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**19 CANNON PLACE, LONDON NW3 1EH**

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**BS4142 PLANT NOISE ASSESSMENT**

**02 August 2023**

**TR Studio**

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## 19 CANNON PLACE, LONDON NW3 1EH

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### BS4142 PLANT NOISE ASSESSMENT

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-	First Issue – Plant Noise Assessment	Damien Hesnan	05/09/2023

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## TABLE OF CONTENTS

1.0	INTRODUCTION .....	1
2.0	SITE DESCRIPTION.....	2
3.0	ENVIRONMENTAL NOISE SURVEY.....	3
3.1	Measurement Equipment.....	3
3.2	Weather Conditions.....	3
4.0	SURVEY RESULTS.....	4
5.0	ASSESSMENT CRITERIA .....	5
5.1	British Standard 4142 .....	5
6.0	TARGET PLANT NOISE LEVELS.....	7
7.0	PLANT NOISE LEVEL ASSESSMENT .....	8
7.1	Vibration .....	8
8.0	SUMMARY AND CONCLUSION.....	9
	APPENDIX A – SITE PLANS .....	10
	APPENDIX B – SITE PHOTOS .....	11
	APPENDIX C – PLANT NOISE CALCULATION SHEETS .....	12
	APPENDIX D – NOISE DATA SHEETS .....	13

## 1.0 INTRODUCTION

Aran Acoustics have been appointed to carry out a noise impact assessment for the proposed installation of condenser units at 19 Cannon Place, London.

A noise survey and assessment has been requested to ensure that noise levels from the proposed plant does not cause undue disturbance to nearby noise sensitive locations.

The purpose of this assessment is to determine the existing noise levels at the nearest noise sensitive location and establish the maximum permissible noise levels from the plant.

Such to establish suitable plant noise levels an assessment has been carried out to BS 4142: 2014 '*Method for rating and assessing industrial and commercial sound*'. This assessment has been benchmarked against an environmental noise survey carried out on 09 May 2023.

This report therefore describes the noise survey and its results. Figure 4.1 contains a graphical representation of the noise measurements taken on site. Section 5.0 provides the maximum permissible noise levels for the proposed plant. Section 6.0 provides an assessment of plant noise levels based on the proposed location.

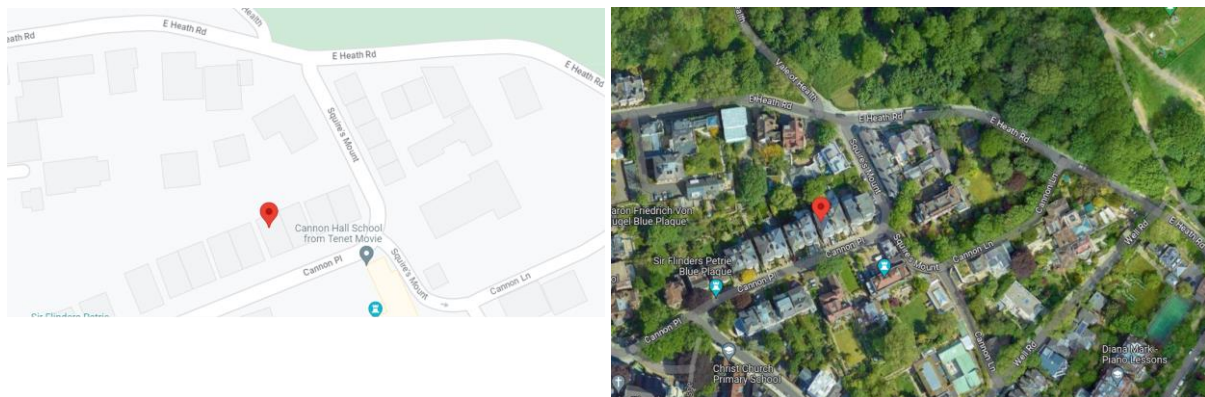
## 2.0 SITE DESCRIPTION

The site is located at 19 Cannon Place in the London Borough of Camden. The site contains an existing 4-storey residential dwelling. Proposals include the installation of an air conditioning system within the property and associated air condenser units located in the rear garden as shown on the site plans within Appendix A.

The nearest noise sensitive receptors to the proposed location of the condenser units are the rear windows of the adjacent residential dwelling on Cannon Place.

A subjective assessment on site determined that the predominant noise sources in the area to impact nearby noise sensitive receptors is background noise from road traffic on surrounding roads.

Figure 2.1 below shows a location map and aerial photo of the site and surrounding area.



**Table 2.1 – Location map and aerial photo of the site\***

*\*Imagery courtesy of Google Maps*

### 3.0 ENVIRONMENTAL NOISE SURVEY

An environmental noise survey was carried out at the site between Tuesday 09 and Wednesday 10 May 2023. The survey incorporated both day and night time measurements.

A single noise monitor was placed at first floor level to the rear of the property. The microphone was located next to the rear windows of the adjacent residential dwelling. Noise levels measured at the microphone location are considered representative of the existing environmental noise levels to impact nearby noise sensitive receptors.

A site plan showing the microphone location is provided in Appendix A. Site photos of the microphone position are provided in Appendix B.

#### 3.1 Measurement Equipment

The following measurement equipment was used, which complies with the performance specifications for a Class 1 device in accordance with BS EN 61672-1, BS EN 61260 and BS EN 60942.

Name	Serial Number	Last Calibrated	Calibration Due
Norsonic Precision Sound Analyser Type 140	1404425	Feb 2022	Feb 2024
Norsonic Type 1209 Pre-amplifier	13231	Feb 2022	Feb 2024
Norsonic Type 1225 Microphone	128783	Feb 2022	Feb 2024
Norsonic Type 1251 Calibrator	32994	Mar 2023	Mar 2024

*Table 3.1 – Measurement equipment used on site*

The meter was calibrated before and after testing - no deviations were found. The meter was set to measure consecutive 'A' weighted 15-minute samples.

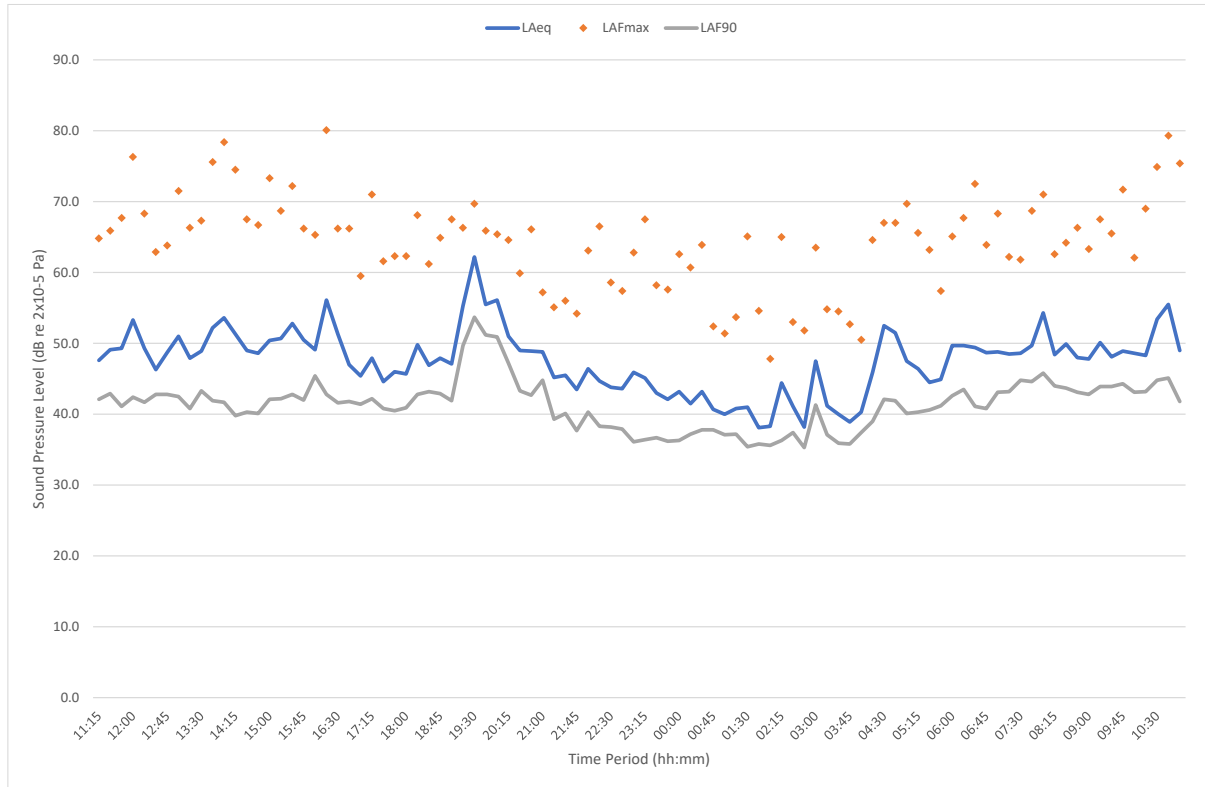
#### 3.2 Weather Conditions

The weather was overcast and remained dry for the duration of the survey. Wind speed remained below 5 m/s. The temperature was approximately 06 - 17 °C.

The weather conditions were seen as suitable for environmental noise surveying in accordance with BS 7445-1:2003 '*Description and measurement of environmental noise*'.

## 4.0 SURVEY RESULTS

The noise levels measured during the survey period are shown in Figure 4.1 below. The full set of acoustic data measured on site is available upon request.



**Figure 4.1 – Measured noise levels**

The following table provides a summary of the noise levels measured on site at the fixed microphone position during the survey period including the equivalent continuous A-weighted sound pressure level;  $L_{Aeq,T}$  and representative background noise level;  $L_{A90,T}$ .

Time Period	Average Noise Level $L_{Aeq}$ , dB	Representative Background $L_{A90}$ , dB
Day (07:00 – 23:00 hours)	51	38
Night (23:00 – 07:00 hours)	46	35

**Table 4.1 - Summary of measured noise levels**

## 5.0 ASSESSMENT CRITERIA

Section 4.0 above provides a summary of measured noise levels on site. The following section provides a summary of guidance documentation relevant to this development.

### 5.1 British Standard 4142

BS 4142:2014 describes a method of determining the level of noise of an industrial nature, together with the procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity. As such, an assessment to BS 4142 is typically called for within planning conditions.

The likelihood of complaints in response to a specific noise depends on various factors. BS 4142 assesses the likelihood of complaints by considering the margin by which the noise in question exceeds the background noise level. BS 4142 states that:

- a) Typically, the greater this difference, the greater the magnitude of the impact.
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

This standard also allows for an appropriate correction for the acoustic features present in the noise using a number of methods. A correction should be applied if one or more of the following features (see the list below), are present within the noise sources in question.

- The noise is of a tonal nature, i.e. it contains a distinguishable, discreet, continuous note such as whine, hiss, screech, hum;
- The noise is impulsive, i.e. it contains distinct impulses such as bangs, clicks, clatters, or thumps;
- The noise contains other characteristics that are neither tonal nor impulsive but is irregular enough to attract attention.

BS4142 states that 'where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration including the following':

- The absolute level of sound. 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.
- The character and level of the residual sound compared to the character and level of the specific sound.

It can be concluded from BS4142 guidance document that noise levels from plant and equipment associated with the development should not generally exceed the background noise level when measured at the nearest noise sensitive location. This is a positive indication of low noise impact.

## 6.0 TARGET PLANT NOISE LEVELS

It is understood that the proposed air condenser units will operate over a 24-hour period and mainly in periods of warmer weather. Planning conditions typically require a design target of -10 dB below the existing background noise levels. This is seen as a design target where noise impact would be 'low' in accordance with BS 4142 and complaints from nearby noise sensitive receptors deemed unlikely.

Following analysis of manufacturers sound level data, it is considered that the proposed plant produces a broadband noise with no tonal features. The unit is also inverter driven, meaning that it will gradually increase or decrease operating capacity depending on the level of duty required. This gives a positive indication that the noise produced is not immediate or distinguishable therefore no acoustic feature correction need be applied.

Based on the lowest background noise level during the proposed operating periods and the suggested design targets including any tolerance or correction factors, the following table shows the maximum permissible noise level from the extract fan when measured at the window of nearby noise sensitive receptors.

Time Period	Lowest Background, $L_{A90}$	Tolerance Factor	Correction Factor	Max Noise Level at Residential
Day (07:00 – 23:00 hours)	38 dBA	-10 dB	-0 dB	<b>28 dBA</b>
Night (23:00 – 07:00 hours)	35 dBA	-10 dB	-0 dB	<b>25 dBA</b>

**Table 6.1 - Plant Noise Level Target**

It is seen from Table 6.1 above that to comply with design targets noise levels from the unit of plant must not exceed a rating level of 28 dBA during the day time period and 25 dBA at night when measured at 1m from the nearest noise sensitive receptor.

The night time target is considered a low rating level and BS4142: 2014 states that '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'.

## 7.0 PLANT NOISE LEVEL ASSESSMENT

Proposals are to install 2 no. Daikin RXYSCQ6-TV1 air condenser units at ground floor level to the rear of the property as indicated on the site plans in Appendix A.

The nearest noise sensitive receptors to the location of the condenser units are the rear first floor windows of the residential dwelling directly adjacent on Cannon Place. At distance, the unit of plant is considered a point source and noise levels will decay at a rate of 6dB per doubling of distance.

Initial calculations showed that noise levels from the unit exceeded the background noise target therefore additional mitigation will be required. Proposed mitigation is to house the units in an enclosure formed from Caice SH300 acoustic louvres.

Calculations show that noise levels for the condenser units in operation at the nearest noise sensitive window would be 25 dBA with the enclosure which meets the design targets set out in Table 6.1 above.

Due to the low rating level at night time it is also important to consider the absolute level. It is generally accepted that a partially open window provides 10 – 15 dB attenuation. Given a rating level of 25 dBA at night the internal noise level from the condenser unit would be approximately 10 - 15 dBA which is considered inaudible. This is a positive indication of low noise impact in accordance with BS 4142 therefore no further mitigation is proposed.

Plant noise calculation sheets are provided in Appendix C. Manufacturers noise level data sheets are provided in Appendix D.

## 7.1 Vibration

Note that attention should be given to the installation of mechanical plant to ensure there is no transmission of excessive tactile and audible frequency vibration to adjacent areas, due to the operation of equipment and/or its connection to pipe work, duct work or conduits. Suitable anti-vibration mounts and flexible connectors should be used where necessary.

## 8.0 SUMMARY AND CONCLUSION

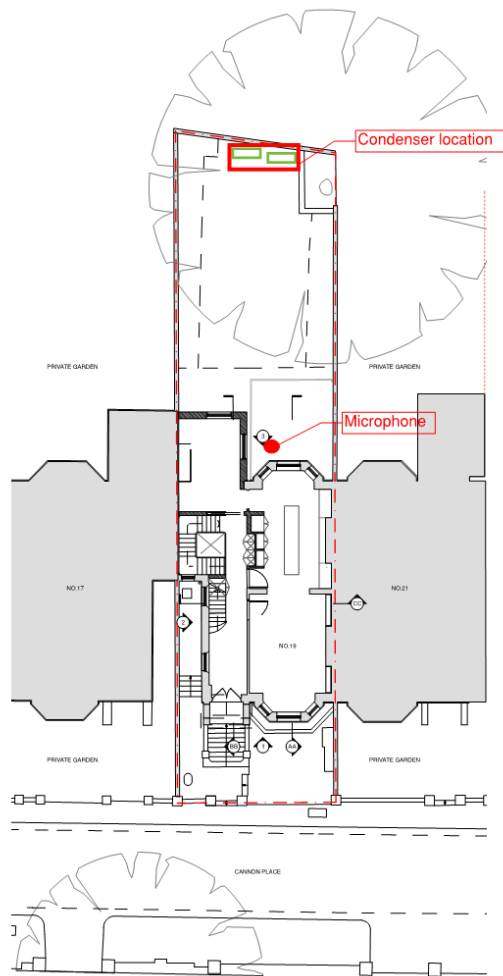
A noise survey was carried out at the proposed location of air condenser units to be installed at 19 Cannon Place, London on 15 March 2013.

From this survey the minimum representative background noise level at the nearby sensitive receptors was found to be 38 dB  $L_{A90}$  during the daytime period and 35 dB  $L_{A90}$  at night.

Using guidance in BS 4142 and based on typical planning conditions, noise levels from the extract system should not generally exceed -10 dB below the background noise level at the window of the nearby noise sensitive receptors.

Based on manufacturer's noise level data for the condenser units along with an acoustic enclosure, calculations show that plant noise levels at nearby noise sensitive receptors would be a worst case 25 dBA. This does not exceed the maximum permissible noise level targets of at any noise sensitive receptor which is a positive indication of low noise impact in accordance with BS 4142 where complaints are deemed unlikely.

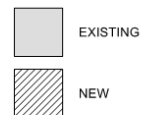
## APPENDIX A – SITE PLANS



1 Proposed Site Plan  
Scale: 1:200

### NOTES RELATING TO ALL EXTERNAL/PLANNING ITEMS

- ① NEW BRICK EXTENSION ALIGNING WITH NEIGHBOUR'S. BRICK TO MATCH EXISTING.
- ② NEW TRADITIONAL TIMBER SASH WINDOW. DETAILS TO MATCH EXISTING.
- ③ NEW BRICK SOLDIER COURSE.
- ④ NEW CAST IRON EFFECT RAIN WATER GOODS.
- ⑤ NEW ROOFLIGHTS TO PROJECT NO MORE THAN 150MM ABOVE ROOFLINE.
- ⑥ INFILLING EXISTING ARCHWAY WITH TRADITIONAL SASH WINDOW TO MATCH EXISTING.



REVISION		
DATE	23.03.01	SCALE 1:200 @ A3
PROJECT	19 Cannon Place, London, NW3 1EH	
CLIENT	Chris & Panya Arnold	
DRAWING TITLE	PROPOSED PLAN - SITE PLAN	
DRAWING NO.	TR5134_PP_100	
ISSUE	Planning	

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This drawing must not be scaled from nor should it be used for the calculation of areas for the purposes of valuation. All dimensions are indicative and must be verified on site prior to the commencement of any works. This drawing must be used in conjunction with all necessary information from all other design consultants and contractors. All works must comply with the relevant British standards and building control requirements. Drawing errors to be reported to the Architect.

## APPENDIX B – SITE PHOTOS



## APPENDIX C – PLANT NOISE CALCULATION SHEETS

	QTY	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	dBA
<b>Daikin RXYSCQ6TMV1B (Lw)</b>	1.0	75.0	73.0	69.0	68.0	66.0	59.0	53.0	<b>70</b>
Multiple Unit Correction	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Distance Attenuation	16.2	-35.2	-35.2	-35.2	-35.2	-35.2	-35.2	-35.2	
Reflection Q	2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
SPL at Receiver		45.8	43.8	39.8	38.8	36.8	29.8	23.8	<b>41</b>
SH300 Enclosure	1	-7.0	-7.0	-10.0	-17.0	-29.0	-30.0	-27.0	
<b>Corrected SPL at Receiver</b>		<b>38.8</b>	<b>36.8</b>	<b>29.8</b>	<b>21.8</b>	<b>7.8</b>	<b>-0.2</b>	<b>-3.2</b>	<b>25</b>

## APPENDIX D – NOISE DATA SHEETS

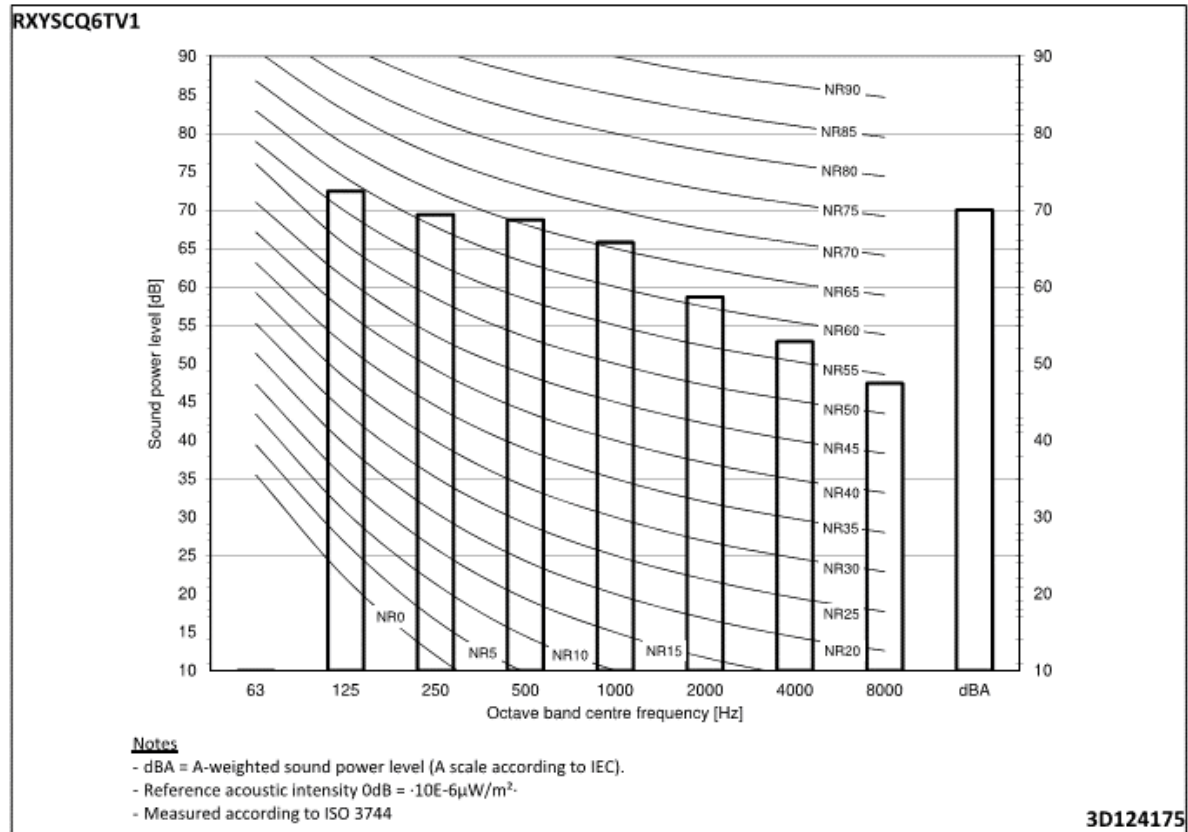
**DAIKIN** • Outdoor Unit • RXYSCQ-TV1

## 2 Specifications

2-1 Technical Specifications					RXYSCQ4TV1	RXYSCQ5TV1	RXYSCQ6TV1
Recommended combination					3 x FXSQ25A2VEB + 1 x FXSQ32A2VEB	4 x FXSQ32A2VEB	2 x FXSQ32A2VEB + 2 x FXSQ40A2VEB
Cooling capacity	Prated,c			kW	12.1 (1)	14.0 (1)	15.5 (1)
Heating capacity	Prated,h			kW	8.4	9.7	10.7
	Nom.		6°CWB	kW	12.1 (2)	14.0 (2)	15.5 (2)
	Max.		6°CWB	kW	14.2 (2)	16.0 (2)	18.0 (2)
Power input - 50Hz	Heating	Nom.	6°CWB	kW	2.82 (2)	3.44 (2)	4.18 (2)
COP at nom. capacity	6°CWB			kW/kW	4.29	4.07	3.71
SEER					8.1	7.7	7.1
SCOP					4.6	4.7	
ηs,c				%	322.8	303.4	281.3
ηs,h				%	182.3	185.1	186.0
Capacity range				HP	4	5	6
Maximum number of connectable indoor units					64 (3)		
Indoor index connection	Min.				50.0	62.5	70.0
	Max.				130.0	162.5	182.0
Dimensions	Unit	Height	mm		823		
		Width	mm		940		
		Depth	mm		460		
	Packed unit	Height	mm		995		
		Width	mm		1,030		
		Depth	mm		580		
Weight	Unit			kg	89		
	Packed unit			kg	101		
Packing	Material				Carton		
	Weight				kg		
Packing 2	Material				Wood		
	Weight				kg		
Packing 3	Material				Plastic		
	Weight				kg		
Capacity control	Method				Inverter controlled		
Casing	Colour				Daikin White		
	Material				Painted galvanized steel plate		
Heat exchanger	Type				Cross fin coil		
	Indoor side				Air		
	Outdoor side				Air		
	Air flow rate	Cooling	Rated	m³/h	5,460		
		Heating	Rated	m³/h	5,460		
Compressor	Quantity				1		
	Type				Hermetically sealed swing compressor		
	Crankcase heater			W	33		
Fan	Quantity				1		
Fan motor	Quantity				1		
	Type				DC motor		
	Output			W	200		
Sound power level	Cooling	Nom.	dBA	68.0 (4)	69.0 (4)	70.0 (4)	
	Heating	Nom.	dBA	69.0 (4)	70.0 (4)	71.0 (4)	
Sound pressure level	Cooling	Nom.	dBA	51.0 (5)	52.0 (5)	53.0 (5)	
Operation range	Cooling	Min.~Max.	°CDB	-5.0~46.0			
	Heating	Min.~Max.	°CWB	-20.0~15.5			
Refrigerant	Type				R-410A		
	GWP				2,087.5		
	Charge			TCO <sub>2</sub> eq	7.7		
				kg	3.7		
Refrigerant oil	Type				Synthetic (ether) oil FVC50K		

## 11 Sound data

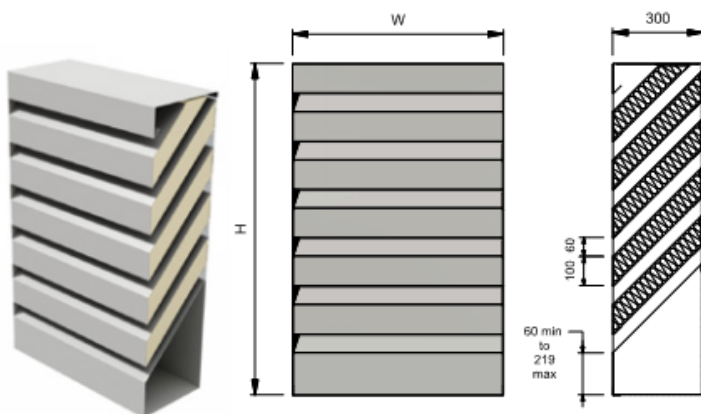
### 11 - 1 Sound Power Spectrum



# SH300 Acoustic Louvre Technical Data



## Single Bank Acoustic Louvre, Higher Performance Profile, 300mm Deep



Typical weight 53kg/m<sup>2</sup>

Generally louvres above 50kg will be supplied in modules for assembly on site. Joining brackets and fixings will be provided for assembly.

Installation services, support steelwork, flashings, fixings to the structure and mastic will not be provided unless stated.

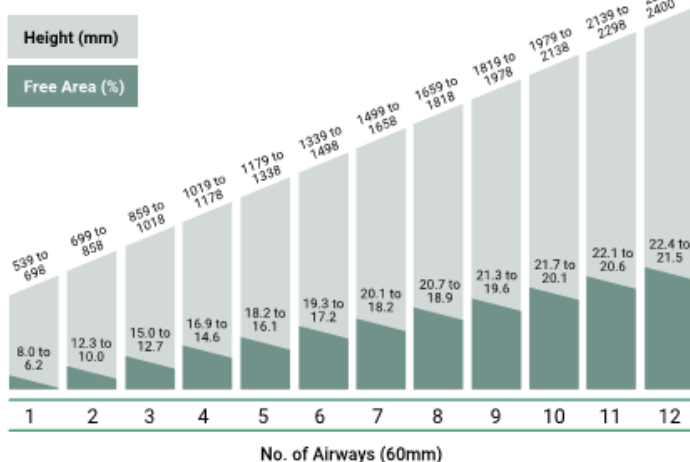
Refer to the Acoustic Louvre Schedule and Product Code Definitions for the size and specification of each Acoustic Louvre.

A minimum of 10mm clearance should be allowed between the structure and the Acoustic Louvre sizes shown.

## Performance

Acoustic Data	dB in each Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Sound reduction index	7	7	10	17	29	30	27	21
Weighted sound reduction index (Rw)	21							
Static insertion loss	6	7	10	18	31	28	26	25
Regenerated sound power level at 1m/s face velocity	50	44	39	34	30	26	17	12
Regenerated sound power level at 2m/s face velocity	70	60	55	52	49	49	43	35

## Free Area and Height range



Free area shown is based on an 1150mm wide single piece louvre fitted with bird mesh and will vary slightly for different widths and bigger heights. Pressure losses for Class A rated louvres are available upon request.

