Philip Acoustics Ltd.

Consultants in Noise and Vibration

REPORT TITLE: ACOUSTIC REPORT IN SUPPORT OF PLANNING APPLICATION FOR EXTERNAL AIR CONDITIONING UNITS AT 24 EARLHAM STREET, LONDON WC2H 9LN

REPORT REF: 16080-002

ISSUED TO: The Architects
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London
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ISSUED BY: David R Philip BEng (Hons) MIOA

DATE: April 2016

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SUMMARY

- Philip Acoustics has been commissioned to assess noise from new air conditioning units proposed to be installed externally within the rear lower ground lightwell of 24 Earlham Street, London WC2H 9LN. The assessment considers Camden Council's noise policy requirements for mechanical services equipment.

- As part of the assessment a noise survey has been carried out over at least a 24 hour period to establish existing noise levels during operational times of the proposed external air conditioning units at a position representative of outside nearest noise sensitive (residential) windows to the proposed location of the units.

- Based on results of the background noise survey and noise model calculations using equipment manufacturer's noise data, noise from the air conditioning units is calculated to comply with Camden Council's noise policy requirements for mechanical services equipment. No additional noise attenuation measures are required to the units to further reduce noise levels.

- Proposed location for the external air conditioning units is structurally linked, albeit indirectly, and at distance to the nearest residential properties (flats) over the upper floor levels of the building itself and therefore it is possible that equipment vibration could transmit into the properties. Although this is considered extremely unlikely as vibration from the proposed modern and relatively small air conditioning units is generally low, it is recommended the units be installed using vibration isolators as good practice. Specification details for suitable vibration isolators are provided in Section 5 of the report.

1. INTRODUCTION

Two new air conditioning condenser units are proposed to be installed externally within the rear lower ground (basement) lightwell of 24 Earlham Street, London WC2H 9LN. The air conditioning units are to serve retail shop Udderlicious Ice Cream over ground and lower ground floor level within the building.

As part of a planning application for aspects of the development which includes installation of the proposed air conditioning units, the Planning Department of Camden Council requires information in the form of an acoustic report regarding noise from the equipment.

Philip Acoustics has therefore been commissioned to assess noise from the proposed new air conditioning units. This report presents results of the assessment and includes:

- Camden Council's noise policy requirements for new mechanical services equipment;
- Measurement of existing background noise levels;
- Calculation of noise levels from the air conditioning units;
- Consideration of vibration from the air conditioning units;
- Specification for noise and/or vibration reduction measures as necessary to ensure compliance with the requirements of Camden Council.

2. CAMDEN COUNCIL NOISE POLICY REQUIREMENTS

Policy DP28 – Noise and Vibration of Section 3 of Camden Development Policies 2010-2025 covers in detail noise issues relating to a wide range of planning and noise pollution scenarios, including mechanical services equipment.

Policy DP28 includes the statement *"The Council will only grant permission for plant or machinery if it can be operated without cause harm to amenity and does not exceed our noise thresholds"*. Camden's noise limit thresholds for plant and machinery are listed in Table E of Policy DP28. A copy of page 133 from Camden Development Policies 2010-2025 Policy DP28 showing Table E is included in Appendix A.

In summary, Camden Council's noise conditions are:

i. That overall dBA noise from equipment shall be designed to at least 5dB below the existing L_{A90} dB background noise level;

ii. That, where it is anticipated any equipment will have a noise that has a distinguishable discrete note (whine, hiss, screech or hum) and/or there are distinct impulses (bangs, clicks, clatters and thumps) then the overall dBA noise from equipment shall be designed to at least 10dB below the existing L_{A90} dB background noise level.

The above conditions are applicable over a period of 60 minutes and measured at 1m external to noise sensitive facades.

For the purpose of this assessment, noise sensitive facades are taken as being windows of the nearest residential properties to the proposed location of the new air conditioning units which are identified as rear windows to residential flats over upper floor levels within the building itself as described in Section 3.2.

Note it is the author's experience and opinion, based on undertaking on-site noise measurements and from manufacturer noise data that the type of proposed relatively small and modern Toshiba external air conditioning unit subject to this assessment generates a typically broadband type of noise (i.e. without any strong tonal or intermittent characteristics sufficient to attract attention) and therefore the more onerous noise limit as item ii. is not considered applicable in this instance.

Although not specifically included within Table E of Policy DP28, Philip Acoustics Ltd is aware that Camden Council also has noise conditions guidance that for each octave band (63Hz to 8KHz) then noise from equipment shall be designed to not add more than 1dB to the existing lowest L_{90} dB octave band background noise level.

Policy DP28 – Noise and Vibration of Section 3 of Camden Development Policies 2010-2025 does not include any limits specifically for equipment vibration. Notwithstanding this, equipment vibration is considered in this report and appropriate recommendations are provided for vibration isolation measures.

3. BACKGROUND NOISE SURVEY

In order to assess noise from the proposed new air conditioning units it is necessary to establish existing background noise levels during operational times for the units as representative of outside nearest noise sensitive (residential) facades. Details of the background noise survey carried out by Philip Acoustics are provided in Sections 3.1 to 3.3.

3.1 Instrumentation

Details of the noise survey instrumentation used are provided in Appendix B. The sound level meters were calibrated before and after the survey measurements using the UKAS certified calibrator.

3.2 Measurement Procedure

The client has advised that the new air conditioning units will operate during opening times for the premises nominally in the range between 11am to midnight.

The survey was carried out over a six day period from 13 April 2016 to 18 April 2016 to obtain sample background noise levels during the entire range of unit operational times; the weather included dry and calm / light wind conditions at the survey position, during several of the day and also the night periods of the survey.

Note that it would be normal to undertake this type of background noise survey over a 24 hour period, however the survey in this instance was carried out over a much longer six day period so to include sample weekdays and a weekend.

In accordance with Camden Council's noise conditions, the sound level meter was set up to record background noise levels over 60 minute periods (split into 12 x 5 minute periods to enable more accurate analysis of results as required). Measurements of background noise were recorded as overall L_{A90} dB values.

In addition to the overall L_{A90} dB values, several manual samples of linear L_{90} dB octave band background noise were also recorded using the Bruel & Kjaer 2260 sound level meter to establish typical background noise octave band spectra.

The new air conditioning units are to be located externally within the rear lower ground (basement) lightwell of the building. Nearest noise sensitive (residential) windows are to residential flats over upper floor levels within the building itself. Proposed location of the new air conditioning units and direction to the nearest residential windows are indicated on a drawing in Appendix C.

The background noise survey location was selected at an elevated position 1m outside the rear façade of the building approximately 5m above basement level using an extension pole and microphone extension lead arrangement selected as being representative of, and as close as practicably accessible to, outside the nearest residential windows over upper floor levels.

3.3 Measurement Results

A graph showing full raw data background noise level measurements over the complete six day survey period is provided in Appendix D.

Background noise levels to the rear of the building outside the nearest residential windows are principally due to existing installed mechanical services equipment items serving other commercial properties in the vicinity, plus with also some underlying noise from traffic and general activity on surrounding streets.

Background noise levels fluctuate depending upon what existing installed mechanical services equipment items are operating. Untypically, lowest background noise levels for the operation time range for the proposed new air conditioning units (11am to midnight) occur during the daytime at and just after 11am as opposed to in the evening to midnight.

Summary of the typical lowest measured background noise level during the operation time range for the proposed new air conditioning units (11am to midnight) in terms of overall L_{A90} dB and associated octave band values expected over 60 minutes and the applicable noise limits as detailed in Section 2 of this report are shown in Table 1.

Description	Overall dBA	Octave Band Centre Frequency (Hz) Linear dB							
		63	125	250	500	1k	2k	4k	8k
Typical lowest background noise level $L_{90\,(T)}$	50	60	56	49	46	43	41	39	34
Camden Council noise limit	≤45	≤56	≤52	≤45	≤42	≤39	≤37	≤35	≤30

Table 1: Typical lowest measured background noise levels and Camden Council's noise conditions (*overall noise limit is set at 5dBA below the background level and with octave band limit to not add more than 1dB to existing octave band background noise levels*)

The overall dBA noise limit to comply with Camden Council's planning consent noise condition is set to 5dB below the typical lowest existing background noise level during the times of operation for the air conditioning units. At this level, noise from the units will be well below the existing lowest background noise and would not be expected to be audible nor disturbing to occupants of nearby noise sensitive (residential) properties.

4. NOISE FROM AIR CONDITIONING UNITS

The two proposed external air conditioning units are Toshiba model RAV-SM804ATP-E to operate in cooling mode. Proposed location of the units is described in Section 3.2 of the report and indicated on the drawing in Appendix C.

Manufacturer noise data for the units is provided in Appendix E. The manufacturer noise data is in terms of free field overall dBA and linear octave band dB sound pressure levels at 1m from the unit (per unit). Summary of noise from the air conditioning units including octave band values is shown in Table 2.

Description	Overall dBA	Octave Band Centre Frequency (Hz) Lin dB							
		63	125	250	500	1k	2k	4k	8k
Toshiba air conditioning condenser unit model RAV-SM804ATP-E *(cooling mode per unit)*	48	53	52	49	47	43	36	33	23

Table 2: Proposed air conditioning unit free field sound pressure levels at 1m

To calculate the noise contribution from the new air conditioning units to outside nearest residential windows a spreadsheet noise model has been used. The model takes account of additional distance between the location for the units and windows, acoustic directivity, acoustic reflections and any acoustic screening. Noise model calculation details are provided in Appendix F.

Summary calculated overall noise from the units to outside the nearest residential windows compared with Camden Council's noise limit requirement is shown in Table 3 on the following page.

The acoustic calculation and associated assessment is considered cautious and in practice noise levels from the equipment will be lower and farther below Camden Council's noise limit for the following reasons:

- The calculation assumes both of the air conditioning units are operating constantly all of the time in any 60 minute period. In practice this type of unit operates "on demand" and even when providing significant cooling during the middle of a hot day would tend to operate only 60 to 70% of the time. It is extremely unlikely that both units would operate constantly for any full 60 minute period;
- The calculation does not allow any noise reduction correction for any screening and acoustic directivity for the equipment, whereas in practice it is likely the location of the units low down in the rear lower ground (basement) lightwell will mean there is some natural screening and directivity applicable to the nearest noise sensitive (residential) windows higher up the building;
- The noise limit used for the assessment is cautiously based on the lowest measured background noise level occurring only for a limited period during the range of operation times for the equipment (nominally 11am to midnight). Background noise levels for the majority of the range of operational times are much higher and correspondingly for these times the unit noise would be even further below noise limits applicable to these times based on the higher background noise that occurs during these times.

Description	Overall Noise Level From Air Conditioning Units	Camden Council Overall Noise Limit	Comment
2 x Toshiba air conditioning condenser units model RAV-SM804ATP-E	≤41dBA	≤45dBA	Complies

Table 3: Overall noise from proposed air conditioning units to outside nearest residential windows

The calculated noise level value of the units is expressed as ≤ (less than or equal to value) as the noise is calculated based on assumption that both units are operating continually in any 60 minute period. In practice this is unlikely to be the case and therefore the actual noise level is expected to be lower than that in Table 3.

Table 3 shows that overall noise from the proposed air conditioning units complies with Camden Council's noise condition limit. In addition, octave band noise levels from the proposed air conditioning units are calculated to also comply with Camden Council's octave band noise condition limit.

It is not expected that noise from the proposed new external air conditioning units would be audible or disturbing to occupants of the nearest noise sensitive (residential) properties over the upper floor levels of the building itself and no additional noise reduction treatment is required to the unit to comply with Camden Council's noise condition limits.

5. VIBRATION FROM AIR CONDITIONING UNITS

Proposed location for the external air conditioning units is structurally linked, albeit indirectly, and at distance to the nearest residential properties (flats) over the upper floor levels of the building itself and therefore it is possible that equipment vibration could transmit into the properties.

Although this is considered extremely unlikely as vibration from the proposed modern and relatively small air conditioning units is generally low, it is recommended the units be installed using vibration isolators as good practice. Specification details for suitable vibration isolators are provided below.

It is recommended the air conditioning units be mounted using proprietary rubber or neoprene turret mount type vibration isolators. The isolators should each have a static deflection not less than 3mm under weight of the unit. Normally four isolators are required per unit (one to each corner of a unit). Two suggested suppliers and their product details are provided below, the suppliers are not listed in any order of preference, a copy of each of the supplier's data sheets is provided in Appendix G.

Suggested Supplier 1:

EMTEC: www.emtecproducts.co.uk Isolator type: R-1

Recommended isolators for the Toshiba air conditioning condenser unit model RAV-SM804ATP-E based on the unit being of nominal gross weight 44Kg, are R-1 colour code blue (max load per isolator 15.8Kg).

Suggested Supplier 2:

Allaway Acoustics: www.allawayacoustics.co.uk Isolator type: MRS0

Recommended isolators for the Toshiba air conditioning condenser unit model RAV-SM804ATP-E based on the unit being of nominal gross weight 44Kg, are MRS0 colour code green (max load per isolator 14Kg).

APPENDIX A

Camden Council Noise Conditions For Mechanical Services Equipment

Table D: Noise levels from places of entertainment on adjoining residential sites at which planning permission will not be granted

Noise description and measurement location	Period	Time	Sites adjoining places of entertainment
Noise at 1 metre external to a sensitive façade	Day and evening	0700-2300	L_{Aeq}, 5m shall not increase by more than 5dB*
Noise at 1 metre external to a sensitive façade	Night	2300-0700	L_{Aeq}, 5m shall not increase by more than 3dB*
Noise inside any living room of any noise sensitive premises, with the windows open or closed	Night	2300-0700	L_{Aeq}, 5m (in the 63Hz Octave band measured using the 'fast' time constant) should show no increase in dB*

* As compared to the same measure, from the same position, and over a comparable period, with no entertainment taking place

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dBL_{Aeq},

Key evidence and references

- Camden's Noise Strategy, 2002
- The London Plan (Consolidated with Alterations since 2004), 2008
- Planning Policy Guidance 24: Planning and noise

APPENDIX B

Noise Survey Instrumentation

Site: 24 Earlham Street, London WC2H 9LN

Report: 16080-002 Appendix B

Date: April 2016

NOISE SURVEY INSTRUMENTATION

Six Day Background Noise Survey:

- Rion sound level meter type NL-31 Class 1 serial number 00903983 plus Rion preamplifier type NH-21 serial number 33991 and Rion microphone type UC-53A serial number 317502 complete with windshield, weatherproof and lockable outdoor environmental kit, microphone extension lead and telescopic boom arrangement;
- Bruel & Kjaer calibrator type 4231 serial number 2454786 (UKAS certified).

Background Noise Sample Octave Band Levels:

- Bruel & Kjaer sound level meter type 2260 Class 1 serial number 2497368 plus Bruel & Kjaer microphone type 4189 serial number 2846933 complete with windshield, microphone extension lead and telescopic boom arrangement;
- Bruel & Kjaer calibrator type 4231 serial number 2454786 (UKAS certified).

APPENDIX C

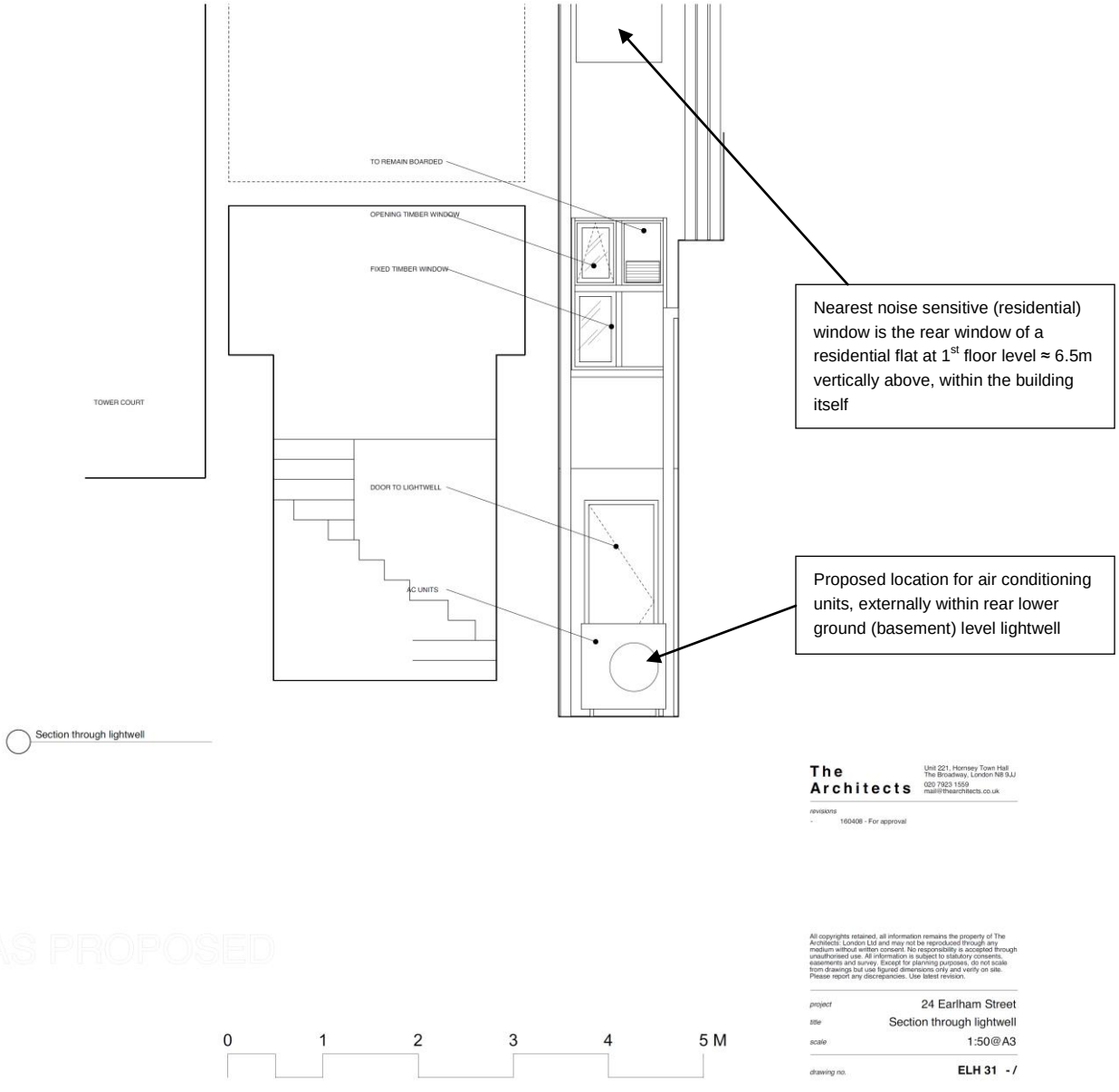
Drawing Showing Proposed Air Conditioning Units Location

Site: 24 Earlham Street, London WC2H 9LN

Report: 16080-002 Appendix C

Date: April 2016

DRAWING SHOWING PROPOSED AIR CONDITIONING UNITS LOCATION



APPENDIX D

Noise Survey Results

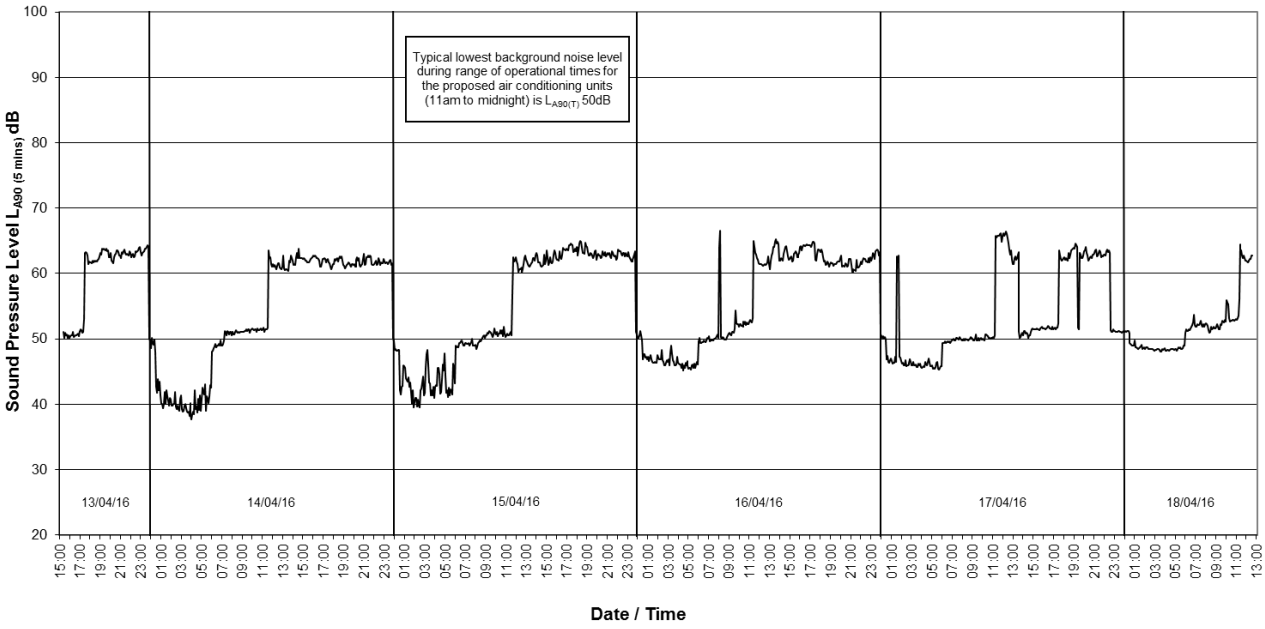
Site: 24 Earlham Street, London WC2H 9LN

Report: 16080-002 Appendix D

Date: April 2016

BACKGROUND NOISE SURVEY RESULTS

Raw data results of six day background noise survey at position representative of outside the nearest noise sensitive (residential) windows to proposed location of the air conditioning units



APPENDIX E

Manufacturer Noise Data For Air Conditioning Units

Site: 24 Earlham Street, London WC2H 9LN

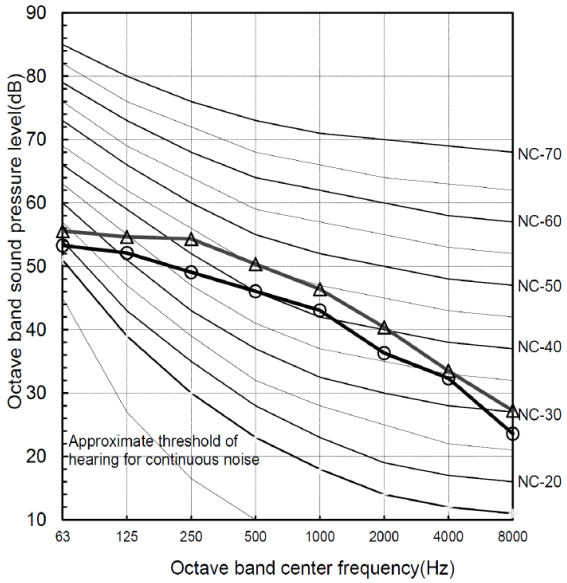
Report: 16080-002 Appendix E

Date: April 2016

MANUFACTURER NOISE DATA FOR PROPOSED TOSHIBA AIR CONDITIONING UNITS

RAV-SM804AT(J)P-E

Sound pressure level (dB(A))	Cooling	Heating
	48	52



Noise data is in terms of overall dBA and linear dB free field sound pressure levels at 1m from the unit (per unit)

APPENDIX F

Noise Model Calculation

Site: 24 Earlham Street, London WC2H 9LN

Report: 16080-002 Appendix F

Date: April 2016

NOISE MODEL CALCULATION

ASSESSMENT POSITION: To outside nearest residential window at first floor level of building itself

NOISE CONDITION: 2 x Toshiba air conditioning units RAV-SM804ATP-E operating continually cooling mode

NOISE MITIGATION: None applied

		Lin dB at Octave Band Centre Frequency Hz							
Equipment & Description	**Overall dBA**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
2 x Toshiba Air Conditioning Condenser Units RAV-SM804ATP-E									
Sound pressure level Lp dB; *free-field level at 1m (2 x units operating)*	51	56	55	52	50	46	39	36	26
Noise Reduction Treatment; *none applied*		0	0	0	0	0	0	0	0
Distance; ≈6.5*m from centre of units to outside nearest residential windows*		-16	-16	-16	-16	-16	-16	-16	-16
Screening; *nil screening correction applied*		0	0	0	0	0	0	0	0
Directivity; *nil directivity correction applicable for this source*		0	0	0	0	0	0	0	0
Reflections; *+6dB correction applied (reflection off adjacent lightwell walls)*		6	6	6	6	6	6	6	6
Individual contribution at assessment location	41	46	45	42	40	36	29	26	16
Cumulative contribution all sources at assessment position	**41**	**46**	**45**	**42**	**40**	**36**	**29**	**26**	**16**

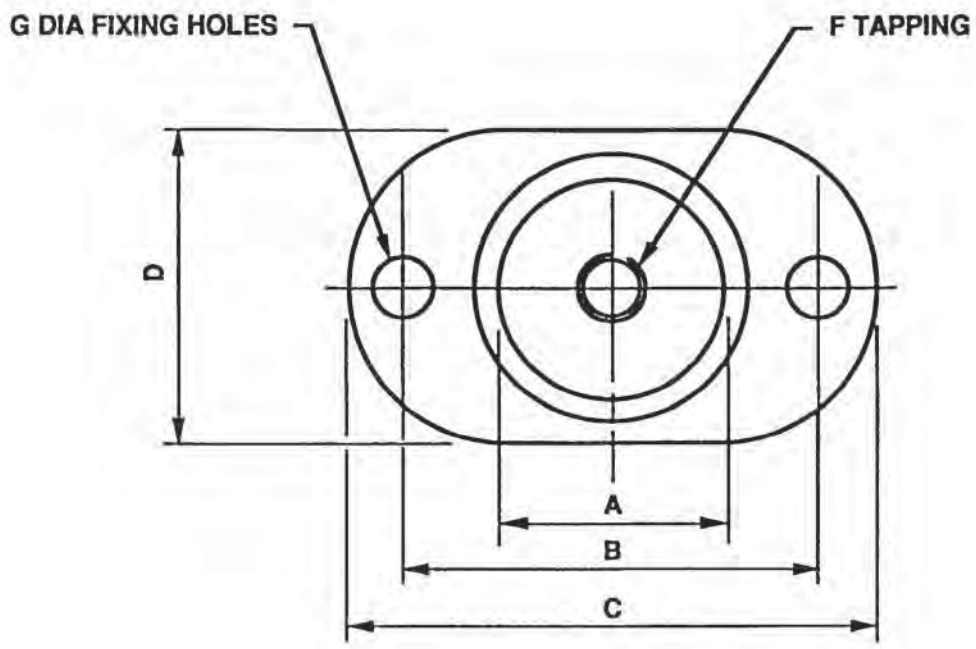
APPENDIX G

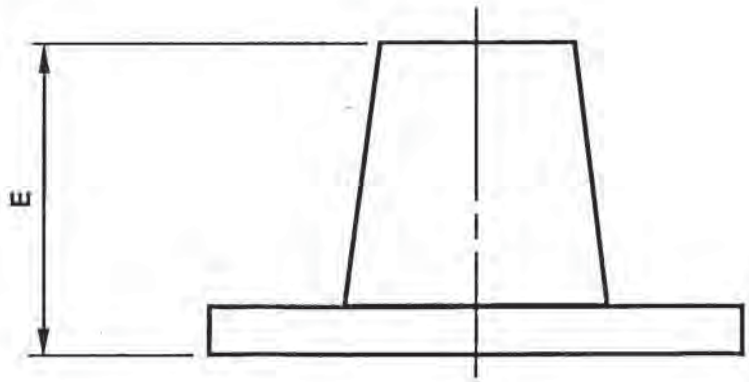
Suggested Details For Vibration Isolators

DRAWING No.
A4-3407A

NEOPRENE RUBBER AV MOUNTS
RANGE MRS0 - MRS4

ALLAWAY ACOUSTICS LTD





DIMENSIONAL DATA

MOUNT TYPE	A	B	C	D	E	F	G
MRS 0	22	50	61	38	18	6	4
MRS 1	29	59	74	41	32	8	7
MRS 2	43	75	98	61	39	12	11
MRS 3	30	60	74	41	37	8	6
MRS 4	41	76	98	60	59	12	11

Allaway Acoustics Ltd Old Police Station 1 Queens Road Hertford Herts. SG14 1EN. Tel: 01992 550825 Fax: 01992 554982

ALLAWAY ACOUSTICS
LIMITED

Mount Type	Colour	Weight Range - Kg From	To	Nominal Deflection
MRS0	Blue	2.5	5	3.0mm
MRS0	Yellow	4	8	3.0mm
MRS0	Green	7	14	3.0mm
MRS0	White	9	18	3.0mm
MRS1	Blue	9	18	4.0mm
MRS1	Yellow	14	28	4.0mm
MRS1	Green	20	40	4.0mm
MRS1	White	27	54	4.0mm
MRS1	Red	36	72	4.0mm
MRS2	Blue	18	60	5.0mm
MRS2	Green	54	108	5.0mm
MRS2	White	90	180	5.0mm
MRS2	Red	135	270	5.0mm
MRS2	Black	180	360	5.0mm
MRS3	Blue	9	18	9.0mm
MRS3	Yellow	14	28	9.0mm
MRS3	Green	20	40	9.0mm
MRS3	White	27	54	9.0mm
MRS3	Red	36	72	9.0mm
MRS4	Blue	18	60	10.0mm
MRS4	Green	54	108	10.0mm
MRS4	White	90	180	10.0mm
MRS4	Red	135	270	10.0mm
MRS4	Black	180	360	10.0mm

in business 30 YEARS

Head Office: Old Police Station, 1 Queens Road, Hertford, Hertfordshire, SG14 1EN. Tel: 01992 550825. Fax: 01992 554982.
Northern Office: Tradeforce Building, Cornwall Place, Bradford, West Yorkshire, BD8 7JT. Tel: 01274 306388. Fax: 01274 308305.
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Bulletin No. R12/93 (UK)

VMC
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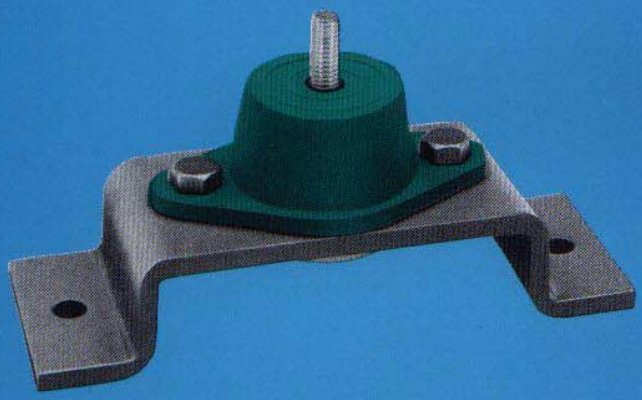
Neoprene Mountings
Series R/RD



- Available in 4 sizes – 5 durometers
- Load Range – 10 lbs. to 4,000 lbs.
- Deflections to ¼" with type R
  to ½" with type RD
- Corrosion Proof
- Molded in colored oil-resistant neoprene
- 5 colors for error free identification

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.

Typical Applications

Air Handling Units Business Machines

Compressors Fans Instrument Panels

Machine Tools Pumps

Motor Generators Transformers

To Specify:

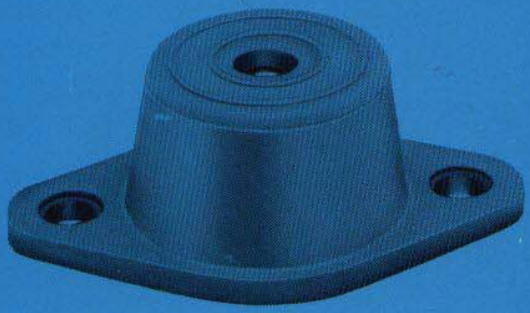
Neoprene mountings shall consist of a steel top plate and base plate completely embedded in coloured oil-resistant neoprene stock for easy identification of capacity. The mountings shall be Type R or RD, depending upon the required deflection of 1/4" to 1/2", as manufactured by VMC and as supplied by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

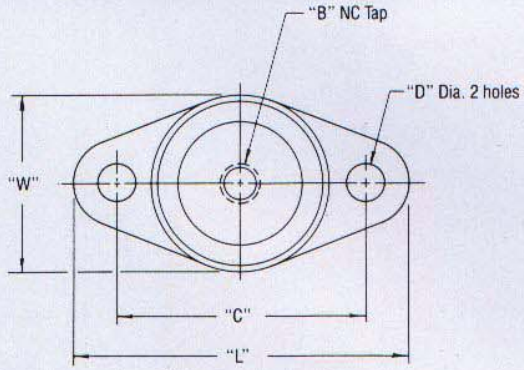
EMTEC

EMTEC Products Limited, Enterprise House, Blyth Road, Hayes, Middlesex UB3 1DD

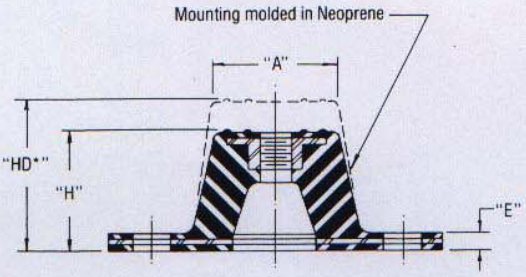
Telephone: 0181 848 3031 Facsimile: 0181 573 3605

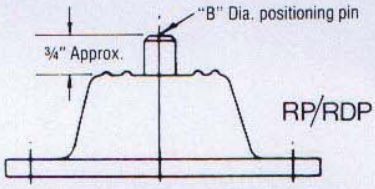
TYPE R/RD





TYPE RP/RDP





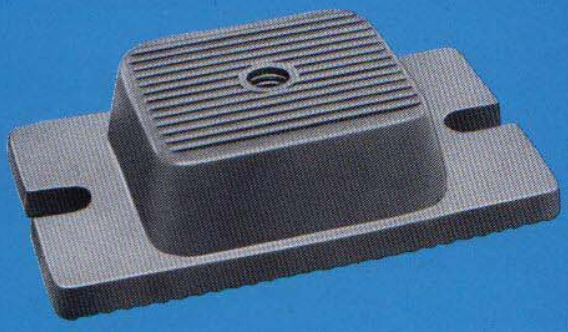
Dimensions: ins. (mm)

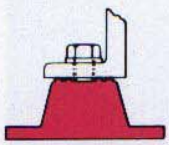
TYPE	L	W	H	*HD	A	B	C	D	E
R-1 or RD-1	3⅛" (79.4)	1¾" (44.4)	1" (25.4)	1¼" (31.7)	1¼" (31.7)	5/16" (8.0)	2⅜" (60.4)	11/32" (8.8)	3/16" (4.8)
R-2 or RD-2	3⅞" (98.6)	2⅜" (60.4)	1¼" (31.7)	1¾" (44.4)	1¾" (44.4)	⅜" (9.6)	3" (76.2)	11/32" (8.8)	7/32" (5.6)
R-3 or RD-3	5½" (139.7)	3⅜" (85.8)	1¾" (44.4)	2⅞" (73.2)	2½" (63.5)	½" (12.7)	4⅛" (104.8)	9/16" (14.4)	¼" (6.3)
R-4 or RD-4	6¼" (158.7)	4⅝" (117.6)	1⅝" (41.4)	2¾" (69.8)	3" (76.2)	½" (12.7)	5" (127.0)	9/16" (14.4)	⅜" (9.6)

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

Type	Color Code	Max. Load lbs.	Max. Load (kg)	Deflection ins. (mm) R	Deflection ins. (mm) RD
R-1 or RD-1	BLUE	35	(15.8)	0.20 (5.0)	0.40 (10.1)
	BLACK	45	(20.4)		
	RED	70	(31.7)		
	GREEN	120	(54.4)		
R-2 or RD-2	BLUE	135	(61.3)	0.25 (6.3)	0.50 (12.7)
	BLACK	170	(77.0)		
	RED	240	(109.0)		
	GREEN	380	(172.5)		
	GRAY	550	(249.7)		
R-3 or RD-3	BLACK	250	(113.5)	0.25 (6.3)	0.50 (12.7)
	RED	525	(238.3)		
	GREEN	750	(340.5)		
	GRAY	1100	(499.4)		
R-4 or RD-4	BLACK	1500	(681.0)	0.25 (6.3)	0.50 (12.7)
	RED	2250	(1021.5)		
	GREEN	3000	(1362.0)		
	GRAY	4000	(1816.0)		

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

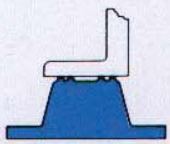




Type R or RD

IF BOLTING IS PREFERRED—

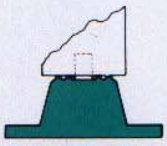
Type R or RD mountings are furnished with a tapped hole in the center. This enables the equipment to be bolted securely to the mounting.



Type R or RD

NO BOLTING REQUIRED—

Type R or RD mountings may be used without bolting under machines having no lateral or severe vertical motion.



Type RP or RDP

IF BOLT HOLE IS INACCESSIBLE

Type RP or RDP mountings with pin (equal in diameter to dimension B above) that simply fits freely into threaded or unthreaded bolt holes.

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