



39 BERKLEY AVENUE READING RG1 6JS

BS4142 PLANT NOISE ASSESSMENT

02 November 2023

Mr Dee Sandhu



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1.0 INTRODUCTION

Aran Acoustics have been appointed to carry out a noise impact assessment for the proposed installation of a kitchen extract system at 39 Berkley Avenue, Reading.

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 10 October 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 39 Berkley Avenue in the Reading. The site contains an existing 2-storey building with a commercial unit at ground floor level and residential flat on the upper floor.

Proposals include the installation of a kitchen extract system within the ground floor commercial unit with associated extract ductwork located to the side of the property as shown on the site plan within Appendix A.

The nearest noise sensitive receptors to the proposed location of kitchen extract system are the side and rear windows of the adjacent residential dwelling on Berkley Avenue.

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 Berkley Avenue and surrounding roads.

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

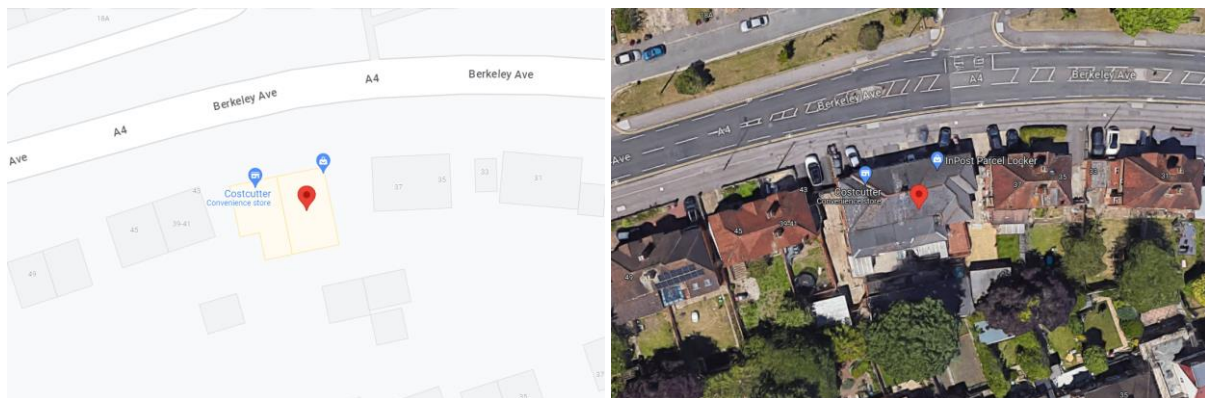


Table 2.1 – Location map and aerial photo of the site

3.0 ENVIRONMENTAL NOISE SURVEY

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

A single noise monitor was placed at ground floor level to the rear of the property. The microphone was extended approximately 1.5m from the rear façade with no direct line of sight to passing road traffic. 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 mainly fine and dry for the duration of the survey. Wind speed remained below 5 m/s. The temperature was approximately 06 - 14 °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.

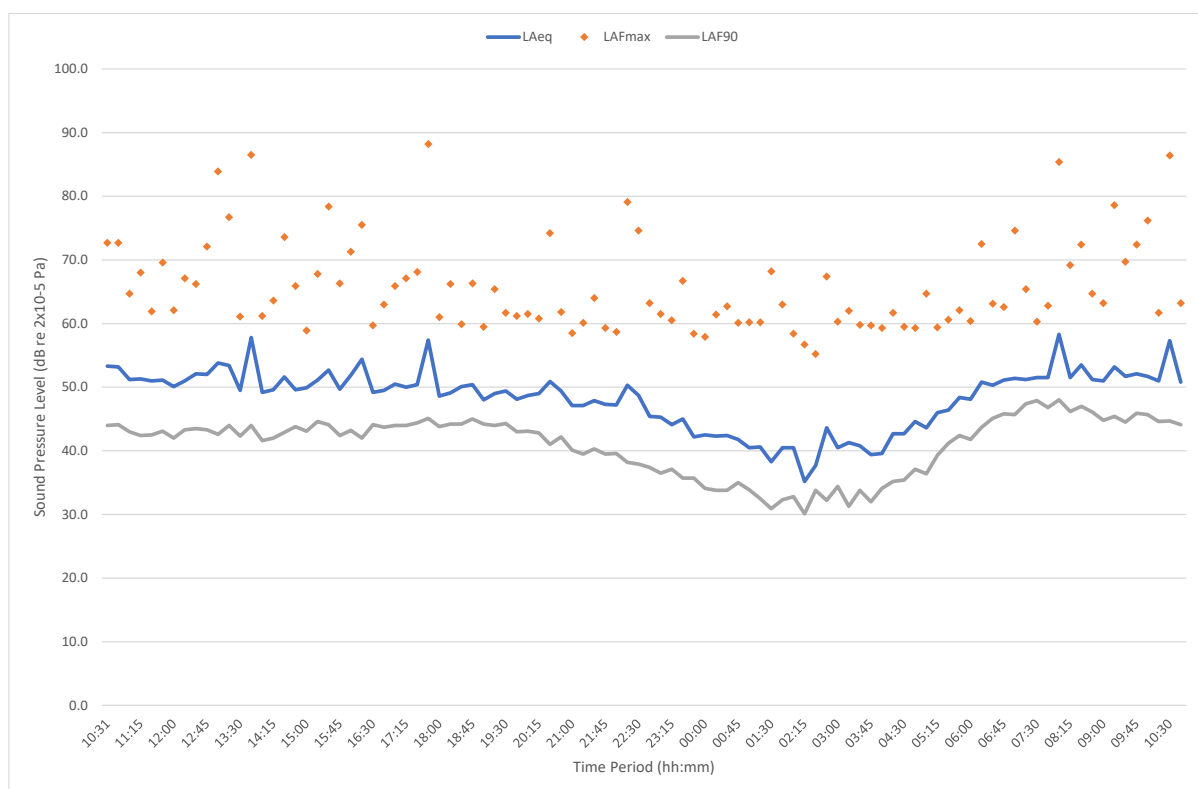


Figure 4.1 – Measured noise levels

Results of the survey shows that noise levels to the rear of the property remained relatively consistent throughout the daytime period with a drop off in the late evening and night time period. This is considered attributable to a reduction in traffic 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)	52	44
Night (23:00 – 07:00 hours)	44	34

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.

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.

5.2 Target Plant Noise Levels

It is understood that the proposed kitchen extract will operate in the day time only, i.e. between 07:00 – 23:00 hours. Local Planning Authorities typically require noise levels from plant to achieve 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 period 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 the 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)	44 dBA	-10 dB	-0 dB	34 dBA

Table 5.1 - Plant Noise Level Target

6.0 PLANT NOISE LEVEL ASSESSMENT

Proposals are to install a kitchen extract system within the ground floor commercial unit. The extract ductwork will be connected to a Novenco CNA-315/D insulated box extractor fan unit located within the commercial premises. The system includes Lindab 315RSD 600m and 1200mm in-line attenuators to the outlet side of the fan unit. The extract duct terminates at roof top level at the side of the building as shown on drawings within Appendix A.

The nearest noise sensitive receptors to the location of the fan extract duct are the rear windows of the residential dwelling directly adjacent on Berkley Avenue.

The following table provides the calculated noise levels from the fan unit and extract duct at the window of nearest residential receptor along with the combined noise level.

Noise Source	Octave Band Centre Frequency, dB							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1.0 K Hz	2.0 K Hz	4.0 K Hz	
Duct Outlet	36.4	39.9	36.7	10.0	-24.2	6.0	8.0	30
Duct Breakout	48.2	45.6	33.5	-1.0	-41.7	-17.6	-20.5	31
Combined SPL (Lp)	48.5	46.6	38.4	10.3	-24.1	6.0	8.0	34

Table 6.1 – Calculated Plant Noise Levels

Calculations show that the noise levels from the kitchen extract unit in operation does not exceed the target plant noise level of **34 dBA** at any of the nearby noise sensitive receptors which is a positive indication of low noise impact in accordance with BS 4142 therefore no further mitigation is proposed at this stage.

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

6.1 Vibration

Note that attention should be given to the installation of the extract system 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 should be used where necessary.

7.0 SUMMARY AND CONCLUSION

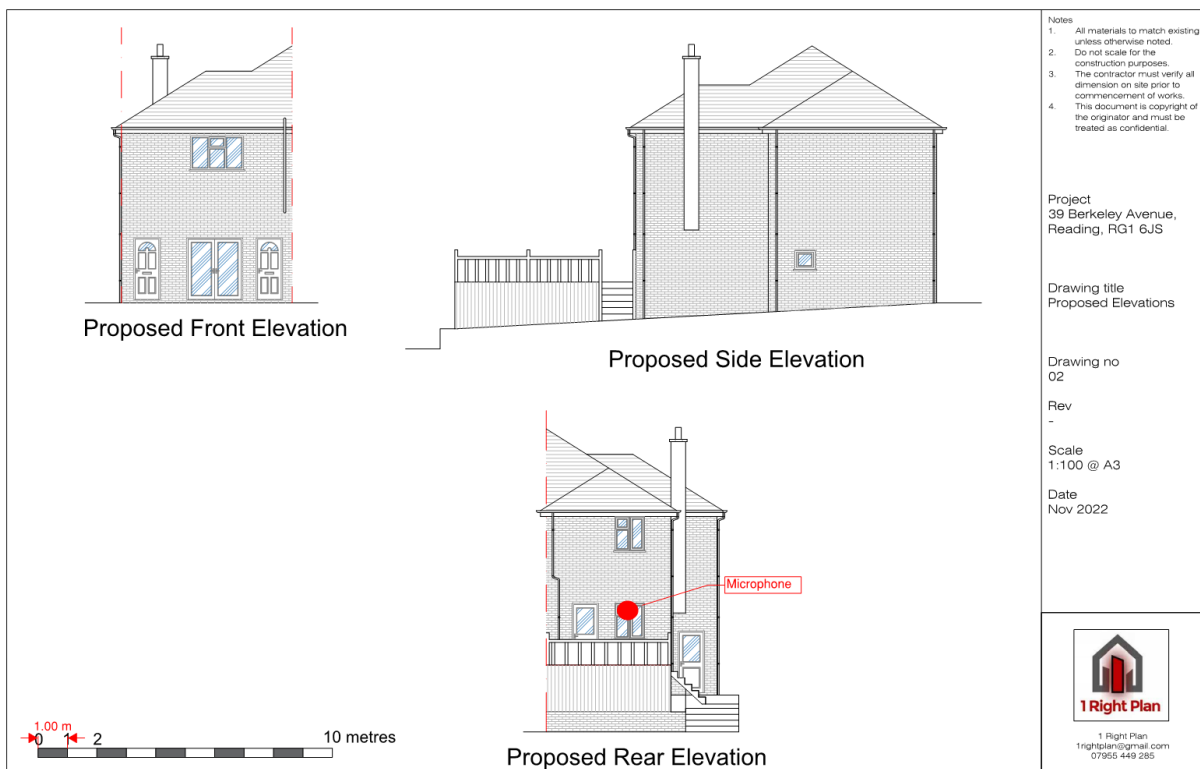
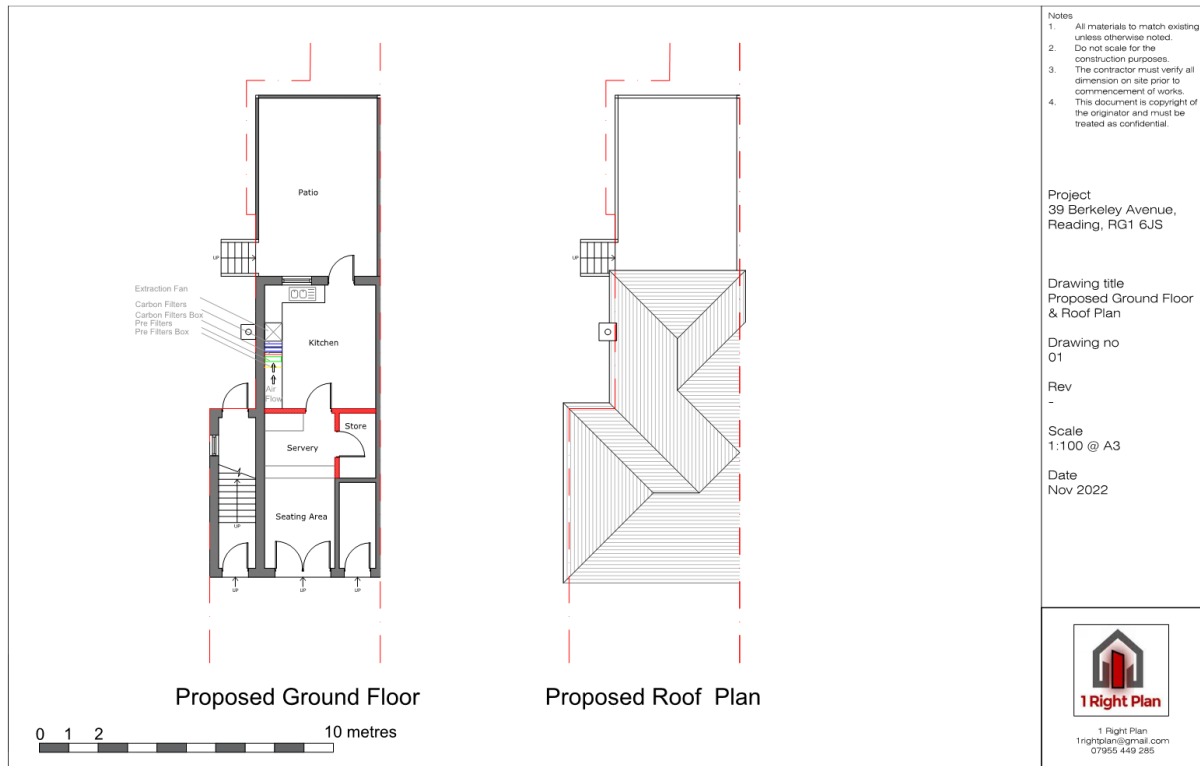
A noise survey was carried out at the proposed location of a kitchen extract system to be installed at the rear of 39 Berkley Avenue, Reading on 09 October 2023

From this survey the minimum representative background noise level at the nearest sensitive property was found to be 44 dB L_{A90} during the proposed operational hours.

Using guidance in BS 4142 and based on the proposed hours of operation, 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 kitchen extract fan along with acoustic attenuators, calculations show that plant noise levels at nearby noise sensitive receptors would be a worst case 34 dBA. This does not exceed the maximum permissible noise level target 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 PLAN



APPENDIX B – SITE PHOTOS



APPENDIX C – PLANT NOISE CALCULATION SHEET

Duct Outlet	QTY	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	dBA
Novenco CNA-315/D (Lw)	1	90	94	97	94	89	84	79	95
Lindab SLU 315/1200/50 Attenuator	1	-2	-3	-8	-20	-39	-16	-9	
Lindab SLU 315/600/50 Attenuator	1	0	-2	-4	-10	-22	-9	-6	
Duct Losses	5.2m	-2.5	-3.4	-2.5	-1.7	-1.2	-1.2	-1.2	
Bend Losses	1	0	0	-2	-8	-5	-3	-3	
End Reflection Loss	315mm	-12	-7	-3	-1	0	0	0	
Directivity	90	-3	-3	-3	-3	-3	-3	-3	
Distance Attenuation	6	-26.6	-26.6	-26.6	-26.6	-26.6	-26.6	-26.6	
Barrier Correction		-7.5	-9.1	-11.2	-13.7	-16.4	-19.3	-22.2	
SPL at Receiver (Lp)		36.4	39.9	36.7	10.0	-24.2	6.0	8.0	30
Duct Breakout	QTY	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	dBA
Novenco CNA-315/D (Lw)	1	90	94	97	94	89	84	79	95
Lindab SLU 315/1200/50 Attenuator	1	-2	-3	-8	-20	-39	-16	-9	
Lindab SLU 315/600/50 Attenuator	1	0	-2	-4	-10	-22	-9	-6	
Bend Losses	1	0	0	-2	-8	-5	-3	-3	
0.8mm Galvanised Steel Duct SRI		-10.0	-12.0	-16.0	-21.0	-26.0	-32.0	-37.0	
Distance Attenuation	5.2	-25.3	-25.3	-25.3	-25.3	-25.3	-25.3	-25.3	
Barrier Correction		-7.5	-9.1	-11.2	-13.7	-16.4	-19.3	-22.2	
Reflection (Q)	2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
SPL at Receiver (Lp)		48.2	45.6	33.5	-1.0	-41.7	-17.6	-20.5	31
Combined SPL (Lp)		48.5	46.6	38.4	10.3	-24.1	6.0	8.0	34

APPENDIX D – TECHNICAL DATA SHEETS

Technical specification



Customer		Project	T:2130004964/Janet
Reference		Quotation/Order	T:2130004964
Configuration	CNA-315/D RD excl. motor 71	Our reference	Soren Kjolby (SNK)
		Site/System	

Fan:

CNA-315/Direct RD/0

Volume flow	1.50 m ³ /s
Fan total pressure	600 Pa
Fan dynamic pressure	281 Pa
Fan static pressure	319 Pa
Efficiency	54 %
Power	1.7 kW
Speed	2504 rpm
Max. speed	3000 rpm
Altitude of installation	0.0 m
Temperature	20.0 °C
Humidity	50.0 %RH
Inlet	Duct
Outlet	Duct
Total weight of installation	35 kg
Master product ID	mp-i01
Total Efficiency	0.0 %
Measurement category (A-D)	D
Efficiency category	Total
Optimum Efficiency grade	62.6 %
Target Efficiency grade (N)	58(2015)
Specific ratio	1.01

Motor:

Frame size	71
Mounting arrangement	B14

Accessories:

None selected

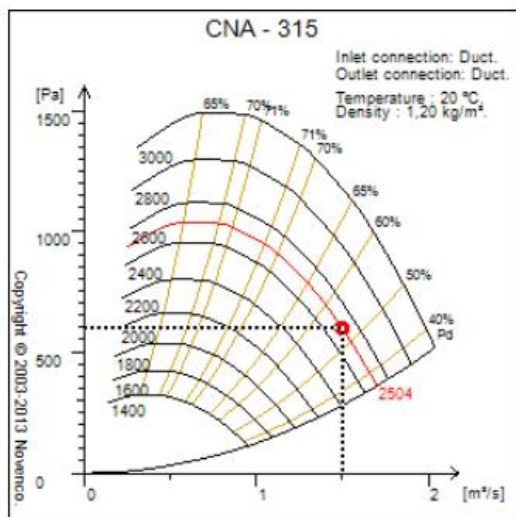


Technical specification

Customer
Reference
Configuration CNA-315/D RD excl. motor 71

Project T:2130004964/Janet
Quotation/Order T:2130004964
Our reference Soren Kjolby (SNK)
Site/System

Fan curves:



Sound data:

	63	125	250	500	1K	2K	4K	8K	Hz	Total
Fan sound power level	90	94	97	94	89	84	79	74	dB	101 dB 95 dB(A)

Circular straight silencer

SLU 50

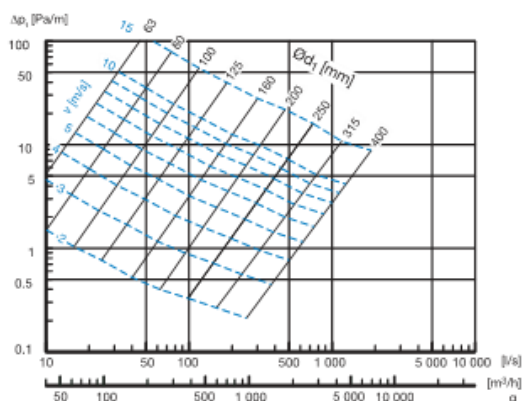


Description

SLU 50 is a circular straight silencer with a connection diameter available between 63 - 400 mm. Nominal insulation thickness 50 mm. Attenuation material is mineral wool. The SLU's are made of strong outer spiral seemed tube and an inner tube made of sheet steel with small openings to be able to withstand mechanical cleaning and at the same time not interfere with the insertion loss. The space between them is filled with mineral wool and a nonwoven cloth is inserted between inner tube and the attenuation material, to prevent fibers from the insulation getting into the duct system.

Tested according to ISO 7235 standard.
Special materials and sizes, please contact Lindab sales.

Technical data

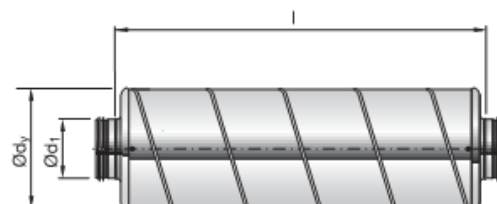


Order code

Product SLU **aaa** **bbbb** **50**
Connection dim. Ød₁ nom
 63 - 400 mm
Length in mm (l_{nom})
 300 - 1200 mm
Nominal Insulation thickness
 50 mm

Example: SLU - 80 - 600 - 50

Dimensions and sound data



Attenuation [dB] for centre frequency [Hz]												
Ød ₁ nom mm	l _{nom} mm	63	125	250	500	1k	2k	4k	8k	Ødy mm	l mm	m kg
63	300	0	6	13	21	32	44	36	26	170	300	1,8
63	600	0	7	20	35	50	50	50	34	170	600	3,0
80	300	1	5	8	15	25	25	21	15	190	300	2,0
80	600	2	8	14	28	49	50	47	24	190	600	3,0
80	900	3	10	21	40	50	50	50	34	190	900	5,0
80	1200	4	13	27	50	50	50	50	43	190	1200	7,0
100	300	1	5	7	15	25	25	21	13	210	360	2,0
100	600	1	7	12	25	43	48	35	20	210	660	3,0
100	900	2	10	17	34	50	50	49	28	210	960	5,0
100	1200	3	12	22	44	50	50	50	35	210	1260	7,0
125	300	0	4	5	13	23	20	16	11	235	365	3,0
125	600	1	5	10	22	39	37	26	16	235	665	4,0
125	900	1	7	14	30	50	50	37	21	235	965	7,0
125	1200	2	9	18	39	50	50	47	26	235	1265	9,0
160	300	0	3	5	11	22	16	11	7	270	370	3,0
160	600	1	4	8	19	37	28	17	11	270	670	6,0
160	900	1	5	12	27	50	39	24	14	270	970	8,0
160	1200	2	6	15	35	50	50	30	17	270	1270	10,0
200	300	0	2	4	9	19	11	7	5	310	385	4,0
200	600	1	3	8	15	28	19	12	8	310	685	7,0
200	900	2	4	11	21	37	28	16	10	310	985	10,0
200	1200	2	5	14	27	46	36	21	13	310	1285	12,0
250	600	1	2	6	14	26	14	8	7	365	600	9,0
250	900	1	3	9	19	38	19	11	9	365	900	12,0
250	1200	2	4	11	24	50	24	13	11	365	1200	15,0
315	600	0	2	4	10	22	9	6	7	427	600	12,0
315	900	2	3	7	16	31	13	8	9	427	900	18,0
315	1200	2	3	8	20	39	16	9	10	427	1200	24,0
400 *	600	0	2	4	8	10	5	4	4	508	600	16,0
400 *	900	0	2	5	12	16	7	5	6	508	900	22,0
400 *	1200	0	2	7	16	20	9	6	7	508	1200	32,0

There is given max. attenuation values of 50 dB in the table above.

* Supplied with two loose couplings.