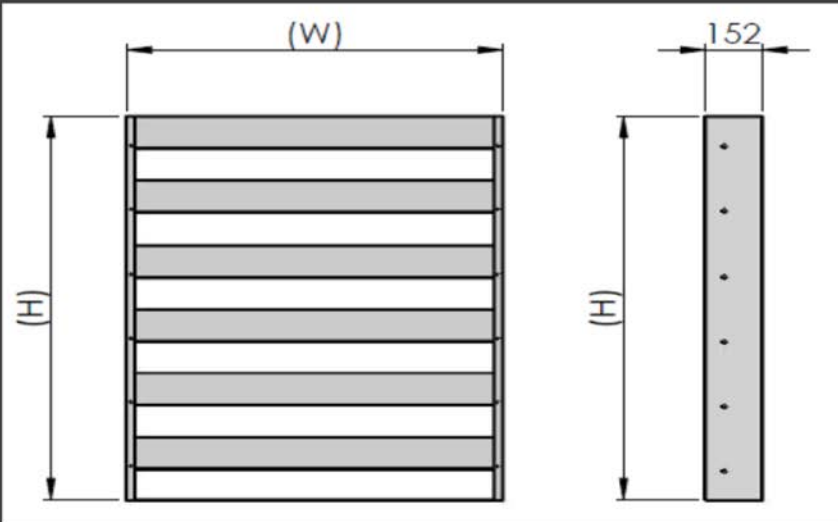
Report: 23074-002 Appendix F (page 2 of 2)

Date: September 2023

DETAILS FOR NOISE REDUCTION

Data Sheet For Example 150mm Depth Type Acoustic Louvre: Supplier BAS Ltd

BA SL150 SP Acoustic Louvre



Model	63	125	250	500	1k	2k	4k	8k	Rw
BASL	4	4	6	8	11	13	12	12	10
Face Velocity	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5
Pressure Drop	3	7	12	19	27	36	48	60	74
Weight	24kg/m ²								
Visual Free Area*	50%								
Actual Free Area	34%								

Louvre acoustic performance;
sound reduction index dB at
octave bands 63Hz to 8kHz



Tel 0161 804 4440

A P P E N D I X G

Details For Example Vibration Isolators

Site: 86 Muswell Road, London N10 2BE

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Date: September 2023

DETAILS FOR EXAMPLE VIBRATION ISOLATORS

Supplier: EMTEC



Effective Isolation for Floor Mounted Equipment

Series R & RD Neoprene Mountings are molded in colored oil-resistant neoprene. This unique color coding provides instant identification of loading capacity — simplifies stocking — prevents installation errors.

The VMC molding process embeds all metal parts in neoprene, preventing corrosion. Mountings can also be molded in other elastomers to meet special requirements.

Bulletin No. R12/93 (UK)

VME KORFUND

Neoprene Mountings Series R/RD

Available in 4 sizes - 5 durometers
Load Range - 10 lbs. to 4,000 lbs.
Deflections to 1/4" with type R to 1/2" with type RD
Corrosion Proof
Molded in colored oil-resistant neoprene
5 colors for error free identification

Typical Applications

Air Handling Units Business Machines
Compressors Fans Instrument Panels
Machine Tools Pumps
Motor Generators Transformers

To Specify:

Neoprene mountings shall consist of a steel top plate and base plate completely embedded in coloured oil-resistant neoprene stock for easy identification of capacity. The mountings shall be Type R or RD, depending upon the required deflection of 1/4" to 1/2", as manufactured by VMC and as supplied by EMTEC Products Limited

TYPE R/RD



TYPE RP/RDP

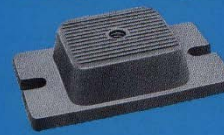


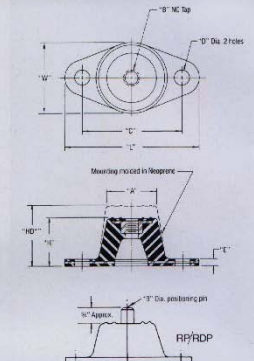
Dimensions: In. (mm)

Type	L	W	H	A	B	C	D	E
R1	3 1/2"	3 1/2"	1 1/2"	1 1/2"	1 1/2"	2 1/2"	1 1/2"	1 1/2"
R1	(91.4)	(91.4)	(38.1)	(38.1)	(38.1)	(63.5)	(38.1)	(38.1)
R2	3 1/2"	3 1/2"	1 1/2"	1 1/2"	1 1/2"	2 1/2"	1 1/2"	1 1/2"
R2	(91.4)	(91.4)	(38.1)	(38.1)	(38.1)	(63.5)	(38.1)	(38.1)
R3	3 1/2"	3 1/2"	1 1/2"	1 1/2"	1 1/2"	2 1/2"	1 1/2"	1 1/2"
R3	(91.4)	(91.4)	(38.1)	(38.1)	(38.1)	(63.5)	(38.1)	(38.1)
R4	3 1/2"	3 1/2"	1 1/2"	1 1/2"	1 1/2"	2 1/2"	1 1/2"	1 1/2"
R4	(91.4)	(91.4)	(38.1)	(38.1)	(38.1)	(63.5)	(38.1)	(38.1)

* RD dimension applies to double deflection Type RD mountings only.

New design for Type R-4 and RD-4 neoprene mountings.





Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)
R3	RED	75 (34.0)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)
R1	RED	125 (56.8)	0.25 (6.3)
R2	RED	125 (56.8)	0.25 (6.3)
R3	RED	125 (56.8)	0.25 (6.3)
R4	RED	125 (56.8)	0.25 (6.3)

Deflection (in. (mm))

Type	Code	Max. Load (lb.)	Deflection (in. (mm))
R1	BLACK	35 (15.8)	0.25 (6.3)
R2	RED	45 (20.4)	0.25 (6.3)

Site: 86 Muswell Road, London N10 2BE

Report: 23074-002 Appendix G (page 2 of 3)

Date: September 2023

DETAILS FOR EXAMPLE VIBRATION ISOLATORS

Supplier: Christie & Grey

Rubber Turret Mountings

Type RM



Type RM Rubber Turret mountings are designed to provide superior attenuation of medium to high frequency vibration and noise emanating from a wide range of motor driven machines particularly axial and centrifugal fans.

High resilience rubber with low dynamic to static stiffness ratio ensures maximum efficiency, good creep performance and long service life.

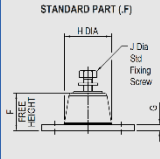
DESIGN FEATURES

- Moulded in first grade natural rubber with integral steel base and upper fixing boss.
- Manufactured in three sizes, each available in three rubber compounds identified by a colour spot.
- Static deflections of up to 8 mm with loads from 5 kg to 400 kg.
- Upper fixing screw supplied as standard with optional height adjusters also available.

TYPICAL APPLICATIONS

- Axial and Centrifugal Fans.
- Air Handling Units.
- Refrigeration Plant.
- Pumps.
- Rotary and Multi Cylinder Compressors.
- Floating Floors.
- Isolation of Sensitive Equipment.
- Test Rigs and Special Purpose Machines.

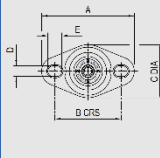
TYPE RM RUBBER TURRET MOUNTINGS



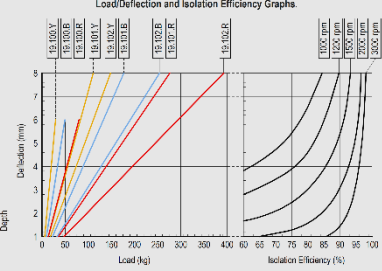
PART No.	CLOUR CODE	STATIC LOAD (kg)	DEFLECTION AT (STATIC) LOAD (mm)	DIMENSIONS (mm)												WT (kg)										
				A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R	S	T	U	V	W	X	Y	Z
15.100.Y.F	YELLOW	26	26	52	57	45	9	12	32	5	41	109 x 21	42	13	15	0.11										
15.100.R.F	RED	50	50	52	57	45	9	12	32	5	41	109 x 21	42	13	15	0.11										
15.100.B.F	BLUE	80	80	52	57	45	9	12	32	5	41	109 x 21	42	13	15	0.11										
15.121.Y.F	YELLOW	150	150	85	71	50	9	14	45	5	55	1410 x 25	56	18	25	0.25										
15.121.R.F	RED	280	280	85	71	50	9	14	45	5	55	1410 x 25	56	18	25	0.25										
15.122.Y.F	YELLOW	420	420	85	71	50	9	14	45	5	55	1410 x 25	56	18	25	0.25										
15.122.R.F	RED	420	420	85	71	50	9	14	45	5	55	1410 x 25	56	18	25	0.25										

■ Above part number includes standard upper fixing screw size J, for height adjustable variant replace J with HA.

■ Maximum height adjustment available is 10 mm with HA variant.



Load/Deflection and Isolation Efficiency Graphs.



Isolation efficiency is based on dynamic rather than static stiffness for accurate calculation of system performance.

Application Notes:
Rubber Turret mountings should not be used on machines exhibiting high out of balance forces or mobile applications without locking devices or independent restraints.

For full installation instructions please refer to our data sheet DS010.
For more detailed information and technical assistance please contact our Technical Department.

In the interests of continual development, the Company reserves the right to make modifications to these details without notice.

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Date: September 2023

DETAILS FOR EXAMPLE VIBRATION ISOLATORS

Supplier: Fibet Group

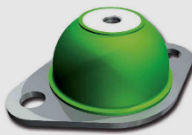






LIGHT DUTY MOUNTS Type SEM

Low frequency elastomeric noise and vibration isolators for industrial equipment and machinery. The Fibet SEM range of mounts are normally used to insulate the transmission of noise and vibration in vertically applied loads. Their applications can include generators, blowers, pumps, road machines or any equipment that by design is unbalanced. They can also be used for isolating instrumentation in mobile, military or road and can accommodate loads between 1.5daN (approx. 1.5kg) to 170daN's (approx. 173kg) per Mount.



APPLICATIONS

- Measurement equipment • Instruments • Small machinery
- Engines • Pumps • Radiators

STANDARD PRODUCTION

Plates: DD12 or DD13 steel (UNI EN 10111)
Nuts: Resistance class 4 Screws: Resistance class 4.8
Natural rubber NR
Zinc plated in accordance with CE standards CHROME VI free, white
Stiffness tolerance +/- 20%

OPTIONS & ADDITIONAL PARTS

Alternative elastomeric hardness and compounds available

ED 2015
SEM1

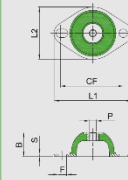
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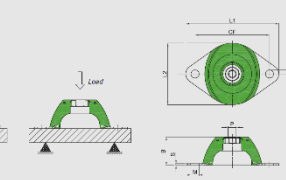




LIGHT DUTY MOUNTS Type SEM



Type 1



Type 2

Item	Hardness (PHZ)	S	L1	L2	P	CF	F(xM)	S	Average SPhmax (daN/mm)	Max Load (daN)	Max Deflec. (mm)	Type
SEM-6430W	45								1.5	4.5		
SEM-6420M	60	20	64	43	M8	50	7	2	3.0	9.0	3.0	1
SEM-6420H	70								5.5	16.5		
SEM-8525W	45								4.0	28.5		
SEM-8525M	60	25	88	59	M8	65	7.5	2.5	6.0	43.0	7.5	1
SEM-8525H	70								10.0	75.0		
SEM-85251W	45								4.0	28.5		
SEM-85251M	60	25	88	59	M10	65	7.5	2.5	6.0	43.0	7.5	1
SEM-85251H	70								12.0	75.0		
SEM-10027W	45								15.0	75.0		
SEM-10027M	60	27	100	70	M8	76	7	3	24.0	120.0	5.0	2
SEM-10027H	70								35.0	170.0		
SEM-100271W	45								15.0	75.0		
SEM-100271M	60	27	100	70	M8	76	10	3	24.0	120.0	5.0	2
SEM-100271H	70								35.0	170.0		
SEM-11435RW	45								7.0	40.0		
SEM-11435RM	60	35	115	76	M10	92	10	2	11.0	60.0	5.6	2
SEM-11435RH	70								24.0	125.0		

FIBET GROUP reserves a policy of continuous improvement and development. We reserve the right to change design and specifications of our products without prior notification or alteration of numbers.

ED 2015
SEM2

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