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NOISE IMPACT ASSESSMENT REPORT – KITCHEN EXTRACTION SYSTEM

147 PARROCK STREET, GRAVESEND DA12 1EY

FOR

GOYA WORKS LTD



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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	Silencers	
7.2	Directivity	
7.3	Extraction Fan Jacket	
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 147 Parrock Street, Gravesend DA12 1EY.

Sound Licensing has used recent noise monitoring data (Venta Acoustics Report Ref: VA3730.210818.NIA1.1) completed at 148 Parrock Street in August 2021 in order to determine prevailing background noise levels that are representative of the nearest noise sensitive property. Which has been identified as the first-floor premises directly above the site at 147 Parrock Street, DA12.

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 147 Parrock Street, Gravesend DA12 1EY, 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 147 Parrock Street, Gravesend DA12 1EY (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 a large car park opposite and residential properties directly above.

The nearest sensitive residential receptors were noted to be the first-floor windows on the rear façade of 147 Parrock Street at an approximate distance of 1.5m from the extraction fan motor casing, 2m from the extraction system terminus and 2m from the air intake 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 (Planning Reference:20220645/PP-11321974) for a new kitchen extraction system at 148 Parrock Street has been identified as providing data relevant to this site. The measurement positions used during the previous survey are 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
	$L_{A90,15min}$
29/06/21 (11:00 to 00:00)	48
28/06/21 & 30/06/21 (11:00 to 00:00)	48

The typical background noise level at the measurement position during the survey, at the time in which the plant could be operational, is **48dB** $L_{A90,15min}$. 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 $L_{A90,15min}$	Rating Noise Level at Nearest Residential Facade, dB $L_{Ar,T}$
29/06/21 (11:00 to 00:00)	48	38
28/06/21 & 30/06/21 (11:00 to 00:00)	48	

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 rear of the premises:

Table 7.0 Proposed Kitchen Extraction & Intake Fan Motors

External Plant Item	Quantity	Make	Model	Reference Noise Level* $L_{W(A)}$
Kitchen Extraction Fan Motor	1	Helios	GBW 450/4	Outlet 75dB Breakout 60dB
Kitchen Intake Fan Motor	1	Ruck Fans	EL 250 E2 01	Intake 72dB

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

The ducting of the extraction system will be 450mm circular ducting and the ducting of the kitchen intake system will be 250mm circular ducting. The extraction fan motor will be located externally and therefore noise from the duct terminus & fan motor breakout have been considered. The air intake fan motor will be located internally therefore only noise from the duct terminus has been considered.

In reference to section 6.2 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 Silencers

The extraction system will be fitted with 2 No. Acoustica CP01-M45-120 silencers on the atmosphere side of the fan. The silencers provide the attenuation shown in Table 7.1.1. All silencers should be Melinex lined.

Table 7.1.1 CP01-M45-120 Silencer Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
8	13	20	29	25	16	11

The air intake system will be fitted with Acoustica CP01-M25-120 and CP01-M25-060 silencers on the atmosphere side of the fan. The silencers provide the attenuation shown in Table 7.1.2 and Table 7.1.3.

Table 7.1.2 CP01-M25-120 Silencer Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
10	15	31	37	38	26	15

Table 7.1.3 CP01-M25-060 Silencer Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
6	10	19	25	29	18	10

7.2 Directivity

A directivity correction should be applied as the extract fan duct aperture is to terminate approximately 120° to the nearest residential windows. A duct opening of 450m has been used. A directivity correction has also been applied to the air intake duct terminus is to terminate at 90 ° to the nearest residential window. A duct opening of 250m has been used. The levels of attenuation (dB) at each octave frequency band (Hz) are provided in table 7.2.1 and table 7.2.2 below.

Table 7.2.1 450mm Directivity Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
2	5	10	13	20	22	22

Table 7.2.2 250mm Directivity Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
0	0	4	7	12	14	17

7.3 Extraction Fan Jacket

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

Table 7.3 Jacket Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
18	24	32	34	39	42	44

Corrections have also been applied for the attenuation from the length of the ductwork (4m)*.

* Reference data taken from CIBSE Guide B4 2016 b Ventilation Services Noise

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 10:00 - 00:00 hours Monday to Friday, 10:00 - 01:00 hours on Saturday and 10:00 to 23:00 hours on Sunday.

The typical background noise level at the measurement position during the survey is **48dB** $L_{A90,15min}$. The design range is **38dB** $L_{Ar,T}$ 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 147 Parrock Street at an approximate distance of 1.5m from the extraction fan motor casing, 2m from the extraction system terminus and 2m from the air intake 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 **38dB** $L_{Ar,T}$ which is **10dB(A) below** the typical background noise level (48dB $L_{A90,15min}$).

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 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 cumulative operating noise level of the air extraction system is demonstrated to comply with the Gravesham Borough Council's policy.

APPENDIX A – Acoustic Terminology

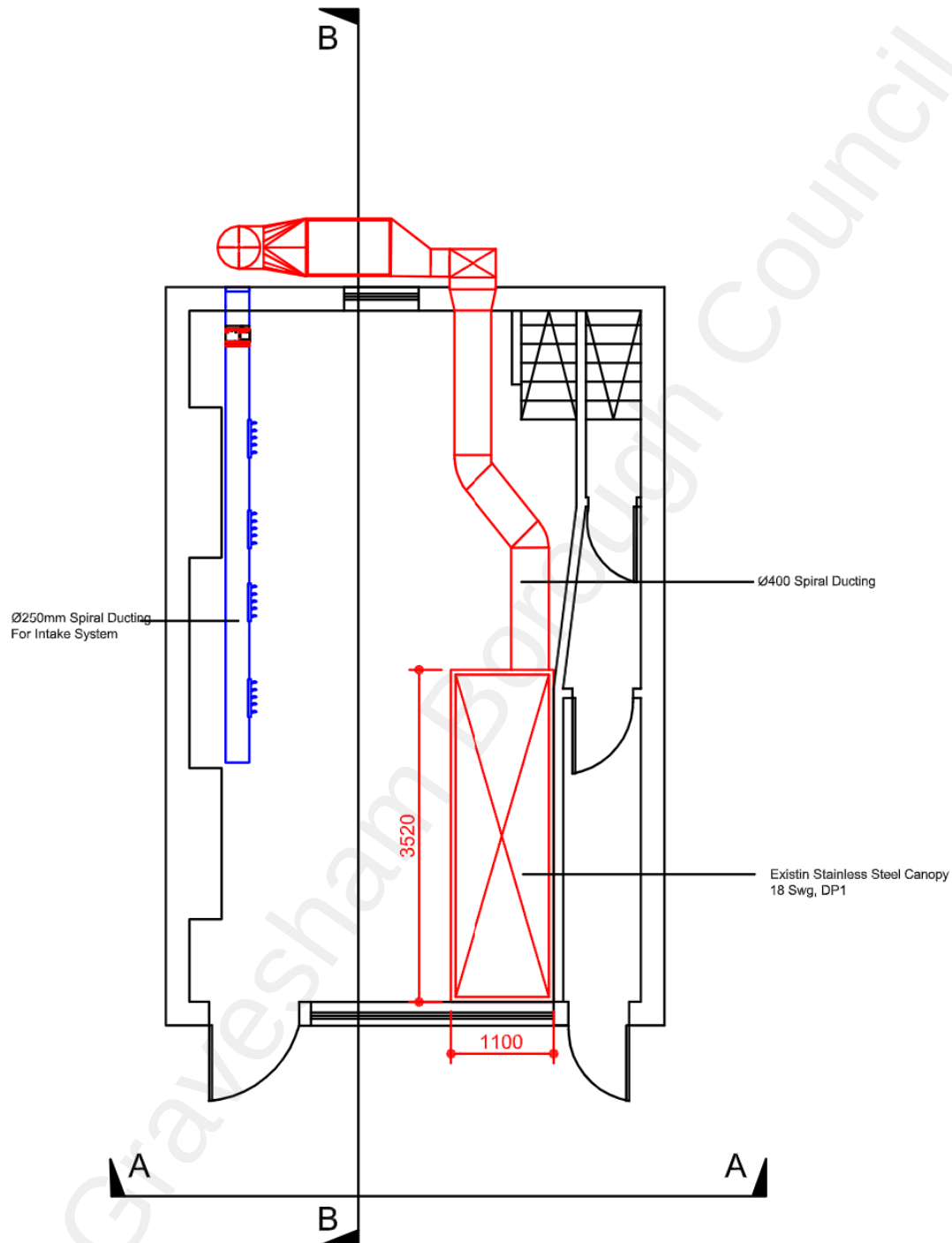
Parameter	Description
Acoustic environment	Sound from all sound sources as modified by the environment
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far
Ambient sound level, $L_a = L_{Aeq,T}$	Equivalent continuous A-weighted 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'

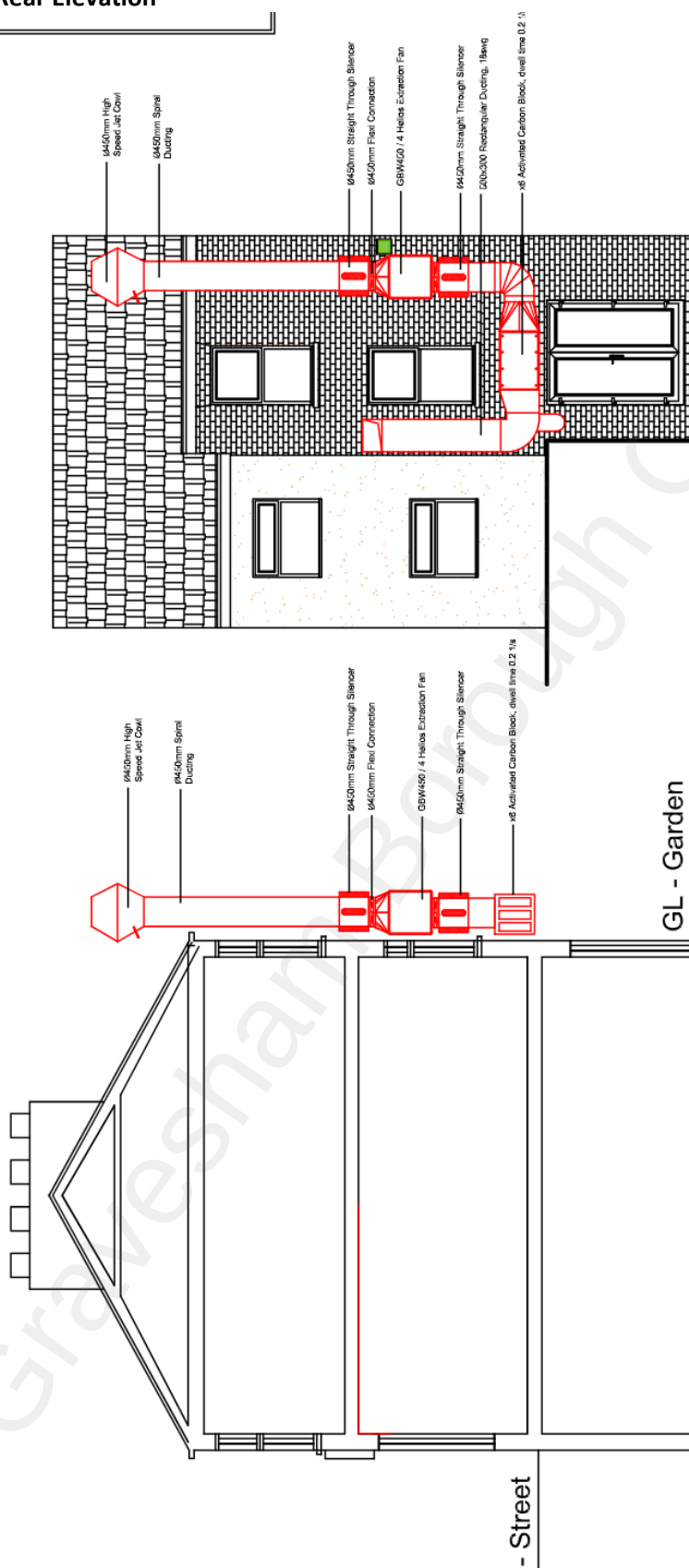
APPENDIX B – Data Sheets and Figures

Proposed Ground Floor Plan



EXISTING GROUND FLOOR PLAN

Proposed Rear Elevation



PROPOSED REAR ELEVATION

PROPOSED BB SECTION ELEVATION

Section B-B

Extraction Fan Motor – Helios Gigabox 450/4

450 mm ø GigaBox centrifugal fan

Helios

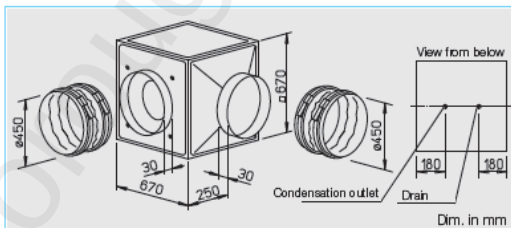
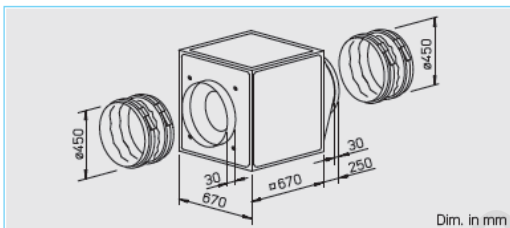
GB

Arbitrary installation position and flexible assembly by five possible discharge directions.



GB T120

Designed for moving dirty, humid and hot air up to max. 120° C. Motor located outside the air flow.



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 condensate 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 centrifugal impeller highly efficient with polymer blades on galvanised steel disc (with GB T120 aluminium impeller), 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

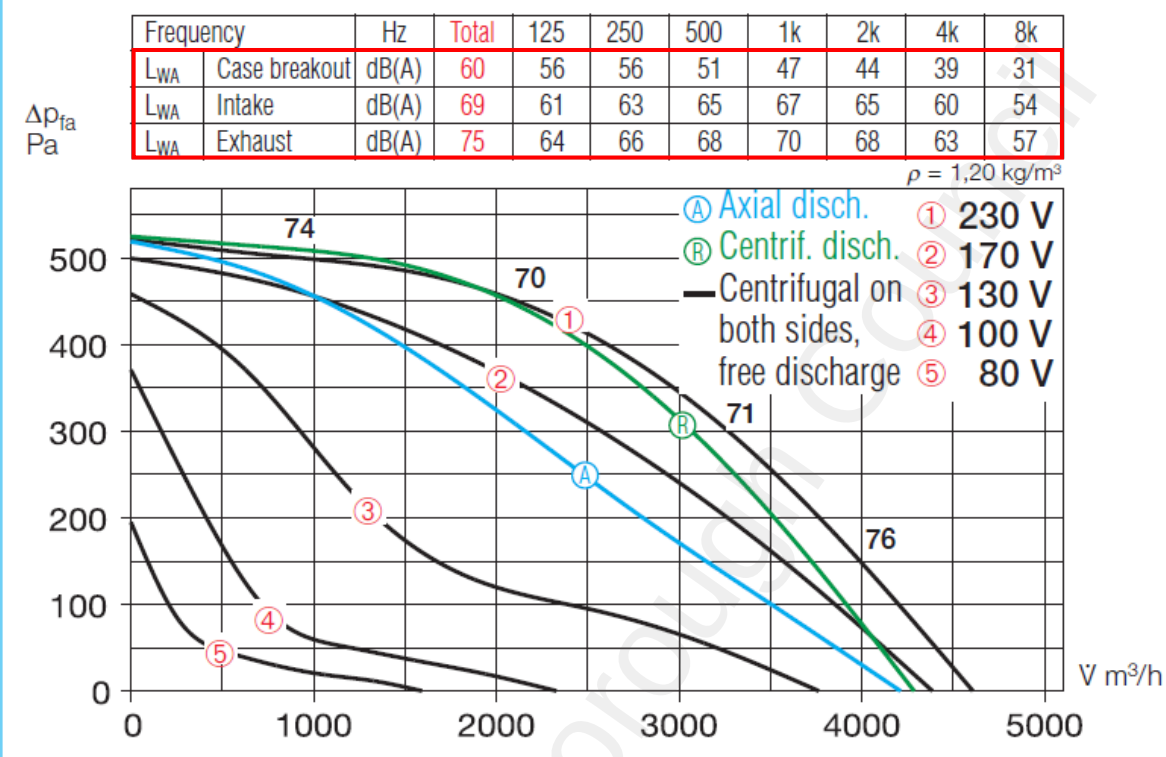
Maintenance-free external rotor motor or IEC-standard motor protected to IP 54. With ball bearings and interference-free as standard.

Type	Ref. no.	Air flow volume (FID)	R.P.M.	Sound press. case breakout	Motor power (nominal)	Current (full load)	Current speed controlled	Wiring diagram	Maximum air flow temperature Full load controlled	Weight (net)	5 step transformer controller with mot. protect. unit	Full motor protection unit using the thermal contacts
		V m³/h	min⁻¹	dB(A) in 4 m	kW	A	A	No.	+°C	kg	Type Ref. no.	Type Ref. no.
1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54												
GBW 450/4	5515	4800	1380	40	0.66	2.90	4.0	854	45	49.0	MWS 5 1949	TSW 5,0 1487 MW 1) 1579
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/Δ wiring, protection to IP 54												
GBD 450/4/4	5516	4350/5450	880/1240	40	0.36/0.67	0.67/1.33	1.30	867	55	55	RDS 2 1315	TSO 1,5 1501 MD 5849
1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54												
GBW 450/4 T120	5774	7110	1370	45	1.00	4.60	5.50	935	120	100	MWS 7,5 1950	TSW 7,5 1596 MW 1) 1579
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/Δ wiring, protection to IP 54												
GBD 450/4/4 T120 5775	6210/7180	1100/1350	45	0.65/0.90	1.10/1.60	1.80	947	120	110	74.0	RDS 2 1315	TSO 3,0 1502 MD 5849

1) incl. operation switch

Helios Gigabox 450/4 Acoustic Data

GBW 450/4



Acoustica CP01-M45-120 Silencer

CP01 M Series



CP01 - M45 Silencer

Available in four standard lengths, M-Series Silencers have excellent attenuation properties, achieved with sound absorbing infill retained in the attenuator casing by a perforated galvanised steel liner.

- Fits directly into 100mm diameter ducting
- Standard lengths 300, 600, 900 & 1200mm
- Use up to 70°C (standard construction)
- Systems up to 1000 Pascals
- Special lengths on request



Typical Noise Reduction (dB) - Centre Band Frequency

Product Code	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
CP01 - M45 - 030	1	1	4	10	14	15	12	7
CP01 - M45 - 060	2	4	6	14	16	16	13	11
CP01 - M45 - 090	3	6	8	17	24	21	15	11
CP01 - M45 - 120	4	8	13	20	29	25	16	11

Typical noise reduction 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.

Helios Gigabox Acoustic Jacket



GB ACOUSTIC JACKETS

As a company HELIOS is working towards a better environment for all and therefore as acoustic issues become more prominent with the requirement of breakout noise reaching levels externally that were only previously used internally we have produced a range of items to help in the fans performance.

Acoustic Jacket.

This is a cladding that simply bolts to the existing casing giving a lower breakout noise for the fan casing. It uses existing fixing holes and comes as 4 x 50mm panels that fit together around the GB Fan box.

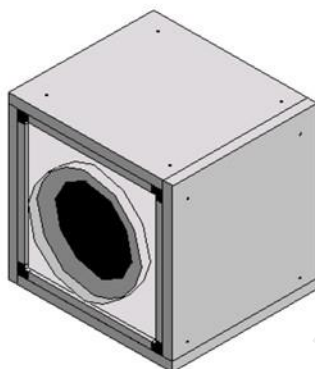


Illustration of GB630 with Cladding fitted

The Acoustic panel construction

The panel is made of a sandwich of internal perforated galvanised sheet steel 0.9mm thk with 50mm rockwool material of 60kg/m³ density with an outer skin of 1.0mm sheet steel.

Reduction for panel

Mid band freq Hz	63	125	250	500	1K	2K	4K	8K
Sound reduction dB	12	18	24	32	34	39	42	44

Ruck Fans EL 250 E2 01 Data Sheet

EL...E



DESCRIPTION
DIAGRAM
SPECIFICATIONS
DOCU
ACCESSORIES

EL 250 E2 01 | 112382

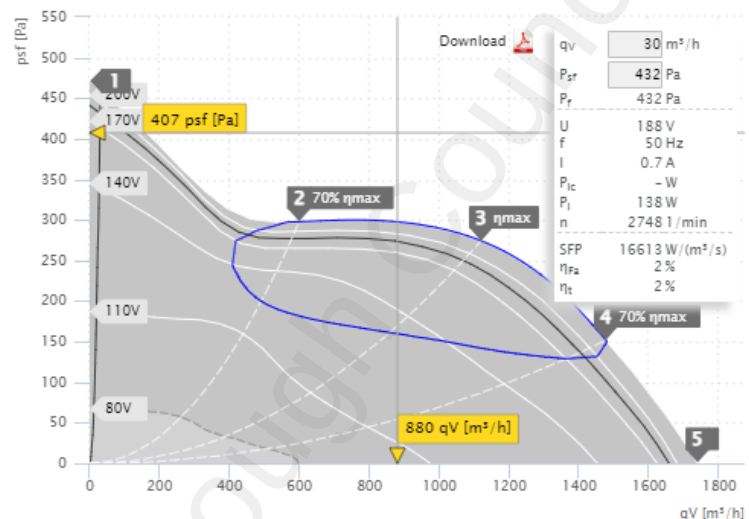


352,10 €

In stock

- Diagonal impeller with downstream three-dimensional guide vanes
- Galvanized metal housing
- Speed controllable
- Integrated thermostatic switch
- Including mounting bracket

EL 250 E2 01 50 Hz	
Voltage U_N	230 V 1~
Current I_{max}	1 A
Ambient temperature t_A	55 °C
Conveyed medium temperature t_M	55 °C
Speed Control	V
Motor protection	TMI
Insulation class motor	F
Weight	6,4 kg
Number of poles	2
IP motor	IP00
IP terminal box	IP44
IP complete unit	IPX4
Min. operating temperature	-25 °C



— ErP compliant range

Sound power (L_W) dB(A)		Medium Frequency Band								
		Σ	63	125	250	500	1k	2k	4k	8k
Inlet	L_{WA5}	76	-	59	65	71	71	68	65	58
Outlet	L_{WA6}	80	-	60	67	73	76	73	67	61
Housing radiation	L_{WA2}	58	-	49	48	51	53	53	46	43

Operating Point		1	2	3	4	5
Current I	A	0.7	0.6	0.8	0.8	0.7
Power consumption P_1	W	164	145	174	179	168
Rotation speed n	1/min	2833	2876	2824	2822	2845
SWL inlet L_{WA5}	dB(A)	77	74	72	72	75
SWL outlet L_{WA6}	dB(A)	81	78	78	77	79
SWL housing break out L_{WA2}	dB(A)	59	58	54	53	55

Acoustica CP01-M25-60 and CP01-M25-120 Silencers

CP01 M Series

ACOUSTICA

CP01 - M25 Silencer

Available in four standard lengths, M-Series Silencers have excellent attenuation properties, achieved with sound absorbing infill retained in the attenuator casing by a perforated galvanised steel liner.

- Fits directly into 100mm diameter ducting
- Standard lengths 300, 600, 900 & 1200mm
- Use up to 70°C (standard construction)
- Systems up to 1000 Pascals
- Special lengths on request



Typical Noise Reduction (dB) - Centre Band Frequency

Product Code	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
CP01 - M25 - 030	2	3	6	12	16	19	17	8
CP01 - M25 - 060	3	6	10	19	25	29	18	10
CP01 - M25 - 090	5	8	12	24	30	30	22	14
CP01 - M25 - 120	7	10	15	31	37	38	26	15

Typical noise reduction 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.

APPENDIX C – Calculations

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

ion per double distance required = SdB for LpA recommended)			6	dB			Metres		
			Enter Distance =				1.5		
	Frequency Hz								
	125	250	500	1000	2000	4000	8000	Total	
	72.1	64.6	54.2	47	42.8	38	32.1	72.89	
Total LW	72.1	64.6	54.2	47.0	42.8	38.0	32.1	72.89	
'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1		
LWA (Power)	56.0	56.0	51.0	47.0	44.0	39.0	31.0	60.03	
LPA at New Dist'	44.49	44.49	39.49	35.49	32.49	27.49	19.50	48.52	
JACKET	18	24	32	34	39	42	44		
LPA After Insert	26.49	20.49	7.49	1.49	-6.51	-14.51	-24.50	27.52	

Extraction Fan Motor Casing @ 1.5m = 28dB L_{Aeq,T}

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

on per double distance required = SdB for LpA recommended)			6	dB			Metres		
			Enter Distance =			2			
		Frequency Hz							
		125	250	500	1000	2000	4000	8000	Total
		80.1	74.6	71.2	70	66.8	62	58.1	82.08
Total LW		80.1	74.6	71.2	70.0	66.8	62.0	58.1	82.08
'A' Weight		16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)		64.0	66.0	68.0	70.0	68.0	63.0	57.0	75.00
LPA at New Dist'		50.00	52.00	54.00	56.00	54.00	49.00	43.00	61.00
SILENCER		8	13	20	29	25	16	11	
SILENCER		8	13	20	29	25	16	11	
DUCT LENGTH, 4m		3	1	1	1	1	1	1	
DIRECTIVITY 120°		2	5	10	13	20	22	22	
LPA After Insert		29.20	19.80	3.20	-15.80	-16.80	-5.80	-1.80	29.69

Extraction Fan Terminus @ 2m = 30dB L_{Aeq,T}

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

on per double distance required = SdB for LpA recommended)			6	dB			Metres		
			Enter Distance =				2		
	Frequency Hz								
	125	250	500	1000	2000	4000	8000	Total	
	75.1	73.6	74.2	71	66.8	64	59.1	80.10	
Total LW	75.1	73.6	74.2	71.0	66.8	64.0	59.1	80.10	
'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1		
LWA (Power)	59.0	65.0	71.0	71.0	68.0	65.0	58.0	75.94	
LPA at New Dist'	45.00	51.00	57.00	57.00	54.00	51.00	44.00	61.94	
SILENCER	10	15	31	37	38	26	15		
SILENCER	6	10	19	25	29	18	10		
DIRECTIVITY 90°	0	0	4	7	12	14	17		
LPA After Insert	29.00	26.00	3.00	-12.00	-25.00	-7.00	2.00	30.78	

Air Intake Fan Terminus @ 2m = 31dB L_{Aeq,T}

<u>Adding dB</u>								
<u>Levels to be added</u> (Max. of eight)								
<i>Enter values</i>	30	28	31	0	0	0	0	0
Total =				34.6 dB				

Cumulative Sound Pressure Level @ Nearest Sensitive Receptor + Intermittency (3dB) = 38dB L_{Ar,T}