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NOISE IMPACT ASSESSMENT REPORT - AIR INTAKE SYSTEM

1 PAKENHAM STREET, CAMDEN WC1X 0LA

FOR

CLEAN AIR SYSTEMS

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1. EXECUTIVE SUMMARY

The client intends to seek planning approval for the installation of mechanical plant (Air Intake System) to service the premises at 1 Pakenham Street, Camden WC1X 0LA.

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 first-floor residential premises at 1 Pakenham Street and the first-floor residential premises at 20 Wren Street.

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 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 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 property is considered to comply with the London Borough of Camden Council's policy.

2. INTRODUCTION

The client is proposing to install a new air intake system at the rear of 1 Pakenham Street, Camden WC1X 0LA, 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 and Local Authority policy, and
- To undertake an assessment to demonstrate compliance with the Local Authority noise requirements.

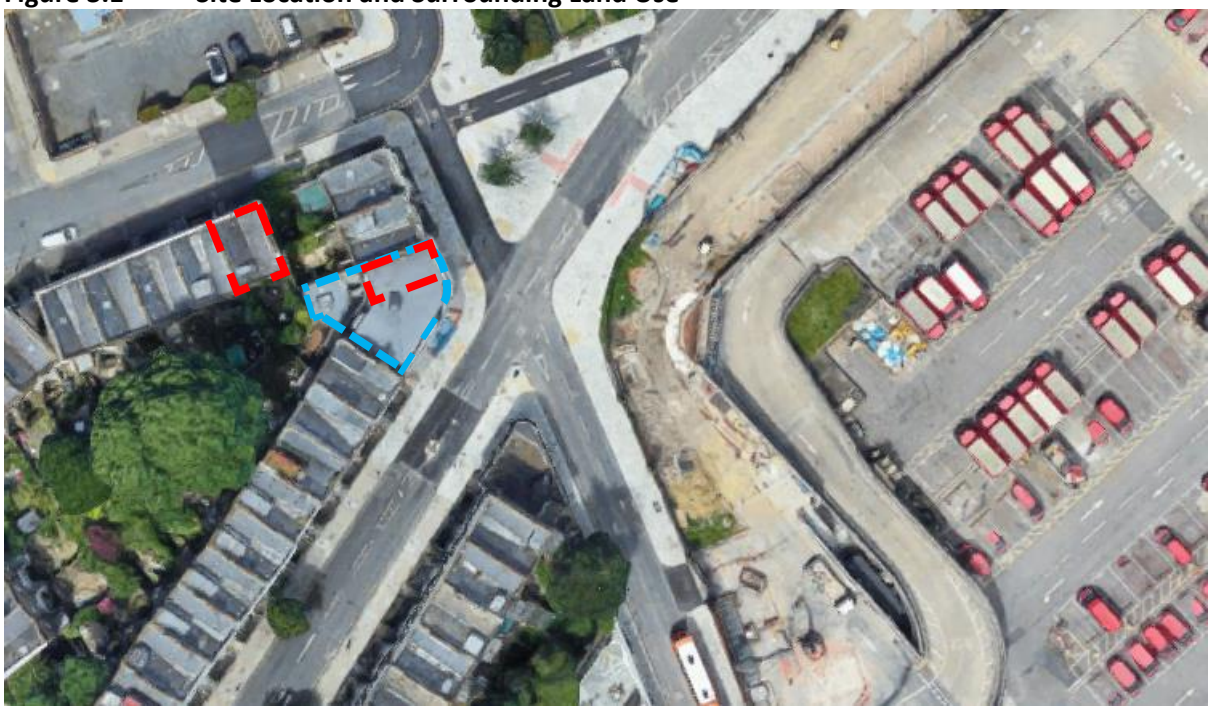
3. SITE DESCRIPTION

Planning permission is being sought for the installation of an air intake system at 1 Pakenham Street, Camden WC1X 0LA (hereafter referred to as 'the site'). The property is a traditionally built three-storey terraced building in the London Borough of Camden, it is located in a predominantly residential area. To the south-east of the property is Mount Pleasant Mail Centre.

The nearest sensitive residential receptors were noted to be the first-floor windows located on the western side of 1 Pakenham Street at an approximate distance of 3m from the intake point of the flue, and the first-floor windows on the south side of 20 Wren Street at an approximate distance of 7m from the intake point of the flue, as 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 first-floor level to the rear of the site. The survey was undertaken between 14:15 hours on the 7th March 2019 and 14:15 hours on the 8th of March 2019. A survey at this time covers the most sensitive period of time in which the mechanical plant system 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 approximately two metres from the rear façade of the building at first floor level. The position is not considered to be in free-field and therefore a 2dB 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	0004720
Larson Davis 377B02	½" microphone	1	159605
Larson Davis	Pre-amplifier	1	042612
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 cool (approx. 3-12° Celsius), cloudy skies (50 to 100% cloud cover approximately) with a light wind (<5m/s) there was some sporadic precipitation. 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 background noise levels during the proposed operational hours are shown in Table 5.1 below (full monitoring data can be found in Appendix C).

Table 5.1 Measured typical background and ambient sound pressure levels

Date / Period (hours)	Ambient Sound Pressure Level, dB *	Typical Background Sound Pressure Level, dB*
07/03/2019(14:15 to 23:00)	**47 - 54 $L_{Aeq,1hour}$**	**46 $L_{A90,1hour}$**
07/03/2019 - 08/03/2019 (23:00 to 07:00)	**41 - 48 $L_{Aeq,15min}$**	**41 $L_{A90,15min}$**
08/03/2019(07:00 to 14:15)	**48 - 54 $L_{Aeq,1hour}$**	**47 $L_{A90,1hour}$**

*Façade correction -2dB

The lowest typical background noise level at the measurement position during the survey, at the time in which the plant could be operational, is **41dB** $L_{A90,15min}$.

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 vehicles on the local road network. 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, Camden Borough Council. The following requirements for commercial plant have previously been requested by the Local Authority:

"Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion."

For the purposes of this report, an assessment has been undertaken in line with BS 4142:2014. A design criterion of achieving a minimum 10dB(A) below the background noise level has been adopted in line with the Local Authorities policy. Taking the noise monitoring data in Section 5 and Local Authority requirements above, the following design target has been adopted for mechanical plant as provided in Table 6.1.

Table 6.1 Maximum noise emission design target at residential premises

	Typical Measured Background Noise Level, dB $L_{A90,15min}$*	Rating noise level at nearest residential facade, dB L_{Aeq}*
07/03/2019(14:15 to 23:00)	**45**	**31**
07/03/2019 - 08/03/2019 (23:00 to 07:00)	**41**	
08/03/2019(07:00 to 14:15)	**47**	

* Façade correction -2dB

6.2 BS 4142:2014

BS 4142:2014 "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. PROPOSED AIR INTAKE SYSTEM AND ASSOCIATED NOISE LEVELS

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

Table 7.0 Proposed Air Intake Fan Motor

External Plant Item	Make	Model	Reference Noise Level* $L_{p(A)}$
Air Intake Fan Motor	Systemair	MUB 025 355DV Sileo Multibox	51dB(A) @ 3m

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

The fan will be located internally and will not be audible at sensitive receptors so only noise from the intake point of the duct is considered. The ducting will be 500mm standard square duct work and the system will intake above the first-floor level flat roof.

In reference to section 6 of this report, a penalty addition (+3dB) has been applied for intermittency as the system will be switched on & off as and when required. 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 system will be fitted with a Systemair LDR 60-35 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

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
7	13	17	18	13	10	8

7.2 Directivity

A directivity correction should be applied as the fan duct aperture is to terminate horizontally at approximately 120˚ to the first-floor window at 1 Pakenham Street and 45˚ to the first-floor window at 20 Wren Street. A duct opening of 500mm has been used. The levels of attenuation (dB) at each octave frequency band (Hz) is provided below in tables 7.2 and 7.3.

Table 7.2 120˚ Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
2	6	10	13	20	22	22

Table 7.3 45˚ Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
0	0	-1	0	1	3	4

8. NOISE IMPACT ASSESSMENT

This section presents calculations to predict the noise impact of the proposed air intake system, located at the site, at the nearest noise sensitive properties.

8.1 Proposed Operational Hours and Background Noise Levels

The air intake system may operate as required 24 hours a day.

The lowest typical background noise level at the measurement position during the survey is **41dB** $L_{A90,15min.}$ The design range is **31dB** L_{Aeq} at the façade of the nearest residential premises.

8.2 Nearest Noise Sensitive Properties

The nearest noise sensitive receptors to the mechanical plant were noted to be the first-floor residential premises at 1 Pakenham Street and the first-floor residential premises at 20 Wren Street at distances of 3 and 7 metres from the proposed intake respectively.

8.3 Description of Calculation Process

In accordance with the methodologies of BS 4142:2014, calculations have been undertaken to predict noise levels in which the air intake system could be operational at its typical 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 air intake system operating at 3 and 7 metres from the facade of the residential property is given below. Full calculations are provided in Appendix D.

The rating noise level at the first-floor window at 1 Pakenham Street, with the mechanical plant operating, is predicted to be **29dB L_{Aeq}** which is **12dB(A) below** the lowest typical background noise level (41dB $L_{A90, 15min}$).

The rating noise level at the first-floor window at 20 Wren Street, with the mechanical plant operating, is predicted to be **23dB L_{Aeq}** which is **18dB(A) below** the lowest typical background noise level (41dB $L_{A90, 15min}$).

In accordance with BS 4142:2014 guidance, the rating noise ***"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 system is not expected, however, as a precaution plant should wherever possible be installed on suitable type isolators. The isolators shall incorporate rubber or neoprene high-frequency isolation

pads. The fan should be installed with flexible connections to adjacent structures.

Uncertainty

The levels of uncertainty in the data and calculations are considered to be low 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 air intake system, in accordance with BS 4142:2014 guidance, indicates to creating a low impact. All worst-case scenarios have been applied to the assessment. The predicted operating noise level of the air intake system is demonstrated to comply with the London Borough of Camden Council's policy.

APPENDIX A – Acoustic Terminology

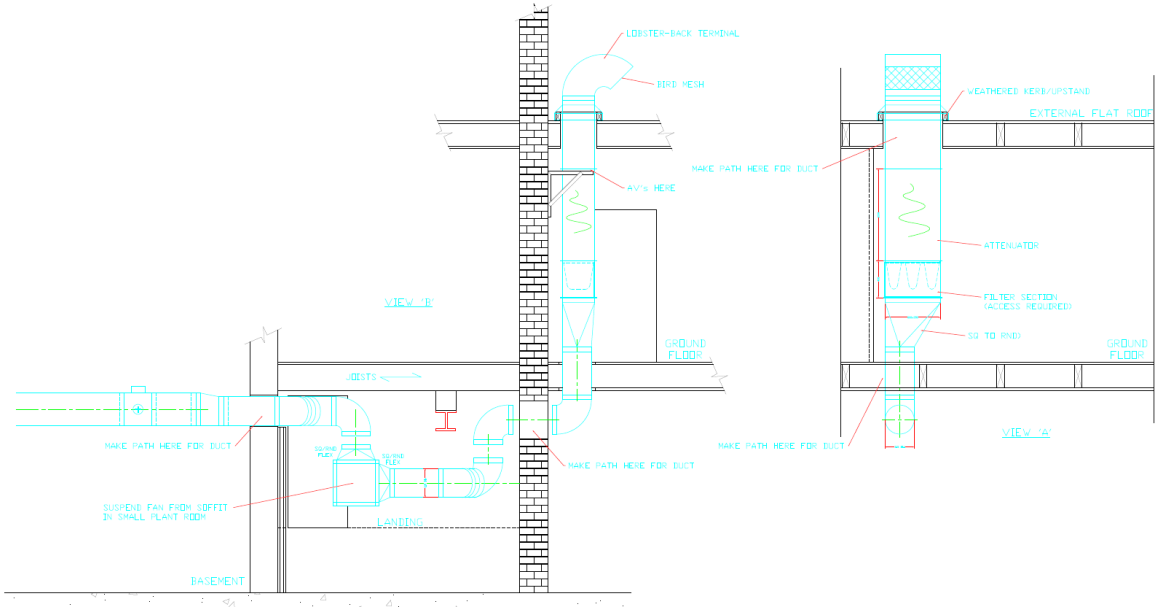
Parameter	Description
Acoustic environment	Sound from all sound sources as modified by the environment
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far
Ambient sound level, La = LAeq,T	Equivalent continuous A-weighted 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, LA90,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 ($20x10^{-6}$ Pascals).
Equivalent continuous A-weighted sound pressure level, LAeq,T	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time
Measurement time interval, Tm	Total time over which measurements are taken
Rating level, LAr,Tr	Specific sound level plus any adjustment for the characteristic features of the sound
Reference time interval, Tr	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, Lr = LAeq,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, Ls = LAeq,Tr	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr
Specific sound source	Sound source being assessed

References:

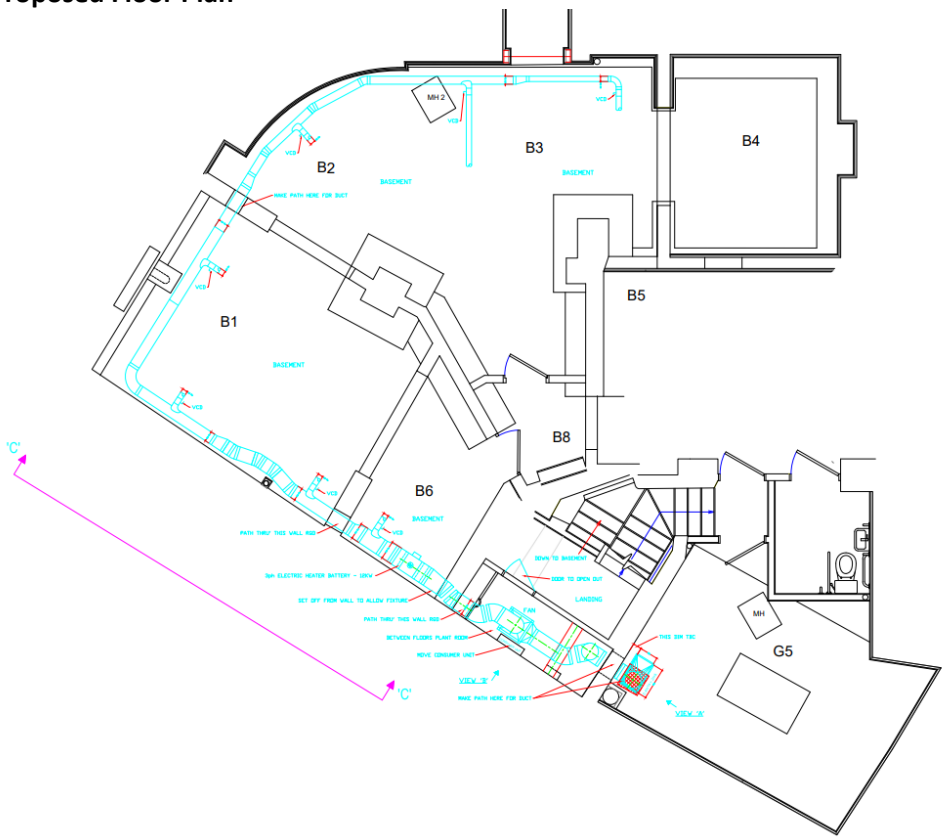
BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'

APPENDIX B – Data Sheets and Figures

Front and Side Elevations of Proposed Plant



Proposed Floor Plan



Systemair MUB 025 355DV Sileo Multibox

systemair

MUB 025 355DV SILEO MULTIBOX

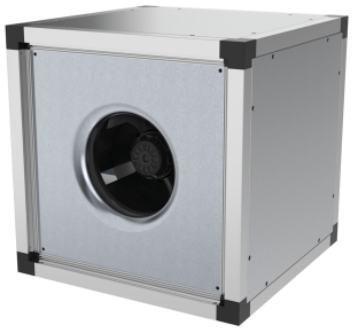
Item no. 37728

Version: 50 Hz; 90° airflow

Document type: **Product card**
Document date: **2019-03-25**
Generated by: **Systemair Online Catalogue**

Description

- Speed-controllable
- Modular system
- Integral thermal contacts
- Low sound level
- Flexible airflow direction due to removable panels
- Installation in any mounting position
- Maintenance-free and reliable



The MUB fans size 355 have impellers with backward curved blades, manufactured from polyamide. The MUB 355 is equipped with external rotor motors, fully speed controllable. The three phase motors are D/Y connected for two speed operation. Motor protection is done by thermal contacts, which have to be connected to an external motor protection device. The casing consists of a corrosion-resistant aluminium frame with fibreglass reinforced plastic corners of PA6; highly shockresistant. The double skin panels are manufactured from galvanised steel with 20 mm mineral wool insulation. To avoid condensation the profile is provided with a separate chamber to fix screws. The Multibox fans are delivered for straight through airflow but can easily be rebuilt due to removable panels. This allows flexible ventilation solutions. The MUB can also be used as extract- or supply air unit in air handling units. Installation in any mounting position is possible.

Note! Motors marked with E (e.g. E4) is 1-phased

Technical parameters

Nominal data		
Voltage	400	V
Frequency	50	Hz
Phase	3	~
Input power (P1)	267	W
Current	0,5	A
Max. airflow	0,836	m³/s
R.p.m.	1338	r.p.m.
Weight	30	kg
Temperature data		
Max. temperature of transported air	60	°C
Max. temperature of transported air when speed-controlled	60	°C
Sound data		
Sound pressure level at 3 m	51	dB(A)

Sound power level		63	125	250	500	1k	2k	4k	8k	Tot
Inlet	dB(A)	35	57	52	58	61	57	54	44	65
Outlet	dB(A)	36	59	54	59	63	58	56	46	67

Systemair LDR 60-35 Silencer

systemair

LDR 60-35 SILENCER

Item no. 5073

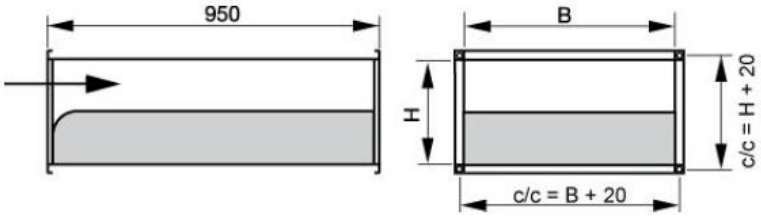
Document type: Product card
Document date: 2019-02-22
Generated by: Systemair Online Catalogue

Description

Silencer
Easily-fitted silencer immediately before or after the KE, KT, RS and RSI rectangular duct fans. Effectively suppresses noise transmitted to the duct. The silencer should be used together with an insulated fan where there is a requirement for noise suppression both in the duct and in the surroundings as a whole. All silencers are supplied with a universal flange suitable for PG flange or Metu profile.

Dimensions

	B	H	
LDR 30-15	300	150	10 kg
LDR 40-20	400	200	13 kg
LDR 50-25	500	250	17 kg
LDR 50-30	500	300	19 kg
LDR 60-30	600	300	21 kg
LDR 60-35	600	350	23 kg
LDR 70-40	700	400	27 kg
LDR 80-50	800	500	34 kg
LDR 100-50	1000	500	41 kg

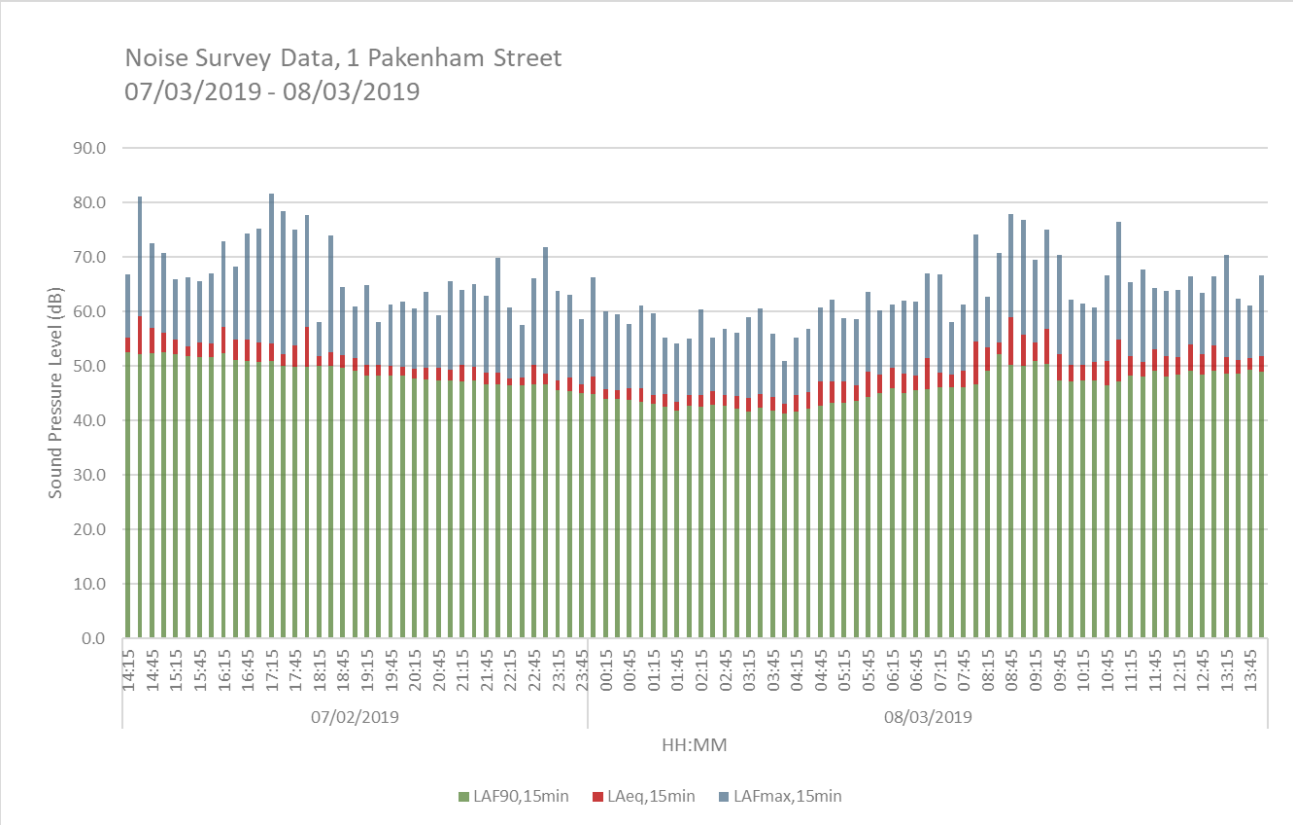


Acoustics

Noise suppression dB (mid-frequency Hz)

	125	250	500	1k	2k	4k	8k
LDR 30-15	7	15	18	25	25	19	19
LDR 40-20	5	9	15	23	16	12	10
LDR 50-25	10	15	25	25	20	15	12
LDR 50-30	8	15	20	31	17	14	11
LDR 60-30	8	15	20	31	17	14	11
LDR 60-35	7	13	17	18	13	10	8
LDR 70-40	7	11	14	14	10	8	6
LDR 80-50	6	8	10	11	8	6	3
LDR 100-50	6	8	10	11	8	6	3

APPENDIX C – Noise monitoring Data



Date	Time	$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{AF90,15min}$	Date	Time	$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{AF90,15min}$	Date	Time	$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{AF90,15min}$
07/02/2019	14:15	55.3	66.9	52.5	07/03/2019	22:15	47.8	60.8	46.4	08/03/2019	06:15	49.7	61.3	45.9
	14:30	59.2	81.2	52.1		22:30	47.9	57.6	46.5		06:30	48.7	62.1	45.1
	14:45	57.0	72.5	52.4		22:45	50.2	66.1	46.6		06:45	48.3	61.8	45.6
	15:00	56.2	70.7	52.5		23:00	48.7	71.7	46.6		07:00	51.6	67.0	45.8
	15:15	54.8	65.9	52.1		23:15	47.3	63.8	45.5		07:15	48.7	66.8	46.2
	15:30	53.7	66.4	51.8		23:30	47.9	63.1	45.4		07:30	48.4	58.1	46.2
	15:45	54.4	65.5	51.7		23:45	46.7	58.7	45.0		07:45	49.1	61.3	46.1
	16:00	54.2	67.0	51.7	08/03/2019	00:00	48.1	66.2	44.9		08:00	54.6	74.2	46.7
	16:15	57.2	72.9	52.4		00:15	45.7	60.1	43.9		08:15	53.4	62.7	49.2
	16:30	54.9	68.3	51.2		00:30	45.6	59.4	43.9		08:30	54.4	70.7	52.2
	16:45	54.9	74.4	50.9		00:45	45.9	57.8	43.8		08:45	58.9	77.9	50.2
	17:00	54.4	75.2	50.7		01:00	46.0	61.1	43.4		09:00	55.8	76.9	50.1
	17:15	54.1	81.7	51.0		01:15	44.7	59.6	43.0		09:15	54.3	69.5	50.9
	17:30	52.1	78.4	50.1		01:30	44.8	55.1	42.5		09:30	56.8	75.0	50.4
	17:45	53.8	75.1	49.9		01:45	43.4	54.2	41.8		09:45	52.2	70.5	47.4
	18:00	57.2	77.8	49.9		02:00	44.7	55.0	42.8		10:00	50.2	62.2	47.1
	18:15	51.9	58.1	50.1		02:15	44.8	60.3	42.6		10:15	50.2	61.5	47.4
	18:30	52.5	73.9	50.0		02:30	45.3	55.2	42.9		10:30	50.7	60.7	47.4
	18:45	52.1	64.5	49.6		02:45	44.7	56.9	42.7		10:45	50.9	66.7	46.5
	19:00	51.4	60.9	49.2		03:00	44.5	56.1	42.1		11:00	54.9	76.4	47.2
	19:15	50.3	64.9	48.3		03:15	44.2	59.0	41.6		11:15	51.8	65.4	48.3
	19:30	50.3	58.0	48.3		03:30	44.9	60.6	42.3		11:30	50.7	67.7	48.0
	19:45	50.1	61.3	48.2		03:45	44.4	56.0	41.9		11:45	53.1	64.2	49.2
	20:00	49.9	61.8	48.2		04:00	43.1	50.9	41.3		12:00	51.8	63.8	48.0
	20:15	49.5	60.6	47.8		04:15	44.8	55.2	41.6		12:15	51.7	64.0	48.5
	20:30	49.6	63.6	47.6		04:30	45.2	56.8	42.1		12:30	54.0	66.5	49.1
	20:45	49.7	59.3	47.4		04:45	47.3	60.7	42.7		12:45	52.3	63.5	48.5
	21:00	49.3	65.7	47.4		05:00	47.2	62.3	43.2		13:00	53.7	66.5	49.1
	21:15	50.2	63.9	47.2		05:15	47.2	58.8	43.2		13:15	51.6	70.5	48.7
	21:30	49.8	65.0	47.3		05:30	46.5	58.6	43.6		13:30	51.2	62.4	48.7
	21:45	48.7	62.9	46.6		05:45	49.1	63.6	44.4		13:45	51.5	61.1	49.3
	22:00	48.7	69.9	46.6		06:00	48.5	60.2	45.1		14:00	51.8	66.6	49.0

APPENDIX D – Calculations

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
	61.2	73.1	60.6	61.2	61	55.8	53	45.1	74.16
Total LW	61.2	73.1	60.6	61.2	61.0	55.8	53.0	45.1	74.16
'A' Weight	26.2	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	35.0	57.0	52.0	58.0	61.0	57.0	54.0	44.0	65.22
LPA at New Dist'	17.49	39.49	34.49	40.49	43.49	39.49	36.49	26.49	47.71
SILENCER	0	7	13	17	18	13	10	8	
DUCT BENDS (4)	0	2	24	32	16	12	12	12	
DUCT LENGTH, 8m	5	3	2	1	1	1	1	1	
DIRECTIVITY 120°	0	2	6	10	13	20	22	22	
LPA After Insert	**12.69**	**25.29**	**-10.91**	**-19.31**	**-4.31**	**-6.31**	**-8.31**	**-16.31**	**25.53**

Sound Pressure Level @ 1 Pakenham Street (3m) + Intermittency Correction = 29dB(A)

Attenuation per double distance required = (6dB for LpA recommended)				6	dB			Metres	
					Enter Distance =			7	
	Frequency Hz								
	63	125	250	500	1000	2000	4000	8000	Total
	61.2	73.1	60.6	61.2	61	55.8	53	45.1	74.16
Total LW	61.2	73.1	60.6	61.2	61.0	55.8	53.0	45.1	74.16
'A' Weight	26.2	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	35.0	57.0	52.0	58.0	61.0	57.0	54.0	44.0	65.22
LPA at New Dist'	10.16	32.16	27.16	33.16	36.16	32.16	29.16	19.16	40.38
SILENCER	0	7	13	17	18	13	10	8	
DUCT BENDS (4)	0	2	24	32	16	12	12	12	
DUCT LENGTH, 8m	5	3	2	1	1	1	1	1	
DIRECTIVITY 45°	0	0	0	-1	0	1	3	4	
LPA After Insert	**5.36**	**19.96**	**-12.24**	**-15.64**	**1.36**	**5.36**	**3.36**	**-5.64**	**20.40**

Sound Pressure Level @ 20 Wren Street (7m) + Intermittency Correction = 23dB(A)