Philip Acoustics Ltd.

Consultants in Noise & Vibration
Building Regulations Certification Sound Insulation Testing

REPORT TITLE: NOISE ASSESSMENT FOR MECHANICAL SERVICES PLANT TO SERVE A PROPOSED CHANGE OF USE HOT FOOD TAKEAWAY AT OLD CHAPEL, BRIDGE STREET, BRIGG DN20 8LP

REPORT REF: 24096-002 Revision A

Revision	Issue Date	Commentary
-	December 2024	Initial issue acoustic report
A	April 2025	Revised report to reflect amended plant layout *(amended positions for supply air system intake aperture & oven extract system discharge aperture)*

ISSUED TO: Pegasus Planning Group Ltd
First Floor South Wing
Equinox North
Great Park Road
Almondsbury
Bristol
BS32 4QL

ISSUED BY: David R Philip BEng (Hons) MIOA

DATE: April 2025

CONTENTS

SUMMARY

- This report provides a noise assessment for mechanical services plant to serve a proposed change of use to hot food takeaway at an existing vacant commercial property Old Chapel, Bridge Street, Brigg DN20 8LP. The proposed development is to operate as Domino's Pizza.

- The plant (equipment) comprises a supply air system fan and oven extract system fan (both with associated external apertures) plus external air conditioning and cold room condenser units.

- As part of the assessment a plant noise criterion (limit) is set with reference to the assessment methodology and guidance of relevant British Standard BS4142.

- Full title of the current edition of this standard is BS4142:2014+A1:2019 "*Methods for rating and assessing industrial and commercial sound*". Unless stated otherwise, reference throughout this report to BS4142 / BS4142:2014 relates to this current edition document. As an aid to clarity, this report retains use of the more familiar term *"noise"* as opposed to the replacement term *"sound"* of BS4142:2014, both terms are interchangeable in the context of the assessment.

- In accordance with the noise assessment procedures of BS4142 a survey has been conducted to establish existing lower value background noise levels during the range of operational times of the plant, as representative of externally at nearest noise sensitive / residential properties.

- Based on results of the background noise survey and acoustic calculations using plant manufacturer's data, noise from the plant (with the specified noise reduction treatment fitted) will be below existing background noise levels and complies with the noise criterion / limit.

- The specified noise reduction treatment comprises conventional atmosphere side duct silencers (attenuators) to the supply air and oven extract fan systems. Specification details for the noise reduction treatment are provided in sub-section 7.1 of the report.

- The report also considers plant vibration. It is advised as good practice the plant is installed using proprietary vibration isolators. Outline specification details for suitable vibration isolators are provided in sub-section 7.2 of the report.

1. INTRODUCTION

A change of use to hot food takeaway (Sui-Generis) development is proposed at an existing vacant commercial / retail property; Old Chapel, Bridge Street, Brigg DN20 8LP.

The development is for a pizza format hot food takeaway, to operate as Domino's Pizza with sought operating times 11am to 11pm.

The takeaway will require installation of mechanical plant (equipment), comprising a supply air system fan and oven extract system fan, both with associated external apertures, plus an external air conditioning condenser unit and cold room condenser unit.

Philip Acoustics has been commissioned to assess noise from the proposed mechanical services plant. The assessment is to determine specifications for noise reduction treatment and vibration isolation measures to the plant, in the interest of safeguarding the amenity of neighbouring residential occupiers.

This report presents results of the noise assessment and includes:

- Qualifications & experience;
- Noise assessment methodology & criterion; with reference to the current edition British Standard BS4142;
- Measurement survey of existing background noise levels;
- Details of proposed plant including location & noise data;
- Calculation & assessment of plant noise levels;
- Consideration of vibration from the plant;
- Specification as necessary for noise reduction treatment & vibration isolation measures.

***Informative 1*: Existing Plant Precedent**

As forward to this noise assessment report, it is noted by the author that the items of mechanical plant to serve the proposed change of use pizza format hot food takeaway are of same and similar function to existing installed plant / equipment (ventilation systems & condenser units) serving other commercial / retail use premises within the Brigg town centre vicinity including along Bridge Street.

Much of this existing plant / equipment is in similar proximity (or closer) to noise sensitive / residential properties as that proposed at the application site Old Chapel, Bridge Street.

Notwithstanding this, assessment of noise from plant to serve the proposed pizza takeaway in this report is only with reference to the noise criterion (limit) set with reference to guidance of the current edition BS4142.

This report and noise assessment takes no account of precedent there is existing similar plant / equipment already installed serving other commercial / retail use premises in the vicinity.

2. QUALIFICATIONS & EXPERIENCE

This report is prepared and issued by David Philip. David Philip graduated in 1989 from The University of Salford Department of Applied Acoustics with a BEng Honours degree in Electroacoustics. David Philip has been since 1995, and continues to be, a fully elected Member of the Institute of Acoustics (MIOA).

David Philip has been the owner / managing director of Philip Acoustics since the firm was formed in 2002. Prior to the formation of Philip Acoustics, David Philip held senior acoustic consultant positions at Sound Research Laboratories (London office) and Spectrum Acoustic Consultants.

Philip Acoustics has held full membership of the Association of Noise Consultants (ANC) since 2003 and is also a full member of the ANC Registration Scheme of approved independent organisations to undertake Building Regulations Approved Document Part E pre-completion certification sound insulation testing.

David Philip has over 30 years' experience as an Acoustic Consultant both in the UK and internationally and has considerable experience undertaking noise surveys and noise assessments for a wide range of commercial uses and also residential developments.

This experience includes a substantial quantity of noise assessments specifically associated with mechanical plant (including extraction and ventilation equipment) serving commercial uses including hot food takeaways in mixed use commercial / retail and residential areas.

David Philip is fully familiar with the provisions of the current (and previous) editions of British Standard BS4142, as well as other acoustics related standards and guidance documents.

The opinions expressed in this report are the true and professional opinions of David Philip. Neither David Philip nor Philip Acoustics is appointed on any incentive fee basis.

3. NOISE ASSESSMENT METHODOLOGY & CRITERION *(BS4142:2014)*

Appropriate relevant noise design standards and guidance (i.e. noise assessment methodology & criterion) applicable for proposed new plant to serve the pizza format hot food takeaway are contained within British Standard BS4142:2014.

Full title of the current edition of the standard is BS4142:2014+A1:2019 "*Methods for rating and assessing industrial and commercial sound*". Reference throughout this report to BS4142:2014 relates to this current edition standard.

As an aid to clarity this report retains use of the more familiar term "*noise*" as opposed to the replacement term "*sound*" of BS4142:2014. The two terms are interchangeable in the context of this assessment report

BS4142:2014 provides a well-established methodology to assess the likely effect (impact) to people regarding noise of an "industrial" nature from commercial or other developments.

Consequently, in requesting noise assessments for mechanical plant, including equipment such as ventilation system external apertures and air conditioning / refrigeration units serving such as hot food takeaways or similar, most Local Planning Authorities refer to BS4142:2014.

In this scenario of new mechanical services plant, the BS4142:2014 assessment method requires that source noise data for the plant is established, and pre-existing background noise levels be measured. The assessment is then carried out by comparing the overall plant noise Rating Level with background noise levels, at assessment positions (normally to outside nearest residential properties or similar).

The (plant noise) Rating Level in this scenario is the Specific Noise Level of the plant plus with any corrections applied to account for subjective characteristics of the noise that might mean it is more noticeable and potentially have more impact.

The BS4142:2014 assessment method then provides guidance on the likely noise impact (effect) to people depending on the magnitude of the excess of the (plant noise) Rating Level over the pre-existing background noise; the higher the excess the more likely there would be an adverse impact and correspondingly, the lower the excess (or no excess) the less likely there would be an adverse impact.

BS4142:2014 does not provide any specific guidance on suitable noise limits / criteria or standards including for proposed new plant / equipment, only guidance on how to determine the likelihood of adverse impact.

In terms of likelihood of adverse (noise) impact, BS4142:2014 advises the following dependent upon context:

i) **Where the (plant noise) Rating Level is around <u>+10dB or more above the background</u>, this is likely to be an indication of significant adverse impact;**

ii) **Where the (plant noise) Rating Level is around <u>+5dB above the background</u> then this is likely to be an indication of adverse impact;**

iii) **Where the (plant noise) Rating Level <u>does not exceed the background</u> then this is an indication of low impact.**

It is important to note the BS4142:2014 assessment methodology does not have a “no impact” indication categorisation. “Indication of low impact” for where the Rating Level does not exceed the pre-existing background is the lowest / least likely noise impact categorisation of BS4142:2014.

Different Local Planning Authorities interpret and apply the guidance of BS4142:2014 differently, some require the noise Rating Level of proposed new plant / equipment be not higher than +5dB above the pre-existing background level, majority require not higher than the background and some require a certain amount below the background. Some do not have a set requirement and consider each situation individually.

It is the author’s experience that most Local Authorities for this context of new plant to serve an existing allocated commercial use property, apply the guidance of BS4142 with a requirement that the noise Rating Level of plant be not higher than the pre-existing background noise; applicable to (assessment) positions outside windows of nearest noise sensitive (residential) properties and applicable to the representative lower value (minimum) pre-existing background noise during plant operational times.

Based on the above and with consideration of context that the proposed plant is to serve an existing commercial use property, it is appropriate to apply the guidance of BS4142:2014 with the common requirement that the noise Rating Level of proposed plant shall not exceed existing background noise levels.

It is the author’s experience of undertaking many noise surveys and assessments of noise from ventilation systems and air conditioning / cold room refrigeration units in similar scenarios and contexts to Old Chapel, Bridge Street, Brigg, that at this level, noise from the proposed new plant would not be of adverse impact or otherwise affect the amenity of neighbouring properties.

Additional clarification points in respect to the noise assessment and criterion are provided below and on the following page:

a) Plant Operating Conditions

The assessment and noise criterion is cautiously/robustly applied to all proposed plant items operating cumulatively at full (100%) duty and during times as relevant; all plant operating during opening times of the premises, and with the cold room unit operable over 24 hours.

b) Rating Noise Level

The noise criterion is applied in terms of a noise Rating Level ($L_{Ar,Tr}$ dB) and thus with any corrections (such as for tonal character noise) applied as necessary to the plant noise at the assessment position as per the BS4142:2014 assessment methodology.

c) Assessment Position

As per normal noise assessment procedures / convention (plus with reference to BS4142:2014), the plant noise criterion is applied to an assessment position directly outside nearest windows of noise sensitive (residential) properties.

Details of nearest residential properties are provided in sub-section 4.2 of the report.

d) Background Noise Level

The noise criterion is cautiously / robustly applied to the measured representative minimum (lowest) pre-existing background noise level $L_{A90,T}$ dB as representative of at the assessment position for times of operation of the plant.

e) Very Low Background Noise Levels (*for information only – not applicable to assessment)*

In accordance with the guidance and assessment provisions of BS4142, then for scenarios of very low background noise it is generally unreasonable / unnecessary to apply a Rating Level noise limit directly relative to the background level, in terms of ensuring amenity protection such that noise from plant / equipment does not cause disturbance or is otherwise of adverse impact.

This simply due to that there is a lower threshold level at which plant noise would become inaudible / not noticeable to neighbouring residential occupiers and thus it being unreasonable and unnecessary to further reduce the plant noise below that level.

BS4142:2014 advises "*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night*."

Where background levels are very low it is instead appropriate to apply a minimum (lower level) threshold cap plant Rating Level limit of $L_{Ar,Tr}$ 30dB at assessment positions. BS4142:1997 advised that noise Rating Levels of below 35dB be considered very low.

Thus a minimum threshold cap plant noise limit (Rating Level) set at $L_{Ar,Tr}$ 30dB is significantly below (i.e. as 5dB betterment to) this guidance and for scenarios of very low background noise levels (i.e. regardless of the low background noise) will maintain surety of protection for the occupants of neighbouring properties from loss of amenity due to noise disturbance.

4. BACKGROUND NOISE SURVEY

To assess noise from plant to serve the proposed change of use it is necessary to establish pre-existing background noise levels during the range of operational times for the plant.

4.1 Survey Instrumentation

Details of instrumentation used for the noise survey are provided in Appendix A. The sound level meter was calibration verified before and after the survey.

4.2 Survey Details & Procedure

The supply air system, oven extract system and air conditioning unit will operate as required during opening times of the premises (11am to 11pm). The cold room unit provides an essential refrigeration function and is required to be operable over 24-hours.

A fully attended background noise survey was conducted by the author for the period approximately 9:30pm to 4am of 27 November 2024 through 28 November 2024 to include sample late evening and night periods as “worse case” when representative minimum (lowest) levels of background noise will occur for operational times of the plant.

Weather conditions were monitored and were suitable for the background noise survey in accordance with BS4142; dry (nil precipitation) and with calm / light wind (wind speed circa 0 to 1m/s recorded at the site and survey position), i.e. not affecting or otherwise detrimentally influencing the survey measurements.

Location of the site, plant and nearest noise sensitive properties are indicated on an aerial image, site location plan and block plan drawing plus proposed layout plan / elevations drawings in Appendix B.

Nearest and least naturally screened noise sensitive properties to the proposed plant locations are residential dwellings on Manley Gardens south-east beyond the rear of the site.

There are other residential properties in various directions in proximity to the site, including on Bridge Street and on Forrester Street. However, the dwellings on Manley Gardens south-east beyond the rear of the site are the physically nearest, and/or least naturally screened to the proposed plant locations, thus potentially the most noise affected neighbouring residential properties.

The background noise survey position was externally to the rear of the site, selected as best practicably accessible and directly representative of outside nearest residential properties on Manley Gardens, conducted in accordance with the procedural guidance of BS4142:2014.

The survey position is indicated on the site aerial image in Appendix B.

Measurements of background noise were at equivalent first floor height, facilitated by positioning the survey instrumentation microphone on a telescopic boom arrangement, recorded continually in terms of consecutive samples of overall $L_{A90,T}$ dB values *(T= 15 minutes)* throughout the survey duration.

4.3 Survey Results, Observations & Plant Noise Limits

Complete raw data results of the background noise survey are provided in Appendix C.

Background noise levels during the late evening and night period are moderate and predominantly due to road traffic.

This includes vehicles locally in and around Brigg (including on the A18 through-route road) plus with underlying lower magnitude but more steady noise from distant traffic, expected to be vehicles passing on the nearby M180 motorway running nominally west through north-east circa 900m at its nearest point from the site.

It was observed there is also some low level (faintly audible / barely noticeable - not dominant) noise from existing plant / equipment expected to be serving various commercial / industrial premises in wider proximity to the site.

The background noise profile is normal for this location, with levels reducing gradually during the late evening and into the night as traffic reduces, lowest during the night between circa 1am to 3am, before gradually starting to rise after about 4am as traffic in the wider vicinity starts to increase slightly.

Summary of measured representative minimum background noise levels and the associated plant noise limit requirements are shown in Table 1.

Background noise levels and noise limits are split into opening hours values (range 11am to 11pm) and night period values such that all plant as operating during opening hours is assessed using representative minimum background noise during that time range, whilst the cold room unit operable over 24 hours is assessed using the representative minimum background noise during the night.

Description	**Plant Operating Times**	**Representative Minimum Background Noise Level $L_{A90,\ 15\ min}$**	**Plant Noise Limit *(Rating Level)***
Assessment to outside nearest noise sensitive (residential) properties	All Plant: Operating during opening hours *(range 11am to 11pm)*	43dB	$L_{Ar,Tr} \leq$ 43dB
	Cold Room Unit: Operable over 24 hours *(including during the night)*	38dB *(occurs circa 1am to 3am)*	$L_{Ar,Tr} \leq$ 38dB

Table 1: Measured representative minimum background noise & associated plant noise limits

5. NOISE FROM MECHANICAL SERVICES PLANT

The proposed mechanical services plant comprises the following items as indicated on the drawings in Appendix B:

- **Supply (Make-Up) Air System Fan:** S&P CBM/6-320/240-550W fan, located internally within the building with fresh air intake via ducting (incorporating a silencer) from an external louvre grille inlet aperture to the rear side elevation of the property;
- **Oven Extract System Fan:** S&P CVAT/4-9000/500 ND acoustic cabinet fan, located internally within the building with exhaust to atmosphere via ducting (incorporating a silencer) to an external louvre grille discharge aperture to the rear side elevation of the property;
- **Air Conditioning Unit:** Mitsubishi FDC140VNA-W condenser unit (cooling mode operation), located externally at ground level to the rear of the property;
- **Cold Room Unit:** Tecumseh Wintsys WINAJ4517Z -FZ condenser unit, located externally to the rear of the property (adjacent to air conditioning unit).

Copy of available manufacturer noise data for the plant is provided in Appendix D.

Summary of noise data for the plant items in terms of equivalent overall dBA and linear dB octave band sound power levels is shown in Table 2. The summary noise data is without any noise reduction treatment applied (i.e. is for un-silenced manufacturer noise data).

Description	Overall dBA	Octave Band Centre Frequency (Hz) Lin dB							
		63	125	250	500	1k	2k	4k	8k
Supply Air System Fan: S&P CBM/6-320/240-550W (1) *(Inlet – induct sound power level)*	79	80	78	77	76	74	70	67	63
Oven Extract System Fan: S&P CVAT/4-9000/500 ND (2) *(Outlet – induct sound power level)*	83	84	89	83	79	77	74	66	58
Air Conditioning Unit: Mitsubishi FDC140VNA-W *(unit configured cooling mode)*	66	77	72	65	63	62	57	52	52
Cold Room Unit: Tecumseh Wintsys WINAJ4517Z -FZ (3)	61	63	61	59	57	56	53	49	41

Note (1): *Sound power level overall dBA & linear dB octave band values for supply air system fan S&P CBM/6-320/240-550W based on limited available manufacturer noise data which is in terms of overall sound pressure level 67dBA at 1.5m from the fan inlet side (free field) & example operating curve.*

Note (2): *Manufacturer octave band noise data for oven extract system fan S&P TCBT/4-450/H is in terms of "A-Weighted" dBA octave band values. The values stated above are equivalent linear dB octave band values (i.e. not "A-Weighted").*

Note (3): *No manufacturer octave band noise data for cold room unit; linear dB octave band sound power levels are based on octave band sound pressure level measurements undertaken by the author of this same make / model cold room unit as installed at other premises.*

Table 2: Summary plant noise data *(sound power levels based on manufacturers' noise data)*

To calculate the overall noise contribution from the plant to the assessment position outside nearest residential windows a spreadsheet noise model calculation has been used.

The model takes account of the accumulation of noise from the worse-case scenario of all plant items operating simultaneously, distance between the plant locations and assessment position, acoustic directivity, acoustic reflections (i.e. non-free-field conditions) and any natural / default line of sight acoustic screening due to orientation and intervening buildings / structures etc. where applicable.

The calculation model also takes account of the specified noise reduction treatment applied to the plant as detailed in sub-section 7.1 of the Report.

Noise assessment position and plant noise model calculation details are provided in Appendix E.

Noise model overall calculated noise Rating Levels from the plant to the assessment position (nearest residential property) compared with the noise limits are shown in Table 3. Noise from the plant to other residential properties in the vicinity that are farther away, and/or more naturally screened from the plant locations, will be lower.

Description	**Plant Operating Times**	**Plant Overall Noise Level** ***(Rating Level)***	**Noise Limit** ***(Rating Level)***	**Comment**
Assessment Position: Nearest noise sensitive premises to plant – nearest residential dwelling on Manley Gardens	All Plant Items : Operating during opening hours *(range 11am to 11pm)*	$L_{Ar,Tr}$ 41dB	$L_{Ar,Tr} \leq$ 43dB	Complies
	Cold room unit: Operable over 24 hours *(including during the night)*	$L_{Ar,Tr}$ 34dB	$L_{Ar,Tr} \leq$ 38dB	Complies

Table 3: Noise assessment

Although the noise reduction treatment will tend to supress any tonal noise characteristics of the supply air and oven extract systems, plus noise of the air conditioning unit and cold room unit is nominally broadband in nature, the assessment cautiously includes a +2dBA correction as BS4142:2014, added to the overall calculated plant noise levels – to give the plant noise Rating Levels, to account that residual noise from the plant could potentially have a just perceptible tonal characteristic.

The assessment demonstrates that with the specified noise reduction treatment fitted as detailed in sub-section 7.1, noise from the proposed plant will be low, below background noise levels and complies with the limit / criterion set with reference to BS4142:2014.

6. VIBRATION FROM MECHANICAL SERVICES PLANT

Location of the plant is at distance from, and not directly structurally connected to, neighbouring noise sensitive properties. There will be no plant vibration transfer to noise sensitive / residential properties.

Notwithstanding this, it is advised the plant is installed using proprietary vibration isolators as good practice and to mitigate possible plant vibration to the development itself.

Outline specification details for suitable vibration isolators are provided in sub-section 7.2 of the report.

7. SPECIFICATIONS FOR NOISE & VIBRATION TREATMENTS

***Informative 2*: Proposed Plant**

This report is based on the specific proposed make and models of plant as detailed in Section 5.

If during later design stages, during installation or as part of future plant / equipment replacement, an alternative make and model of plant item is selected, it is important that noise levels for the alternative item be checked by Philip Acoustics or another acoustic consultant to ensure the treatments specified below remain valid and noise emissions remain compliant with the noise limit.

7.1 Noise Reduction

To comply with the noise criterion limit it is necessary to specify noise reduction treatment to the supply air and oven extract systems.

Specification details for the noise reduction treatment are provided in the sub-sections below and are as included in the noise model calculation in Appendix E.

7.1.1 Supply Air System

A silencer (attenuator) is to be fitted within the supply air fan system atmosphere side (intake / inflow) duct, between the fan and external inlet aperture, i.e. to reduce fan noise transmission out of the external intake aperture.

The proposed silencer is a conventional circular type; Alnor Ventilation Systems product code SIL-50 450-600, 450mm internal diameter and 600mm length.

Specification for the silencer is shown in Table 4, data sheet for the silencer is provided in Appendix F.

Description	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Supply Air System: Circular type silencer Alnor Ventilation Systems product code SIL-50 450-600								
Silencer Insertion Loss (attenuation dB)	2 (1)	4	8	16	18	13	12	12
***Note* (1):** *No manufacturer data available for 63Hz octave band. Stated value is as typical for the specified type circular silencer*								

Table 4: Specification details for Supply Air System silencer

7.1.2 Oven Extract System

As for the supply air system, a silencer (attenuator) is to be fitted within the oven extract system atmosphere side (outlet / outflow) duct, between the extract fan and external discharge aperture, i.e. to reduce oven extract fan noise transmission externally out of the aperture.

The proposed silencer is a conventional circular type; Alnor Ventilation Systems product code SIL-50 500-1200, 500mm internal diameter and 1200mm length.

Specification for the silencer is shown in Table 5, data sheet for the silencer is provided in Appendix F.

Description	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Oven Extract System: Circular type silencer Alnor Ventilation Systems product code SIL-50 500-1200								
Silencer Insertion Loss (attenuation dB)	4(1)	9	13	19	22	17	16	17
Note (1): *No manufacturer data available for 63Hz octave band. Stated value is as typical for the specified type circular silencer*								

Table 5: Specification details for Oven Extract System silencer

The normal build-up of deposits inside kitchen / oven extract ductwork can degrade the performance of silencers over time. It is important therefore to clean the inside of the oven extract system silencer at regular intervals depending up on the level of deposit build up. This would normally take place during routine oven extract fan and ductwork cleaning.

7.1.3 Air Conditioning Unit & Cold Room Unit

It is advised the air conditioning unit & cold room unit located externally at ground floor to the rear of the property as indicated on the proposed block plan and layout drawings in Appendix B do not require noise reduction treatment.

7.2 Vibration Isolation

As detailed in Section 6, it is advised as good practice the plant is installed using proprietary vibration isolators. Outline specification detail for suitable vibration isolators are provided below.

7.2.1 Supply Air Fan & Oven Extract Fan Systems

It is advised the supply air fan and oven extract fan be installed using proprietary rubber or neoprene turret type vibration isolators (hangers or bracket mountings as applicable). The isolators selected to each have a static deflection ≥5mm under the installed total weights of the fan units.

Four isolators are normally required per fan unit, one for each corner support position. The vibration isolator hangers or mounts should only take weight of the supply air fan and oven extract fan. Associated ductwork either side (including silencers) should be supported by other separate rubber or neoprene vibration isolator hangers / mountings.

The supply air fan and oven extract fan would also typically have ductwork flexible connections fitted. To be effective the flexible connections need to be “loose” (not taught) when installed and would be typically formed using rubber or neoprene sheet material. Standard size flexible connections are available from most duct component suppliers.

7.2.2 Air Conditioning Unit & Cold Room Unit *(outdoor units)*

It is advised the air conditioning unit & cold room unit are installed mounted from the ground on proprietary rubber or neoprene turret type vibration isolator mountings.

The isolators selected to each have a static deflection ≥3mm under the installed total weights of the units. Four isolators are required per unit (one to each corner mounting foot position).

7.2.3 Air Conditioning Unit & Cold Room Unit *(internal cassette units)*

It is advised the air conditioning and cold room internal cassette units are installed using proprietary rubber or neoprene turret type vibration isolators (hangers or bracket mountings as applicable).

The isolators selected to each have a static deflection ≥3mm under the installed total weights of the internal cassette units. Four isolators are required per unit (one to each corner mounting / suspension position).

APPENDIX A

Noise Survey Instrumentation

Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix A *(page 1 of 1)*

Date: April 2025

NOISE SURVEY INSTRUMENTATION

Instrumentation Used:

- Rion sound level meter type NL-31 Class 1, Rion preamplifier type NH-21, Rion microphone type UC-53A, Rion microphone windshield type WS-10, Rion microphone extension cable type EC-04A and tripod / boom arrangement;
- Bruel & Kjaer calibrator type 4231;
- Speedtech Instruments Skymaster model SM-28 serial number 19370 (sample weather conditions data).

Instrumentation Calibration Certification:

Description	Type Number	Manufacturer	Date of Calibration Expiration	Calibration Certificate Number
Class 1 Sound Level Meter *s/n 00903983*	NL-31	Rion	22/03/2026	TCRT24/1257
Microphone *s/n 317502*	UC-53A			
Preamplifier *s/n 33991*	NH-21			
Calibrator *s/n 2642929*	4231	Bruel & Kjaer	22/03/2026	TCRT24/1256

Instrumentation On-Site Calibration Check:

Description	Calibrator Reference Level	Measured Level	Comment
Before survey measurements	94.0dB	94.0dB	Pass
After survey measurements		94.0dB	Pass *(nil drift)*

APPENDIX B

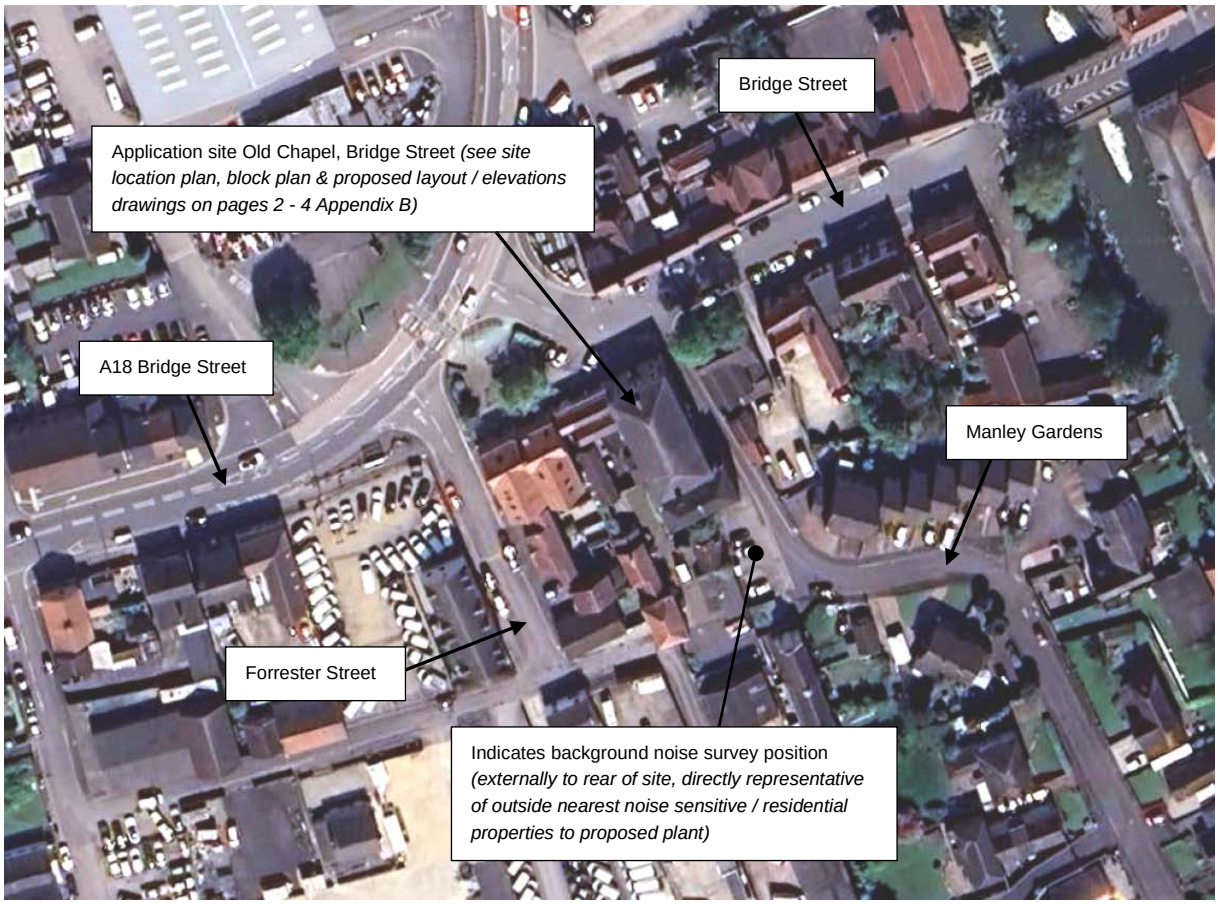
Aerial Image, Site Location Plan, Block Plan & Proposed Layout Plan / Elevations Drawings

Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix B *(page 1 of 4)*

Date: April 2025

AERIAL IMAGE

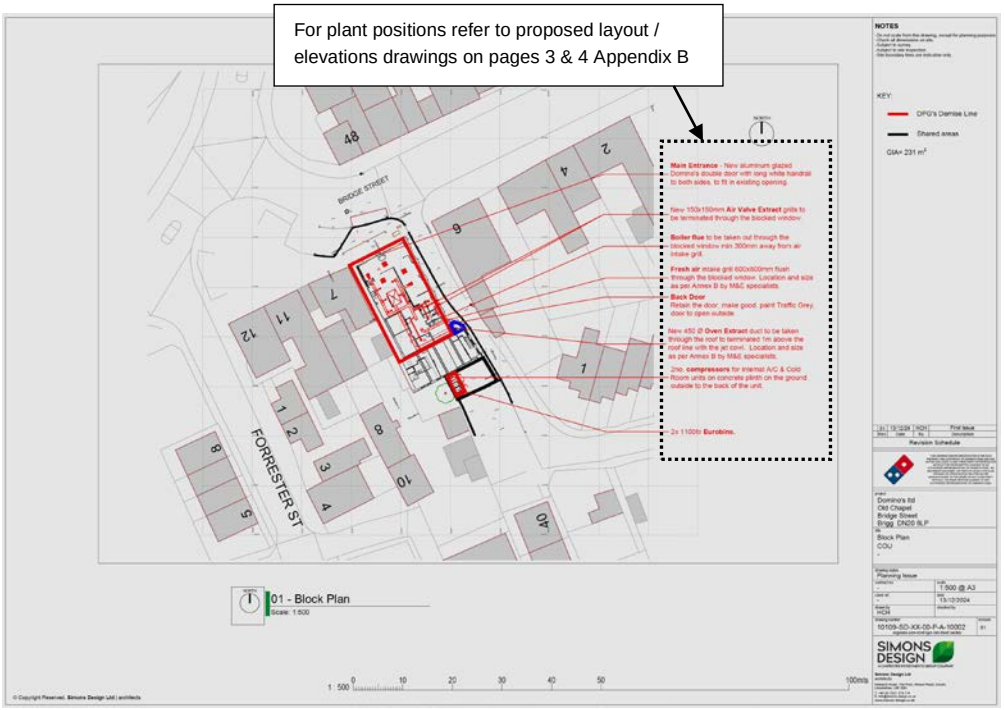


Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix B *(page 2 of 4)*

Date: April 2025

SITE LOCATION PLAN & BLOCK PLAN

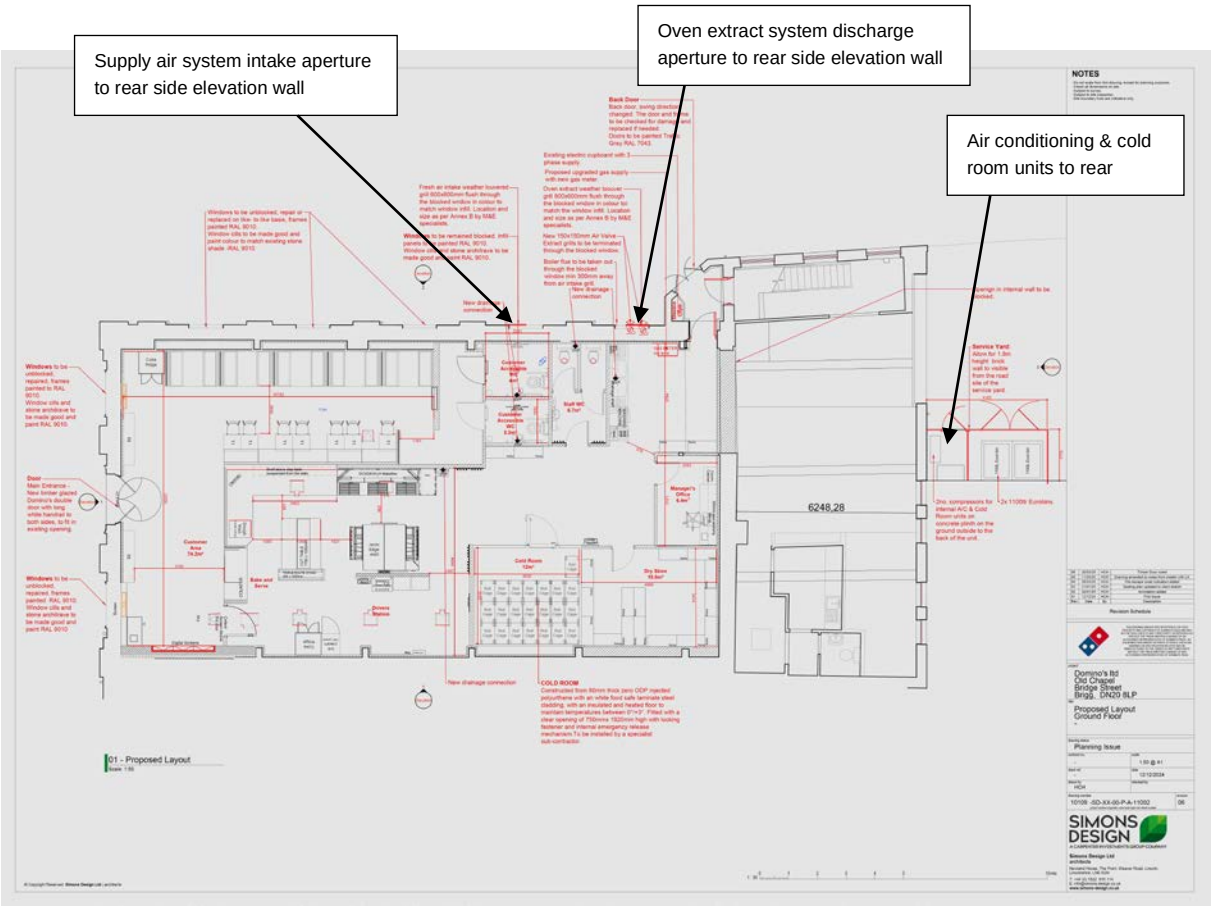


Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix B *(page 3 of 4)*

Date: April 2025

PROPOSED LAYOUT PLAN DRAWING

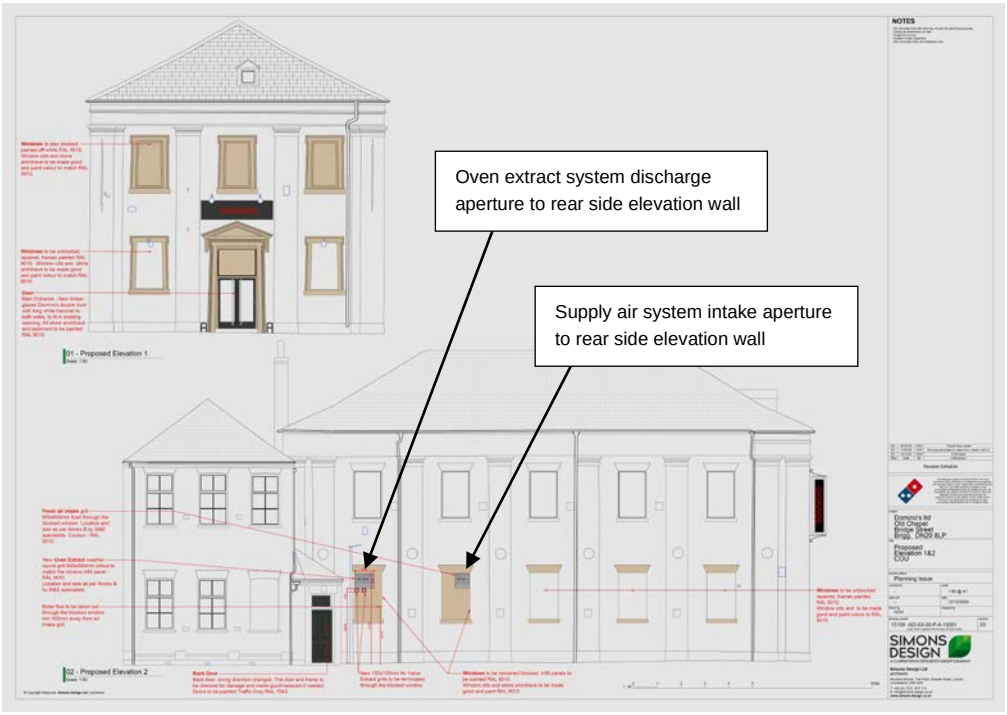


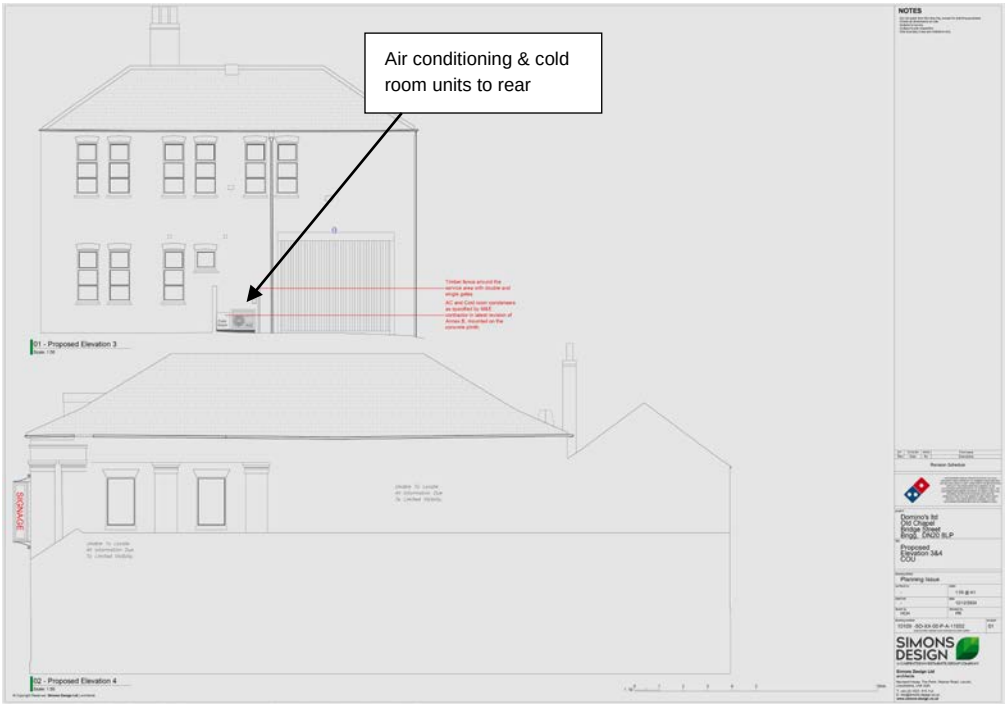
Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix B *(page 4 of 4)*

Date: April 2025

PROPOSED ELEVATIONS DRAWINGS





APPENDIX C

Background Noise Survey Results

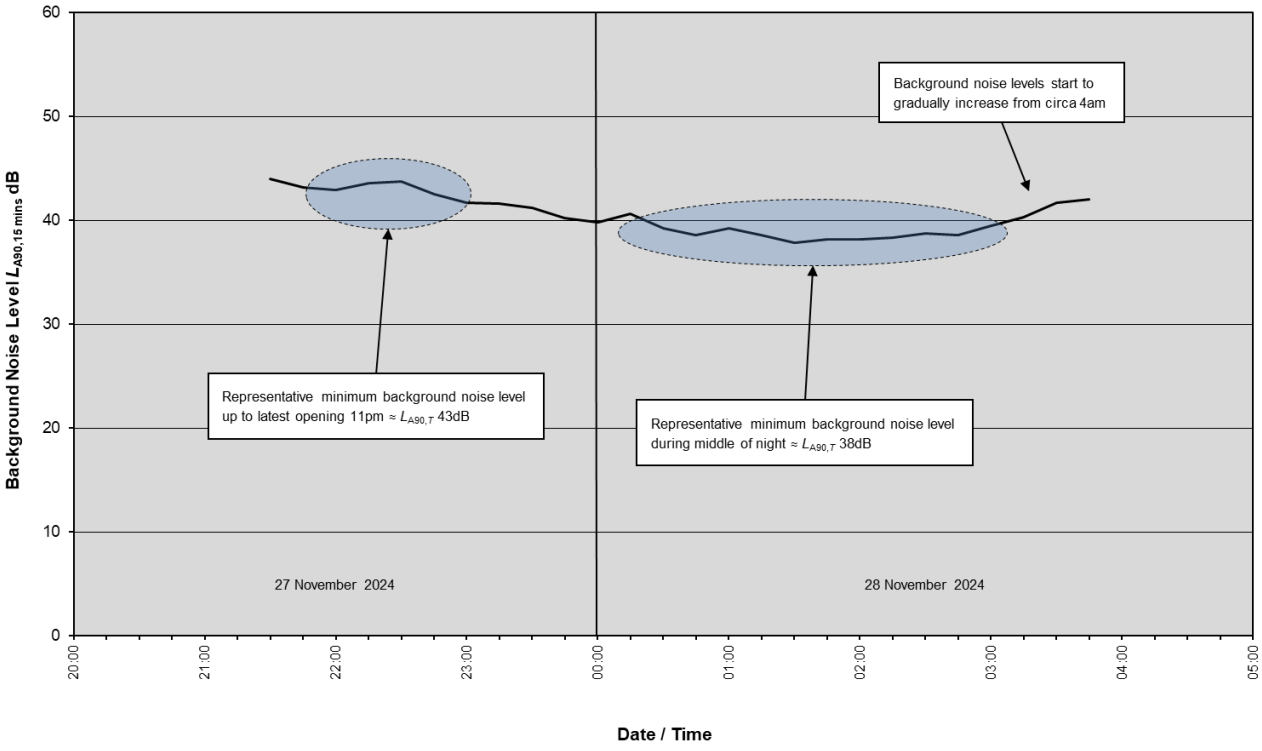
Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix C *(page 1 of 1)*

Date: April 2025

BACKGROUND NOISE SURVEY RESULTS

Raw Data Survey Results *(rear of site, directly representative externally outside neighbouring residential properties)*



APPENDIX D

Manufacturer's Plant Noise Data

Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix D *(page 1 of 4)*

Date: April 2025

MANUFACTURER'S PLANT NOISE DATA

Supply Air System Fan: S&P CBM/6-320/240-550W

Technical characteristics

Before installation check that the product electrical characteristics listed on the data plate label (Voltage, power, frequency etc) match those of the intended electrical supply.

Model	Motor power (W)	Motor power (PK)	Equiv. in inches	Poles	Speed (r.p.m.)	Capacitor (µF / V)	Maximum current absorbed 230/1/50 (A)	Maximum current absorbed 230-400/3/50 (A)	Airflow (m³/h)	Sound pressure level * (dB(A))	Weight (kg)
CBM/6-180/180-72W	72	1/10	7/7	6	960	4/400	1,0	–	1400	56	9
CBM/4-180/180-147W	150	1/5	7/7	4	1350	6/400	1,5	–	1565	59	10
CBM/6-240/180-122W	120	1/6	9/7	6	900	8/500	2,1	–	2430	63	15
CBM/6-240/180-245W	250	1/3	9/7	6	920	10/450	2,45	–	2680	65	16
CBM/6-240/240-122W	120	1/6	9/9	6	850	8/500	2,1	–	2500	61	16
CBM/6-240/240-245W	250	1/3	9/9	6	900	10/450	2,75	–	2900	63	17
CBM/4-240/240-373W	370	1/2	9/9	4	1350	10/400	3,8	–	2650	65	19
CBM/6-270/200-245W	250	1/3	10/8	6	900	10/400	3,0	–	3480	65	18
CBM/6-270/200-373W	370	1/2	10/8	6	970	15/400	4,0	–	4000	68	19
CBM/4-270/200-373W	370	1/2	10/8	4	1300	12/400	5,0	–	3150	66	21
CBM/6-270/270-245W	250	1/3	10/10	6	900	10/400	3,0	–	3550	63	20
CBM/6-270/270-373W	370	1/2	10/10	6	900	15/400	4,0	–	4500	67	21
CBM/4-270/270-550W	550	3/4	10/10	4	1400	15/400	5,9	–	3540	66	23
CBM/6-320/240-550W	550	3/4	12/9	6	900	18/400	5,8	–	4700	67	28
CBM/6-320/240-1100W (trif.)	1100	1,5 (3f)	12/9	6	900	–	–	7,0/4,2	7000	75	28
CBM/6-320/320-550W	550	3/4	12/12	6	900	18/400	5,8	–	5250	66	30
CBM/6-320/320-1100W (trif.)	1100	1,5 (3f)	12/12	6	900	–	–	7,0/4,0	7900	78	30
CBM-RTC/6-380/380-2200W (trif.)	2200	3 (3f)	15/15	6	940	–		10,4/6,0	9000	70	45

* Measured at 1,5 meters at the fan inlet side in free field.

Manufacturer data in terms of overall sound pressure level 67dBA at 1.5m distance (free field) from fan inlet side

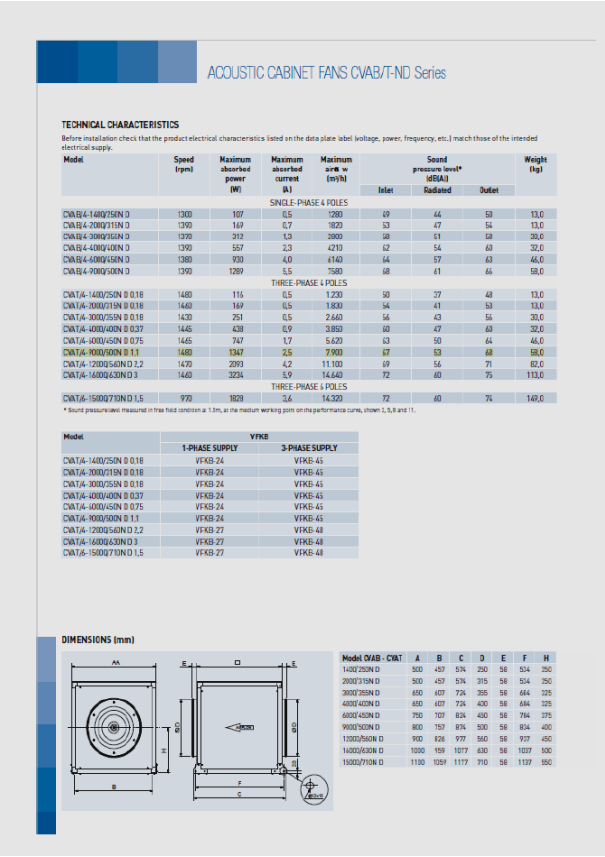
Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix D *(page 2 of 4)*

Date: April 2025

MANUFACTURER'S PLANT NOISE DATA

Oven Extract System Fan: S&P CVAT/4-9000/500 ND



ACOUSTIC CABINET FANS CVAB/T-ND Series

TECHNICAL CHARACTERISTICS

Before installation check that the product electrical characteristics listed on the data plate label (voltage, power, frequency, etc.) match those of the intended electrical supply.

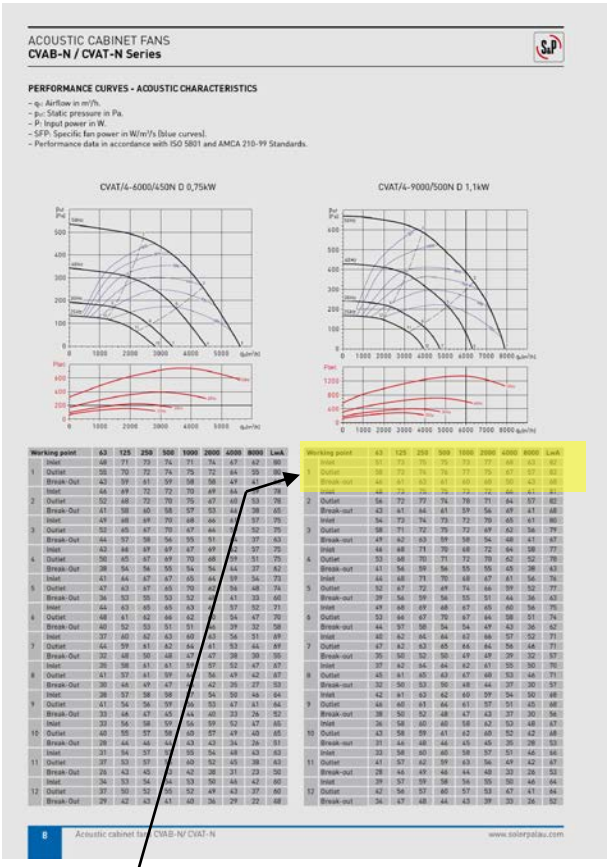
Model	Speed (rpm)	Maximum absorbed power (W)	Maximum absorbed current (A)	Maximum air w (m³/h)	Sound pressure level* dB(A) Inlet	Sound pressure level* dB(A) Radiated	Sound pressure level* dB(A) Outlet	Weight (kg)
SINGLE-PHASE 4 POLES								
CVAB/E4-140Q/250N D	1300	107	0,5	1280	49	44	50	13,0
CVAB/E4-200Q/315N D	1390	169	0,7	1820	53	47	54	13,0
CVAB/E4-300Q/355N D	1370	312	1,3	2800	58	51	58	30,0
CVAB/E4-400Q/400N D	1390	557	2,3	4210	62	54	63	32,0
CVAB/E4-600Q/450N D	1360	930	4,0	6140	64	57	63	44,0
CVAB/E4-900Q/500N D	1390	1289	5,5	7580	68	61	66	58,0
THREE-PHASE 4 POLES								
CVAT/A-140Q/250N D 0,18	1480	116	0,5	1.230	50	37	48	13,0
CVAT/A-200Q/315N D 0,18	1460	169	0,5	1.830	54	41	53	13,0
CVAT/A-300Q/355N D 0,18	1430	251	0,5	2.660	56	43	56	30,0
CVAT/A-400Q/400N D 0,37	1445	438	0,9	3.850	60	47	60	32,0
CVAT/A-600Q/450N D 0,75	1445	747	1,7	5.620	63	50	64	44,0
CVAT/A-900Q/500N D 1,1	1480	1347	2,5	7.900	67	53	68	58,0
CVAT/A-1200Q/560N D 2,2	1470	2093	4,2	11.100	69	56	71	82,0
CVAT/A-1600Q/630N D 3	1460	3234	5,9	14.640	72	60	75	113,0
THREE-PHASE 6 POLES								
CVAT/A-1500Q/710N D 1,5	970	1829	3,6	14.320	72	60	74	149,0

* Sound pressure level measured in free field condition at 1.5m, at the medium working point on the performance curve, shown 1, 5, 8 and 11.

Model	VFKB 1-PHASE SUPPLY	VFKB 3-PHASE SUPPLY
CVAT/A-140Q/250N D 0,18	VFKB-24	VFKB-45
CVAT/A-200Q/315N D 0,18	VFKB-24	VFKB-45
CVAT/A-300Q/355N D 0,18	VFKB-24	VFKB-45
CVAT/A-400Q/400N D 0,37	VFKB-24	VFKB-45
CVAT/A-600Q/450N D 0,75	VFKB-24	VFKB-45
CVAT/A-900Q/500N D 1,1	VFKB-24	VFKB-45
CVAT/A-1200Q/560N D 2,2	VFKB-27	VFKB-48
CVAT/A-1600Q/630N D 3	VFKB-27	VFKB-48
CVAT/A-1500Q/710N D 1,5	VFKB-27	VFKB-48

DIMENSIONS (mm)

Model CVAB - CVAT	A	B	C	D	E	F	H
1400/250N D	500	457	574	250	58	514	250
2800/315N D	500	457	574	315	58	514	250
3800/355N D	650	607	724	355	58	644	325
4000/400N D	650	607	724	400	58	644	325
6000/450N D	750	707	824	450	58	744	375
9000/500N D	800	757	874	500	58	834	400
12000/560N D	900	826	977	560	58	977	450
16000/630N D	1000	159	1077	630	58	1037	500
19000/710N D	1100	1059	1177	710	58	1137	550



ACOUSTIC CABINET FANS
CVAB-N / CVAT-N Series

PERFORMANCE CURVES - ACOUSTIC CHARACTERISTICS

- q_v: Airflow in m³/h.
- p_{sc}: Static pressure in Pa.
- P: Input power in W.
- SFP: Specific fan power in W/m³/s (blue curves).
- Performance data in accordance with ISO 5801 and AMCA 210-99 Standards.

CVAT/4-6000/450N D 0,75kW

CVAT/4-9000/500N D 1,1kW

Working point	63	125	250	500	1000	2000	4000	8000	LwA
1 Inlet	51	73	75	75	73	77	68	63	82
1 Outlet	58	73	74	76	77	75	67	57	83
1 Break-out	46	61	63	61	60	60	50	43	68

Manufacturer noise data is in terms of overall dBA & A weighted octave band sound power level values *(working point 1 applicable for noise assessment)*

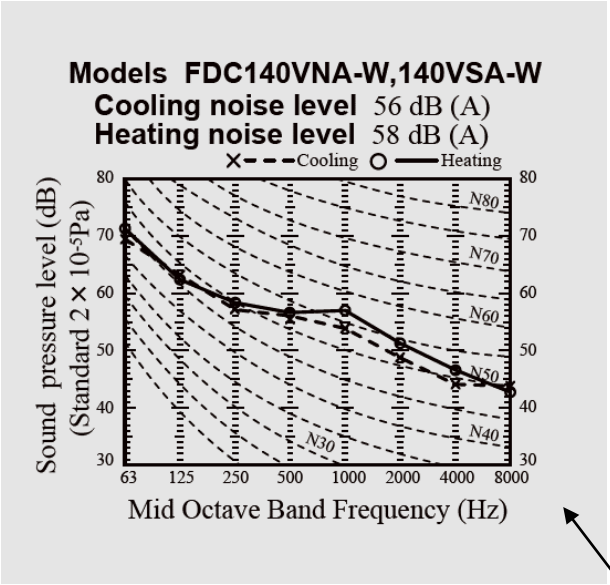
Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix D *(page 3 of 4)*

Date: April 2025

MANUFACTURER'S PLANT NOISE DATA

Air Conditioning Unit: Mitsubishi FDC140VNA-W *(configured cooling mode)*



Manufacturer noise data is in terms of overall dBA & octave band linear dB sound pressure levels at 1m distance from the unit.

Note the manufacturer stated octave band values equate to slightly higher equivalent overall dBA values (example: for cooling mode 58dBA as opposed to the stated value 56dBA).

For purpose of the noise assessment, it is cautiously/robustly taken the octave band data values are correct, thus with slightly higher equivalent overall dBA value than the manufacturer stated value.

Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix D *(page 4 of 4)*

Date: April 2025

MANUFACTURER'S PLANT NOISE DATA

Cold Room Unit: Tecumseh Wintsys WINAJ4517Z-FZ

Tecumseh

Condensing unit
Voltage Code : FZ

WINAJ4517Z-FZ

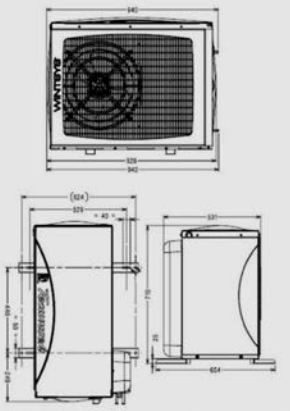
High Temp. Commercial (HP)

220 - 240V 1~ 50 Hz

R452A / R404A / R448A / R449A

WINAJ4517Z-FZ

Conditions	Frequency	Nominal Cooling Capacity Watts	Nominal Cooling Capacity BTU/h	Sound Power ISO3745 / ISO 3743-1
EN13215 / R452A	50 Hz	2190	7470	61 dBA
EN13215 / R404A	50 Hz	2296	7830	61 dBA
EN13215 / R448A	50 Hz	2003	6831	61 dBA
EN13215 / R449A	50 Hz	2004	6835	61 dBA



Net Weight (Kg)	65.0
Expansion device	Expansion_Valve
Air Flow (m³/h)	1650
Compo Data Sheet	224LT-FZ
Elec Comp Type	CSR
Current (Amp)	
Load Rated Amp	7.6
Max Cont Current	13.2
Lock Rotor Amp	39
Fan	
Speed (rpm)	546
Power (W)	65.0
Diameter (mm)	360
Protection	Overload
IP Level	IP44
Condenser	360/14100
Liquid Receiver	
Capacity (L)	2.35
Maximum Pressure (Bars)	32.0
Suction Line	
Suction Type	Tube / Tube
For Tubing Out Diam	15.9 (5/8")
Suction Connection Type	Brased
Liquid Line	
Liquid Line Type	Tube
For Tubing Out Diam	9.5 (3/8")
Liquid Connecton Type	Brased
Connection Type	TT
Fan Guard	maille < à 8mm

* EN13215 : T°Ambient 32.0°C / T°Evap. -10.0°C / T°Return gas temp.. 20.0°C T°Subcooling. 3.0K

Note : Tecumseh reserves the right to change information contained in this document without notification.

Selection program - V4.6_2020072 - 06/05/2020

Manufacturer noise data is in terms of overall dBA sound power level

APPENDIX E

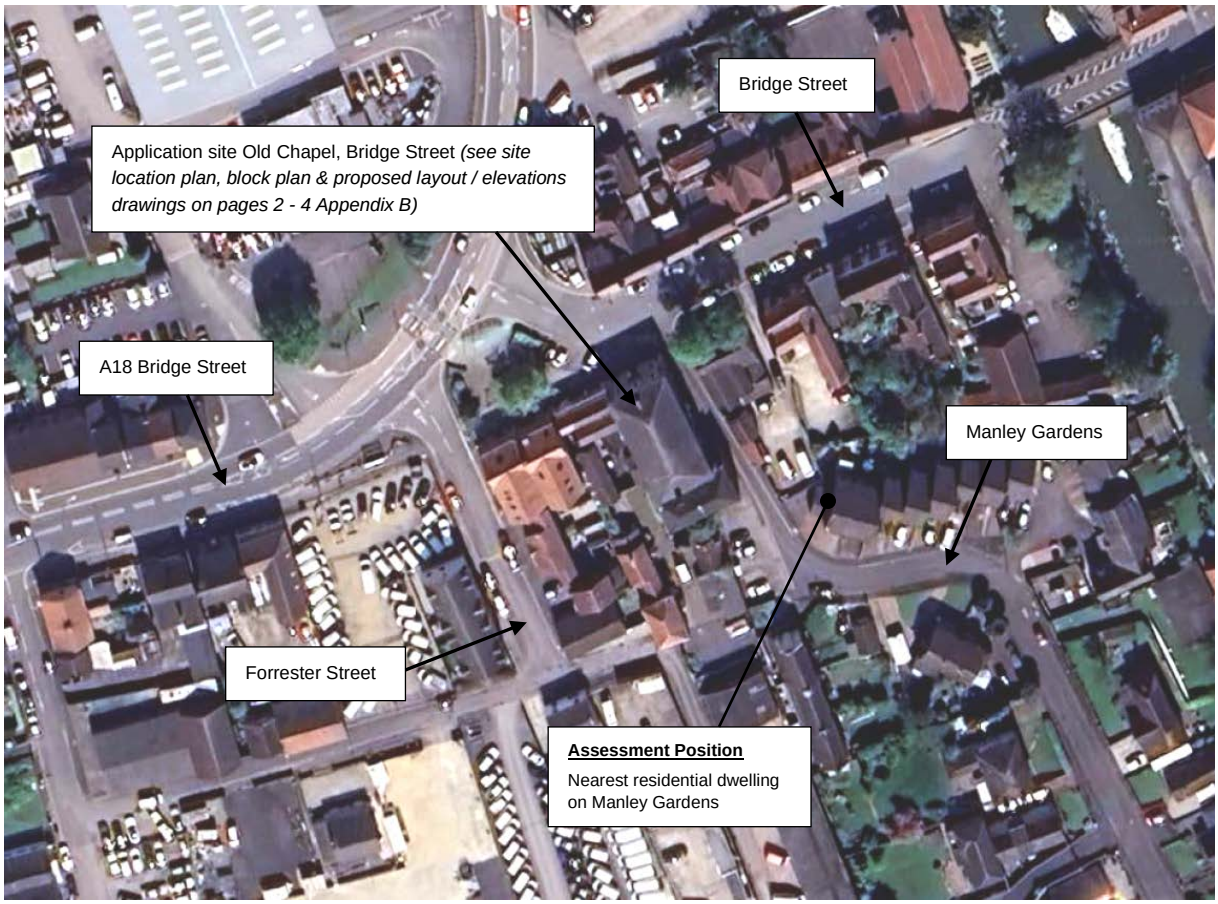
Noise Assessment Position & Plant Noise Model Calculation

Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix E *(page 1 of 2)*

Date: April 2025

NOISE ASSESSMENT POSITION



Site: Old Chapel, Bridge Street, Brigg DN20 8LP

Report: 24096-002 Revision A Appendix E *(page 2 of 2)*

Date: April 2025

PLANT NOISE MODEL CALCULATION

ASSESSMENT POSITION: Nearest residential dwelling on Manley Gardens

NOISE CONDITION: Opening hours; all plant items operating full duty

NOISE MITIGATION: Silencers to supply air system & oven extract system *(see sub-section 7.1 Report 24096-002 Revision A)*

		Lin dB at Octave Band Centre Frequency Hz							
Plant & Description	**Overall dBA**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
SUPPLY AIR SYSTEM - INTAKE APERTURE: S&P CBM/6-320/240-550W Fan									
Sound power level Lw dB; *fan inlet induct*	79	80	78	77	76	74	70	67	63
Duct Loss; *duct length between fan & aperture (excluding silencer) - allow ≈3m 500mm Ø*		0	0	0	0	0	0	0	0
Duct Loss; *duct bends between fan & aperture - allow 1 x 90° radius bend 500mm Ø*		0	0	0	-1	-2	-3	-3	-3
Duct Loss; *aperture end reflection 500mm Ø duct to external fresh air intake aperture*		-9	-5	-2	0	0	0	0	0
Noise Mitigation; *atmosphere side silencer to system (Alnor SIL-50 450-600 circular silencer)*		-2	-4	-8	-16	-18	-13	-12	-12
Sound power level Lw dB; *external aperture Lw*	63	69	69	67	59	54	54	52	48
Distance; *free-field correction for ≈29m from aperture to assessment position*		-37	-37	-37	-37	-37	-37	-37	-37
Screening; *nil line of sight screening correction applied*		0	0	0	0	0	0	0	0
Directivity; *≈50° off-axis aperture directivity to assessment position applicable, limit to -4dB*		0	-1	-1	-2	-3	-4	-4	-4
Non Free-Field / Reflections; *+3dB correction applied for intake aperture within wall*		3	3	3	3	3	3	3	3
Individual contribution at assessment position	27	35	34	32	23	17	16	14	10
OVEN EXTRACT SYSTEM - DISCHARGE APERTURE: S&P CVAT/4-9000/500 ND Acoustic Cabinet Fan									
Sound power level Lw dB; *fan outlet induct*	83	84	89	83	79	77	74	66	58
Duct Loss; *duct length between fan & aperture (excluding silencer) - allow ≈3m 500mm Ø*		0	0	0	0	0	0	0	0
Duct Loss; *duct bends between fan & aperture - allow 1 x 90° radius bend 500mm Ø*		0	0	0	-1	-2	-3	-3	-3
Duct Loss; *aperture end reflection 500mm Ø duct to external discharge aperture*		-9	-5	-2	0	0	0	0	0
Noise Mitigation; *atmosphere side silencer to system (Alnor SIL-50 500-1200 circular silencer)*		-4	-9	-13	-19	-22	-17	-16	-17
Sound power level Lw dB; *external aperture Lw*	64	71	75	68	59	53	54	47	38
Distance; *free-field correction for ≈26m from aperture to assessment position*		-36	-36	-36	-36	-36	-36	-36	-36
Screening; *nil line of sight screening correction applied*		0	0	0	0	0	0	0	0
Directivity; *≈50° off-axis aperture directivity to assessment position applicable, limit to -4dB*		0	-1	-1	-2	-3	-4	-4	-4
Non Free-Field / Reflections; *+3dB correction applied for discharge aperture within wall*		3	3	3	3	3	3	3	3
Individual contribution at assessment position	29	38	41	34	24	17	17	10	1
AIR CONDITIONING UNIT: Mitsubishi FDC140VNA-W									
Sound power level Lw dB *(unit installed for cooling mode operation)*	66	77	72	65	63	62	57	52	52
Quantity; *0dB quantity correction applicable for 1 x unit*		0	0	0	0	0	0	0	0
Noise Mitigation; *non applied*		0	0	0	0	0	0	0	0
Distance; *free-field correction for ≈22m from unit to assessment position*		-35	-35	-35	-35	-35	-35	-35	-35
Screening; *nil line of sight screening correction applied*		0	0	0	0	0	0	0	0
Directivity; *nil directivity correction applicable (unit radiates noise equally all directions)*		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; *+6dB correction applied for unit in proximity to rear elevation wall & boundary wall*		6	6	6	6	6	6	6	6
Individual contribution at assessment position	38	48	43	36	34	33	28	23	23
COLD ROOM UNIT: Tecumseh Wintsys WINAJ4517Z -FZ									
Sound power level Lw dB	61	63	61	59	57	56	53	49	41
Quantity; *0dB quantity correction applicable for 1 x unit*		0	0	0	0	0	0	0	0
Noise Mitigation; *non applied*		0	0	0	0	0	0	0	0
Distance; *free-field correction for ≈22m from unit to assessment position*		-35	-35	-35	-35	-35	-35	-35	-35
Screening; *nil line of sight screening correction applied*		0	0	0	0	0	0	0	0
Directivity; *nil directivity correction applicable (unit radiates noise equally all directions)*		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; *+6dB correction applied for unit in proximity to rear elevation wall & boundary wall*		6	6	6	6	6	6	6	6
Individual contribution at assessment position	32	34	32	30	28	27	24	20	12
Cumulative Plant Noise (Specific Noise Level) At Assessment Position									
All Plant: Operating during opening hours (range 11am to 11pm)	**39**	**49**	**46**	**40**	**36**	**34**	**30**	**25**	**24**
Cold Room Unit: Operable over 24 hours (including through the night)	**32**	**34**	**32**	**30**	**28**	**27**	**24**	**20**	**12**

The overall cumulative sound pressure (Specific noise) level at the assessment position due to all plant items operating is 39dBA. For only the cold room unit operating through the night, the noise level of plant at the assessment position is 32dBA.

Although the specified noise reduction treatment will tend to supress any tonal characteristics of the plant, plus noise of the air conditioning & cold room units is nominally broadband in nature, a +2dBA penalty (correction) as per the assessment guidance of the current edition BS4142 is cautiously added to the overall calculated plant noise levels to give plant noise Rating Levels to account that residual noise from the plant could potentially have a just perceptible tonal characteristic.

APPENDIX F

Noise Reduction Treatment For Plant

Site: Old Chapel, Bridge Street, Brigg DN20 8LP

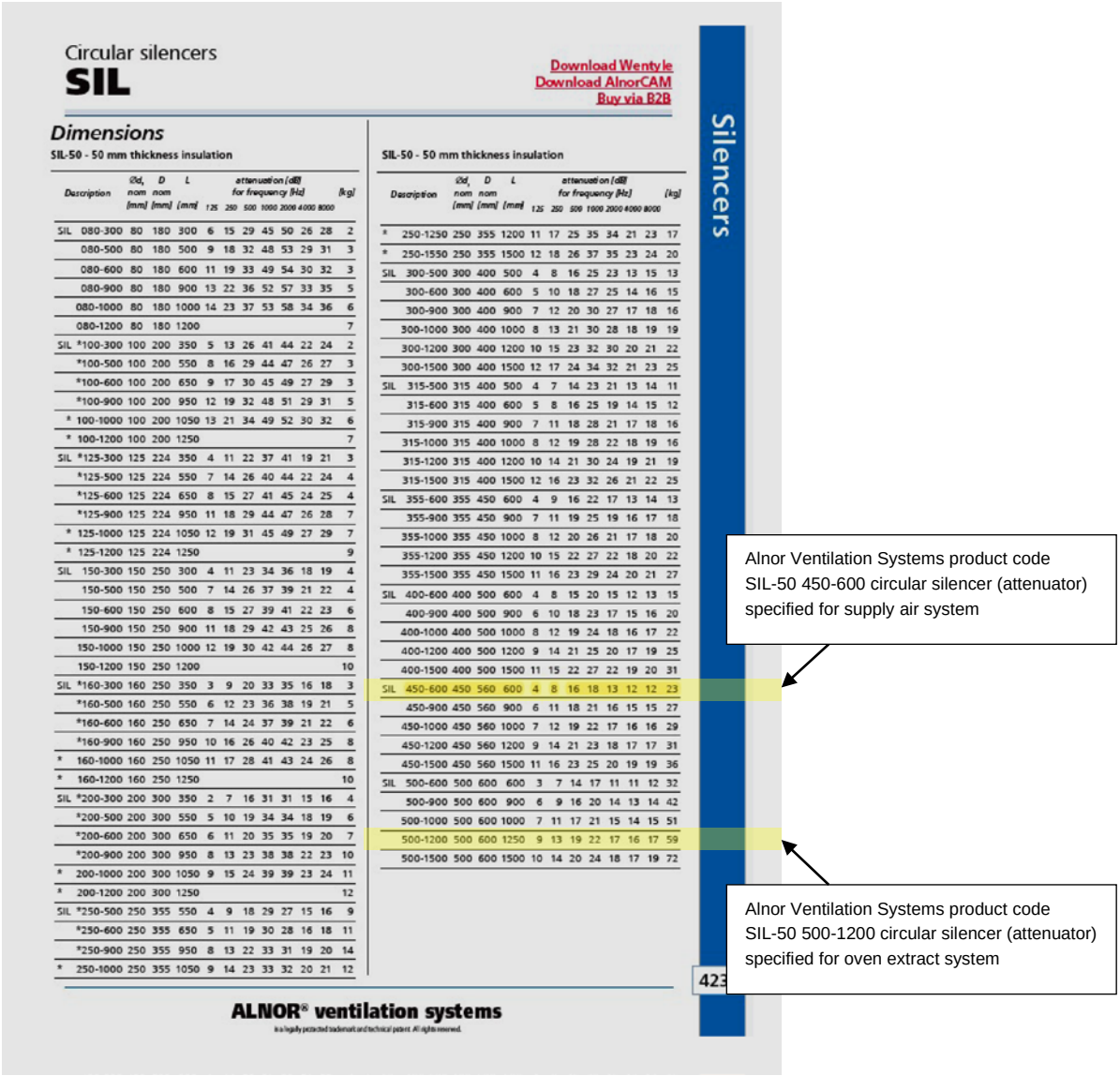
Report: 24096-002 Revision A Appendix F *(page 1 of 1)*

Date: April 2025

NOISE REDUCTION TREATMENT FOR PLANT

Supply Air System & Oven Extract System Silencers:

Data sheet for specified circular type silencers; Alnor Ventilation Systems product code SIL-50 ***-****



Circular silencers
SIL

Download Wentyle
Download AlnorCAM
Buy via B2B

Dimensions

SIL-50 - 50 mm thickness insulation

	Description	Ød, nom [mm]	D nom [mm]	L [mm]	attenuation [dB] for frequency [Hz] 125	250	500	1000	2000	4000	8000	[kg]
SIL	080-300	80	180	300	6	15	29	45	50	26	28	2
	080-500	80	180	500	9	18	32	48	53	29	31	3
	080-600	80	180	600	11	19	33	49	54	30	32	3
	080-900	80	180	900	13	22	36	52	57	33	35	5
	080-1000	80	180	1000	14	23	37	53	58	34	36	6
	080-1200	80	180	1200								7
SIL	*100-300	100	200	350	5	13	26	41	44	22	24	2
	*100-500	100	200	550	8	16	29	44	47	26	27	3
	*100-600	100	200	650	9	17	30	45	49	27	29	3
	*100-900	100	200	950	12	19	32	48	51	29	31	5
*	100-1000	100	200	1050	13	21	34	49	52	30	32	6
*	100-1200	100	200	1250								7
SIL	*125-300	125	224	350	4	11	22	37	41	19	21	3
	*125-500	125	224	550	7	14	26	40	44	22	24	4
	*125-600	125	224	650	8	15	27	41	45	24	25	4
	*125-900	125	224	950	11	18	29	44	47	26	28	7
*	125-1000	125	224	1050	12	19	31	45	49	27	29	7
*	125-1200	125	224	1250								9
SIL	150-300	150	250	300	4	11	23	34	36	18	19	4
	150-500	150	250	500	7	14	26	37	39	21	22	4
	150-600	150	250	600	8	15	27	39	41	22	23	6
	150-900	150	250	900	11	18	29	42	43	25	26	8
	150-1000	150	250	1000	12	19	30	42	44	26	27	8
	150-1200	150	250	1200								10
SIL	*160-300	160	250	350	3	9	20	33	35	16	18	3
	*160-500	160	250	550	6	12	23	36	38	19	21	5
	*160-600	160	250	650	7	14	24	37	39	21	22	6
	*160-900	160	250	950	10	16	26	40	42	23	25	8
*	160-1000	160	250	1050	11	17	28	41	43	24	26	8
*	160-1200	160	250	1250								10
SIL	*200-300	200	300	350	2	7	16	31	31	15	16	4
	*200-500	200	300	550	5	10	19	34	34	18	19	6
	*200-600	200	300	650	6	11	20	35	35	19	20	7
	*200-900	200	300	950	8	13	23	38	38	22	23	10
*	200-1000	200	300	1050	9	15	24	39	39	23	24	11
*	200-1200	200	300	1250								12
SIL	*250-500	250	355	550	4	9	18	29	27	15	16	9
	*250-600	250	355	650	5	11	19	30	28	16	18	11
	*250-900	250	355	950	8	13	22	33	31	19	20	14
*	250-1000	250	355	1050	9	14	23	33	32	20	21	12

SIL-50 - 50 mm thickness insulation

	Description	Ød, nom [mm]	D nom [mm]	L [mm]	attenuation [dB] for frequency [Hz] 125	250	500	1000	2000	4000	8000	[kg]
*	250-1250	250	355	1200	11	17	25	35	34	21	23	17
*	250-1550	250	355	1500	12	18	26	37	35	23	24	20
SIL	300-500	300	400	500	4	8	16	25	23	13	15	13
	300-600	300	400	600	5	10	18	27	25	14	16	15
	300-900	300	400	900	7	12	20	30	27	17	18	16
	300-1000	300	400	1000	8	13	21	30	28	18	19	19
	300-1200	300	400	1200	10	15	23	32	30	20	21	22
	300-1500	300	400	1500	12	17	24	34	32	21	23	25
SIL	315-500	315	400	500	4	7	14	23	21	13	14	11
	315-600	315	400	600	5	8	16	25	19	14	15	12
	315-900	315	400	900	7	11	18	28	21	17	18	16
	315-1000	315	400	1000	8	12	19	28	22	18	19	16
	315-1200	315	400	1200	10	14	21	30	24	19	21	19
	315-1500	315	400	1500	12	16	23	32	26	21	22	25
SIL	355-600	355	450	600	4	9	16	22	17	13	14	13
	355-900	355	450	900	7	11	19	25	19	16	17	18
	355-1000	355	450	1000	8	12	20	26	21	17	18	20
	355-1200	355	450	1200	10	15	22	27	22	18	20	22
	355-1500	355	450	1500	11	16	23	29	24	20	21	27
SIL	400-600	400	500	600	4	8	15	20	15	12	13	15
	400-900	400	500	900	6	10	18	23	17	15	16	20
	400-1000	400	500	1000	8	12	19	24	18	16	17	22
	400-1200	400	500	1200	9	14	21	25	20	17	19	25
	400-1500	400	500	1500	11	15	22	27	22	19	20	31
SIL	450-600	450	560	600	4	8	16	18	13	12	12	23
	450-900	450	560	900	6	11	18	21	16	15	15	27
	450-1000	450	560	1000	7	12	19	22	17	16	16	29
	450-1200	450	560	1200	9	14	21	23	18	17	17	31
	450-1500	450	560	1500	11	16	23	25	20	19	19	36
SIL	500-600	500	600	600	3	7	14	17	11	11	12	32
	500-900	500	600	900	6	9	16	20	14	13	14	42
	500-1000	500	600	1000	7	11	17	21	15	14	15	51
	500-1200	500	600	1250	9	13	19	22	17	16	17	59
	500-1500	500	600	1500	10	14	20	24	18	17	19	72

ALNOR® ventilation systems

Silencers

423

Alnor Ventilation Systems product code SIL-50 450-600 circular silencer (attenuator) specified for supply air system

Alnor Ventilation Systems product code SIL-50 500-1200 circular silencer (attenuator) specified for oven extract system