

REPORT TITLE: ACOUSTIC REPORT IN SUPPORT OF PLANNING APPLICATION FOR
PROPOSED ROOF LEVEL EXTERNAL AIR CONDITIONING UNITS AT
11 STONE BUILDINGS, LINCOLN'S INN, LONDON WC2A 3TG

REPORT REF: 15239-002

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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 at roof level of 11 Stone Buildings, Lincoln's Inn, London WC2A 3TG. 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 background noise levels during operational times of the proposed 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 calculation using equipment manufacturer's noise data, overall cumulative 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 new air conditioning units at roof level of the building is not directly or otherwise structurally linked to any noise sensitive (residential) properties and therefore there will be no vibration transfer to residential properties. Notwithstanding this, it is recommended the new air conditioning units be installed using vibration isolators as standard / good practice and to anyhow minimise potential vibration from the equipment to office/chambers use space within the building itself. Specification details for suitable vibration isolators are provided in Section 5 of the report.

1. INTRODUCTION

New air conditioning condenser units are proposed to be installed externally at roof level of 11 Stone Buildings, Lincoln's Inn, London WC2A 3TG. The air conditioning units are to serve office/chambers use space within the building.

As part of a planning application for the 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 Ltd 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 overall cumulative 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 as described in Section 3.2, the nearest are ≥ 20 m distance from the units in all directions.

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 modern Samsung external air conditioning units subject to this assessment generate 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 between 7am to 7pm (allowing a 1 hour overlap either side of normal daytime office hours nominally 8am to 6pm).

The survey was carried out over a complete 24 hour period 25 November 2015 through 26 November 2015 to obtain sample background noise levels during the entire range of unit operational times; the weather included dry and light wind conditions at the survey position, during the day and also the night periods of the survey.

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.

Nearest noise sensitive (residential use) properties to location of the proposed new air conditioning units externally at roof level of 11 Stone Buildings are identified on the following page and in all directions are $\geq 20m$ distance from the proposed roof level location of the new air conditioning units:

- Residential flats at top floor level within adjacent buildings at 1 to 3 Stone Buildings;
- Possible residential flats over upper floor levels above ground floor retail uses within buildings at 75 to 76 Chancery Lane;
- Possible residential flats over upper floor levels above ground floor retail uses within buildings at 67 to 69 Chancery Lane (to the opposite side of Chancery Lane from 11 Stone Buildings).

A site location aerial image and proposed roof plant layout drawing showing the background noise survey measurement position, proposed equipment location and directions to the nearest identified potential noise sensitive (residential) properties are provided in Appendix C.

The background noise survey location was selected at the rear roof level of 11 Stone Buildings 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 flats at top floor level within adjacent buildings at 1 to 3 Stone Buildings. Background noise to outside these residential flats will be lower than to outside the other identified residential flats which are closer and more exposed to noise from traffic and general activity along Chancery Lane and High Holborn. The noise survey location was selected well away from any existing installed mechanical services equipment in the vicinity so as not to unduly influence the noise survey results.

3.3 Measurement Results

A graph showing full raw data background noise level measurements over the complete 24 hour survey period is provided in Appendix D.

Background noise levels at roof level of 11 Stone Buildings and in the vicinity of nearest noise sensitive (residential) properties is principally due to existing (albeit distant) mechanical services equipment serving other properties as well as underlying noise from traffic and general activity on surrounding streets (Chancery Lane and High Holborn).

Summary of the typical lowest measured background noise level during the operation time range for the proposed new air conditioning unit (nominally 7am to 7pm) in terms of overall L_{A90} dB and associated octave band values expected over 60 minutes plus 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 (7am to 7pm) L_{A90} (T)	51	60	56	50	47	45	43	39	34
Camden Council noise limit	≤46	≤56	≤52	≤46	≤43	≤41	≤39	≤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 unit. At this level, noise from the unit 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 proposed external roof level air conditioning units comprise:

- 1 x Samsung model AM080FXVAGR to serve basement space within 11 Stone Buildings;
- 3 x Samsung model AM100FXVAGR, one each to serve ground, first and second floor space within 11 Stone Buildings;
- Allowance of an additional 1 x Samsung model AM100FXVAGR as a possible future additional air conditioning unit.

Proposed location of the units is described in Section 3.2 of the report and indicated on the roof plant layout drawing in Appendix C. Available manufacturer noise data for the units is provided in Appendix E.

The manufacturer noise data includes free field overall dBA sound pressure levels at 1m in front of the units. Summary of noise from the air conditioning units including indicative / expected octave band values based on noise measurements by the author of similar units and from available manufacturer data for similar units is shown in Table 2.

Description	Overall dBA	Octave Band Centre Frequency (Hz) Lin dB							
		63	125	250	500	1k	2k	4k	8k
Samsung air conditioning condenser unit model AM080FXVAGR (<i>per unit</i>)	57	58	57	56	55	53	47	41	36
Samsung air conditioning condenser unit model AM100FXVAGR (<i>per unit</i>)	58	59	58	57	56	54	48	42	37

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

To calculate the noise contribution from the proposed 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 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 that all 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 all air conditioning units would operate constantly within any full 60 minute period;
- The calculation does not allow any noise reduction correction for any screening and acoustic directivity for the air conditioning units, whereas in practice it is likely the location of the units in the central area of the twin-pitched roof will mean there is some natural screening and directivity applicable to the nearest noise sensitive (residential) windows in all directions;

- The noise limit used for the assessment is cautiously based on the typical lowest measured background noise level occurring during the range of operation times for the equipment (nominally 7am to 7pm). Background noise levels for most of the range of operational times are higher and correspondingly for these times the unit noise would be even further below noise limits applicable to these times based on the background noise during these times.

Description	Overall Noise Level From Air Conditioning Units	Camden Council Overall Noise Limit	Comment
1 x Samsung model AM080FXVAGR & 4 x Samsung model AM080FXVAGR all operating simultaneously	≤39dBA	≤46dBA	Complies

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

Note that the calculated overall cumulative air conditioning unit noise level value is expressed as ≤ (less than or equal to value) as the noise level is calculated based on assumption that all of the 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 advisory 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 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

The location for the proposed new air conditioning units at roof level of the building is not directly or otherwise structurally linked to any noise sensitive (residential) properties and therefore there will be no vibration transfer to residential properties.

Notwithstanding this, it is recommended the new air conditioning units be installed using vibration isolators as standard / good practice and to anyhow minimise potential vibration from the equipment to office/chambers use space within the building itself. Specification details for suitable vibration isolators are provided below.

It is recommended the air conditioning units each be mounted using proprietary rubber or neoprene turret mount type vibration isolators. The isolators should each have a static deflection ≥5mm under weight of the units. Normally four isolators are required per unit (one to each corner of a unit).

Two suggested suppliers and their product details are provided on the following page, the suppliers are not listed in any order of preference, a copy of each of the supplier's data sheets for typically suitable isolators is provided in Appendix G. Other suppliers will also be able to offer suitable / equivalent vibration isolators.

Suggested Supplier 1:

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

Typically suitable isolators for the Samsung air conditioning units model AM080FXVAGR and AM100FXVAGR based on the units being each of nominal gross weight 200kg (net weight 195kg plus refrigerant charge ≈5kg), are RD-1 colour code green (max load per isolator 54.4Kg).

Suggested Supplier 2:

Allaway Acoustics: www.allawayacoustics.co.uk Isolator type: MRS3

Typically suitable isolators for the Samsung air conditioning units model AM080FXVAGR and AM100FXVAGR based on the units being each of nominal gross weight 200kg (net weight 195kg plus refrigerant charge ≈5kg), are MRS3 colour code white (max load per isolator 54Kg).

A P P E N D I X 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 L_{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: 11 Stone Buildings, Lincoln's Inn, London WC2A 3TG

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NOISE SURVEY INSTRUMENTATION

24 Hour 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 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 and tripod;
- Bruel & Kjaer calibrator type 4231 serial number 2454786 (UKAS certified).

APPENDIX C

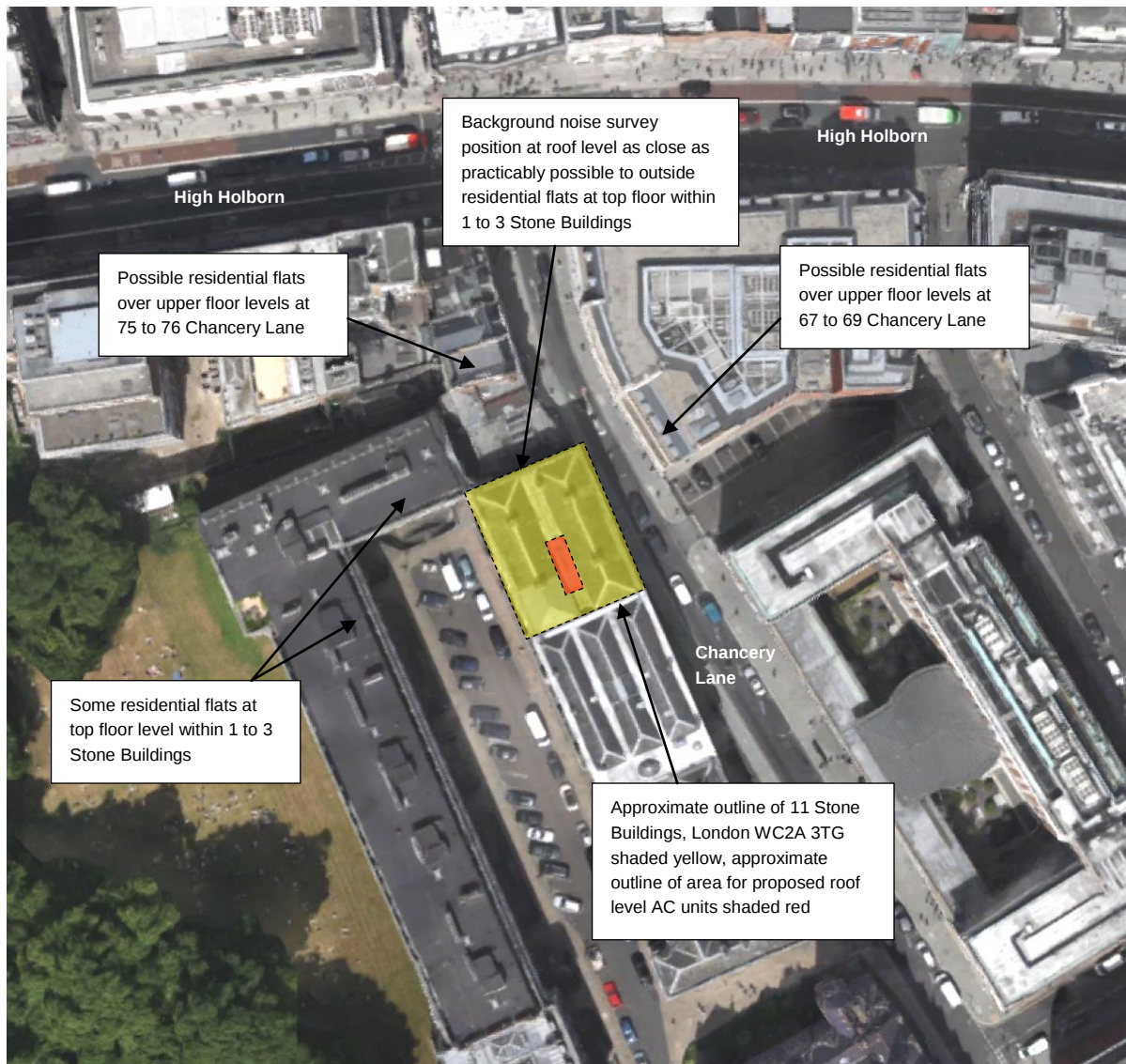
Site Location Aerial Image & Proposed Roof Plant Layout Drawing

Site: 11 Stone Buildings, Lincoln's Inn, London WC2A 3TG

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Date: April 2016

SITE LOCATION AERIAL IMAGE

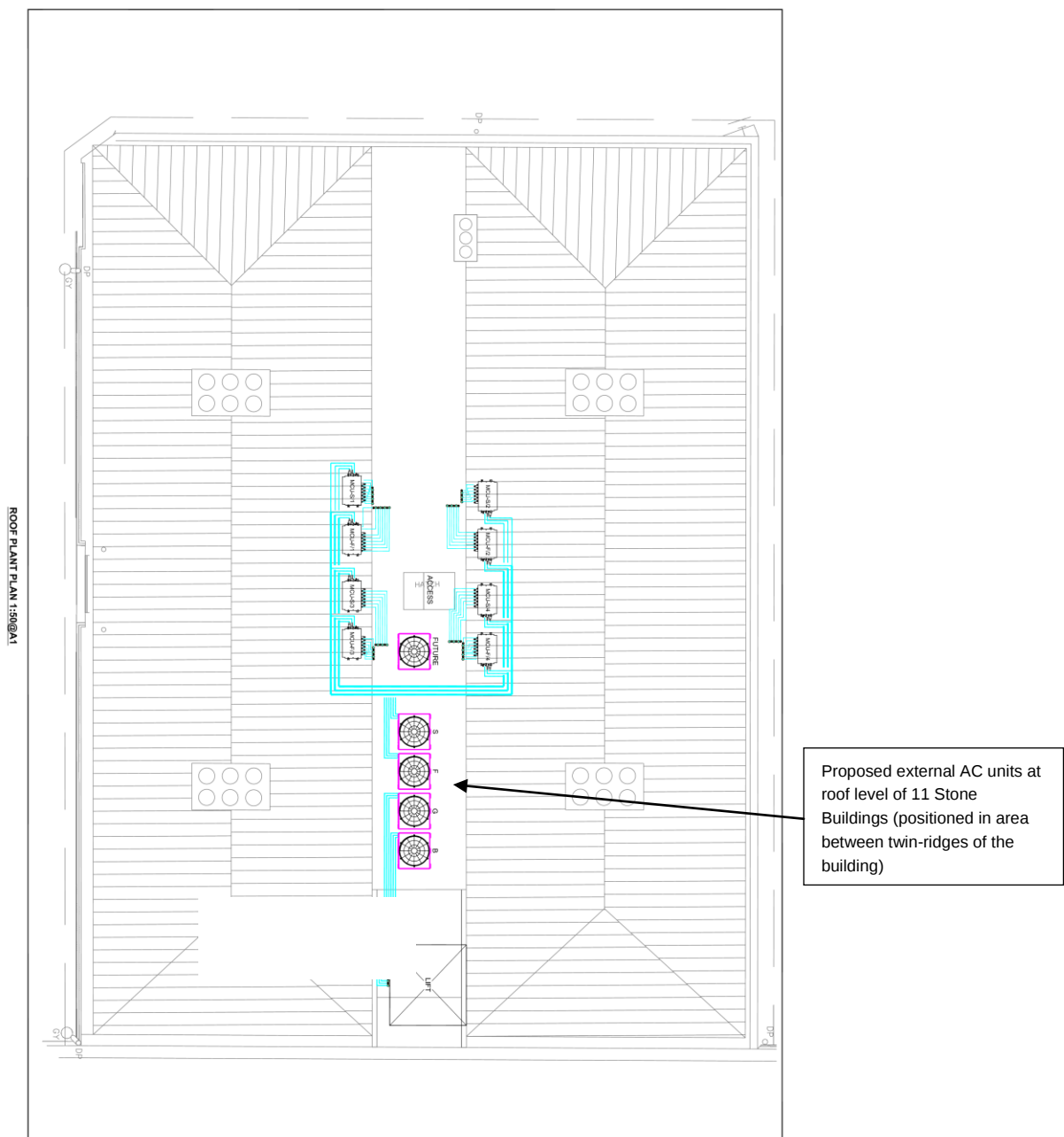


Site: 11 Stone Buildings, Lincoln's Inn, London WC2A 3TG

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Date: April 2016

PROPOSED ROOF PLANT LAYOUT DRAWING



APPENDIX D

Background Noise Survey Results

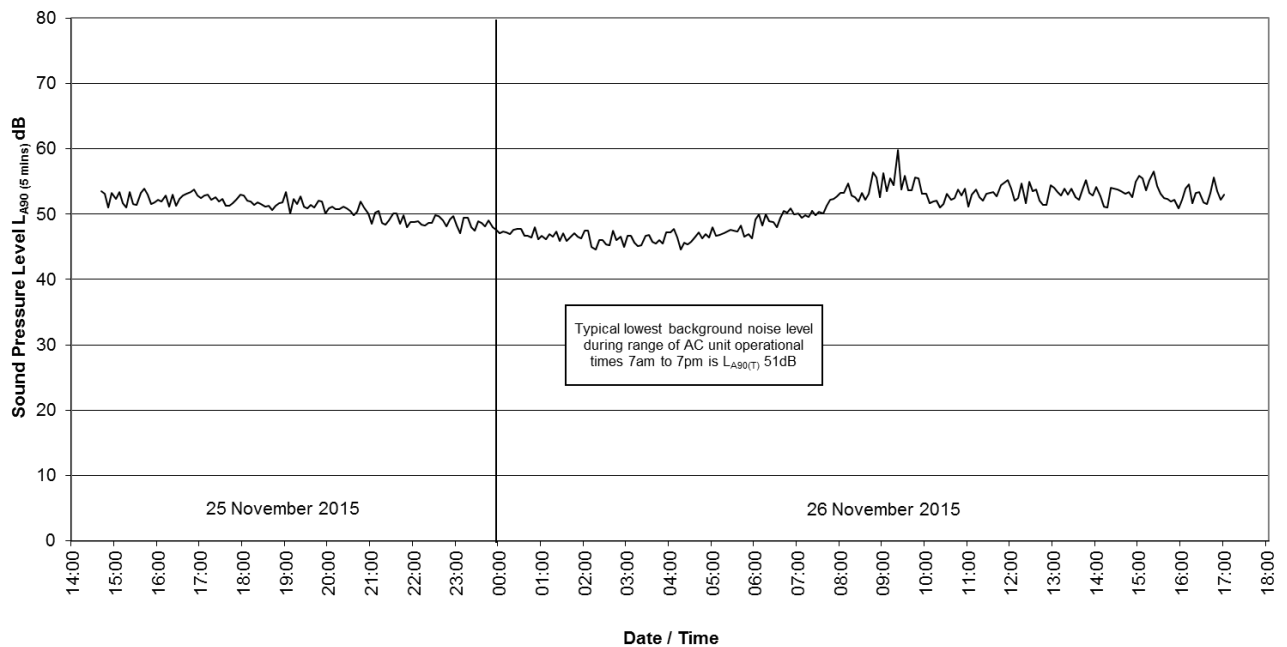
Site: 11 Stone Buildings, Lincoln's Inn, London WC2A 3TG

Report: 15239-002 Appendix D

Date: April 2016

BACKGROUND NOISE SURVEY RESULTS

Raw data results of 24 hour background noise survey at position representative of outside the nearest noise sensitive (residential) properties to proposed location of the air conditioning units



APPENDIX E

Manufacturer Noise Data For Air Conditioning Units

Site: 11 Stone Buildings, Lincoln's Inn, London WC2A 3TG

Report: 15239-002 Appendix E

Date: April 2016

MANUFACTURER NOISE DATA FOR PROPOSED SAMSUNG AIR CONDITIONING UNITS

Proposed Samsung AC Units model
AM080FXVAGR & AM100FXVAGR

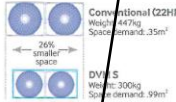
DVM S Heat Recovery Specifications




Model Name	AM080FXVAGR	AM100FXVAGR	AM120FXVAGR	AM140FXVAGR
Power Supply	Φ, V, Hz 3, 4, 380-415, 50			
Mode	HEAT RECOVERY			
HP	8.00	10.00	12.00	14.00
Capacity (Nominal)	Cooling 22.40	28.00	33.60	40.00
Heating 25.20	31.50	37.80	45.00	
ESEER	7.85	7.25	7.03	7.02
EER	4.48	4.12	4.00	4.49
COP	4.94	4.70	4.34	4.74
Power Input (Nominal)	Cooling 5.00	6.80	8.40	8.90
Heating 5.10	6.70	8.70	9.50	
Max. Current	22.5	29.9	31.3	
Fuse Rating	30	40		
Nominal Cooling	4.48	4.12	4.00	4.49
Nominal Heating	4.94	4.70	4.34	4.74
Air Flow Rate	CMM 145	190	250	
Fan	L/S 2,416	3,166	4,333	
External Static Pressure	Max. mmHg 8.00	78.45		
Piping Connections	Liquid Pipe 3/8	7/8	1/2	
Gas Pipe 3/4	7/8	1 1/8		
Discharge Gas Pipe 5/8	3/4	7/8		
Installation Limitation	Max. Length 200(220)	110(100)		
Max. Height	110(100)			
Refrigerant	Type R410A			
Factory Charge	5.50	5.20	5.50	7.70
Sound	Sound Pressure 57	58	62	61
Net Weight	195.0	241.0		
External Dimension	Net Dimensions (WxHxD) mm 880 x 1,695 x 765	1,295 x 1,695 x 765		
Operating Temp. Range	Cooling -15 ~ 48	-20.0 ~ 24.0		
Heating				

These products contain R410A refrigerant which has a GWP>150.

Small Footprint and Lighter Weight
Large unit capacity (2.2HP) facilitates the economical installation with a smaller footprint and lighter weight, making it the perfect fit for larger buildings.



Versatile Piping Connection with Various Knock-Out Holes
The knock-out holes for piping, power and communication cables are located in a variety of directions, allowing for more convenient installation of DVM S since the piping and cable direction can be freely selected from the front, left and right side.



If outdoor unit is located in a higher position than indoor unit, level difference is 110m or under. If the level difference is higher than 50m, make a decision simulating by PDM kit installation guide software whether the PDM kit should be installed or not. *PDM kit: Pressure Drop Modulation kit.

1) Nominal cooling capacities are based on indoor temperature: 27°C DB / Outdoor temperature: 35°C DB. Equivalent refrigerant piping: 7.5m, Level differences: 0m.

2) Nominal heating capacities are based on indoor temperature: 20°C DB / Outdoor temperature: 7°C DB. 6°C WB. Equivalent refrigerant piping: 7.5m, Level differences: 0m.

3) Sound level was acquired in an anechoic room. Thus actual noise level may be different depending on the installation conditions.

50 | www.samsung.com/uk/dvms

Unit free-field sound pressure levels at 1m
AM080FXVAGR = 57dBA
AM100FXVAGR = 58dBA

APPENDIX F

Noise Model Calculation

Site: 11 Stone Buildings, Lincoln's Inn, London WC2A 3TG

Report: 15239-002 Appendix F

Date: April 2016

NOISE MODEL CALCULATION

ASSESSMENT POSITION: To outside nearest residential properties at top floor level of 1 to 3 Stone Buildings

NOISE CONDITION: 1 x Samsung AM080FXVAGR & 4 x Samsung AM100FXVAGR operating continually

NOISE MITIGATION: None applied

Equipment & Description	Overall dBA	Lin dB at Octave Band Centre Frequency Hz							
		63	125	250	500	1k	2k	4k	8k
1 x Samsung AM080FXVAGR Air Conditioning Condenser Unit									
Sound pressure level Lp dB; free-field level at 1m	57	58	57	56	55	53	47	41	36
Noise Reduction Treatment; none applied		0	0	0	0	0	0	0	0
Distance; ≈20m nominal from unit to outside residential properties		-26	-26	-26	-26	-26	-26	-26	-26
Screening; nil screening correction applied		0	0	0	0	0	0	0	0
Directivity; nil directivity correction applied		0	0	0	0	0	0	0	0
Reflections; nil applied, unit at roof level will radiate sound hemispherically		0	0	0	0	0	0	0	0
Individual contribution at assessment location	31	32	31	30	29	27	21	15	10
4 x Samsung AM100FXVAGR Air Conditioning Condenser Units									
Sound pressure level Lp dB; free-field level at 1m (data for 4 units operating)	64	65	64	63	62	60	54	48	43
Noise Reduction Treatment; none applied		0	0	0	0	0	0	0	0
Distance; ≈20m nominal from units to outside residential properties		-26	-26	-26	-26	-26	-26	-26	-26
Screening; nil screening correction applied		0	0	0	0	0	0	0	0
Directivity; nil directivity correction applied		0	0	0	0	0	0	0	0
Reflections; nil applied, units at roof level will radiate sound hemispherically		0	0	0	0	0	0	0	0
Individual contribution at assessment location	38	39	38	37	36	34	28	22	17
Cumulative contribution all sources at assessment position	39	40	39	38	37	35	29	23	18

APPENDIX G

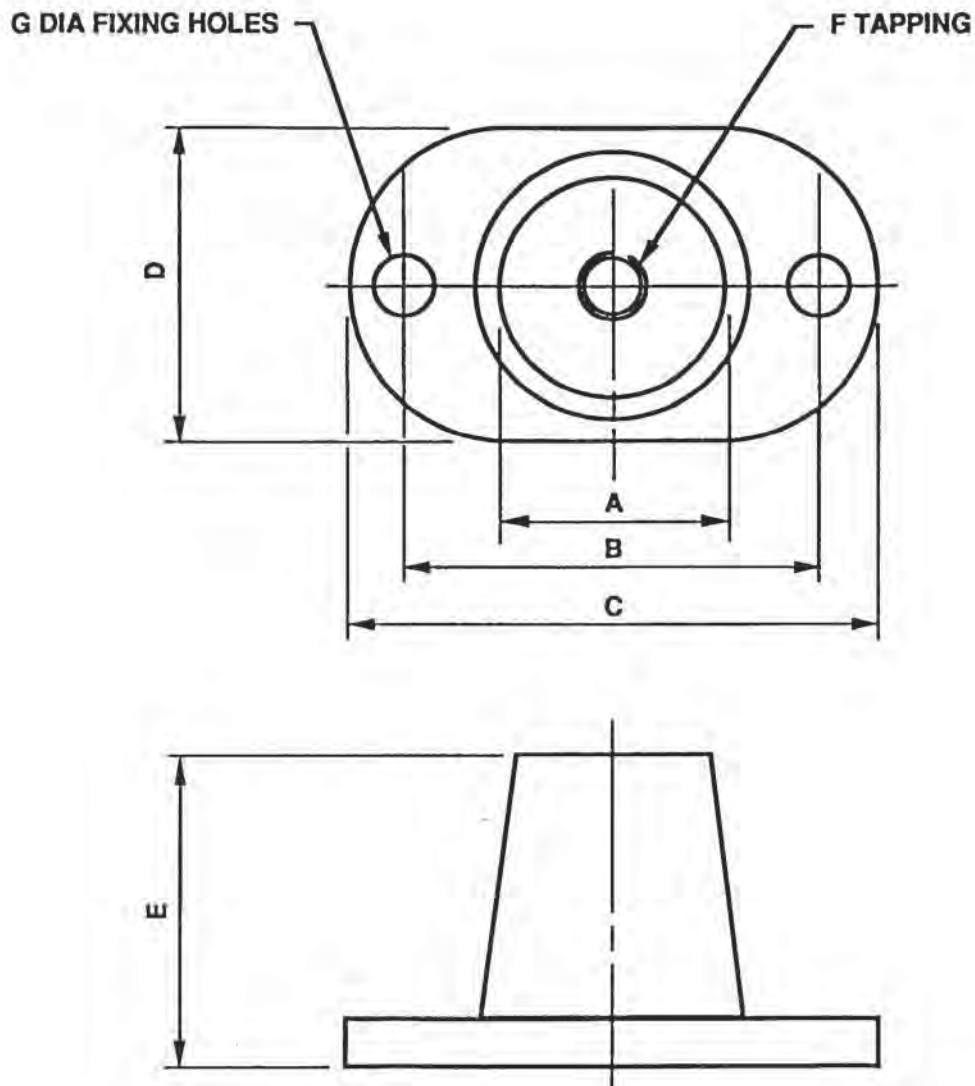
Suggested Details For Vibration Isolators

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
LIMITED

Mount Type	Colour	Weight Range - Kg		Nominal Deflection
		From	To	
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



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. ☐

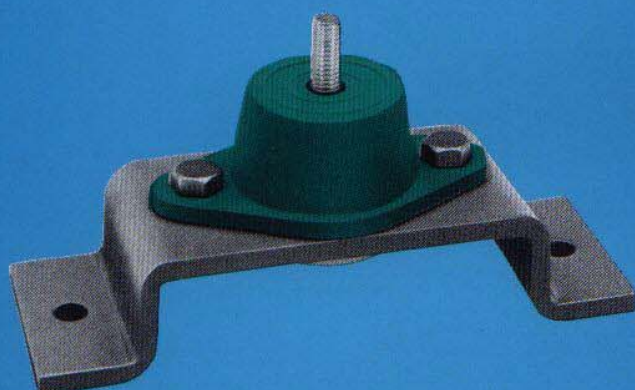
Registered in England 958950 Registered Office: 1 Queens Road, Hertford, Herts, SG14 1EN

VMC KORFUND

Neoprene Mountings Series R/RD



EXCLUSIVE—
COLOR
CODED



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.

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:

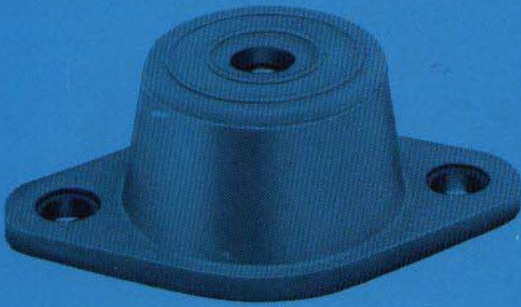
Neoprene mountings shall consist of a steel top plate and base plate completely embedded in coloured oil-resistant neoprene stock for easy identification of capacity. The mountings shall be Type R or RD, depending upon the required deflection of 1/4" to 1/2", as manufactured by VMC and as supplied by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

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EMTEC

TYPE R/RD



TYPE RP/RDP

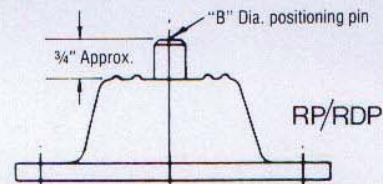
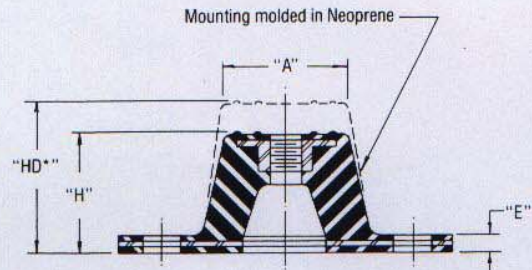
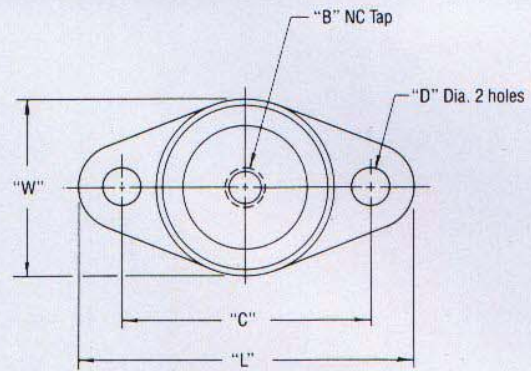
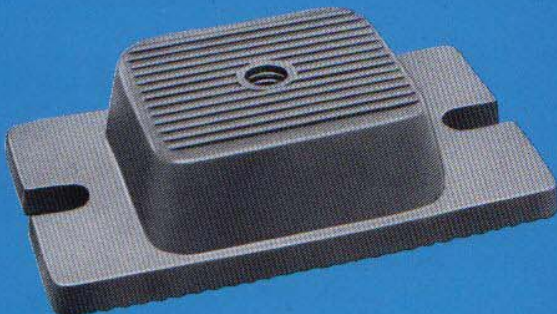


Dimensions: Ins. (mm)

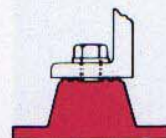
TYPE	L	W	H	*HD	A	B	C	D	E
R-1 or RD-1	3 1/8" (79.4)	1 3/4" (44.4)	1" (25.4)	1 1/4" (31.7)	1 1/4" (31.7)	5/16" (8.0)	2 3/8" (60.4)	1 1/32" (8.8)	3/16" (4.8)
R-2 or RD-2	3 7/8" (98.6)	2 3/8" (60.4)	1 1/4" (31.7)	1 3/4" (44.4)	1 3/4" (44.4)	3/8" (9.6)	3" (76.2)	1 1/32" (8.8)	7/32" (5.6)
R-3 or RD-3	5 1/2" (139.7)	3 3/8" (85.8)	1 3/4" (44.4)	2 7/8" (73.2)	2 1/2" (63.5)	1/2" (12.7)	4 1/8" (104.8)	9/16" (14.4)	1/4" (6.3)
R-4 or RD-4	6 1/4" (158.7)	4 3/8" (117.6)	1 3/8" (41.4)	2 3/4" (69.8)	3" (76.2)	1/2" (12.7)	5" (127.0)	9/16" (14.4)	3/8" (9.6)

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

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

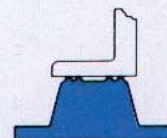


Type	Color Code	Max. Load lbs. (kg)	Deflection ins. (mm)	
R-1 or RD-1	BLUE	35	(15.8)	
	BLACK	45	(20.4)	
	RED	70	(31.7)	0.20 (5.0)
	GREEN	120	(54.4)	0.40 (10.1)
R-2 or RD-2	BLUE	135	(61.3)	
	BLACK	170	(77.0)	
	RED	240	(109.0)	0.25 (6.3)
	GREEN	380	(172.5)	0.50 (12.7)
	GRAY	550	(249.7)	
R-3 or RD-3	BLACK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



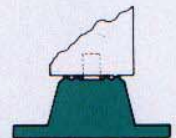
**Type R or RD
IF BOLTING IS
PREFERRED—**

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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