

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

9 BREWHOUSE YARD, GRAVESEND DA12 2EJ

FOR

GOYA WORKS LTD



ISSUE STATUS: FINAL
DATE OF ISSUE: 22/11/2022
AUTHOR: M LAUEZZARI, MIOA MIOL
CHECKED: L ANKERS, AMIOA
APPROVED: M LAUEZZARI, MIOA MIOL

Contents Page

1	Executive Summary	
2	Introduction	
3	Site Description	
4	Determination of Background Noise Levels	
5	Noise Survey Results	
6	External Noise Emission Limits	
	6.1	Local Authority Requirements
	6.2	BS 4142:2014+A1:2019
7	Proposed Kitchen Extraction System and Associated Noise Levels	
	7.1	Silencer
8	Noise Impact Assessment	
	8.1	Proposed Operational Hours and Background Noise Levels
	8.2	Nearest Noise Sensitive Properties
	8.3	Description of Calculation process
	8.4	Noise Level Prediction
	8.5	Vibration
9	Conclusion	
Appendix A Acoustic Terminology & References		
Appendix B Data Sheets and Figures		
Appendix C Calculations		

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 is seeking planning approval for the installation of a kitchen extraction system to service the premises at 9 Brewhouse Yard, Gravesend DA12 2EJ.

Sound Licensing has used recent noise monitoring data (Venta Acoustics Report Ref: Report VA3207.200728.NIA) completed at the site in July 2020 in order to determine prevailing background noise levels that are representative of the most effected sensitive property. Which has been identified as the residential block approximately 40m to the West of the site.

The historic data is considered reasonable given the location of the measurement positions 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 property is considered to comply with the Gravesham Borough Council's policy.

2. INTRODUCTION

The client is seeking planning permission for the installation of a kitchen extraction system to service the premises at 9 Brewhouse Yard, Gravesend DA12 2EJ, the noise from which could have the potential to affect existing noise sensitive properties nearby.

The purposes of this report are:

- To identify 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 installation of a kitchen extraction system to service the premises at 9 Brewhouse Yard, Gravesend DA12 2EJ (hereafter referred to as 'the site'). The property is a traditionally built two-storey building in the Borough of Gravesham. It is located in a mixed-use area with commercial & residential properties.

The most effected residential receptors were noted to be the first-floor windows on the rear façade of the residential block to the West approximately 40m 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. DETERMINATION OF BACKGROUND NOISE LEVELS

A recent noise survey at in the area carried out by Venta Acoustics (Reference: Report VA3207.200728.NIA) for a new kitchen extraction system at 9 Brewhouse Yard has been identified as providing data relevant to this site. The measurement position used during the previous survey is relevant to this site and are indicated in Figure 4.1 below in orange on Figure 4.1 below.

Figure 4.1 Site Plan Showing Approximate Location of Measurement Position



Source: Google Maps

5. NOISE SURVEY RESULTS

5.1 Results

A summary of the measured typical background noise levels at the measurement position is shown in Table 5.1 below.

Table 5.1 Measured Typical Background Noise Levels

Date / Period (hours)	Typical Background Sound Pressure Level, dB
	$L_{A90,5min}$
21-23/07/20 (08:00 to 22:00)	39

The typical background noise level at the measurement position during the survey, at the time in which the plant could be operational, is **39dB $L_{A90,5min}$** . This representative noise level is considered appropriate for the assessment.

6. EXTERNAL NOISE EMISSION LIMITS

6.1 Local Authority Requirements

The site lies within the jurisdiction of the Local Authority, Gravesham Borough Council. In previous applications the Environmental Health department have requested that the assessment be completed in accordance with BS4142:2014+A1:2019 and that it should demonstrate that the operating noise level of the plant will be at a minimum of 10dB(A) below the assessed typical background noise level, $L_{A90,T}$.

For the purposes of this report, an assessment has been undertaken in line with BS 4142:2014+A1:2019. 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 data in Section 4 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

Date / Period (hours)	Typical Background Sound Pressure Level, dB $L_{A90,5min}$	Rating Noise Level at Nearest Residential Facade, dB $L_{Ar,T}$
21-23/07/20 (08:00 to 22:00)	39	29

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. PROPOSED AIR EXTRACTION SYSTEM AND ASSOCIATED NOISE LEVELS

It is proposed to install the following items of plant at the side of the premises:

Table 7.0 Proposed Kitchen Extraction Fan Motor

External Plant Item	Quantity	Make	Model	Reference Noise Level* $L_{W(A)}$
Kitchen Extraction Fan Motor	1	Helios	GBW 560/4	Outlet 82dB

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

The ducting of the extraction system will be 600mm x 300mm rectangular ducting. The extraction fan motor will be located internally and therefore only noise from the duct terminus has been considered.

In reference to section 6.2 of this report, a penalty addition has not been applied for intermittency as the system will be switched on at the beginning of service and off at the close of service. 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 1 No. Acoustica R02 8-1200 Silencer on the atmosphere side of the fan. The silencers provide the attenuation shown in Table 7.1. All silencers should be Melinex lined.

Table 7.1 R02 8-1200 Silencer Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
5	10	19	24	23	14	6

8. NOISE IMPACT ASSESSMENT

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

8.1 Proposed Operational Hours and Background Noise Levels

The kitchen extraction system will operate as required during the opening hours of the proposed business. The opening hours are from 08:00 - 22:00 hours 7 days a week.

The typical background noise level at the measurement position during the survey is **39dB** $L_{A90,5min}$. The design range is **29dB** $L_{Ar,T}$ at the façade of the nearest residential premises.

8.2 Nearest Noise Sensitive Properties

The nearest sensitive residential receptors were noted to be the first-floor windows on the rear façade of the building West of the site at an approximate distance of 40m 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 mechanical plant 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 C.

The rating noise level at the 1st floor window, with the mechanical plant operating, is predicted to be **29dB** $L_{Ar,T}$ which is **10dB(A) below** the typical background noise level (39dB $L_{A90,5min}$).

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 system is not expected, however, as a precaution plant should wherever possible be installed on suitable type isolators. The fans should be installed with flexible connections to adjacent structures.

Uncertainty

The levels of uncertainty in the data and calculations are considered to be 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.

8. 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 proposed 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 air extraction system is demonstrated to comply with the Gravesham Borough Council's policy.

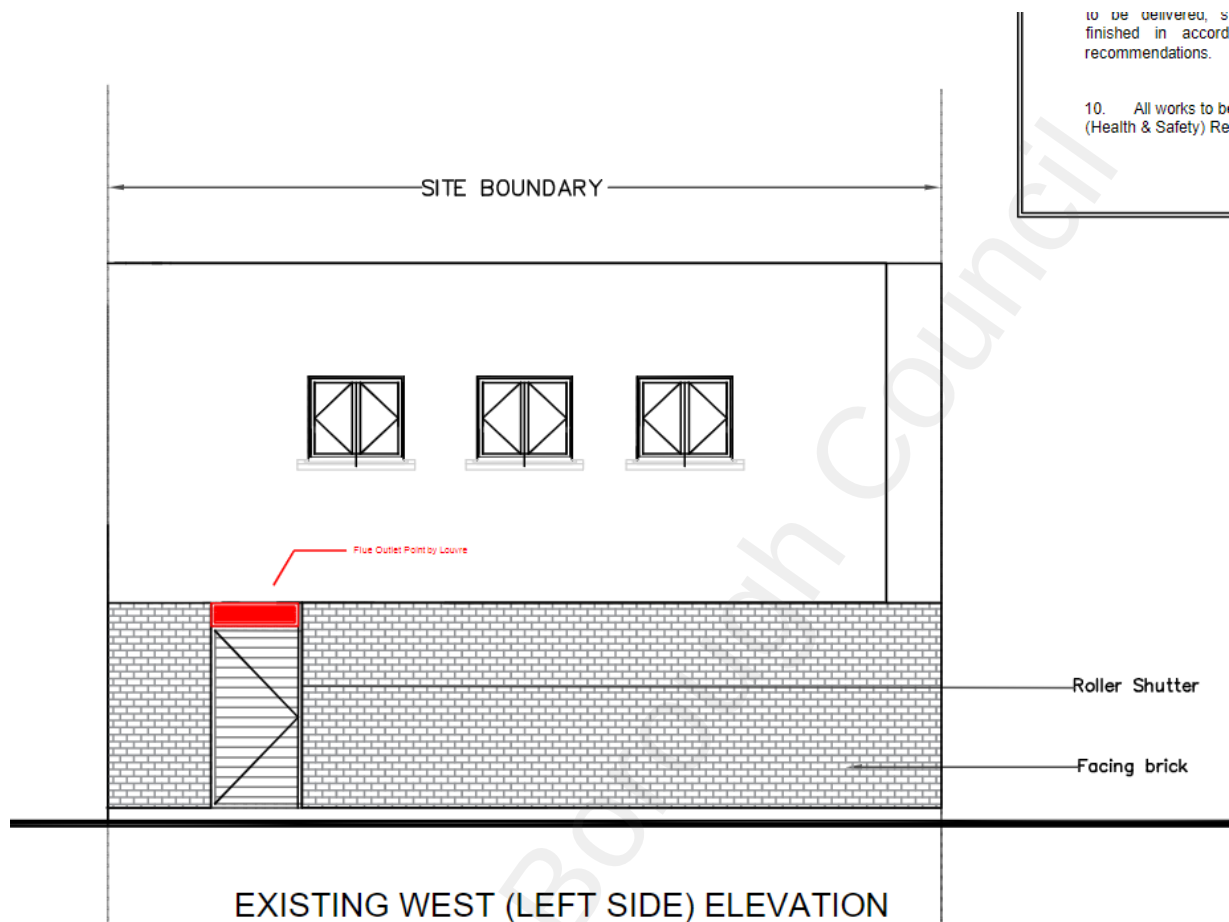
APPENDIX A – Acoustic Terminology

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, $L_a = L_{Aeq,T}$	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, $L_{Aeq,T}$	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, 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, $L_r = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T
Specific sound level, $L_s = L_{Aeq,Tr}$	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+A1:2019 'Methods for rating and assessing industrial and commercial sound'

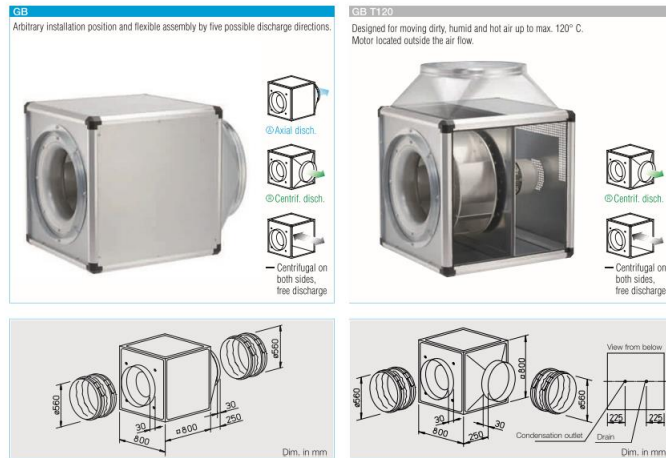
Proposed Side (West) Elevation



Extraction Fan Motor – Helios Gigabox GBW 560/4

560 mm ø GigaBox centrifugal fan

Helios



- Special features of types GB T120**
 - Designed for moving dirty, humid and hot air volumes up to max. 120° C.
 - Motor located outside of air flow.
 - Temperature insulated partition panel between motor and impeller, lined with 20 mm thick, flame-retardant mineral wool.
 - Easily accessible motor and impeller unit, removable without disassembling the system components.
 - Inspection cover with handle, simply remove for cleaning and maintenance.
 - Condensate collector with condensate spigot included in delivery. Drill hole for rain drainage (accessories) for outdoor installation is prepared.
- Assembly GB T120**
 - Installation must be carried out with condensation discharge showing downward. Flexible assembly by three possible centrifugal discharge directions via the discharge adapter.
 - Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).
- Feature**
 - Assembly of types GB**
 - Arbitrary installation position and flexible assembly by five possible discharge directions via the discharge adapter.
 - For wall mounting the wall bracket (accessories) have to be used. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).
- Specification of both types**
 - Casing**
 - Self-supporting frame construction from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel, lined with 20 mm thick temperature insulating and flame-retardant mineral wool. Intake cone for ideal inflow as well as spigot and flexible sleeve (for the respective max. permissible air flow temperature) for duct connection. With discharge adapter (from square to circular) on the pressure side for low-loss discharge and flexible sleeve to reduce vibration transmission. Simple positioning by standard crane hooks.
 - Impeller**
 - Smooth running backward curved aluminium centrifugal impeller highly efficient and direct driven. Energy efficient with a low noise development. Dynamically balanced together with the motor to DIN ISO 1940 Pt.1 – class 6.3.
 - Motor**
 - Maintenance-free external rotor motor or IEC-standard motor protected to IP 54. With ball bearings and interference-free as standard.
 - Electrical connection**
 - Standard terminal box (IP 54) fitted on the motor, with GB T120 fitted on the motor support plate.

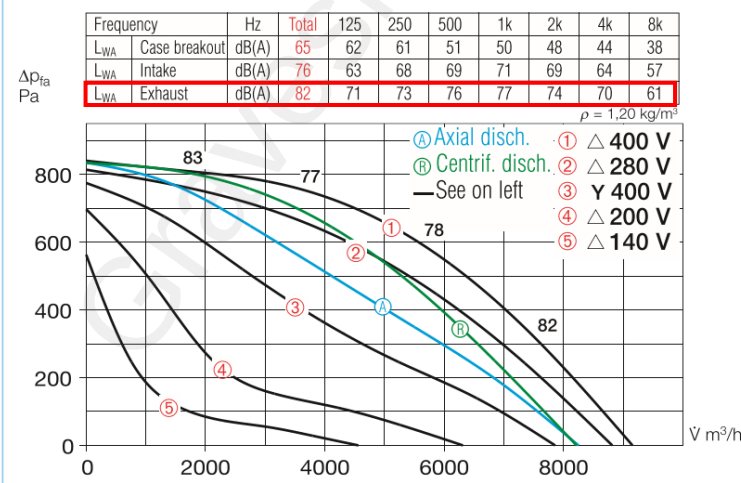
Type	Ref. no.	Air flow volume (FID)	RPM	Sound press. class breakout	Motor power (nominal)	Full load	Current speed controls	Wiring diagram	Maximum air flow temperature	Weight (net)	5 step transformer controller with mtd. protected unit	Full motor protection unit using the thermal contacts
1 Phase motor, 230 V / 3 ph / 50 Hz, capacitor motor, protection to IP 54												
GBW 560/4	5508	9120	1498	45	1.80	7.90	10.4	867	45	45	92	MWS 10 1946 TSW 10 1498 MW 15 1579
2 speed motor, 3 Phase motor, 400 V / 3 ph / 50 Hz, Y- wiring, protection to IP 54												
GBW 560/4/6	5522	7800/9000	705/885	35	0.51/0.80	0.90/1.85	1.90	867	60	60	80	RDS 4 1316 TSD 3.0 1502 MD 5849
GBW 560/4/4	5521	11500/13000	1110/1300	44	1.70/2.60	2.80/4.80	4.90	867	55	45	90	RDS 7 1578 TSD 7.0 1504 MD 5849
2 speed motor, 3 Phase motor, 400 V / 3 ph / 50 Hz, Y- wiring, protection to IP 54												
GBW 560/4/4 T120	5778	11520/12300	1250/1400	48	1.85/2.50	3.20/6.80	6.80	520	120	120	105	RDS 7 1578 TSD 7.0 1504 MD 5849

1) incl. operation switch

258

Helios Gigabox GBW 560/4 Acoustic Data

GBW 560/4



Acoustica R02 8-1200 Silencer



INSERTION LOSS (db) - CENTRE BAND FREQUENCY									
PRODUCT CODE	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
R02-8-600	2	2	5	12	12	11	7	4	
R02-8-900	2	4	7	15	19	18	10	5	
R02-8-1200	3	5	10	19	24	23	14	6	
R02-8-1500	3	7	12	24	30	30	19	7	
R02-8-1800	4	8	16	27	35	36	20	8	
R02-8-2100	5	9	20	33	42	42	26	10	
R02-8-2400	5	10	23	38	45	45	28	12	

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.

R02 8 RECTANGULAR SILENCER
Available in eight standard lengths R02 8 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 8 silencers with a face velocity above 7 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.

RESISTANCE TO AIRFLOW (Pa)						
FACE VELOCITY M/S	3.0	4.0	5.0	6.0	7.0	
R02-8-600	9	15	22	35	45	
R02-8-900	9	15	24	35	46	
R02-8-1200	9	16	25	36	48	
R02-8-1500	9	16	24	36	48	
R02-8-1800	10	17	27	37	49	
R02-8-2100	11	18	26	38	50	
R02-8-2400	12	18	28	40	52	

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



ACOUSTICA MANUFACTURING LTD

01794 528 350 info@aco-on.com aco-on.com



APPENDIX C – Calculations

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

	6	dB				Metres	
	Enter Distance =					40	
	Frequency Hz						
	125	250	500	1000	2000	4000	8000
	87.1	81.6	79.2	77	72.8	69	62.1
Total LW	87.1	81.6	79.2	77.0	72.8	69.0	62.1
'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1
LWA (Power)	71.0	73.0	76.0	77.0	74.0	70.0	61.0
LPA at New Dist'	31.07	33.07	36.07	37.07	34.07	30.07	21.07
SILENCER	5	10	19	24	23	14	6
LPA After Insert	26.07	23.07	17.07	13.07	11.07	16.07	15.07
							28.83

Extraction Fan Terminus @ 40m = 29dB LAeq,T