NOVA HD BIM DESIGN

122 HIGH STREET, TW11 8JB

PLANT NOISE SURVEY & ASSESSMENT REPORT

Revision 00

HUSEYIN ZABUN

DIRECTOR/MECHANICAL ENGINEER

Document Revisions

Issue	Date	Reason for issue	By
00	08/06/2022	First issue	HZ

Table of Contents

1. **INTRODUCTION** 3
2. **SITE DESCRIPTION** 3
3. **ENVIRONMENTAL NOISE SURVEY** 4
4. **NOISE ASSESMENT/CALCULATION** 6
5. **SUMMARY** 8

Appendix A – Acoustic Terminology

Appendix B – Datasheets

1. INTRODUCTION

This document is prepared to provide plant noise assessment of commercial kitchen canopy ventilation at 122 HIGH STREET, TW11 8JB . This document is to be read in conjunction with the Goya Works drawings.

An extractor fan unit has been installed on the roof located at the rear of the property which require retrospective planning approval.

This assessment presents results of a noise study undertaken, and analysis of mitigation measures required to meet The London Borough of Richmond upon Thames noise criteria.

The London Borough of Richmond upon Thames has raided the following comments:
"Noise Impact Assessment to be carried out before determine the application"

The following technical noise assessment has been prepared to support the planning application to The London Borough of Richmond upon Thames .This report details the existing background sound climate at the nearest receptors, as well as the sound emissions associated with the Proposed Development.

This noise assessment is necessarily technical in nature; therefore, Noise units and acoustic terminology a have been presented and briefly discussed in Appendix A.

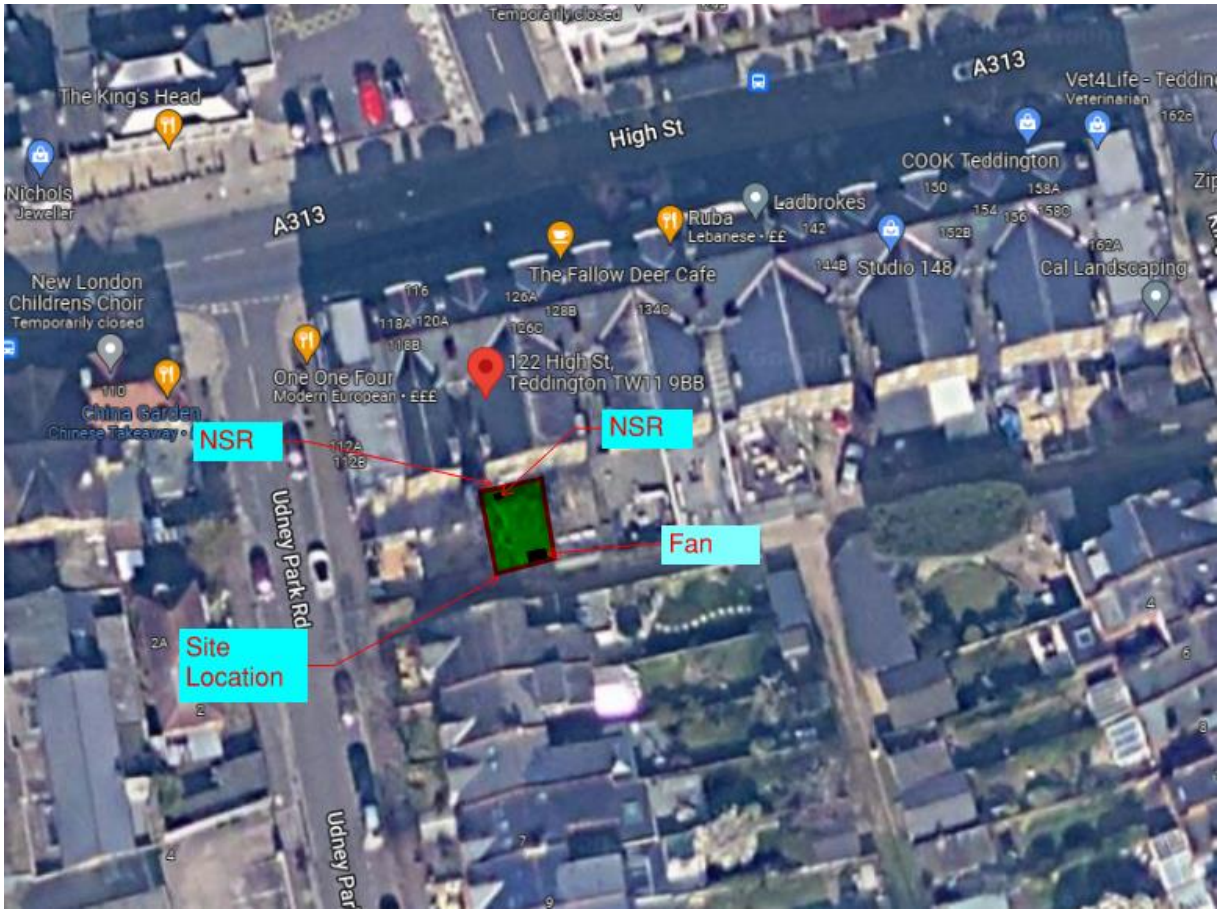
The scope of the noise assessment can be summarized as follows:

- Baseline sound monitoring survey to evaluate the prevailing background sound levels at the nearest sensitive receptor ('NSR') to Site;
- Detailed sound modelling, acoustic calculation and analysis in accordance with; ISO9613 – 1 ISO 9613-2 - Attenuation of sound during propagation outdoors prediction methodology, to predict sound levels at the NSR;
- A detailed assessment of the suitability of the Site, in accordance with relevant standards in respect of sound from the proposed sources; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Policy Framework (2019), Noise Policy Statement for England (2010) and British Standard BS 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound. Further information on the legislation can be found in Appendix B.

2. SITE DESCRIPTION

An extractor fan unit has been installed on the roof located at the rear of the property see figure 1 . Ducting penetrates the kitchen roof and terminates on outlet on far rear side of the property away from windows of the nearest noise sensitive receptor.

Figure 1. Site Location



Extract system Configuration is as follow ;
ESP filter + Carbon filter box + Silencer + Fan + Silencer

Context & Subjective Impression

The area surrounding site is primarily a mixture of commercial with residential. To the north runs High Street, which provides moderate to high traffic flow levels. There are several commercial premises along high street as 'One One Four' and 'Falloow deer'. among others.
There are also restaurants as 'Ruba' and 'Piezza Frenze', which opens up to 22:30.
The noise profile of the area is dominated by road noise from High Street and its surrounding network, and noise from surrounding commercial premises and associated activities.

3. ENVIRONMENTAL NOISE SURVEY

An extractor fan unit installed on the roof located at the rear of the property and terminates with a silencer on outlet . The fan has anti-vibration mountings to isolate the fan from the building.

Kitchen Extract Fan:

- Fan Manufacturer's name: Helios
- Equipment name and product code: GBW 560/4
- Noise figures (dB) - Centre Band Frequency as on datasheets attached.

Outlet Silencer:

- Silencer Manufacturer's name: Helios
- Equipment name and product code: Circular Silencer RSD 560/600
- Insertion Loss (dB) - Centre Band Frequency as on tables below and also see datasheets

Figure 2 . Extractor fan duct, measurement position and nearest residential window

Noise measurements were taken between approximately 03:00 and 04:30 hrs on Wednesday 8th April 2022. The noise meter was positioned 1 m from the nearest 1st floor residential window as shown in Figure 2 above.

Noise levels were measured using a Tekcoplus Slm25tk Data Logging sound level meter. The Sound meter was mounted on a tripod and the microphone was fitted with a weatherproof windshield.

To capture background noise, levels were recorded without fan in operation at the start and finish of measurements.

Noise levels generated by the extractor fan were measured in max. user confirmed speed settings: Speed 4, for a period of 15 minutes at setting.

Table 1 presents the results of the noise survey captured 1 m from the nearest resident window during the periods stated above.

Table 1: Measured Noise levels

Measurement condition @ N.S.R	Noise Level dBA	
	$L_{Aeq, T}$	$L_{A90, T}$
Plant operating – Speed 4	57	54
Plant OFF - Residual Noise	56	53

*N.S.R = Noise Sensitive Receptors.

Using the measured levels presented in the previous section, a noise impact assessment has been undertaken, see Table 1 measured levels and calculation based on equipment technical specification.

4. NOISE ASSESMENT/CALCULATION

Assesment Source	Assessment Position
Kitchen Extract outlet	6m (to nearest residential property window)

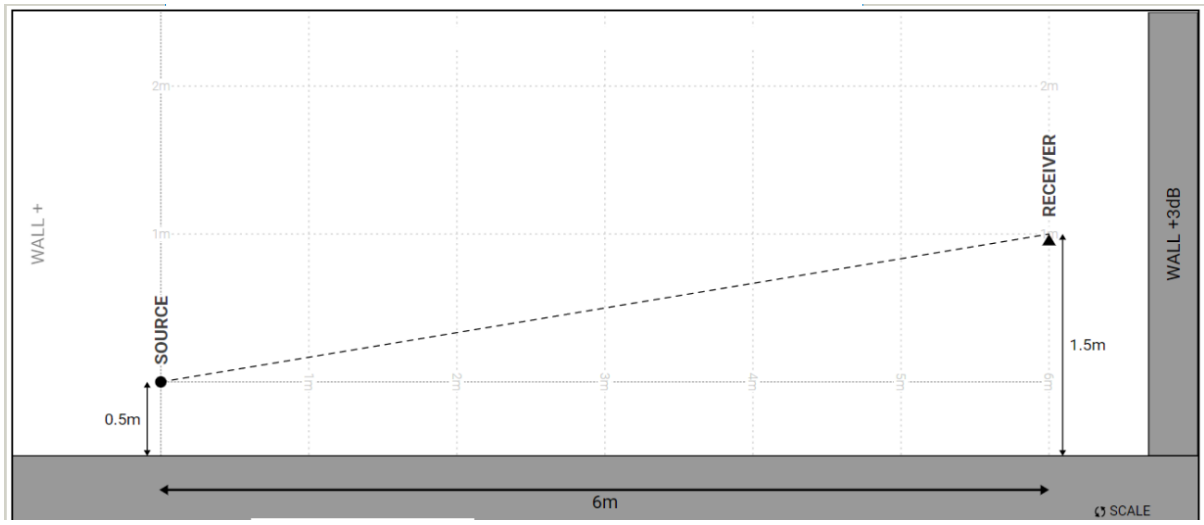


Table 2 - Fan noise levels:

Helios GBW 560/4		Centre Frequency (Hz)						
	TOTAL	125	250	500	1.0k	2.0k	4.0k	8.0k
Lwa Extract (dBA)	82	71	73	76	77	74	70	61

Table 3 - Attenuator insertion losses:

Acoustica R02 - 4 - 900	Centre Frequency (Hz)						
	125	250	500	1.0k	2.0k	4.0k	8.0k
(dBA)	4	7	14	14	9	10	7

Table 4 - Initial Assessment

Extract Side	125	250	500	1.0k	2.0k	4.0k	8.0k	Lw dB
Fan Outlet	71	73	76	77	74	70	61	**82.0**
Bend Section	0	0	0	0	0	0	0	
Duct Length	0	0	0	0	0	0	0	
End Reflection Loss	-4	-1	0	0	0	0	0	
Directivity	0	0	0	0	0	0	0	
Lw to Lp Conversion	-11	-11	-11	-11	-11	-11	-11	
Calculated Discharge Noise Level @1meter	56	61	65	66	63	59	50	70.7
Distance Correction(propagation) to Residential window @6meter	-16	-16	-16	-16	-16	-16	-16	
Reflection at Residential	3	3	3	3	3	3	3	
Calculated Fan Noise Level at Residential window Laeq @N.S.R*	43	48	52	53	50	46	37	57.7

Table 5 - Mitigated Assessment

Extract Side	125	250	500	1.0k	2.0k	4.0k	8.0k	Lw dB
Fan Outlet	71	73	76	77	74	70	61	**82.0**
600mm Attenuator	-4	-7	-14	-14	-9	-10	-7	
Bend Section	0	0	0	0	0	0	0	
Duct Length	0	0	0	0	0	0	0	
End Reflection Loss	-4	-1	0	0	0	0	0	
Directivity	0	0	0	0	0	0	0	
Lw to Lp Conversion	-11	-11	-11	-11	-11	-11	-11	
Calculated Discharge Noise Level @1meter	52	54	51	52	54	49	43	**60.2**
Distance Correction(propagation) to Residential window @6meter	-16	-16	-16	-16	-16	-16	-16	
Reflection at Residential	3	3	3	3	3	3	3	
Calculated Fan Noise Level at Residential window Laeq @N.S.R*	**39**	**41**	**38**	**39**	**41**	**36**	**30**	**47.2**

*N.S.R = Noise Sensitive Receptors.

Table 6- Extract Position :

Source	Assessment Position	Assessment Position
Highest Resultant Noise Levels Assessment Position	6m from Extract Vent	$L_{Aeq,}$ 47 dB

Table 7 - Calculated Noise Level Summary

Results	L_A dB
Background Sound Level LA90 =	53 dBA
Calculated Sound level LAeq =	47 dBA
Excess of Rating Over Background Sound Level	-5dBA

When the difference between two-decibel measurements is 5dB(A) or above, the amount added is 1 dBA.

5. SUMMARY

The assessment above indicates that the rating level is below the background sound level at the noise sensitive receptor by - 5.0 dBA. This indicates negligible/minimal Impact, Dependant on Context impact on the surrounding residential Noise Sensitive Receptors.
When the difference between two-decibel measurements is 5dB(A) or above, the amount added is 1 dBA. And alsoSite survey Measured Noise levels is also inline with assessment that there is 1 dBA difference between plant operating and plant off situation.

Disclaimer

The opinions and interpretations presented in this report represent our best technical interpretation of the data made available to us. However, due to uncertainty inherent in the estimation of all parameters, we cannot, and do not guarantee the accuracy or correctness of any interpretation and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, cost, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. If additional information becomes available which may affect our comments, conclusions or recommendations, the author reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly. Except for the provision of professional services on a fee basis, NOVA HD BIM does not have a commercial arrangement
with any person or company involved in the interests that are the subject of this report. NOVA HD BIMcannot accept any liability for the correctness, applicability or validity for the information they have provided, or indeed for any consequential costs or losses in this regard. Our efforts have been made on a “best endeavours” basis and no responsibility or liability is warranted or accepted by NOVA HD BIM

Appendix A – Acoustic Terminology

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20μPa (20x10-6 Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L90 can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

Common sound levels:

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided. The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source. A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 2 dB(A) is just perceptible). Therefore, a 1 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the LA10, the noise level exceeded for 10% of the measurement period. The LA90 is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of

discrete events.

An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, LAeq.

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound. To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS4142:2014 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as LA90,1hour dB and LA90,15mins dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125ms .

APPENDIX B

PRODUCT DATA SHEETS

- Canopy Extract fan: Helios Gigabox GBW 630/4
- Silencers : Flakt Woods Ltd – Circular Silencer SB281401

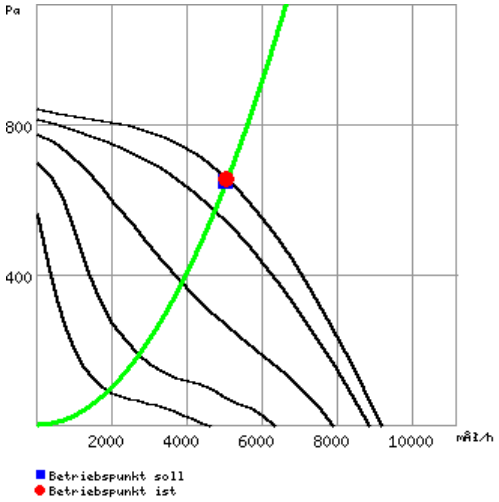
Product 5508 GBW 560/4

Image

Characteristics

● - Current working point ■ - Specified working point

Static pressure Pa



Air flow volume m³/h

Layout for centrifugal discharge on both sides only. For other discharge direction, please see performance curve in the catalogue.

Properties

Ref.no.	5508 - 002
Model	GBW 560/4
Description	Gigabox with discharge adapter and flex. sleeve, 1-ph., controllable
Actual pressure	653 Pa static
Actual volume	5050 m³/h
Air flow volume	100 %
Speed	1409 min-1
FLC un-controlled	7.930 A
STC un-controlled	28.548 A
Power consumption	1.83 kW
Voltage	230 V / 1 ph / 50 Hz
Max.temp.	45 °C (45 °C if controlled)
Wiring diagram no.	865
Weight	92.00 kg
Delivery time	On request
Acoustic data:	
Sound in-duct	56 in 4 m
Case breakout	45 in 4 m

Intake	**Hz**	**Total**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Lwa Intake	dB(A)	76	63	68	69	71	69	64	57
Lwa Extract	dB(A)	82	71	73	76	77	74	70	61
Lwa Breakout	dB(A)	65	62	61	51	50	48	44	38

Description

GBW 560/4
Gigabox with discharge adapter
and flex. sleeve, 1-ph., controllable

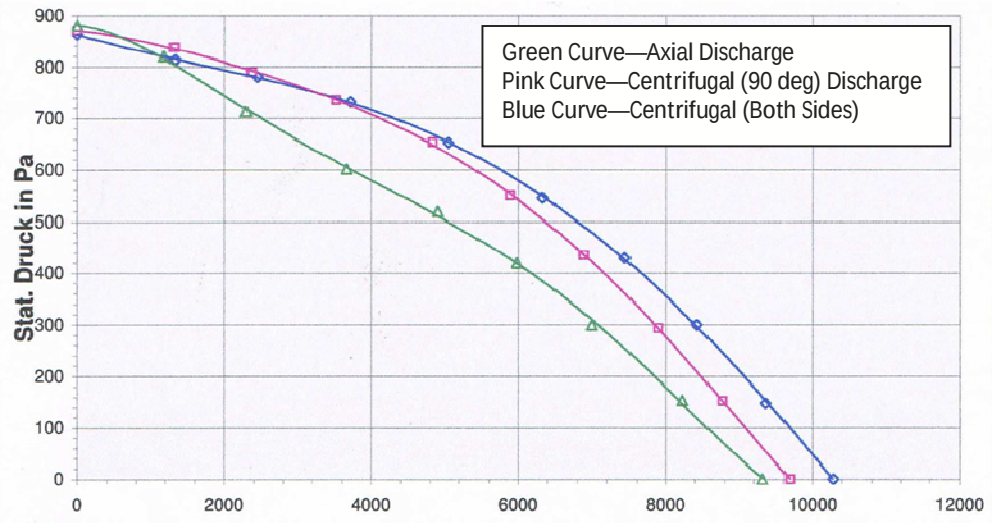
Cubic ventilation box with intake and extract spigots, with flexible connectors to reduce vibration transmission and variable applicable side panels to suit to structural conditions. Simple positioning by standard crane hooks.

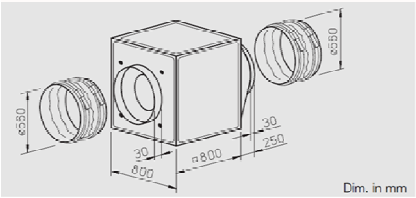
Self-supporting frame construction made from hollow aluminum profiles. Lined with 20 mm thick double-walled side panels made from galvanised sheet steel, sound and thermally insulated with flame-retardent minal wool. The casing panels can be replaced as required with accessories, such as the external weather louvre and condensate collector. Other accessories, wall bracket and outdoor cover hood.

Free-running backward curved centrifugal impeller from aluminium, direct driven. Energy efficient with low noise development. Dynamically balanced with the motor to DIN ISO 1940 Pt.1 – class 6.3

Single phase, enclosed, maitenance free external rotor motor with thermal contacts wired to the terminal block, speed controllable by voltage reduction. Low-noise, sealed for life ball bearings.Mains supply via terminal box which is fitted externally on the motor as standard (IP 54).

GBW 560/4





$\Delta p_{stat.}$ Pa

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	64	64	64	48	50	46	43	37
L_{WA}	Intake	dB(A)	77	57	66	69	74	70	64	55
L_{WA}	Extract	dB(A)	81	62	74	75	75	74	70	61

Self supporting frame construction from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel. Intake cone for ideal airflow, spigot and flexible connector for duct connection. With discharge adapter (square to circular) on the pressure side for low-loss discharge and flexible sleeve to reduce vibration transmission. Simple positioning by standard crane hooks. Installation must be carried out with condensation discharge showing downward. Flexible assembly by three possible centrifugal discharge directions via discharge adapter. Outdoor installation is possible using outdoor cover hood and external weather louvres (accessories).

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 44 and 54. With ball bearings and radio suppressed as standard.

Electrical Connection:
Standard terminal box (IP54) fitted on the motor support plate.

Motor Protection:
Motors have thermal contacts wired to the terminal block and must be connected to a motor protection unit.

Speed Control:
Speed controllable by voltage reduction using transformer controller.

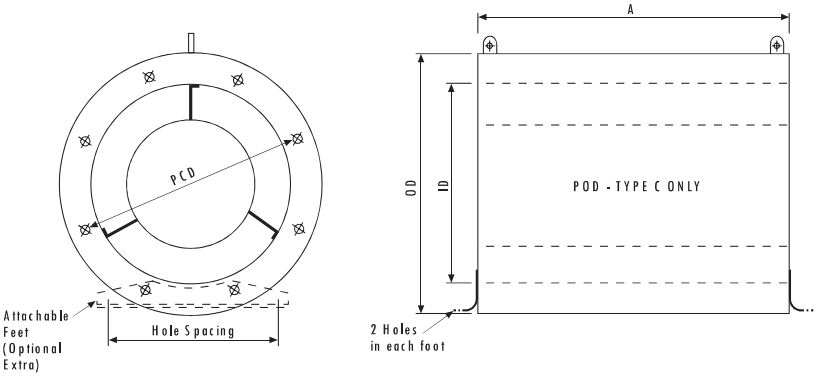
Type	Ref. No.	R.P.M.	Sound Level	Motor power (nominal)	Current Full Load	Maximum air flow temp.	Nom. weight (net)	5 step trans. controller	
		min^{-1}	dB(A) at 4 m	kW	Amps	+°C	kg	Type	Ref.
GBW 560/4	5508	1370	44	2.0	8.7	60	90	TSW 10	1498

Volume Flow m3/s against static pressure

0	50	100	150	200	250	300	400	500	600	700	800
2.77	2.72	2.55	2.48	2.41	2.31	2.22	2.0	1.72	1.44	1.00	0.36

Type Ref.

CASED AXIAL ACCESSORIES



B TYPE SILENCER

Bore Dia. mm (A)	Product Number (B1D)	OD	No of holes	PCD	Thread	Mounting Foot holes		A Length		Weight (kg)	
						Dia	Spacing	1D	2D	1D	2D
315	SB211401	415	8	355	M8	10	265	315	630	10	17
355	SB221401	455	8	395	M8	10	305	355	710	12	20
400	SB241401	500	8	450	M10	10	350	400	800	15	25
450	SB251401	600	8	500	M10	10	400	450	900	20	33
500	SB271401	650	12	560	M10	10	450	500	1000	25	41
560	SB281401	710	12	620	M10	10	510	560	1120	30	50
630	SB301401	780	12	690	M10	12	580	630	1260	35	61
710	SB311401	860	16	770	M10	10	660	710	1420	44	76
800	SB331401	1000	16	860	M10	12	750	800	1600	55	96
900	SB341401	1100	16	970	M12	12	850	900	1800	70	129
1000	SB351401	1200	16	1070	M12	12	950	1000	2000	82	157

C TYPE SILENCER (PODDED)

Bore Dia. mm (A)	Product Number (C1D)	OD	No of holes	PCD	Thread	Mounting Foot holes		A Length		Weight (kg)	
						Dia	Spacing	1D	2D	1D	2D
315	SC211401	415	8	355	M8	10	265	315	630	13	19
355	SC221401	455	8	395	M8	10	305	355	710	15	24
400	SC241401	500	8	450	M10	10	350	400	800	18	30
450	SC251401	600	8	500	M10	10	400	450	900	24	39
500	SC271401	650	12	560	M10	10	450	500	1000	29	48
560	SC281401	710	12	620	M10	10	510	560	1120	35	58
630	SC301401	780	12	690	M10	12	580	630	1260	42	72
710	SC311401	860	16	770	M10	10	660	710	1420	53	90
800	SC331401	1000	16	860	M10	12	750	800	1600	66	116
900	SC341401	1100	16	970	M12	12	850	900	1800	84	150
1000	SC351401	1200	16	1070	M12	12	950	1000	2000	100	182

CASED AXIAL ACCESSORIES

SILENCER ACOUSTIC PERFORMANCE

TYPE B DYNAMIC ATTENUATION

		OCTAVE-BAND MID FREQUENCIES HZ							
BORE DIA. MM (D)	LENGTH	63	125	250	500	1K	2K	4K	8K
315	1D	1	2	4	9	11	10	9	7
	2D	1	2	5	11	16	12	11	10
355	1D	1	2	4	10	12	10	9	7
	2D	2	3	6	13	17	14	11	11
400	1D	2	3	5	10	13	11	9	8
	2D	3	4	7	14	18	15	11	12
450	1D	2	3	6	12	13	11	10	6
	2D	3	4	8	17	18	15	11	11
500	1D	2	3	6	13	14	10	10	5
	2D	3	4	8	19	18	14	11	10
550	1D	2	4	7	14	14	9	10	7
	2D	3	5	9	19	18	14	12	11
630	1D	2	5	7	15	13	8	9	8
	2D	4	6	9	19	19	14	13	12
710	1D	2	5	7	15	13	9	9	8
	2D	4	6	9	19	17	13	12	11
800	1D	2	5	8	16	12	9	9	8
	2D	4	6	10	19	15	12	11	10
900	1D	2	5	10	17	13	11	10	8
	2D	4	6	12	19	15	12	11	10
1000	1D	4	5	11	16	11	10	8	9
	2D	4	6	13	19	14	12	11	11

TYPE C DYNAMIC ATTENUATION

		OCTAVE-BAND MID FREQUENCIES HZ							
BORE DIA. MM (D)	LENGTH	63	125	250	500	1K	2K	4K	8K
315	1D	2	5	5	9	18	20	18	15
	2D	2	6	6	12	20	25	20	17
355	1D	2	5	6	9	18	22	19	16
	2D	2	6	7	13	25	27	21	17
400	1D	2	6	6	10	19	24	20	17
	2D	3	7	8	14	29	29	23	18
450	1D	2	4	7	13	20	23	22	17
	2D	2	5	9	16	29	29	21	20
500	1D	2	3	8	16	21	22	21	17
	2D	2	4	10	20	29	30	20	26
550	1D	3	5	8	16	20	18	19	15
	2D	4	5	10	20	29	28	21	23
630	1D	3	5	8	15	19	16	14	12
	2D	5	6	10	19	29	25	21	20
710	1D	3	5	8	15	19	15	14	12
	2D	5	6	10	20	26	23	18	17
800	1D	4	5	8	16	19	15	14	13
	2D	5	7	11	22	23	21	16	14
900	1D	4	5	9	17	19	15	14	13
	2D	5	7	12	24	23	21	16	15
1000	1D	5	5	11	18	19	15	14	13
	2D	5	7	13	26	24	20	16	16

All performances are derived from tests to BS848.

The above silencers give the following approximate dBA reductions: -

B Type 1 diameter length - 7 to -10 dBA

C Type 1 diameter length - 12 to -15 dBA

For full acoustic details and resistance to airflow for type C please refer to fan selector.