

# REPORT



45 Moscow Road

BS4142 Noise Impact Assessment

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## 1.0 Introduction

Clear Acoustic Design has been appointed to carry out a noise impact assessment in relation to the proposed mechanical plant installation at 45 Moscow Road, London, W2 4AH. Proposals are for the installation of an external AC condenser unit to the rear of the building.

The local planning authority has requested a noise impact assessment in order to safeguard the amenity of the surrounding receptors. The noise impact assessment is in line with BS 4142: 2014+ A1: 2019 *Methods for Rating and Assessing Industrial and Commercial Sound*. These criteria are seen to be appropriate in assessing and mitigating noise impact from this source.

## 2.0 Relevant Performance Standards

### 2.1 Local Authority Requirements

An extract from Westminster Draft Noise Technical Guidance Note is provided below.

*Table 3: Noise criteria for plant machinery and internal/external activities*

<b>Existing External Ambient Noise Level</b>	<b>Tonal or Intermittent Noise/ Noise Source</b>	<b>Sound Emission Level that should not be Exceeded at the nearest Noise Sensitive Receptor<sup>3</sup></b>
<p>Exceed WHO Guideline levels.</p> <p><math>L_{Aeq}</math> 55 dB over periods of daytime (07.00-23.00hrs) and <math>L_{Aeq}</math> 45 dB at night-time (23.00-07.00hrs).</p>	Does not contain tones or intermittent noise sufficient to attract attention.	10 dB below the minimum external background noise level
	Contains tones or be intermittent noise sufficient to attract attention.	15 dB below the minimum external background noise level.
	Noise emitted from emergency plant or an emergency life supporting generators. <sup>4</sup>	10 dB above the lowest background noise level within a 24-hour period.
<p>Does not exceed WHO Guideline levels.</p> <p><math>L_{Aeq}</math> 55 dB over periods of daytime (07.00-23.00hrs) and <math>L_{Aeq}</math> 45 dB night-time (23.00-07.00hrs).</p>	Does not contain tones or intermittent noise sufficient to attract attention.	5 dB below the minimum external background noise level.
	Contains tones or be intermittent noise sufficient to attract attention.	10 dB below the minimum external background noise level.
	Noise emitted from emergency plant or an emergency life supporting generators. <sup>5</sup>	10 dB above the lowest background noise level within a 24-hour period.
<p>Below 30 dB <math>L_{A90,15min}</math> at the nearest noise sensitive receptors Both daytime (07.00-23.00hrs) and night-time (23.00-07.00hrs).</p>	Noise contains and/or does not contain tones or intermittent noise	Site specific standards that avoid noise disturbance to nearest noise sensitive receptors may be considered.

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The local authority has requested that noise levels from the proposed plant be 10dB below the minimum background noise. This is more onerous than the requirements of BS4142:2014, the justification for this requirement is unknown.

## 2.2 BS 4142: 2014 + A1: 2019

BS 4142: 2014 + A1: 2019 *Methods for Rating and Assessing Industrial and Commercial Sound* has formed the basis of the assessment in this report. This standard states that if the rating level of the proposed plant does not exceed the existing background noise level, this is a positive indication that the noise impact will be low.

It is therefore deemed that a noise level equal to the background noise would represent the LOAEL when referencing national planning policy. This is the lowest observed adverse effect level. It makes sense that the LOAEL would represent the low impact level advised in BS4142:2014.

## 3.0 Environmental Noise Survey

In order to assess the noise impact of the proposed mechanical plant installation, an environmental noise survey has been undertaken by Clear Acoustic Design at a location representative of the nearest noise sensitive receptor(s).

The main sources of noise on site are typical inner city traffic noise, and noise from existing mechanical services from neighbouring commercial premises.

The closest receptor locations are taken to be the facades on the upper floors of the building which contain some residential windows. The microphone was located 1 metre outside of an existing upper floor window. This is therefore seen to be a representative location.

The environmental noise survey has provided background noise levels, which will form the basis of the assessment in line with BS 4142:2014. Ambient and background noise levels were measured between 11/01/23 and 12/01/23 using a single fixed noise monitor (referred to as F1).

### 3.1 Measurement Equipment and Environmental Conditions

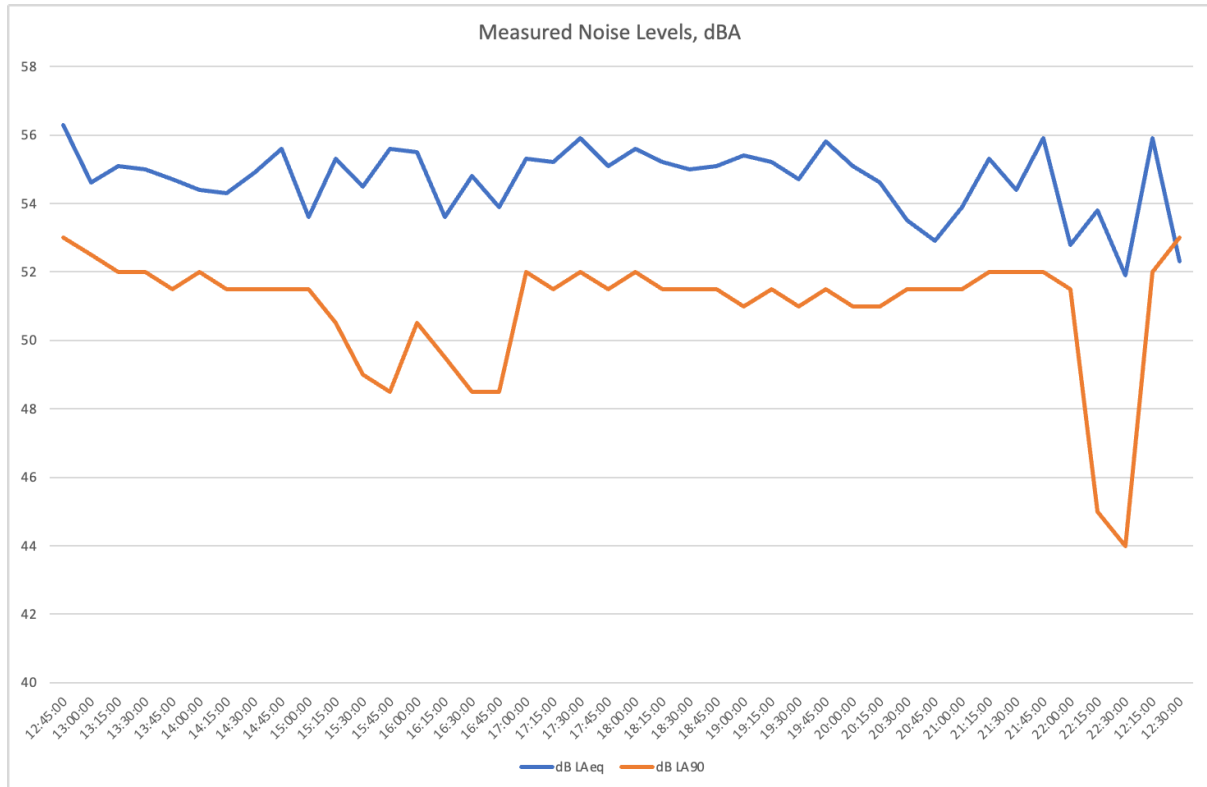
The weather was witnessed to be overcast and dry for the duration of the survey with light wind speeds. The following measurement equipment was used for the survey.

Equipment	Serial Number	Calibration Date
Casella CEL-633C Type 1 Sound Level Meter	2145374	18/02/22
Casella CEL-495 Preamplifier	002436	18/02/22
B&K 4189 Microphone	2529821	18/02/22
Casella CEL-120-1 Calibrator	113251	18/02/22

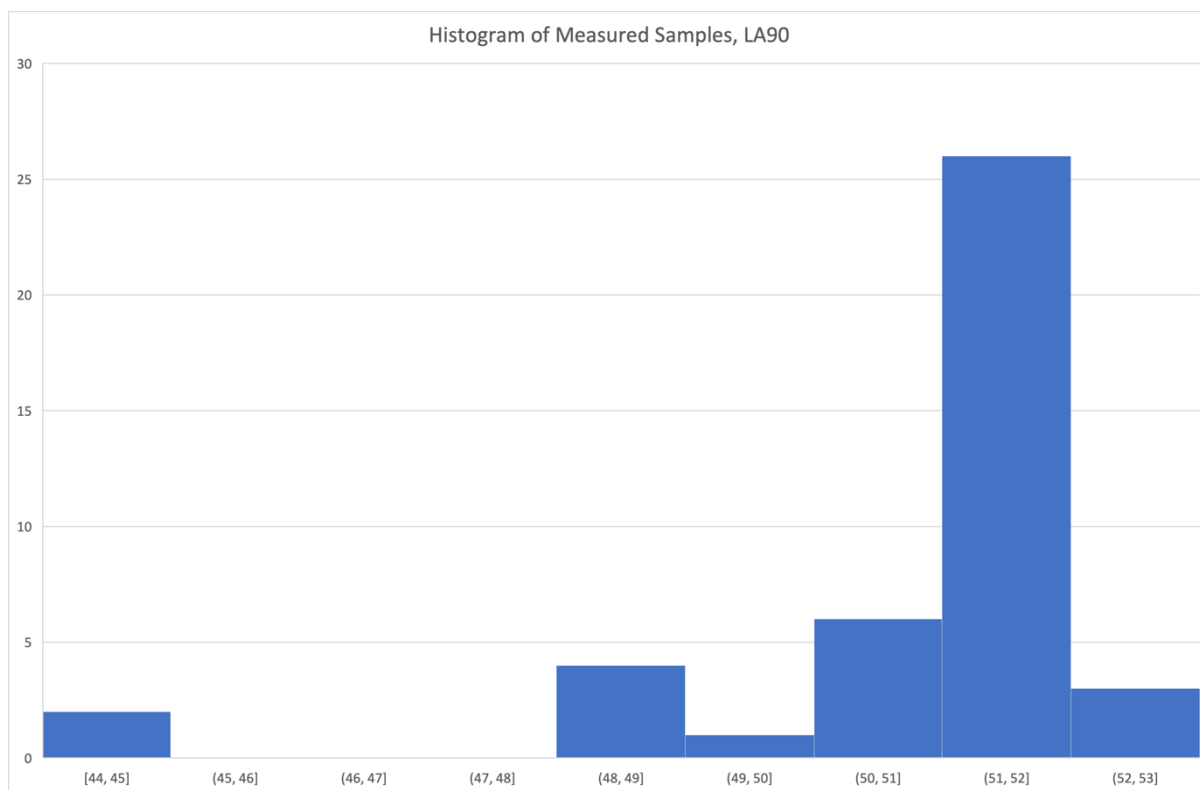
**Table 3.1 Measuring Equipment used for Survey**

### 3.2 Fixed Noise Monitoring Graph – F1

Figure 3.1 below provides a graph of the measured noise levels at Location F1. The ambient ( $L_{Aeq}$ ) and background ( $L_{A90}$ ) noise levels are shown.



**Figure 3.1 Long Term Measurement Graph – F1 – Operational Hours**



**Figure 3.2 Histogram of measured samples – 12:00-22:30**



### 3.2.1 Assessment Background Noise Level

In order to conduct an assessment in line with BS 4142: 2014, it is necessary to extrapolate representative background noise levels from the long-term survey data. The proposed mechanical plant will operate during daytime hours (1200-2230) and therefore the background noise levels during this time will be applicable.

As stated in BS4142:2014, the representative background noise level should not necessarily be the minimum sample value measured and should suitably represent the full assessment dataset. The published example in BS4142:2014 uses the modal value.

The local authority has requested that the minimum background noise level be used for the assessment. This is deemed to be overly onerous, especially given the low number of samples measured at this minimum level.

The background noise level which will form the basis of the assessment is presented in Table 3.2 below.

Representative Background Noise Level, $L_{A90}$ dB	Minimum Background Noise level, $L_{A90}$ dB
51	44

**Table 3.2: Assessment Background Noise Level**

## 4.0 Noise Impact Assessment

### 4.1 Noise Sources

The proposed external installation will be comprised of 1 external AC unit.

The proposed units are from Mitsubishi Electric. The sound pressure levels, which have formed the basis of the assessment are presented in Table 4.1 below and are based on the manufacturer datasheet.

The external unit is proposed to be located on the façade at ground floor level. There is understood to be residential on the upper floors of this development, the windows on the upper floor are approximately 5 metres away.



**Figure 4.1: Proposed Location of External Plant**



**Figure 4.2: Location of Windows Above Plant**

The proposed units are not deemed to be tonal nor highly impulsive in nature. As the specific noise level of the proposed unit is designed to be below both the existing ambient and background noise level, it is also unlikely that the units will be audible or readily distinctive against the residual acoustic environment, and therefore an intermittency correction is also seen as unnecessary.

Type	Sound Pressure Level, @1m	Source directivity correction	Distance to window	Distance loss to window	Sound pressure level at window
Mitsubishi – MUZ-LN60VG2	55 dBA	+3dB	5m	14 dB	44 dBA

**Table 4.1: Specific Noise Level Calculation**

Time Period	Rating Noise Level, $L_{A,T}$ dB	Minimum Background Noise Level, $L_{A90}$ dB	Assessment Outcome
1200-2230	44 dBA	44 dBA	<b>+/- 0 dB</b>

**Table 4.2: Assessment Outcome**

## 4.2 Noise Mitigation and Assessment Outcome

Based on the above calculations it will be necessary to introduce further noise mitigation to comply with the noise requirement of 10dB below the minimum background noise level.

The assessment shows that the sound pressure level at the residential windows on the top floor will be equal to the minimum background noise level. Therefore, the noise level is required to be reduced by 10dBA.

Table 4.3 shows a calculation to establish the required insertion loss required from an acoustic enclosure. This calculation demonstrates compliance with the enforced noise target with a predicted rating noise level of 33dBA at the receptor. This is 11 dB below the minimum background noise level.

	Octave Band Centre Frequencies, Hz							dB(A)
	63	125	250	500	1000	2000	4000	
SPL Radiating from condenser 1	56	54	53	49	44	52	40	55
Distance measured at source, m	1							
Source Directivity Correction, dB	3							
Louver / breakout losses	3	4	6	10	12	13	13	
Other losses (screening, etc)	0	0	0	0	0	0	0	
Distance to receptor, m	5							
SPL @ Receptor	42	39	36	28	21	28	16	33

**Table 4.3: Noise Sources, Sound Power Levels, dB**

The insertion loss data above has been taken from Caice for a SS150 150mm single bank acoustic louvre. Other louvres and enclosure systems will be able to provide similar levels of noise reduction.

The supplier/installer of the acoustic enclosure system should demonstrate that the noise enclosure is capable of complying with these insertion loss values or demonstrate that rating noise level from the proposed AC unit will be 34dBA or below at the receptor once the enclosure is installed.

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## 5.0 Conclusion

Clear Acoustic Design has been appointed to carry out a noise impact assessment in relation to the proposed mechanical plant installation at 45 Moscow Road.

The noise impact assessment is in line with BS 4142: 2014 + A1: 2019 *Methods for Rating and Assessing Industrial and Commercial Sound*. These criteria are seen to be appropriate in assessing and mitigating noise impact from this source. The requirements of the local planning authority have been considered with regards to rating level limits.

As can be seen in Table 4.3 above, the noise level of the mechanical plant installation will be in line with the requirements of the local planning authority if a suitable enclosure is fitted to attenuate the sound by at least 10dBA.

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## Appendix A – Manufacturer Datasheet



**Air Conditioning Product Information**

**MSZ-LN R32**  
Wall Mounted System  
Inverter Heat Pump

**R32**

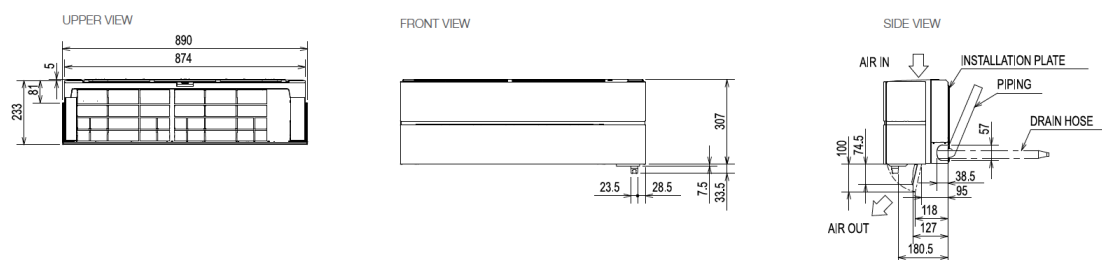


MSZ-LN INDOOR UNITS		MSZ-LN18VG2 R/B/V/W	MSZ-LN25VG2 R/B/V/W	MSZ-LN35VG2 R/B/V/W	MSZ-LN50VG2 R/B/V/W	MSZ-LN60VG2 R/B/V/W
CAPACITY (kW)	Heating (nominal)	2.0 (0.9 - 4.0)	3.2 (0.8 - 5.4)	4.0 (1.0 - 6.3)	6.0 (1.0 - 8.2)	6.8 (1.8 - 9.3)
	Cooling (nominal)	1.8 (0.9 - 3.0)	2.5 (1.0 - 3.5)	3.5 (0.8 - 4.0)	5.0 (1.0 - 6.0)	6.1 (1.4 - 6.9)
	Heating (UK)	-	2.64 (0.66 - 4.45)	3.3 (0.83 - 5.2)	4.94 (0.82 - 6.75)	5.6 (1.48 - 7.66)
	Cooling (UK)	-	2.48 (0.99 - 3.47)	3.47 (0.79 - 3.96)	4.95 (0.99 - 5.94)	6.05 (1.38 - 6.84)
SHF (nominal)	-	0.97	0.90	0.77	0.77	0.75
COP / EER (nominal)	-	5.52 / 5.15	5.00 / 4.27	4.05 / 3.62	3.76 / 3.41	3.76 / 3.41
SCOP / SEER (BS EN14825)	-	5.2 / 10.5	5.1 / 9.5	4.6 / 8.5	4.6 / 7.5	4.6 / 7.5
ErP ENERGY EFFICIENCY CLASS	Heating/Cooling	-	A+++ / A+++	A+++ / A+++	A++ / A+++	A+ / A++
AIRFLOW (l/s)	Heating (SLo-Lo-Mi-Hi-SHi)	67-95-118-142-240	67-95-118-142-240	71-97-118-142-228	90-107-142-178-262	110-158-192-227-262
	Cooling (SLo-Lo-Mi-Hi-SHi)	71-97-118-147-198	71-97-118-147-198	71-97-118-147-213	95-127-148-177-232	118-147-177-212-262
PIPE SIZE mm (in)	Gas	9.52 (3/8")	9.52 (3/8")	9.52 (3/8")	9.52 (3/8")	12.7 (1/2")
	Liquid	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")
SOUND PRESSURE LEVEL (dBA)	Heating (SLo-Lo-Mi-Hi-SHi)	19-24-29-36-45	19-24-29-36-45	19-24-29-36-45	25-29-34-39-47	29-37-41-45-49
	Cooling (SLo-Lo-Mi-Hi-SHi)	19-23-29-36-42	19-23-29-36-42	19-24-29-36-43	27-31-35-39-46	29-37-41-45-49
SOUND POWER LEVEL (dBA)	-	58	58	58	60	65
DIMENSIONS (mm)	Width x Depth x Height	890 x 233 x 307	890 x 233 x 307	890 x 233 x 307	890 x 233 x 307	890 x 233 x 307
WEIGHT (kg)	-	15.5	15.5	15.5	15.5	15.5
ELECTRICAL SUPPLY	-	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit
FUSE RATING (BS88) - HRC (A)	-	6	6	6	6	6
INTERCONNECTING CABLE No. CORES	-	4	4	4	4	4

Notes: MSZ-LN18VG only available with R32 MXZ Multi-Split outdoor units. Ruby Red (R), Onyx Black (B), Pearl White (W), Natural White (N).

MSZ-LN OUTDOOR UNITS		N/A MULTI-SPLIT ONLY	MUZ-LN25VG2	MUZ-LN35VG2	MUZ-LN50VG2	MUZ-LN60VG2
SOUND PRESSURE LEVEL (dBA)	Heating/Cooling	-	49 / 46	50 / 49	54 / 51	55 / 55
	Cooling	-	60	61	64	65
WEIGHT (kg)	-	-	35	35	40	55
DIMENSIONS (mm)	Width x Depth x Height	-	800 x 285 x 550	800 x 285 x 550	800 x 285 x 714	840 x 330 x 880
ELECTRICAL SUPPLY	-	-	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz
PHASE	-	-	Single	Single	Single	Single
SYSTEM POWER INPUT (kW)	Heating/Cooling (nominal)	-	0.580 / 0.485	0.800 / 0.820	1.480 / 1.380	1.810 / 1.790
	Heating/Cooling (UK)	-	0.523 / 0.406	0.722 / 0.686	1.335 / 1.151	1.632 / 1.494
STARTING CURRENT (A)	-	-	3.0	4.0	6.8	7.9
SYSTEM RUNNING CURRENT (A)	Heating/Cooling (MAX)	-	3.0 / 2.5 [7.1]	4.0 / 3.9 [9.9]	6.8 / 6.3 [13.9]	7.9 / 7.9 [15.2]
FUSE RATING (BS88) - HRC (A)	-	-	10	10	16	16
MAINS CABLE No. CORES	-	-	3	3	3	3
MAX PIPE LENGTH (m)	-	-	20	20	30	30
MAX HEIGHT DIFFERENCE (m)	-	-	12	12	12	15
CHARGE REFRIGERANT (kg) / CO <sub>2</sub> EQUIVALENT (t) - R32 (GWP 675) - 7m	-	-	1.0 / 0.68	1.0 / 0.68	1.25 / 0.85	1.45 / 0.98
MAX ADDITIONAL REFRIGERANT (kg) / CO <sub>2</sub> EQUIVALENT (t) - R32 (GWP 675)	-	-	0.26 / 0.18	0.26 / 0.18	0.26 / 0.18	0.46 / 0.32

**MSZ-LN25/35/50/60VG2 R/B/V/W DIMENSIONS**



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Note: The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R1234ze (GWP:7) or R1234yf (GWP:4). \*These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No 626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

Effective as of May 2020





