Our Ref: NIA/1149/23/191/V2.0/Cranswick Convenience Foods

5th May 2023

Mr David Roe
Director
Building Link Design
15 Thorne Road
Doncaster
DN1 2HG

Dear Sir

NOISE IMPACT ASSESSMENT FOR NEW AMMONIA PLANT ROOM & RECEPTION BUILDING

CRANSWICK CONVENIENCE FOODS, VALLEY PARK INDUSTRIAL ESTATE, MEADOWBANK, WOMBWELL, BARNSLEY, S73 0UN

BARNSLEY METROPOLITAN BOROUGH COUNCIL PLANNING APPLICATION 2023/0294

1.00 INTRODUCTION

1.01 RP Acoustics Limited has been commissioned by Cranswick Convenience Foods to carry out a noise impact assessment for a new ammonia plant room and reception building at Cranswick Convenience Foods, Valley Park Industrial Estate, Meadowbank, Wombwell, Barnsley, S73 0UN (hereafter referred to as the application site). The noise impact assessment is in support of Planning Application 2023/0294.

1.02 The objectives of the noise impact assessment were to:

- Establish ambient and background noise levels at the Dearne Valley Premier Inn Hotel
- Calculate the ammonia plant noise levels at the Dearne Valley Premier Inn Hotel
- Assess the impact of the ammonia plant on the Dearne Valley Premier Inn Hotel
- Provide recommendations for noise mitigation measures if required

1.03 This report sets out the methodology and findings of the noise impact assessment. It has been prepared on behalf of Cranswick Convenience Foods for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Cranswick Convenience Foods (applicant), Building Link Design (applicant's agent) and RP Acoustics Limited as to the extent to which the findings may be appropriate for their use.

1.04 A glossary of acoustic terms is contained in Appendix 1 for reference.

2.00 APPLICATION SITE SETTING AND PROPOSED DEVELOPMENT

2.01 The application site is located on the Valley Park Industrial Estate, Meadowbank, Wombwell, Barnsley, S73 0UN. There are a number of existing industrial units within the estate, whilst the Dearne Valley Premier Inn Hotel is located to the south. The application site location plan and the proposed layout are reproduced in Appendices 2 and 3, respectively.

2.02 The proposal involves the creation of a new ammonia plant room and reception building. The basis for the proposal will be an ammonia / glycol refrigeration system, with a series of dual temperature functions. In the plant room there will be 4 no. industrial compressors (2 no. serving the glycol and MT (Medium Temp) pumped ammonia systems, 1 no. serving the LT (Low Temp) pumped ammonia system and 1 no. swing compressor which will be capable of providing back up to each system). In addition to the internal plant, there will also be 2 no. Evapco PMCQ-566Q Condensers located on the roof of the plant room building.

2.03 The LT (Low Temp) Ammonia system will serve the Impingement and Cabinet Freezers, the MT Ammonia system will serve the Oven and Roaster Blasts whilst the HT glycol system will be piped to various room coolers and AHU's. All compressors will be VSD as standard with high efficiency motors. Defrosting of the chill temperature air coolers will use 'free energy' recovered from the refrigeration oil cooling system. The higher temperature air coolers will have 'Off Cycle' defrost. All air coolers fed via pumped ammonia will be Hot Gas as standard.

2.04 For reference, Ammonia as a refrigerant has an Ozone Depletion Potential (ODP) and Global Warming Potential (GWP) of zero meaning compared to other forms of refrigeration it is particularly climate friendly and efficient. It has excellent thermodynamic properties, reflected in very low operating costs for refrigeration technology. It has consistently been used in food processing plants, the beverage and dairy industries, as well as in breweries and cold stores. Globally, ammonia is widely acknowledged as the best refrigerant both on efficiency and environmental impact, hence it is given the 'benchmark' GWP rating of 0 (zero). CO_2 has a GWP rating of 1 (one) as it is perceived to be the next best refrigerant.

2.05 The ammonia plant layout and size has been carefully considered and designed to house all the equipment needed for the ammonia refrigeration system. There is a main plant room with a switch room off to the side. The switch room has two entrance doors from the outside for usability. The larger ammonia plant room has two external doors; a larger roller shutter so that larger plant machinery can be upgraded if need be with ease through the larger door and a louvered grill for ventilation into this area.

2.06 Also proposed is a new reception building adjoined to the ammonia plant. This will be used as a new entrance to the site for visitors who will have to sign in at security. It includes a parcel room for deliveries; a WC and staff room for the security staff and a first floor for both a meeting room and server room.

2.07 The reception / security office layout has been designed specifically for usability. There is an entrance door that leads directly into reception and an opposite door that leads out into the site, meaning that in order to enter the site the only option is to walk directly through security which helps to minimise security risks on site. The positioning of windows in reception have also been placed specifically so that security staff can have a clear sight to anyone entering the site, which is a big factor in minimising security risks also.

2.08 The existing access to the site is to still be utilised for visitors. A new fence is proposed to separate staff and visitor parking, there will be a turnstile for pedestrians with permitted access to enter through. Again this is a major improvement on the existing security and means that only persons with permitted access can enter this side of the site or visitors who are accompanied by persons with access.

2.09 The existing access by the existing security oy office is to be blocked off for the new location of the ammonia plant and reception building, this will also mean a reduction in 12 car parking spaces. This reduction will not have a negative effect however due to the previous planning application that has been implemented which created an additional 316 parking spaces.

3.00 PRE-ASSESSMENT CONSULTATION

3.01 The consultation response dated 18th April 2023 from Emily Convey-McGovern, Environmental Health Officer, Pollution Control, Barnsley Metropolitan Borough Council stated

A Noise Impact Assessment is required using BS 4142 methodology to assess the impact of the development on nearby sensitive receptors.

3.02 This report sets out the methodology and findings of the noise impact assessment.

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4.00 BASELINE NOISE SURVEY

4.01 For the baseline noise survey, a noise monitoring position was adopted at 1 metre from the first floor of the Dearne Valley Premier Inn Hotel overlooking Meadowbank.

4.02 Baseline noise measurements were undertaken using a NTi Audio XL2 Type 1 integrating sound level meter. The calibration was verified immediately before and after measurement sessions and no drift in calibration level was noted (calibration certificates reproduced in Appendix 4). Baseline noise measurements consisted of A–weighted broadband parameters, together with linear one-third octave band L_{eq} levels (1 second logging interval).

4.03 The baseline noise measurement data is summarised in the following tables (note: a – 3 dB façade enhancement correction has been applied to measured data in order to derive the free field noise level).

Table 4.1 – Baseline Noise Measurement Data

NMP	Date	Time	LAeq (dB)	LA90 (dB)	LA10 (dB)	LA1 (dB)	Comments
NMP1	Thursday 20/04/2023	1545–1600	64	55	62	75	Road traffic dominant
	Friday 28/04/2023	0700–0800	60	54	61	71	
		0800–0900	59	54	60	70	
		0900–1000	56	53	57	65	
		1000–1100	57	53	57	67	
	Thursday 27/04/2023	1800–1900	59	55	61	68	
		1900–2000	58	55	60	65	
		2000–2100	57	53	60	65	
		2100–2200	57	53	59	64	
		2200–2300	58	51	59	69	
Ambient day time noise level is 59 dB LAeq **BS 4142 daytime background noise level (i.e. the most commonly occurring) is 53 dB LA90 (1 hour)**							
NMP1	Friday 21/04/2023	0045–0100	53	51	54	57	Road traffic dominant
	Thursday 27/04/2023	2300–0000	55	51	57	63	
	Friday 28/04/2023	0000–0100	56	51	56	67	Night time background noise level due to distant traffic and plant
		0100–0200	55	50	55	64	
		0200–0300	53	49	54	60	
		0300–0400	52	50	53	58	
		0400–0500	57	51	59	68	
		0500–0600	58	54	60	67	
		0600–0700	59	54	61	68	
Ambient night time noise level is 56 dB LAeq (2300–0700) **BS 4142 night time background noise level (i.e. the most commonly occurring) is 51 dB LA90 (15 minutes)**							

4.04 The principal noise source at the Dearne Valley Premier Inn Hotel was traffic, whilst the night time background noise level was due to distant traffic and plant (broadband in character).

Continued from page 3

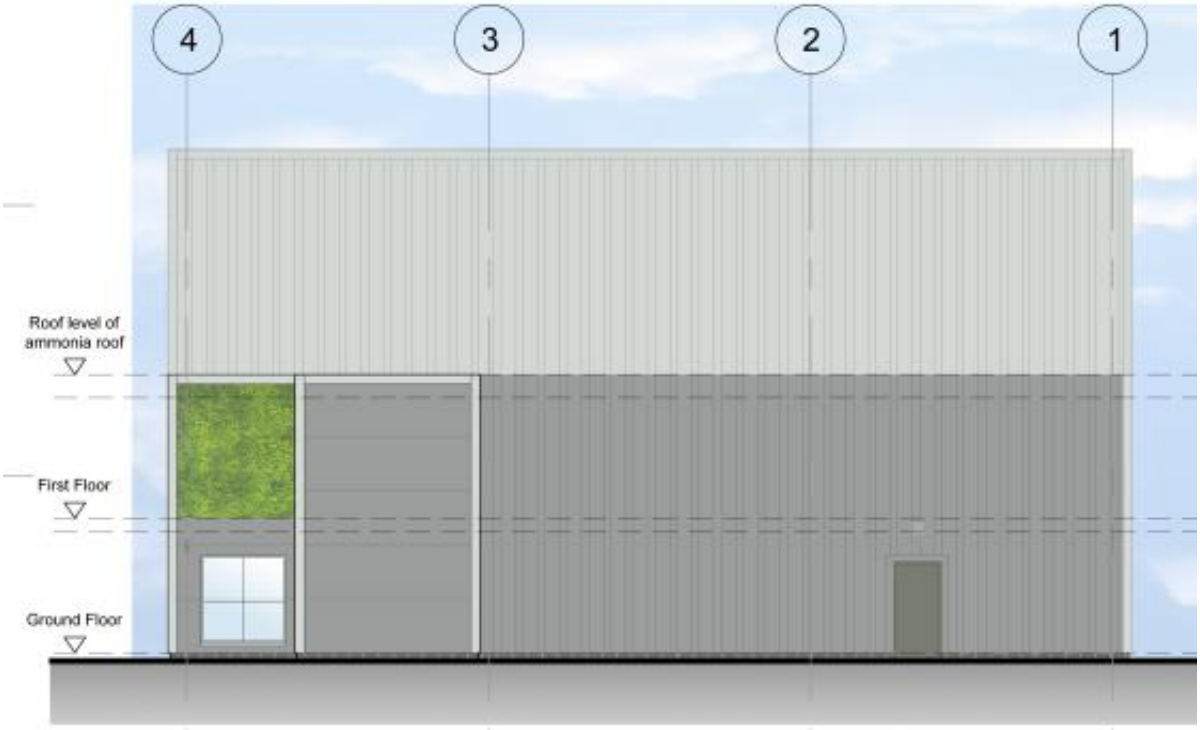
5.00 NOISE IMPACT OF THE PROPOSED AMMONIA PLANT ROOM

5.01 The principal noise source associated with the proposed ammonia plant room is the 2 no. roof mounted condensers. The noise levels associated with the condensers are directional, with the highest noise levels on the 'open' motor side (see Appendix 5).

5.02 For reference the condenser's will be orientated such that the motors will not face towards the Dearne Valley Premier Inn Hotel to the south. The noise level associated with a condenser is orientated as such is 58 dB(A) at 15 metres; the cumulative noise level of 2 no. condensers is 61 dB(A) at 15 metres.

5.03 The roof mounted condensers are to be located circa 48 metres from the Dearne Valley Premier Inn Hotel. Based on point source propagation, the resultant noise level at the northern façade of the Dearne Valley Premier Inn Hotel due to the roof mounted condensers is calculated at 51 dB LAeq (61 – 20*log(48/15) = 61 – 10) in the absence of any screening (note: this is the cumulative rating level due to 24/7 operation and their broadband noise emissions).

5.04 The roof mounted condensers will be fully screened from the Dearne Valley Premier Inn Hotel by the ammonia plant room building structure itself (as shown below).



5.05 British Standard 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' (BS 5228-1) states in Annex F.2.2.2.1 c) that *'In the absence of spectral data, as a working approximation, if there is a barrier or other topographic feature between the source and the receiving position, assume an approximate attenuation of 5 dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10 dB when the noise screen completely hides the sources from the receiver.*'

5.06 The resultant noise level at the northern façade of the Dearne Valley Premier Inn Hotel due to the screened roof mounted condensers is calculated at 41 dB LAeq.

Continued from page 4

5.07 There are to be 4 no. compressors (3 no. duty and 1 no. standby) compressors housed within the ammonia plant room. The noise level of each compressor is 95 dB(A) at 1 metre. The cumulative noise level of 3 no. compressors is 100 dB(A) at 1 metre. The corresponding sound power level is 108 dB(A).

5.08 The reverberant sound pressure level plant inside the ammonia plant room is calculated using the following equation:

$SPL_{REV} = L_W – 10*\log(V) + 10 \log(T) + 14$ where:

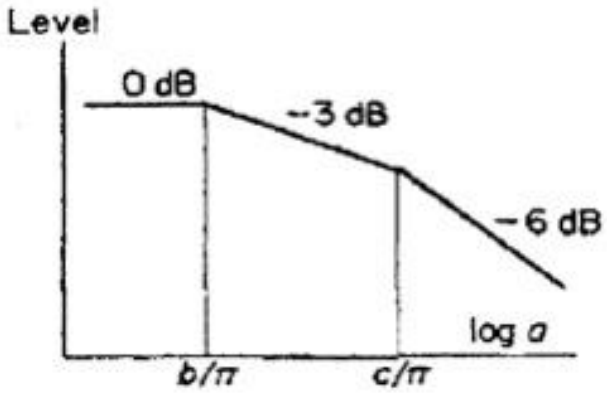
L_W is the cumulative sound power level	108 dB(A) L_W
V is the ammonia plant room volume	1320 m^3
T is the ammonia plant room reverberation time	2.0 seconds unfurnished

5.09 Processing the above equation, the reverberant sound pressure level inside the ammonia plant room is calculated at 93.8 dB(A) Lw.

5.10 The noise emissions at the Dearne Valley Premier Inn Hotel associated with the compressors inside the ammonia plant is calculated using the following equation:

$SPL_{EXT} = SPL_{REV} – R_w – DA – 6$ where:

SPL_{EXT} is the free field sound pressure level at the hotel	
SPL_{REV} is the plant room reverberant sound pressure level	93.8 dB(A) L_W
R_w is the sound reduction index (SRI) of the cladding façade	25 dB R_W
DA is the distance attenuation of noise (Rathe Method)	See figure below
– 6 is transition from internal reverberant to external free	



5.11 For reference the ammonia plant room is approximately 6.2 metres height (b) and 17.2 metres length (c). The distance from the southern façade of the ammonia plant room to the northern façade of the Dearne Valley Premier Inn Hotel is 39 metres. The total distance attenuation is 21.5 dB(A); 4 dB line source (10*log((17.2/π)/(6.2/π))) plus 17 dB point source (20*log((48/(17.2/π))).

5.12 Processing the equation $SPL_{EXT} = SPL_{REV} – R_w – DA – 6$, the resultant noise level at the northern façade of the Dearne Valley Premier Inn Hotel is calculated at 41 dB LAeq due to the 3 no. compressors inside the ammonia plant room. This is the cumulative rating level of the compressors as they will operate 24/7 and are broadband in character.

5.13 The cumulative rating noise level at the northern façade of the Dearne Valley Premier Inn Hotel due to the 2 no. screened roof mounted condensers and the 3 no. compressors within the ammonia plant room is 44 dB LAeq (41 dB + 41 dB = 44 dB).

5.14 This cumulative rating noise level is very significantly below the free field night time ambient noise level of 56 dB LAeq (2300–0700) and well below the free field night time background noise level of 51 dB LA90 (2000–0700; 15 minutes) at the northern façade of the Dearne Valley Premier Inn Hotel.

5.15 In accordance with British Standard 4142:2914+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142), 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 occurs. Typically, the greater this difference, the greater the magnitude of the impact. 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.

5.16 In conclusion, the proposed ammonia plant room building will not have any adverse impact on noise amenity at the Dearne Valley Premier Inn Hotel.

If we can be of any further assistance, please do not hesitate to contact us.

RP Acoustics Limited

APPENDIX 1
GLOSSARY OF ACOUSTIC TERMS

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 µPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_0)$ where

L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 µPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript ‘F’ denotes fast time weighting, slow time weighting ‘S’ is also used.

Building Regulations ADE 2003 Standard ($D_{nT,w} + C_{tr}$)

A single-number quantity which characterises the airborne sound insulation between rooms using noise spectrum No. 2 as defined in BS EN ISO 717–1:1997.

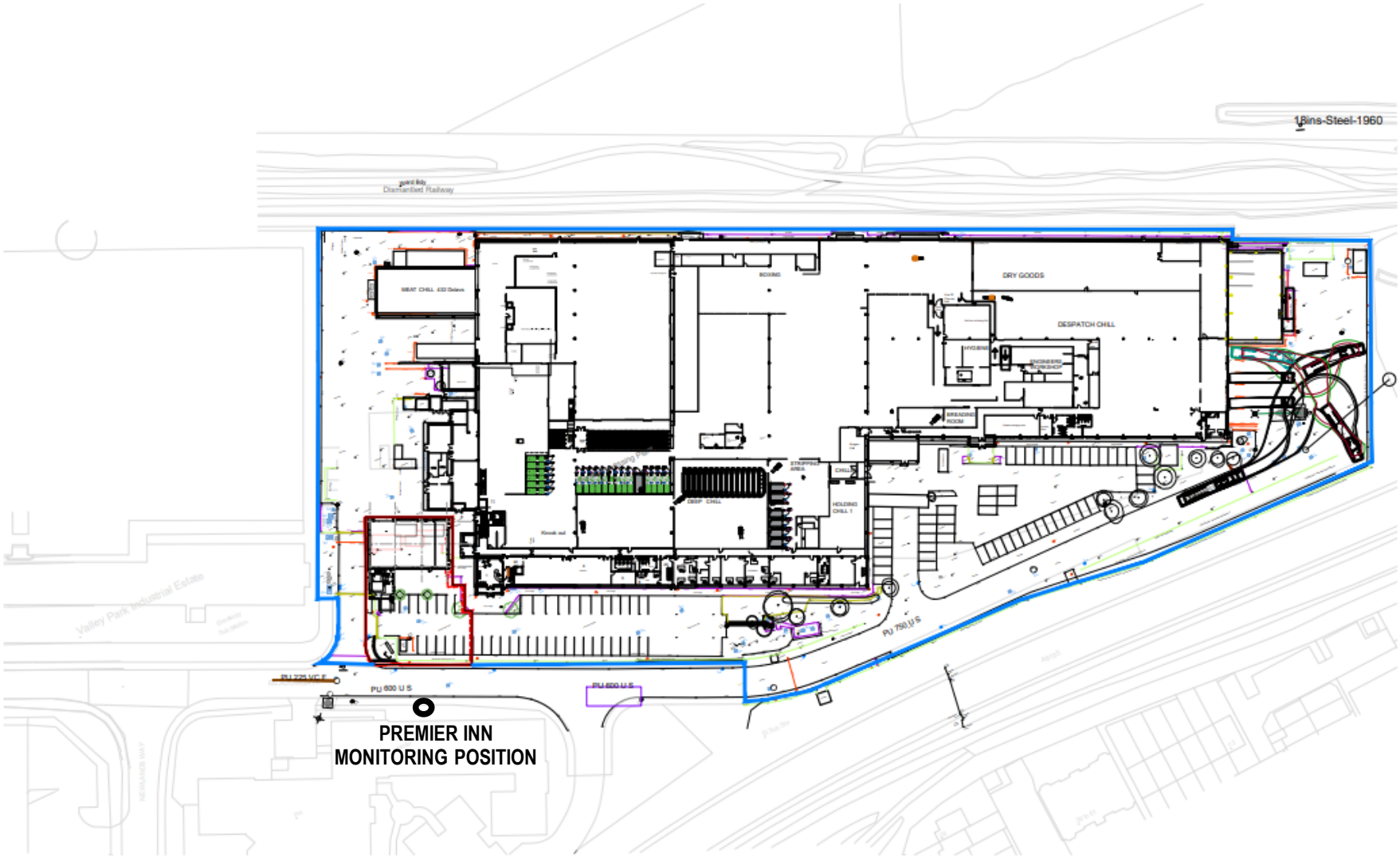
Flanking Element

Any building element that contributes to sound transmission between rooms in a building that is not a separating floor or separating wall.

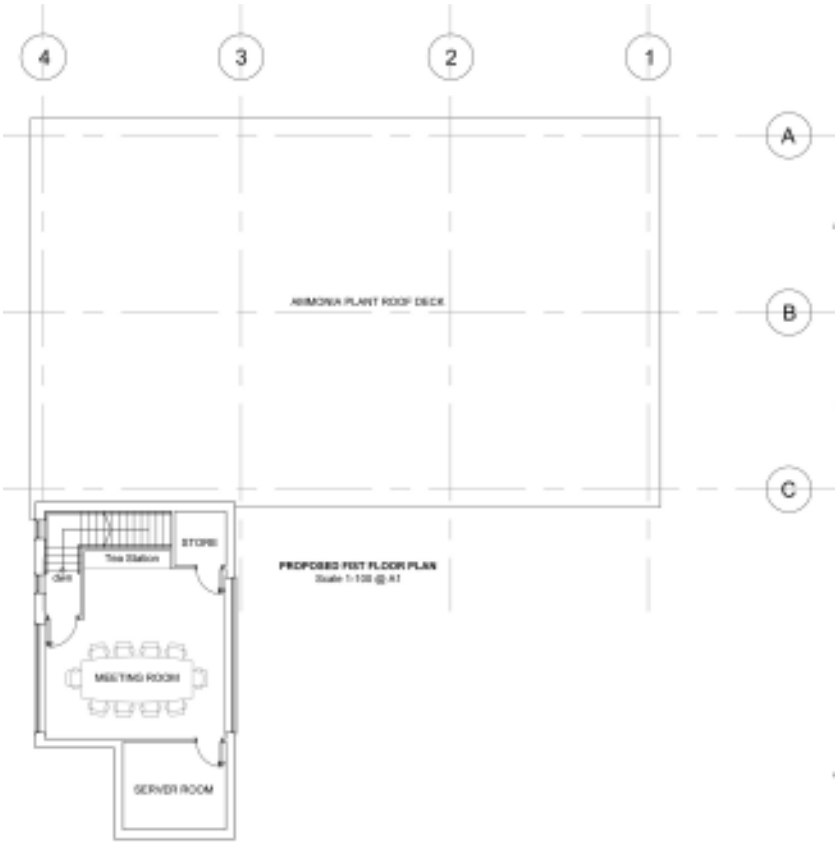
Flanking Sound

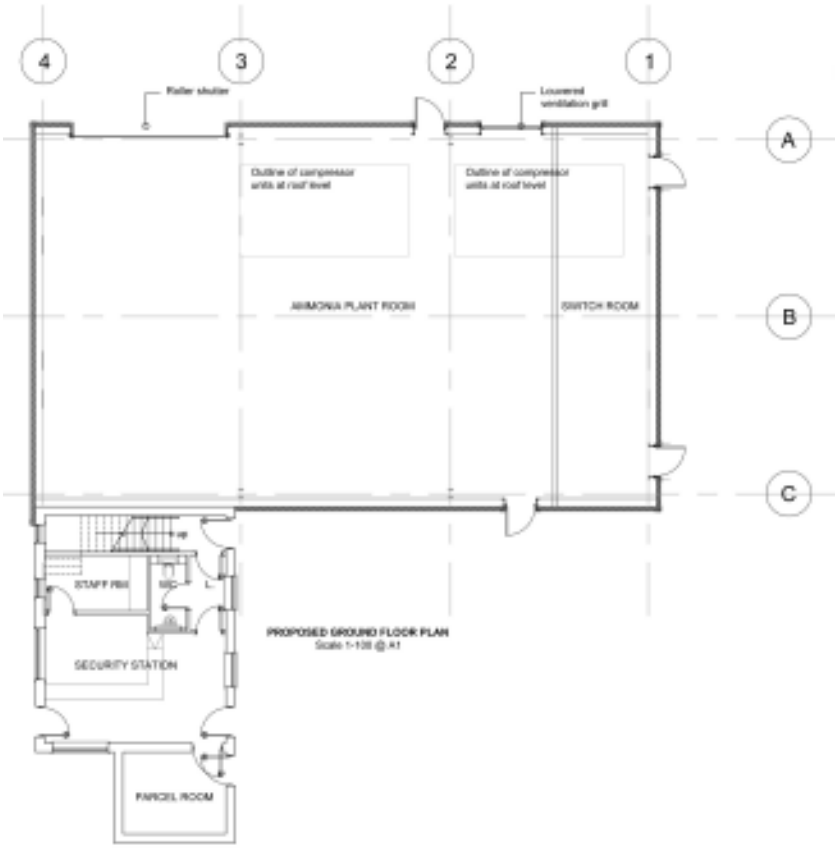
Sound transmitted between rooms via flanking elements instead of directly through separating elements or along any path other than the direct path.

APPENDIX 2
APPLICATION SITE LOCATION PLAN



APPENDIX 3
PROPOSED FLOOR PLANS





APPENDIX 4
CALIBRATION CERTIFICATE FOR SOUND LEVEL METER (CALIBRATION EVERY 2 YEARS)

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

0789

Certificate of Calibration and Conformance

Certificate number: **U39995**

Test Object:	**Sound Level Meter, BS EN IEC 61672-1:2013 Class 1** **Associated Frequency Analyser to BS EN IEC 61260:1996 Class 1**
Producer:	**NTi Audio**
Type:	**XL2-TA**
Serial number:	**A2A-17283-E0**
Customer:	**RP Acoustics Ltd**
Address:	**1 Dobcroft Close,** **Sheffield, South Yorkshire. S11 9LL.**
Contact Person:	**Richard Pennell**
Order No:	

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	NTi Audio	MC230A	A18352	39994
Calibrator*	Larson Davis	CAL200	17115	U39993
Preamplifier	NTi Audio	MA220	8854	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield	-	-
Attenuator	-	
Extension cable	-	

These items have been taken into account wherever appropriate.

Instruction Manual: NTi-Audio XL2 Operating Manual v3.11.02 August 2016 Firmware Version: v4.21 The test object is a single channel instrument.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	102.80 ±0.04	22.65 ±0.15	31.35 ±0.25

Calibration Dates:

Received date:	17/01/2022	Reviewed date:	25/01/2022
Calibration date:	25/01/2022	Issued date:	25/01/2022

Technicians: (Electronic certificate)

Calibrated by: *Palaniwel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Darren Batten*

APPENDIX 4
CALIBRATION CERTIFICATE FOR SOUND LEVEL METER (CALIBRATION EVERY 2 YEARS)

Certificate of Calibration and Conformance

Continuation of Certificate number: **U39995**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	**BS EN IEC 61672-1:2013**
Periodic Tests:	**BS EN IEC 61672-3:2013**
Pattern Evaluation:	**BS EN IEC 61672-2:2013**
Filter Evaluation:	**BS EN IEC 61260:1996 Class 1**

Conformance:
From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.2 #10	Passed
Self-generated noise - IEC 61672-3 Ed.2.0 #11.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.2.0 #12	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.2.0 #13	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.2.0 #14	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.2.0 #16	Passed
Level linearity including the level range control - IEC 61672-3 Ed.2.0 #17	Passed
Toneburst response - IEC 61672-3 Ed.2.0 #18	Passed
Peak C sound level - IEC 61672-3 Ed.2.0 #19	Passed
Overload indication - IEC 61672-3 Ed.2.0 #20	Passed
High level stability test - IEC 61672-3 Ed.2.0 #21	Passed
Long term stability test - IEC 61672-3 Ed.2.0 #15	Passed
1/1octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed
1/3octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed

Comments
Correct level with associated calibrator is 114.0dB(A).

Statement of Conformance
The sound level meter submitted has successfully completed the periodic tests of the standard listed for the environmental conditions under which the tests were performed. As public evidence(1) was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with the manufacturer's standard to demonstrate that the model of sound level meter fully conformed to the requirements of the said standard, the sound level meter submitted for testing conforms to the relevant class of the said standard.
(1 - evidence is held on file at the calibration laboratory)

Filter Calibration
The filter functions have been found to conform, by electrical testing, to the relative attenuation requirement of the standard noted over the range of frequencies shown in the attached test report.

Observations
No information on the uncertainty of measurement, required by the listed standard, for the correction data was made available in the instruction manual / data sheets from the equipment manufacturer / supplier for thetest object. The uncertainty of measurement of the correction data was therefore assumed to be the maximum-permitted uncertainty given in IEC 62585 for the corresponding free-field correction data and for a coverage probability of 95 %.

1 Dobcroft Close, Sheffield, S11 9LL. Tel: 07786 735282 e-mail:info@rpacoustics.co.uk. Registered No.: 11312952

APPENDIX 4
CALIBRATION CERTIFICATE FOR SOUND LEVEL METER (CALIBRATION EVERY 2 YEARS)

Certificate of Calibration and Conformance

Continuation of Certificate number: **U39995**

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Decision Rule
The decision rules will be applied in accordance with the procedure as described in BS EN 61672-3:2013.

A PASS or PASSED statement indicates that the instrument conforms with the relevant accuracy requirements of the testing standard AND the expanded measurement uncertainty (k = 2 for approximately 95 % coverage probability) is no greater in magnitude than the accuracy requirements defined in BS EN IEC 61260:1996 standard.

This certificate relates only to the items tested above.

** End of Certificate **

1 Dobcroft Close, Sheffield, S11 9LL. Tel: 07786 735282 e-mail:info@rpacoustics.co.uk. Registered No.: 11312952

APPENDIX 4
CALIBRATION CERTIFICATE FOR SOUND CALIBRATOR (CALIBRATION EVERY YEAR)

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

0789

Certificate of Calibration and Conformance

Certificate number: **U43128**

Test Object: **Sound Calibrator**

Producer: **Larson Davis**
Type: **CAL200**
Serial number: **17115**
Customer: **RP Acoustics Ltd**
Address: **1 Dobcroft Close, Sheffield, S11 9LL**
Contact Person: **Richard Pennell**
Order No: **N/A**

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.17	0.01	1000.32	0.48
Measurement 2	114.17	0.01	1000.32	0.48
Measurement 3	114.17	0.02	1000.32	0.48
Result (Average):	**114.17**	**0.01**	**1000.32**	**0.48**
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement
Pres:0 dB/kPa Temp:0 dB/°C Humi:0 dB/%RH Load volume: 0 dB/mm3

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	101.932 ±0.042	22.4 ±0.1	32.9 ±0.8

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\LDL200_17115_M1.nmf

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	24/01/2023	Reviewed date:	31/01/2023
Calibration date:	30/01/2023	Issued date:	31/01/2023

Technicians: (Electronic certificate)
Calibrated by: *Katie Brown*
Reviewed by: *Jenny Crawford*

Doc ref: Calb-Cert-Master-V3-05

APPENDIX 4
CALIBRATION CERTIFICATE FOR SOUND CALIBRATOR (CALIBRATION EVERY YEAR)

Certificate of Calibration and Conformance

Continuation of Certificate number: **U43128**

Reference Microphone: WSM11 (C) - GRAS40AG-291442

Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Instruments and Program
A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Comments
94dB spot check = 94.15dB. Note this is not UKAS data.

Statement of Conformance and Calibration
As public evidence was available*, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.

*This evidence is held on file at the calibration laboratory.

Notes:
The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in BOLD are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Observations:

Decision Rule:
The decision rules have been applied in accordance with the procedure as described in BS EN 60942:2003

This certificate relates only to the items tested above.

** End of Certificate **

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APPENDIX 5
CONDENSER TECHNICAL DATA SHEET

Condenser Technical Data Sheet

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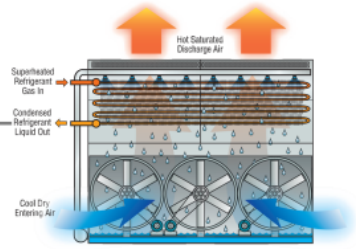
(2) PMCQ-566Q

Project Details

Project Name : 42-3-2-4936
Job Reference: 42-3-2-4936
Job Number: 4936

Date: 18/02/2022

Product Description



Selection Criteria

Refrigerant:	NH3
Condensing Temp:	32.0 C
Condensing Pressure:	1136.8 kPa
Entering Wet Bulb:	21.0 C

Required Capacity

2,850 kW NH3 + 396kW DTX Total

Unit Selected

Two(2) EVAPCO PMCQ-566Q at 100% capacity (1,624.00 kW each)

Physical Data Per Unit

Overall Dimensions (WxLxH):	2,991mm x 5,490mm x 4,150mm
Operating Weight:	12,179 kg
Shipping Weight:	9,312 kg
Heaviest Section:	5,706 kg

*weights and dimensions could vary depending on options selected

IBC Design Capability

IBC Standard Structural Design
1.0 Importance Factor Specified

Seismic(Sds):	up to 0.67 g, z/h = 0
Wind Load(P):	up to 13.79 kPa

Fan Motor Data per Unit

Number of Fans:	3
# of Fan Motors:	3
Nameplate Power (415/3/50):	7.50 kW Per Motor
Total Connected Nameplate Power:	22.50 kW
Typical Nameplate FLA:	13.9 Amps Per Motor

*Nameplate FLA could vary

Pump Motor Data per Unit

No.of Pumps:	1
Nameplate Power (415/3/50):	5.5 kW per pump motor
Typical Nameplate FLA:	10.3 Amps Per Motor

*Nameplate FLA could vary

Additional Details Per Unit

Air Flow:	49 m^3/s
Coil Volume:	1.4 m^3 per unit
Est. Refrigerant Charge:	166.4 kg per unit
Coil Design Pressure:	24 Bar

Hydraulic Data

Spray Water Flow:	65 LPS
Evaporated Water Rate:	0.57 LPS

Layout Criteria

From FACE B/D to wall:	2.44m
From FACE A/C to wall:	4.88m
Between FACE B/D ends:	0.00m
Between FACE A/C sides:	0.00m

Sound Data(dB(A) @ 1.5m/15m)

Face A (Opp Mtr. Side):	66/58	Face C (Motor Side):	84/69
Face B (End):	70/59	Face D (Opp End):	70/59
Top:	77/63		

Notes: Sound Pressure Levels are according to CTI Standard ATC-128 and verified by an independent CTI-licensed sound test agency. Sound data is shown for 1 cell operating at full speed. The use of frequency inverters (Variable Frequency Drives) can increase sound levels. Sound Options: Super Low Sound Fan

Shipping Data

1 Basin Sections: (WxLxH): 2971mm x 5969mm x 2743mm ; 3606kg each* | 1 Casing Sections: (WxLxH): 2971mm x 5943mm x 1752mm ; 5706kg each*
*dimensions and weights above include shipping skids

Accessories

(1) IBC Standard Structural Design
(1) 1.0 Importance Factor Specified
(1) Additional Coil Circuits
(1) Nitrogen Charged Coil(s)
(1) El. Heaters (0F / -18C ambient) (2) 6 kW; 415/3/50
(1) Bottom Screens
(3) IE3 Single Speed Inverter Duty Motor Compliant with (EC) No 640/2009
(1) Super Low Sound Fan
(3) Fan Motor: PTC thermistor
(1) Exterior Paint Finish
(1) Full length access platform, ladder & cage
(1) Glycol Circuit: 198kW DTX