

Sound Licensing Ltd.
Suite 4, Broxbourne Business Centre
New River Trading Estate
Cheshunt
Herts EN8 ONL

T: +44 (0) 20 7096 1555
www.soundlicensing.co.uk
enquiries@soundlicensing.co.uk

NOISE IMPACT ASSESSMENT REPORT – KITCHEN EXTRACTION SYSTEM

25 SALE PLACE, LONDON W2 1PU

FOR

BIZARREKA ARCHITECTURE LTD



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AUTHOR: L ANKERS, AMIOA
CHECKED: M LAUEZZARI, MIOA MIOL
APPROVED: M LAUEZZARI, MIOA MIOL

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The preparation of this report by Sound Licensing Ltd. has been undertaken within the terms of the proposal using all reasonable skill and care. Sound Licensing Ltd accepts no responsibility for the data provided by other bodies and no legal liability arising from the use by other persons of data or opinions contained in this report.

1. EXECUTIVE SUMMARY

The Client intends to seek planning approval for the relocation of the existing kitchen extraction system servicing the premises at 25 Sale Place, London W2 1PU.

Sound Licensing has undertaken an environmental noise survey at the site in order to determine prevailing background noise levels that are representative of the nearest noise sensitive properties, which have been identified as the proposed second-floor residential premises above the site at 25 Sale Place, W2.

The results of the noise survey are considered reasonable given the location of the measurement position and the existing noise sources in the local vicinity.

Noise calculations of the mechanical plant have been undertaken using all available details and plans provided by the client and obtaining manufacturers' specifications wherever possible. The data and information form the basis of the assessment.

Noise break-out limits for the mechanical plant have been proposed based on the methodologies of British Standard (BS) 4142:2014+A1:2019 and in accordance to Local Authority policy. A robust, worst-case assessment of the noise levels associated to the proposed mechanical plant has been undertaken.

In accordance with BS 4142:2014+A1:2019 guidance, the predicted noise impact due to the operation of the mechanical plant ***"is an indication of the specific sound source having a low impact"***. The predicted noise level of the mechanical plant at the nearest noise sensitive properties is considered to comply with the City of Westminster Council's policy.

2. INTRODUCTION

The client is proposing to relocate the existing kitchen extraction system at 25 Sale Place, London W2 1PU, the noise from which could have the potential to affect existing noise sensitive properties nearby.

The purposes of this report are:

- To determine prevailing environmental noise levels affecting surrounding properties due to nearby noise sources (e.g. road traffic, aircraft etc);
- Based on the above, to present noise emission limits in accordance with the requirements of BS 4142:2014+A1:2019 and Local Authority policy, and
- To undertake an assessment to demonstrate compliance with the Local Authority noise requirements.

3. SITE DESCRIPTION

Planning permission is being sought for the relocation of the existing kitchen extraction system at 25 Sale Place, London W2 1PU (hereafter referred to as 'the site'). The property is a traditionally built three-storey terraced building with a basement in the City of Westminster. It is located in a mixed used area.

The nearest sensitive residential receptors were noted to be the second-floor windows located on the rear façade of 25 Sale Place at an approximate distance of 1m from the proposed extraction fan motor and 3m from the extraction system terminus.

The nearest sensitive receptors are identified in figure 3.1. If the noise impact assessment details that there is an indication of the specific sound source having a low impact at these premises then it can be safely assumed it will be met at other properties of equal distance and/or those further away.

Figure 3.1 shows the site highlighted in blue with the nearest noise sensitive premises highlighted in red.

Figure 3.1 Site Location and Surrounding Land Use



Source: Google Maps

4. ENVIRONMENTAL NOISE SURVEY METHODOLOGY

An unmanned environmental noise survey was undertaken at a single measurement location at second-floor level at the rear of the site. The survey was undertaken between 14:30 hours on the 2nd April and 14:00 hours on the 4th April 2024. A survey at this time covers the most sensitive period of time in which the mechanical plant may be operational.

Ambient, background and maximum noise levels (L_{Aeq} , L_{A90} and L_{Amax} respectively) were measured throughout the noise survey in continuous 15-minute periods. The approximate measurement position is indicated in orange on Figure 4.1 below.

Figure 4.1 Site Plan Showing Approximate Location of Measurement Position



Source: Google Maps

The sound level meter microphone was positioned on a tripod out of the second-floor window, 1 metre from the rear façade of the building. The position is not considered to be in free-field and therefore a 3dB façade correction will be applied. The monitoring position is considered representative of background noise levels at the nearest identified noise sensitive properties. The monitoring position was chosen for equipment security reasons also.

The equipment used for the noise survey is summarised in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Equipment	Description	Quantity	Serial Number
Larson Davis Sound Expert LxT	Type 1 automated logging sound level meter	1	0003814
Larson Davis 377B02	½" microphone	1	142503
Larson Davis	Pre-amplifier	1	028032
Larson Davis CAL200	Class 1 Calibrator	1	12245

The noise survey and measurements were conducted in accordance with BS7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'.

Weather conditions throughout the entire noise survey period were noted to be mild (approx. 9-15° Celsius), partly sunny (60 to 90% cloud cover approximately) with a light wind (<5m/s). These weather conditions were checked against and confirmed by the use of the Met Office mobile application available on smart phone technology. These conditions were maintained throughout the majority of the survey period and are considered reasonable for undertaking environmental noise measurements.

The noise monitoring equipment was field calibrated before and after the noise survey period. No significant drift was recorded (± 0.3 dB). Equipment calibration certificates can be provided upon request.

5. NOISE SURVEY RESULTS AND OBSERVATIONS

5.1 Results

A summary of the measured ambient and minimum background noise levels during the proposed operational hours are shown in Table 5.1 below (full monitoring data can be found in Appendix C). The existing extraction system was not in operation during the monitoring period.

Table 5.1 Measured Ambient and Minimum Background Sound Pressure Levels

Date / Period (hours)	Ambient Sound Pressure Level, dB $L_{Aeq,15min}^*$	Minimum Background Sound Pressure Level, dB $L_{A90,15min}^*$
02/04/2024(14:30 to 23:00)	50-57	47
03/04/2024 (09:00 to 23:00)	52-58	48
04/04/2024(09:00 to 14:00)	54-57	53

*-3dB Façade Correction

The minimum background noise level at the measurement position during the survey, at the time in which the plant could be operational, is **48dB** $L_{A90,15min}$.

5.2 Observations

Given that the noise survey was unmanned, noise sources could not be identified. However, at the beginning and end of the survey background noise was dominated by noise from the existing mechanical plant at the adjacent premises. After analysis of the data no significant abnormal noise source(s) were identifiable. It is considered that the measured noise levels are reasonable given the location of the measurement position.

6. EXTERNAL NOISE EMISSION LIMITS

6.1 Local Authority Requirements

The site lies within the jurisdiction of the Local Authority, Westminster City Council. Westminster's Environmental Supplementary Planning Document (Adopted February 2022) states:

'Development including plant and machinery, or new internal/external uses that cause noise from amplified/unamplified music or human voices both internally and externally, even when windows and doorways are open, should achieve the following standards:

Existing External Ambient Noise Level	Tonal or Intermittent Noise/Noise Source	Noise level that should not be exceeded at the nearest Noise sensitive Receptor*1
Exceeds WHO Guideline levels L_{Aeq} 55 dB over periods of day-time (7am–11pm) and L_{Aeq} 45 dB at night-time (11pm–7am)	Does not contain tones or intermittent noise sufficient to attract attention	10 dB below the minimum external background noise level
	Contains tones or 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 generator	10 dB above the lowest background noise level within a 24-hour period.
Does not exceed WHO Guideline levels. L_{Aeq} 55 dB over periods of daytime (7am–11pm) and L_{Aeq} 45 dB night-time (11pm–7am).	Does not contain tones or intermittent noise sufficient to attract attention	5 dB below the minimum external background noise level.
	Contains tones or 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 generator	10 dB above the lowest background noise level within a 24 hour period
Below 30 dB $L_{A90,15min}$ at the nearest noise sensitive receptors Both day-time (7am–11pm) and night-time (11pm–7am)	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

Taking the noise monitoring data in Section 5 and the Local Authority design requirements above, the following design target has been adopted as provided in Table 6.1.

Table 6.1 Maximum noise emission design target at noise sensitive premises

Minimum Measured Background Sound Pressure Level, dB $L_{A90,15min}$	Sound Pressure Level at the Nearest Noise Sensitive Receptor, dB $L_{Aeq,T}$
47	42

6.2 BS 4142:2014+A1:2019

BS 4142:2014+A1:2019 “Methods for rating and assessing industrial and commercial sound” presents a method for assessing the significance and possible adverse impact due to an industrial noise source, based on a comparison of the source noise levels and the background noise levels, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property.

The specific noise level due to the source is determined, with a series of corrections for tonality, impulsivity, intermittency or other unusual characteristic. The rating level is then compared to the background noise level and the significance of the new noise source likelihood of any adverse impact is determined in accordance with the following advice:

“The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occur. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. 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.”

7. KITCHEN EXTRACTION SYSTEM AND ASSOCIATED NOISE LEVELS

It is proposed to relocate the following items of plant to the rear of the premises.

Table 7.0 Kitchen Extraction Fan Motor

External Plant Item	Make	Model	Reference Noise Level* $L_{W(A)}$
Kitchen Extraction Fan Motor	Soler & Palau	TCBBX2/4-450	Outlet 77dB Breakout 59dB**

*Reference sound power levels. Manufacturer's specifications are provided in Appendix B.

**Calculated using manufacturer's outlet data. No breakout data provided by manufacturer.

The ducting will be 450mm standard rectangular duct work. The extraction fan motor will be located externally and therefore breakout noise from the motor and noise from the duct terminus have been considered.

In reference to section 6 of this report, no penalty addition has been applied for intermittency as the system will remain on throughout the operating period. Penalty additions have not been applied for tonality as manufacturers' data shows no significant characteristics, or for impulsiveness as it is considered that these characteristics will not be perceptible sufficient to attract attention at the noise receptors. Penalty additions have not been applied for any other sound characteristics as mechanical plant of this type generally do not demonstrate such features.

7.1 Silencer

The extraction system will be fitted with an R02-5-600 Acoustica silencer on the atmosphere side of the fan. The silencer provides the attenuation shown in Table 7.1. All silencers should be Melinex lined.

Table 7.1 Silencer Attenuation

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
4	6	11	19	24	23	18	12

7.2 Directivity

A directivity correction should be applied as the extract fan duct aperture is to terminate approximately 90° to the nearest residential windows. A duct opening of 450mm has been used. The levels of attenuation (dB) at each octave frequency band (Hz) is provided in table 7.2 below.

Table 7.2 Directivity Attenuation

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
0	0	2	6	7	14	16	19

7.3 Extraction Fan Jacket

The extraction fan motor will be fitted with a Flakt Woods acoustic jacket. The jacket provides the attenuation shown in Table 7.3.

Table 7.3 Jacket Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
2	4	10	18	22	26	29

8. NOISE IMPACT ASSESSMENT

This section presents calculations to predict the noise impact of the relocated kitchen extraction system, located at the site, at the nearest noise sensitive property.

8.1 Proposed Operational Hours and Background Noise Levels

The kitchen extraction system will operate during the opening hours of the proposed business. The opening hours are from 09:00 - 23:00 hours, 7 days-a-week.

The minimum background noise level at the measurement position during the survey is **47dB** $L_{A90,15min}$. The design range is **42dB** $L_{Aeq,T}$ at the façade of the nearest residential premises.

8.2 Nearest Noise Sensitive Properties

The nearest sensitive residential receptors were noted to be the second-floor windows located on the rear façade of 25 Sale Place at an approximate distance of 1m from the proposed extraction fan motor and 3m from the extraction system terminus.

8.3 Description of Calculation Process

In accordance with the methodologies of BS 4142:2014+A1:2019, calculations have been undertaken to predict noise levels in which the kitchen extraction system could be operational at its maximum level. Given the distances between the noise sources and the noise sensitive receptors, point source calculations have been used.

8.4 Noise Level Predictions

Calculations to predict the noise of the kitchen extraction system operating at the facade of the residential property is given below. Full calculations are provided in Appendix D.

The rating noise level at the 2nd floor window, with the mechanical plant operating, is predicted to be **41dB** $L_{Aeq,T}$ which is **6dB(A) below** the minimum background noise level (47dB $L_{A90,15min}$).

In accordance with BS 4142:2014+A1:2019 guidance, noise from the mechanical plant ***“is an indication of the specific sound source having a low impact”***. *The lower the rating level is relative to the measured background level, the less likely it is that the specific sound source will have an adverse impact.*

8.5 Vibration

In addition to the control of airborne noise transfer, it is important to consider the transfer of noise as vibration to adjacent properties as well as any sensitive areas of the same building. Vibration from the unit is not expected, however, as a precaution plant should wherever possible be installed on suitable type isolators.

Uncertainty

The levels of uncertainty in the data and calculations are considered to be low/medium given the robust exercise undertaken in noise monitoring and the confidence in the data statistical analysis. Manufacturers' data for the plant is highly likely to be robust. Detailed calculations and resultant noise levels at the residential location are considered to be confidently predicted.

9. CONCLUSION

Sound Licensing has undertaken an environmental noise survey at the site in order to determine prevailing background noise levels that are representative of the nearest noise sensitive properties. The operation of the kitchen extraction system, in accordance with BS 4142:2014+A1:2019 guidance, indicates to creating a low impact. All worst-case scenarios have been applied to the assessment. The predicted operating noise level of the kitchen extraction system is demonstrated to comply with the City of Westminster Council's policy.

APPENDIX A – Acoustic Terminology

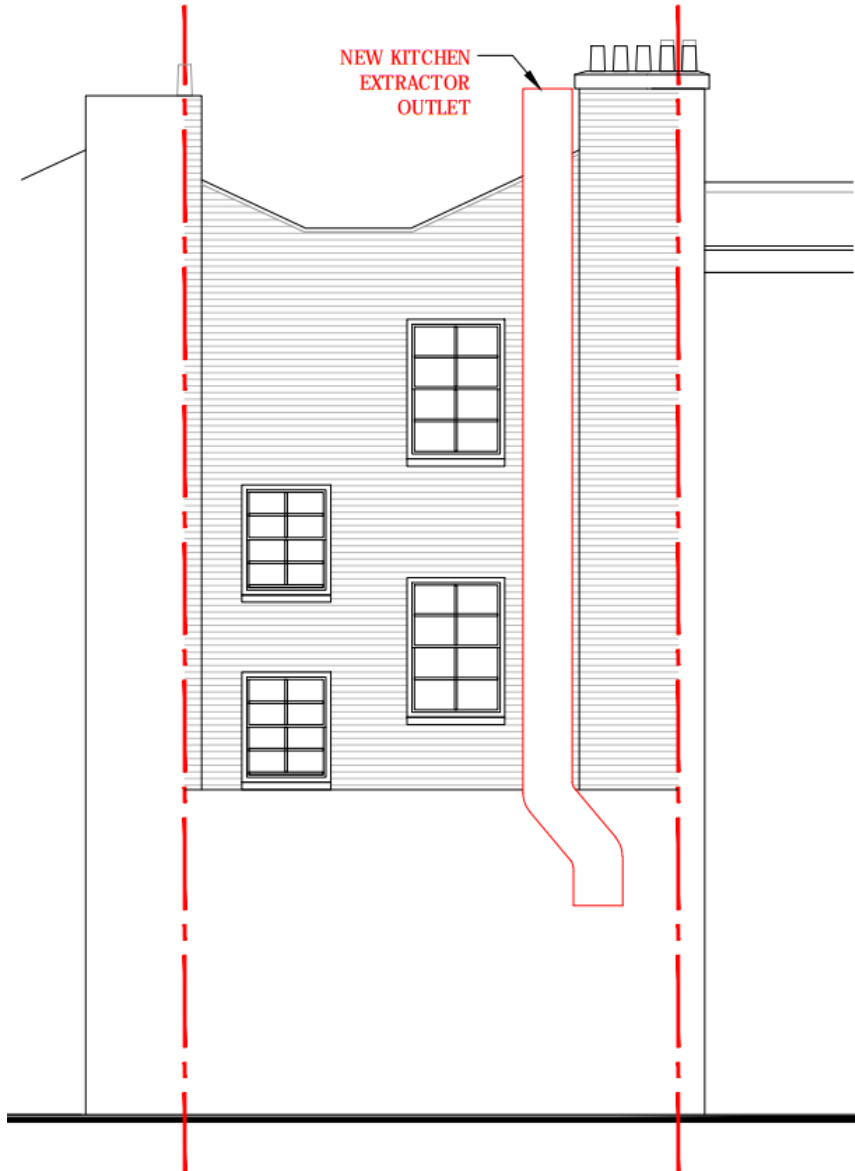
Parameter	Description
Acoustic environment	Sound from all sound sources as modified by the environment
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far
Ambient sound level, $L_a = LA_{eq,T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T
Background sound level, $LA_{90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing (20×10^{-6} Pascals).
Equivalent continuous A-weighted sound pressure level, $LA_{eq,T}$	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time
Measurement time interval, T_m	Total time over which measurements are taken
Rating level, $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound
Reference time interval, T_r	Specified interval over which the specific sound level is determined
Residual sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound
Residual sound level, $L_r = LA_{eq,T}$	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T
Specific sound level, $L_s = LA_{eq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r
Specific sound source	Sound source being assessed

References:

BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'
Westminster City Council 'Environmental Supplementary Planning Document (Adopted February 2022)'

APPENDIX B – Data Sheets and Figures

Proposed Rear Elevation



Proposed Front Elevation



Soler & Palau TCBBx2/4-450 Data Sheet – Kitchen Extraction Fan Motor

CYLINDRICAL CASED AXIAL FLOW FANS
COMPACT TCBB / TCBT Series - ALUMINIUM IMPELLERS



Range of cylindrical cased axial flow fans fitted with aluminium impellers and manufactured from high grade rolled galvanised steel and protected against corrosion by cataforesis primer and black polyester paint finish. All models are supplied with pre-wired wiring junction box located on the outside of the fan casing for easy wiring access. Available, depending upon the model, with single or three phase motors in 2, 4 or 6 poles.

Motors
Single phase motor (TCBB) or three phase motor (TCBT).
Models 250, 315, 355 and 400: External rotor motor, IP54, Class F, thermal protection, working temperature from -40°C to +40°C.
Models 450, 500, 560, 630 and 6/710: IP65, Class F, thermal protection, working temperature from -40°C to +70°C.
Models 4/710 and 800: IP55, Class F, working temperature from -40°C to +40°C.

All motors are speed controllable by autotransformer except models /4-560H, /4-630, 710 and T/800.
Three phase motors are speed controllable by inverter.
Electrical supplies:
Single phase 220-240V-50Hz.
[Capacitor located inside the wiring terminal box].
Three phase 220-240/380-415V-50Hz or 380-415V-50Hz.
[See characteristic chart].

Additional information
Standard air direction: form (B) configuration (impeller over motor).

On request
Air direction: form (A) configuration (motor over impeller).
From Ø450 to Ø800, three phase motors 2 speed, 4/8 poles.



Specific applications



ATEX versions TCBT

On request, explosion proof versions in accordance with ATEX Directive, for 3 phase models.

For ambient working temperatures:

From -20°C to +55°C: models TCBT/4-315 to 630mm
models TCBT/6-355 to 710mm
From -20°C to +40°C: models TCBT/4-710 to 800mm
models TCBT/6-800mm

Motors IP55 Class F

- ATEX Flameproof - Gas
For models TCBT/4-710 and 800mm
Ⓢ models 2G Exd IIB T4
Ⓢ models 2G Exd IIB IIC T4 (with Ex d IIC T4 motor)

- ATEX Increased safety - Gas
Not available TCBT/2-250/H 400V-50Hz
TCBT/4-250/H 400V-50Hz
TCBT/6-355/H 400V-50Hz
TCBT/6-400/H 400V-50Hz

Available for TCBT/6-400/H 230/400V-50Hz and larger sizes.

Ⓢ models 2G Exe II T3
- ATEX - Dust
For models TCBT/4-710 and 800mm
Suspended flammable particles and non-conductive dust:
Ⓢ II 3D Ex tc IIB T125°C
Conductive dust:
Ⓢ II 3D Ex tc IIC T125°C (with IP65 motor)

To select TCBT ATEX refer to performance curves, or Easyvent.
Note electrical data may vary for ATEX motors.



Corrosion resistance
Rolled steel casings and motor support protected by cataforesis primer and black polyester paint finish. Stainless steel screws.



Terminal box
Wiring terminal box with cable gland PG-11 (except ATEX models).



Impeller dynamically balanced
Impellers are dynamically balanced, according to ISO 1940 standard, giving vibration free operation.



Configuration for models /4-710 and 800.



Constructive configuration models 250, 315, 355 and 400 (excepted 6-355, 6-400 and ATEX)

Soler & Palau TCBBx2/4-450 Acoustic Data

Model	63	125	250	500	1000	2000	4000	8000	LwA
/2-250/H	31	44	59	65	74	70	64	56	76

Model	63	125	250	500	1000	2000	4000	8000	LwA
/4-250/H	24	37	41	47	52	52	47	41	57
/4-315/H	40	51	45	53	59	59	51	43	63
/4-355/H	24	40	45	55	58	58	49	42	62
/4-400/H	46	53	59	66	69	69	66	58	74
/4-450/H	46	58	65	71	73	71	67	59	77
/4-500/H	50	62	69	75	76	75	70	62	81
/4-560/L	52	64	71	77	78	77	72	64	83
/4-560/H	53	65	72	78	79	78	73	65	84
/4-630/L	56	67	75	80	82	81	76	68	87
/4-630/H	56	67	75	80	82	81	76	68	87
/4-710/L	53	69	79	85	86	84	78	70	91
/4-710/H	60	72	79	85	86	85	80	72	91
/4-800/L	57	73	83	90	91	88	82	74	95
/4-800/K	63	75	82	88	90	88	84	76	94
/4-800/G	64	76	83	89	90	89	84	76	95
/4-800/H	66	77	84	90	92	91	86	78	96

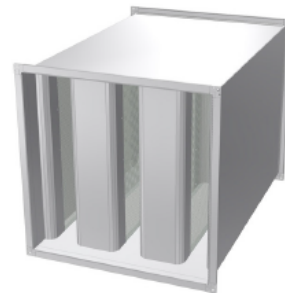
Acoustica R02-5-600 Data Sheet

R02 Rectangular Silencers



R02 - 5 - Attenuator

Available in seven standard lengths R02 5 Rectangular Duct Mounted Silencers have excellent attenuation properties, achieved with sound absorbing infill splitters, retained in the attenuator casing by a perforated liner. The resistance to airflow is a function of the face velocity and length. It is not recommended to select the R02 5 Silencers with a face velocity above 3.5 metres per second without asking advice regarding re-generated self noise. We can advise on the selections and can perform system analysis to ensure the correct unit is specified.



- High performance rectangular duct silencer
- Seven standard lengths
- Many connection options
- Cross section dimensions in 1mm increments
- System pressure within ducted systems to 1500 Pa
- Special lengths on request

Insertion Loss (dB) - Centre Band Frequency

Product Code	Length (mm)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R02 - 5 - 600	600	4	6	11	19	24	23	18	12
R02 - 5 - 900	900	4	6	12	26	30	31	22	16
R02 - 5 - 1200	1200	5	9	18	32	40	39	28	19
R02 - 5 - 1500	1500	7	11	23	37	45	45	32	22
R02 - 5 - 1800	1800	8	13	25	44	50	50	37	24
R02 - 5 - 2100	2100	9	16	28	50	50	50	45	29
R02 - 5 - 2400	2400	11	19	33	50	50	50	50	32

Insertion loss data is derived from continual testing to BS4718 and other standards in independent UKAS certified laboratories, which includes where appropriate, re-generated or self noise testing in both forward and reverse flow conditions. If you request system analysis from our technicians all predictions will be assessed using the relevant certified insertion loss data together with relevant dynamic corrections.

Flakt Woods Acoustic Fan Jacket Data Sheet



Fläkt Woods Limited
 Axial Way, Colchester,
 Essex, CO4 5ZD,
 United Kingdom

tel +44 (0) 1206 222555
 email woodsuk@flaktwoods.com
 web www.flaktwoods.co.uk
 twitter @Woods_Fans_UK

ACOUSTIC JACKETS

Flakt Woods Limited are able to supply Acoustic Jackets to suit the metric Aerofoil Axial Flow Fan range (other fan ranges can be accommodated, for details please enquire). The effect of fitting an Acoustic Jacket to our 'L' type only is to reduce the amount of total sound breaking out from the fan casing only.

The effect of fitting an Acoustic Jacket to our 'L' type only is to reduce the amount of total sound breaking out from the fan casing only.

High performance acoustic jackets which typically achieve a 10-14dB(A) reduction in casing breakout noise

Typical Construction suitable for indoors / outdoors

- Grey silicone glass cloth inner and outer
- 50mm mineral wool insulation layer
- Sound barrier material
- Terminal box cut out included (if required / or if dimensions are available)
- Supplied complete with Velcro flap and straps with D rings



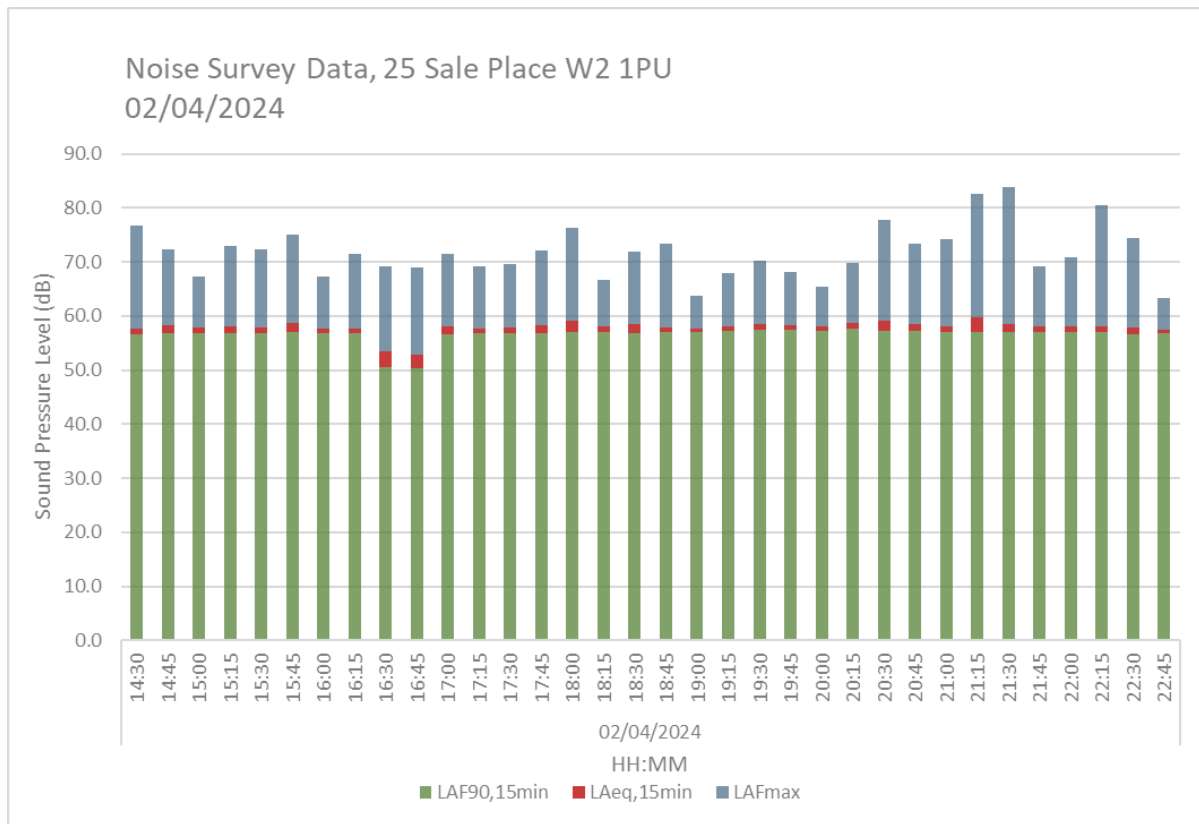
Fläkt Woods Limited,
 Axial Way, Colchester, CO4 5ZD
 Registered in England No. 233771
 Registered office as above



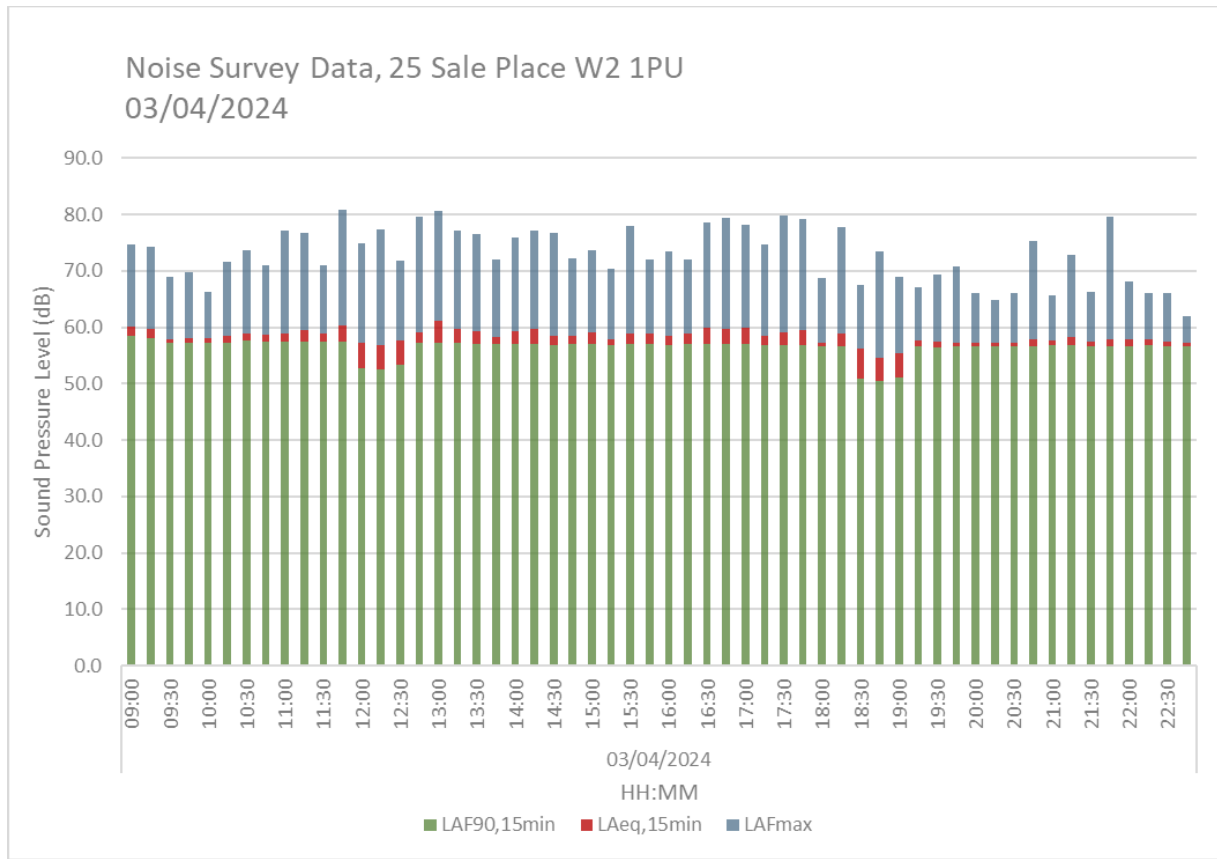
Acoustic Jacket Spectrum

Acoustic Jacket Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
High Performance (50mm insulation +10kg/m2 sound barrier)	2	4	10	18	22	26	29	30

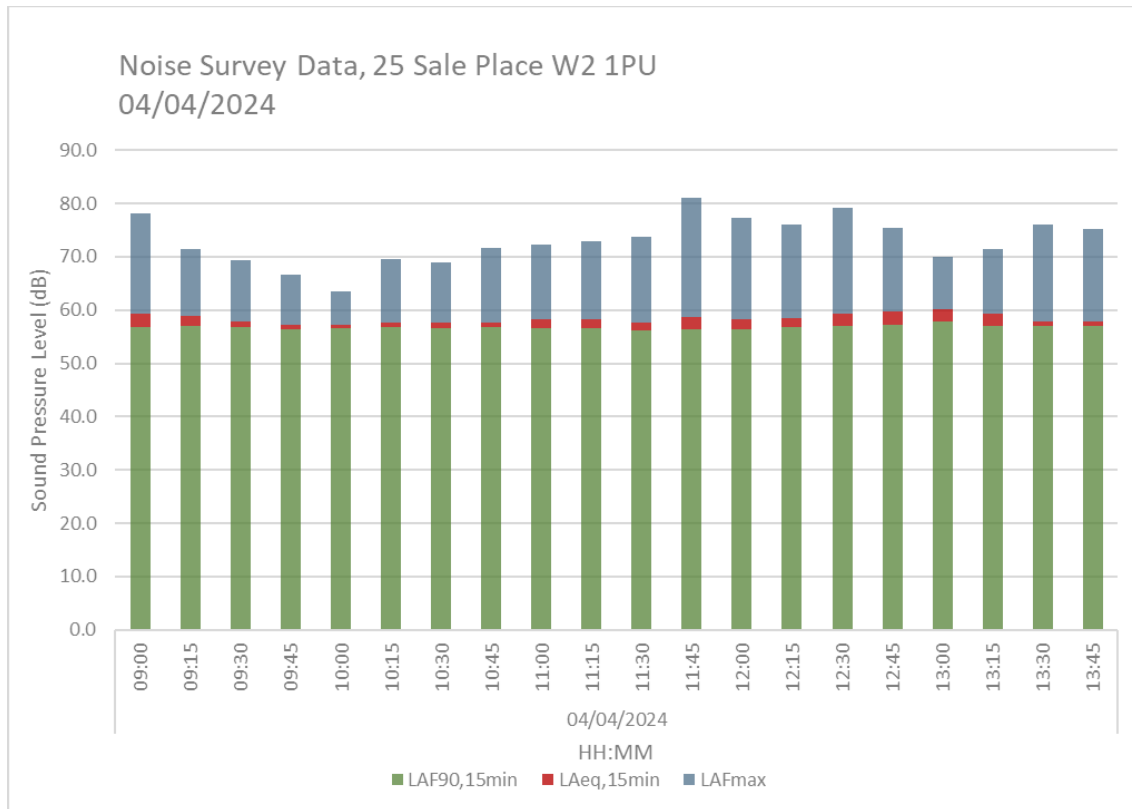
APPENDIX C – Noise monitoring Data



Date	Time	L _{Aeq,15min}	L _{AFmax}	L _{AF90,15min}	Date	Time	L _{Aeq,15min}	L _{AFmax}	L _{AF90,15min}
02/04/2024	14:30	57.7	76.7	56.7	02/04/2024	18:45	57.9	73.5	57.0
	14:45	58.3	72.4	56.8		19:00	57.7	63.8	57.0
	15:00	57.9	67.3	56.8		19:15	58.0	68.0	57.3
	15:15	58.1	72.9	56.9		19:30	58.5	70.3	57.5
	15:30	57.9	72.4	56.9		19:45	58.3	68.2	57.4
	15:45	58.7	75.0	57.0		20:00	58.1	65.4	57.2
	16:00	57.8	67.2	56.9		20:15	58.7	69.8	57.6
	16:15	57.8	71.5	56.8		20:30	59.2	77.8	57.2
	16:30	53.5	69.2	50.6		20:45	58.5	73.4	57.2
	16:45	52.8	69.0	50.4		21:00	58.1	74.3	57.0
	17:00	58.0	71.5	56.7		21:15	59.8	82.7	57.1
	17:15	57.6	69.2	56.8		21:30	58.5	83.8	57.1
	17:30	57.9	69.6	56.8		21:45	58.0	69.3	57.1
	17:45	58.4	72.2	56.8		22:00	58.1	70.9	57.1
	18:00	59.1	76.3	57.0		22:15	58.1	80.6	57.0
18:15	58.1	66.8	57.1	22:30	57.9	74.4	56.7		
18:30	58.5	72.0	56.9	22:45	57.6	63.4	56.9		



Date	Time	L _{Aeq,15min}	L _{AFmax}	L _{AF90,15min}	Date	Time	L _{Aeq,15min}	L _{AFmax}	L _{AF90,15min}
03/04/2024	09:00	60.2	74.8	58.5	03/04/2024	16:00	58.5	73.4	56.9
	09:15	59.7	74.4	58.1		16:15	59.0	72.1	57.0
	09:30	57.9	68.8	57.2		16:30	59.9	78.6	57.1
	09:45	58.1	69.7	57.3		16:45	59.6	79.4	57.0
	10:00	58.0	66.3	57.2		17:00	59.9	78.1	57.1
	10:15	58.5	71.5	57.3		17:15	58.5	74.6	56.8
	10:30	58.9	73.7	57.6		17:30	59.1	79.8	56.9
	10:45	58.7	70.9	57.5		17:45	59.4	79.2	56.8
	11:00	58.8	77.1	57.5		18:00	57.3	68.7	56.6
	11:15	59.5	76.8	57.5		18:15	58.9	77.8	56.7
	11:30	58.8	70.9	57.5		18:30	56.2	67.6	50.8
	11:45	60.3	80.7	57.5		18:45	54.5	73.5	50.5
	12:00	57.2	74.8	52.7		19:00	55.5	68.9	51.0
	12:15	56.9	77.3	52.5		19:15	57.6	67.1	56.6
	12:30	57.7	71.8	53.3		19:30	57.4	69.4	56.5
	12:45	59.1	79.5	57.3		19:45	57.3	70.7	56.6
	13:00	61.1	80.6	57.3		20:00	57.3	66.0	56.6
	13:15	59.8	77.1	57.2		20:15	57.3	64.7	56.7
	13:30	59.2	76.4	57.0		20:30	57.3	66.0	56.6
	13:45	58.3	71.9	57.1		20:45	57.8	75.3	56.7
	14:00	59.3	76.0	57.1		21:00	57.6	65.6	56.8
	14:15	59.7	77.1	57.0		21:15	58.2	72.9	56.8
	14:30	58.4	76.7	56.9		21:30	57.4	66.3	56.6
	14:45	58.6	72.3	57.1		21:45	57.7	79.6	56.6
15:00	59.0	73.6	57.0	22:00	57.8	68.2	56.6		
15:15	57.9	70.4	56.9	22:15	57.8	66.0	56.9		
15:30	58.9	78.0	57.1	22:30	57.5	66.1	56.6		
15:45	58.9	71.9	57.1	22:45	57.2	62.0	56.6		



Date	Time	L _{Aeq,15min}	L _{AFmax}	L _{AF90,15min}
04/04/2024	09:00	59.3	78.1	56.8
	09:15	58.8	71.4	56.9
	09:30	57.8	69.4	56.7
	09:45	57.2	66.6	56.4
	10:00	57.3	63.4	56.5
	10:15	57.7	69.6	56.7
	10:30	57.7	68.9	56.6
	10:45	57.7	71.7	56.7
	11:00	58.2	72.4	56.6
	11:15	58.3	72.9	56.5
	11:30	57.6	73.8	56.1
	11:45	58.6	81.0	56.3
	12:00	58.3	77.3	56.3
	12:15	58.4	76.1	56.7
	12:30	59.2	79.1	57.1
	12:45	59.7	75.4	57.3
	13:00	60.2	70.0	57.9
	13:15	59.3	71.4	57.0
13:30	57.9	75.9	57.0	
13:45	57.8	75.3	56.9	

APPENDIX D – Calculations

Attenuation per double distance required =
(6dB for LpA recommended)

	6	dB						Metres	
	Enter Distance =							1	
	Frequency Hz								
	63	125	250	500	1000	2000	4000	8000	Total
LWA Internal	46	58	64	71	73	71	67	59	77.33
S/A	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Transmission Loss	16	16	18	25	31	32	32	34	
LWA External	37.8	49.8	53.8	53.8	49.8	46.8	42.8	32.8	
JACKET	2	4	10	18	22	26	29	30	
LPA at New Dist'	24.8	34.8	32.8	24.8	16.8	9.8	2.8	-8.2	37.45

Extraction Fan Motor Casing Breakout @ 1m = 37dB LAeq,T

Attenuation per double distance required =
(6dB for LpA recommended)

	6	dB						Metres	
	Enter Distance =							3	
	Frequency Hz								
	63	125	250	500	1000	2000	4000	8000	Total
	72.2	74.1	72.6	74.2	73	69.8	66	60.1	80.84
Total LW	72.2	74.1	72.6	74.2	73.0	69.8	66.0	60.1	80.84
'A' Weight	26.2	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	46.0	58.0	64.0	71.0	73.0	71.0	67.0	59.0	77.33
LPA at New Dist'	28.49	40.49	46.49	53.49	55.49	53.49	49.49	41.49	59.82
SILENCER	4	6	11	19	24	23	18	12	
DIRECTIVITY 90°	0	0	2	6	7	14	16	19	
LPA After Insert	24.49	34.49	33.49	28.49	24.49	16.49	15.49	10.49	38.07

Extraction System Terminus @ 3m = 38dB LAeq,T

Adding dB									
Levels to be added (Max. of eight)									
Enter values	37	38	0	0	0	0	0	0	0
Total = 40.5 dB									

Cumulative Sound Pressure Level @ Nearest Sensitive Receptor = 41dB LAeq,T