24Acoustics
**Armstrong House**
**3 Bassett Avenue**
**Southampton**
**SO16 7DP**

**T: 02381 555000**
**E: chrismcconnell@24acoustics.co.uk**

Philip Kinsella
GLP Consulting Engineers Ltd
Unit 5, Howarth Court
Gateway Crescent
Oldham Broadway Business Park
Chadderton
Greater Manchester
OL9 9XB

Date: 3rd May 2019
Reference: R6723-6 Rev 1

Dear Philip

**RE: Stephenson House, London - Assessment of Noise from Roof Plant**

I am pleased to provide our updated assessment of external noise levels from the proposed roof plant, with respect to the relevant planning condition requirements.

## 1.0 INTRODUCTION

1.1 Condition 11 from the planning consent for Stephenson House (Ref: 2017/3518/P) states the following in relation to noise from plant and equipment associated with the scheme:

> *11. "Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the LA90, expressed in dB(A)."*

1.2 Condition 23 also requires the following to submitted prior to commencement of plant and equipment operation:

> *23. "Prior to commencement of the any plant equipment, full details (including plans, elevations, manufacturers specification and sections) of the proposed plant equipment and compounds shall be submitted to and approved by the local planning authority prior to that element of work. The details shall include details of the external noise level emitted from plant/machinery/equipment and mitigation measures as appropriate. The measures shall ensure that the external noise level emitted from plant, machinery/equipment will be lower than the lowest existing background noise level by at least 5dBA, by 10dBA where the source is tonal, as assessed according to BS4142:2014 at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity. A post installation noise assessment shall be carried out where required to confirm compliance with the noise criteria and additional steps to mitigate noise shall be taken, as necessary. Approved details shall be implemented prior to occupation of the development and thereafter be permanently retained."*

1.3 The proposed roof-mounted plant will comprise multiple condenser/VRV units, extract fans and AHUs serving the offices and residential elements of the scheme.

1.4 The plant located on the southern roof will serve the offices and will operate during typical office hours only, i.e. 07:00 – 19:00 hours. Plant serving the residential apartments will be located on the northern roof and will operate as required over 24 hours.

1.5 Existing background noise levels were obtained by 24 Acoustics in March 2017, as presented in technical report R6723-1 Rev 1. Additional background noise data has also been obtained from continuous noise monitoring undertaken on façades overlooking Drummond Street during 2019.

1.6 Nearby residential properties are located to the rear of the site on Drummond Street and opposite the site on Hampstead Road and Drummond Street. Figure 1 shows the site layout and location.

1.7 This report assesses external noise from the proposed roof plant, with reference to the existing background noise levels and the requirements of conditions 11 and 23.

## 2.0 CRITERIA

British Standard BS 4142

2.1 BS 4142:2014 'Methods for Rating Industrial and Commercial Sound, 2014' provides a method for rating the effects of industrial and commercial sound on residential areas.

2.2 The standard advocates a comparison between the representative measured $L_{A90}$ background noise level and $L_{Aeq}$ noise level from the source being considered. For rating purposes, if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction should be applied.

Plant Noise Criteria

2.3 Based on the measured background noise levels and the requirements of condition 11, the external plant noise limits, to be achieved at the nearest noise sensitive façades, are presented in Table 1 below.

| **Noise Sensitive Façades** | **Noise Rating Level (07:00 – 19:00)** **dB $L_{Aeq,\ 1hr}$** | **Noise Rating Level (00:00 – 00:00)** **dB $L_{Aeq,\ 15\ min}$** |
|---|---|---|
| Facing Hampstead Road | 54 | 49 |
| Facing Drummond Street | 50 | 42 |
| Facing the Rear of the site | 45 | 43 |

**Table 1**: Maximum External Plant Noise Levels

2.4 In accordance with the planning condition requirements, in the event that tonal, impulsive or other distinctive features are present at the assessment location, the values in Table 1 should be reduced by 5 dB.

## 3.0 PLANT NOISE ASSESSMENT

3.1 The proposed plant items to be installed on the north and south roof areas are listed in Table 2 below.

| South Roof<br>Office Plant (07:00 – 19:00 hours) | North Roof<br>Residential Plant (00:00 – 00:00) |
|---|---|
| 32 x Mitsubishi VRF PURY Condensers<br>4 x Mitsubishi PUHZ Condensers<br>2 x Nuaire Toilet Extract Fans<br>1 x Dalair Supply AHU<br>1 x Dalair Extract AHU | 7 x Mitsubishi PUMY Condensers<br>16 x Mitsubishi SUZ Condensers |

**Table 2**: Maximum External Plant Noise Levels

3.2 The plant model numbers and manufacturer's noise level data are provided in Appendix B. GLP Consulting Engineers have confirmed that the Mitsubishi VRF PURY condensers would operate at 85 % fan speed, therefore the manufacturer's noise levels for 85 % fan speed have been used in the following calculations.

3.3 The cumulative noise levels from all plant units operating have been considered in the following assessment. The south roof plant area will be enclosed on all sides by a louvred screen, of approximate height 2.4 m above roof level. It should be noted that, where the nearest properties are located higher than the plant, the proposed louvred screen will have negligible benefit in reducing noise impact.

3.4 Calculations have been undertaken using the manufacturers' published noise data to determine the plant noise levels at the nearest existing noise sensitive properties. Calculations have included corrections for duct end reflections, directivity, distance and acoustic screening from the roof edge and the proposed louvred screen where applicable. The plant is not expected to exhibit any tonal characteristics.

3.5 It is recommended to install in-duct atmospheric-side attenuators to all AHUs and toilet extract fans. Table 3 shows the recommended minimum insertion losses for the proposed attenuators to each atmospheric intake and discharge.

| Air Handling Plant (Nuaire) | Section | Single Octave (Hz) Attenuator Minimum Insertion Loss, dB | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| Toilet Extract Fan 01 | Discharge | 2 | 6 | 11 | 20 | 23 | 19 | 12 | 9 |
| Toilet Extract Fan 02 | Discharge | 1 | 2 | 7 | 10 | 11 | 9 | 8 | 7 |
| AHU 01 Supply | Intake | 5 | 11 | 21 | 33 | 37 | 36 | 27 | 18 |
| AHU 01 Extract | Discharge | 2 | 6 | 11 | 20 | 23 | 19 | 12 | 9 |

**Table 3**: Recommended Minimum Insertion Losses for Atmospheric Side In-Duct Attenuators

3.6 Tables 4, 5 and 6 describe the predicted plant noise levels outside the nearest and most affected noise sensitive windows.

| Noise Sensitive Properties | Daytime Noise Rating Level (07:00 – 19:00) dB $L_{Aeq, 1hr}$ | 24-hour Noise Rating Level (00:00 – 00:00) dB $L_{Aeq, 15\ min}$ |
|---|---|---|
| 62-70 Hampstead Road | 37 | 30 |
| **Plant Noise Limit** | **54** | **49** |

**Table 4**: Calculated External Plant Noise Levels –Façades facing Hampstead Road

| Noise Sensitive Properties | Daytime Noise Rating Level (07:00 – 19:00) dB $L_{Aeq, 1hr}$ | 24-hour Noise Rating Level (00:00 – 00:00) dB $L_{Aeq, 15\ min}$ |
|---|---|---|
| 175 Drummond Street | 50 | 28 |
| 164-166 Drummond Street | 40 | Lower than 20 |
| **Plant Noise Limit** | **50** | **42** |

**Table 5**: Calculated External Plant Noise Levels – Façades facing Drummond Street

| Noise Sensitive Properties | Daytime Noise Rating Level (07:00 – 19:00) dB $L_{Aeq, 1hr}$ | 24-hour Noise Rating Level (00:00 – 00:00) dB $L_{Aeq, 15\ min}$ |
|---|---|---|
| 168-182 Drummond Street | 38 | Lower than 20 |
| **Plant Noise Limit** | **45** | **43** |

**Table 6**: Calculated External Plant Noise Levels – Façades facing the rear of the site

3.7 The calculated noise levels in Tables 4, 5 and 6 demonstrate that, with the attenuation measures as recommended, noise from the proposed plant will achieve the established criteria at the nearest noise sensitive properties.

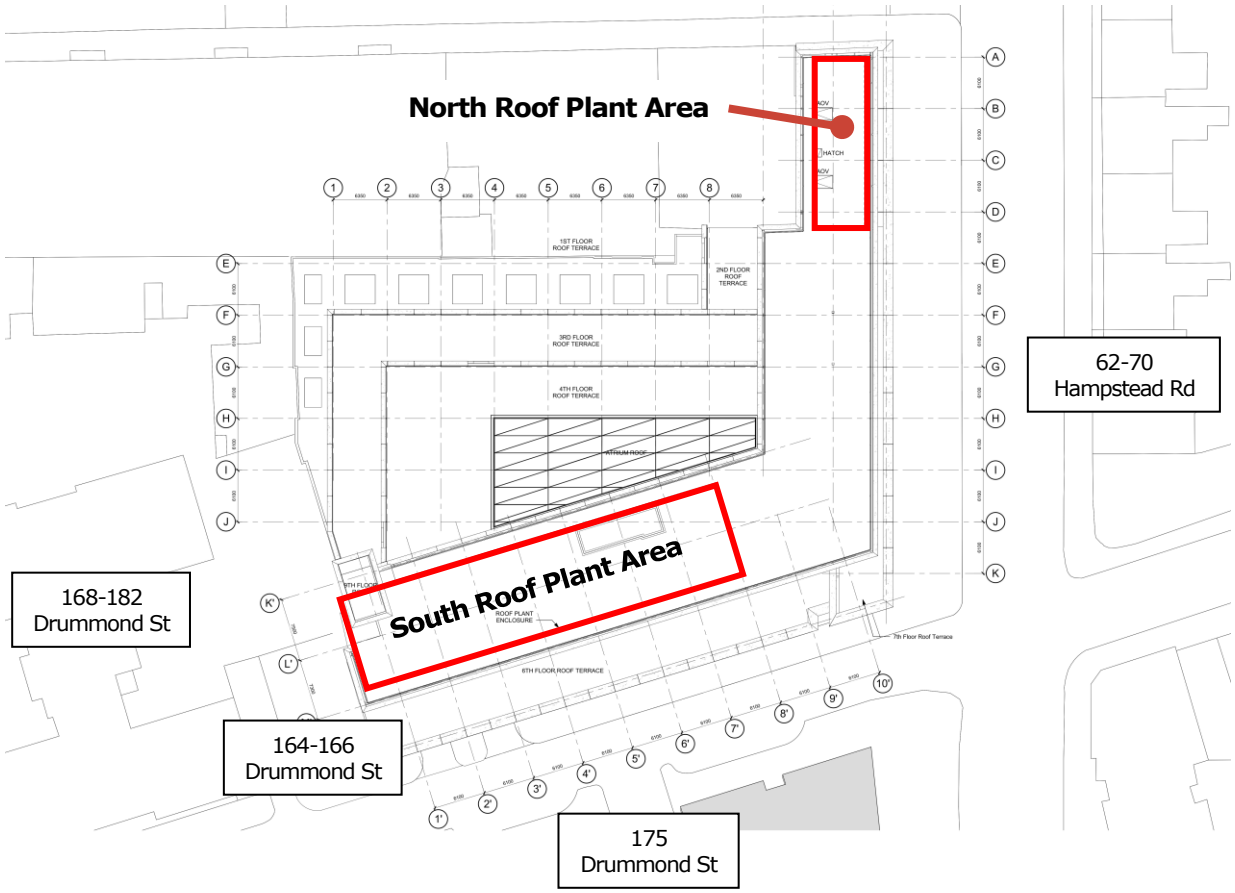
3.8 It should be noted that, as seen in Table 5, the daytime plant noise levels at 175 Drummond Street only just achieve the upper noise limit required by the planning condition. The dominant sources of plant noise at this receptor location are the Mitsubishi VRF condenser units on the south roof. As many of the properties at 175 Drummond Street are located higher than the plant, the proposed louvred screen will have negligible benefit in reducing noise impact at these receptors.

3.9 On this basis, it may be worth considering additional attenuation measures to the VRF units in order to provide comfort that, with the addition of future tenants' plant and equipment, some design tolerance would be allowed.

I trust the above is in order. If you have any further queries in the meantime, please do not hesitate to contact me.

Yours sincerely,
**For 24 Acoustics Ltd**

Chris McConnell BSc MSc MIOA
Senior Consultant
chrismcconnell@24acoustics.co.uk




| | | |
|---|---|---|
| **Project**:<br>Stephenson House, London | **Title**:<br>Site Plan and Nearest Noise Sensitive Properties | |
| **DWG No:** Figure 1 | **Scale:** N.T.S. | **Rev**: 0 |

## APPENDIX A: ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dBA is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dBA. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dBA corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The $L_{Amax}$ noise level

This is the maximum noise level recorded over the measurement period.

ii) The $L_{Aeq}$ noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time internal, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The $L_{A10}$ noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The $L_{A90}$ noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

## APPENDIX B: MANUFACTURERS' PLANT NOISE DATA

| MITSUBISHI VRV CONDENSERS at 85 % fan speed | | |
|---|---|---|
| **Model** | **dBA at 1m** | **Quantity** |
| PURY-P200YNSW-A | 55.5 | 1 |
| PURY-P250YNSW-A | 57.0 | 2 |
| PURY-P300YNSW-A | 59.5 | 1 |
| PURY-P400YNSW-A | 61.0 | 2 |
| PURY-P450YNSW-A | 64.0 | 1 |
| PURY-P500YNSW-A | 62.0 | 3 |
| PURY-P550YNSW-A | 63.5 | 2 |
| PURY-P600YNSW-A | 62.5 | 3 |
| PURY-P650YNSW-A | 63.9 | 1 |
| PURY-P700YNSW-A | 65.0 | 3 |
| PURY-P800YNSW-A | 64.0 | 5 |
| PURY-P850YNSW-A | 65.8 | 5 |
| PURY-P1000YNSW-A | 65.0 | 1 |
| PURY-P1050YNSW-A | 64.7 | 1 |
| PURY-P1100YNSW-A | 65.0 | 1 |
| PUHZ-ZRP250YKA3 | 62.0 | 4 |

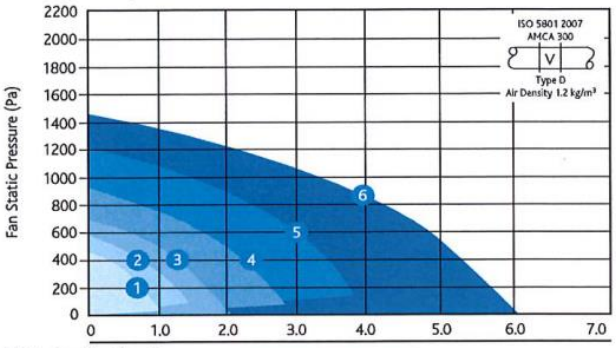
| MITSUBISHI CONDENSERS | | |
|---|---|---|
| **Model** | **dBA at 1m** | **Quantity** |
| PUMY-SP112VKM-E | 52 | 7 |
| SUZ-KA50VA4 | 52 | 7 |
| SUZ-KA35VA4 | 50 | 5 |
| SUZ-KA25VA4 | 48 | 4 |

TWIN FANS
TWIN SQUIF
TECHNICAL INFORMATION

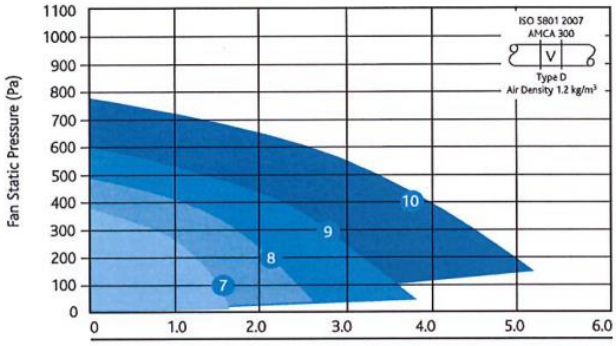
TEf 01

## PERFORMANCE - TWIN SQUIF FANS

Twin Squif - 4 pole



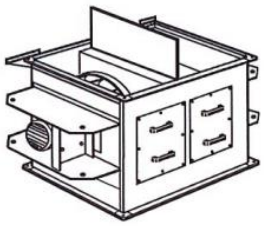

Twin Squif - 6 pole




Air volume flow rate (m³/s)

Air volume flow rate (m³/s)

### Casing



### Code descriptions

**SQFTA 4 1 - 3ES**

1 2 3 4 5 6

1. Twin Squif Range
2. A = Ambient
3. Pole (4 or 6)
4. Curve No.
5. Phase (1 or 3)
6. Ecosmart control

Note: curves include loss through idling fan.

## PERFORMANCE - TWIN SQUIF EXTRACT FANS

### ELECTRICAL & SOUND

| Curve | Code | Phase | RPM | Motor Power (kW) | FLC (amps) | SC (amps) | Data Type | Induct inlet Sound Power levels dB re lpW 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K | Breakout dBA@ 3m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SQFTA41-1 | 1 | 1410 | 0.37 | 2.8 | 11.2 | I | 90 | 93 | 79 | 70 | 70 | 70 | 69 | 62 | 52 |
| | | | | | | | O | 87 | 94 | 74 | 68 | 74 | 75 | 70 | 64 | |
| 1 | SQFTA41-3 | 3 | 1450 | 0.37 | 1.06 | 5.2 | I | 90 | 93 | 79 | 70 | 70 | 70 | 69 | 62 | 52 |
| | | | | | | | O | 87 | 94 | 74 | 68 | 74 | 75 | 70 | 64 | |
| 2 | SQFTA42-1 | 1 | 1370 | 0.75 | 5.4 | 21 | I | 88 | 95 | 82 | 77 | 74 | 76 | 75 | 67 | 55 |
| | | | | | | | O | 85 | 96 | 78 | 74 | 78 | 80 | 77 | 69 | |
| 2 | SQFTA42-3 | 3 | 1450 | 0.75 | 2.01 | 9.04 | I | 88 | 95 | 82 | 77 | 74 | 76 | 75 | 67 | 55 |
| | | | | | | | O | 85 | 96 | 78 | 74 | 78 | 80 | 77 | 69 | |
| 3 | SQFTA43-1 | 1 | 1420 | 1.1 | 7 | 35 | I | 92 | 98 | 83 | 79 | 77 | 78 | 78 | 71 | 58 |
| | | | | | | | O | 89 | 99 | 79 | 77 | 82 | 83 | 79 | 73 | |
| 3 | SQFTA43-3 | 3 | 1450 | 1.1 | 2.5 | 12 | I | 92 | 98 | 83 | 79 | 77 | 78 | 78 | 71 | 58 |
| | | | | | | | O | 89 | 99 | 79 | 77 | 82 | 83 | 79 | 73 | |
| 4 | SQFTA44 | 3 | 1450 | 2.2 | 4.8 | 28.8 | I | 86 | 96 | 89 | 82 | 77 | 80 | 80 | 71 | 58 |
| | | | | | | | O | 87 | 90 | 86 | 87 | 81 | 82 | 82 | 68 | |
| 5 | SQFTA45 | 3 | 1450 | 4 | 9 | 59 | I | 92 | 102 | 87 | 85 | 85 | 84 | 83 | 81 | 63 |
| | | | | | | | O | 90 | 103 | 83 | 82 | 89 | 89 | 84 | 83 | |
| 6 | SQFTA46 | 3 | 1450 | 7.5 | 15.2 | 108 | I | 92 | 106 | 92 | 86 | 86 | 85 | 86 | 83 | 64 |
| | | | | | | | O | 95 | 95 | 90 | 91 | 89 | 87 | 87 | 81 | |
| 7 | SQFTA61 | 3 | 960 | 0.75 | 2.1 | 8.82 | I | 84 | 92 | 84 | 75 | 70 | 73 | 73 | 64 | 48 |
| | | | | | | | O | 85 | 86 | 81 | 80 | 74 | 75 | 75 | 61 | |
| 8 | SQFTA62 | 3 | 960 | 1.1 | 3 | 13.2 | I | 90 | 99 | 83 | 78 | 76 | 75 | 74 | 72 | 58 |
| | | | | | | | O | 87 | 100 | 78 | 76 | 80 | 79 | 75 | 74 | |
| 9 | SQFTA63 | 3 | 960 | 2.2 | 5.9 | 28.9 | I | 90 | 103 | 87 | 79 | 76 | 76 | 77 | 73 | 61 |
| | | | | | | | O | 87 | 104 | 82 | 77 | 80 | 80 | 78 | 75 | |
| 10 | SQFTA64 | 3 | 960 | 4 | 9.4 | 61.2 | I | 91 | 106 | 91 | 82 | 79 | 77 | 77 | 74 | 64 |
| | | | | | | | O | 88 | 107 | 86 | 80 | 83 | 82 | 78 | 76 | |

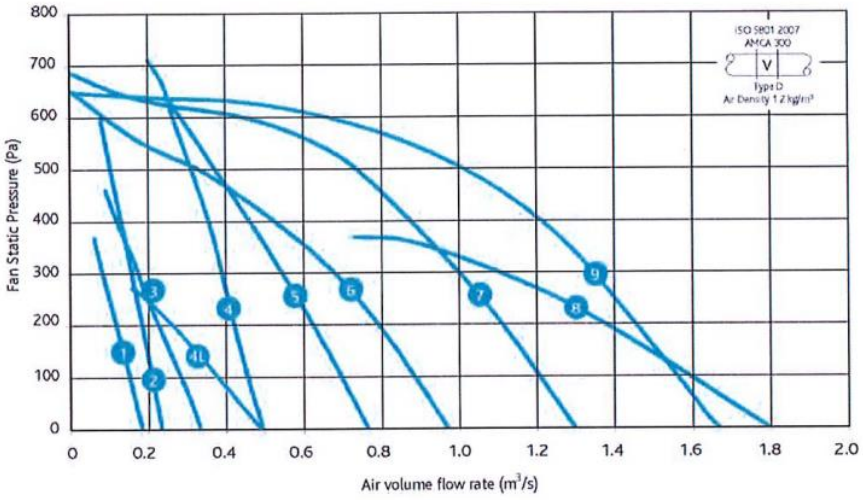
Breakout dBA@3m is hemispherical free field. The electrical and sound information in the table are nominal figures.

TEf 02.

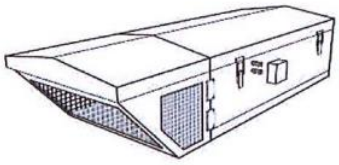
# AIRE-VOLVE TWIN FANS

## TECHNICAL INFORMATION

### PERFORMANCE - AIRE-VOLVE EXTERNAL TWIN FANS




### Casing



AVT-R External In-line Twin Fan with grille outlet.

### Code descriptions

**AVT2 - R**

1 2 3 4

1. Aire-Volve range
2. Twin Fan
3. Case size 1-9
4. Grille outlet external unit

### PERFORMANCE - AIRE-VOLVE EXTERNAL TWIN FANS AVT 1-9 - R

**AVT 'R' UNIT - ELECTRICAL & SOUND**

1. Unweighted induct inlet octave band Sound Power Level - dB re 1pW
2. Unweighted open outlet octave band Sound Power Level - dB re 1pW

| Curve/ Code | Duct conn. | Supply (V/Freq Hz/Phase) | FLC (amps) | SC (amps) | Input Power (Max) (W) | Fan Speed (Nominal) | | Frequency (Hz) 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K | Outlet Radiated Free Field dBA @ 3m (Spherical Radiation) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AVT1-R | 250 | 230/50/1 | 0.75 | 0.75 | 85 | 3300 | 1 | 75 | 69 | 64 | 65 | 61 | 57 | 53 | 51 | |
| | | | | | | | 2 | 75 | 70 | 68 | 71 | 71 | 66 | 60 | 56 | 54 |
| AVT2-R | 250 | 230/50/1 | 1.4 | 1.4 | 170 | 4000 | 1 | 81 | 75 | 70 | 71 | 67 | 63 | 59 | 57 | |
| | | | | | | | 2 | 81 | 76 | 74 | 77 | 77 | 72 | 66 | 62 | 60 |
| AVT3-R | 250 | 230/50/1 | 1.35 | 1.35 | 170 | 2500 | 1 | 79 | 75 | 81 | 69 | 65 | 60 | 54 | 52 | |
| | | | | | | | 2 | 79 | 76 | 85 | 75 | 75 | 69 | 61 | 57 | 59 |
| AVT4-R | 315 | 230/50/1 | 3.1 | 3.1 | 500 | 3400 | 1 | 85 | 80 | 82 | 84 | 80 | 75 | 71 | 68 | |
| | | | | | | | 2 | 85 | 81 | 86 | 90 | 90 | 84 | 78 | 73 | 72 |
| AVT4L-R | 315 | 230/50/1 | 1.1 | 1.1 | 160 | 1700 | 1 | 72 | 67 | 67 | 66 | 60 | 57 | 53 | 48 | |
| | | | | | | | 2 | 72 | 68 | 71 | 72 | 70 | 66 | 60 | 53 | 54 |
| AVT5-R | 315 | 230/50/1 | 3.5 | 3.5 | 550 | 2400 | 1 | 76 | 72 | 71 | 70 | 64 | 62 | 58 | 53 | |
| | | | | | | | 2 | 76 | 73 | 75 | 76 | 74 | 71 | 65 | 58 | 58 |
| AVT6-R | 400 | 230/50/1 | 2.9 | 2.9 | 450 | 1700 | 1 | 79 | 81 | 76 | 74 | 68 | 66 | 62 | 55 | |
| | | | | | | | 2 | 79 | 82 | 80 | 80 | 78 | 75 | 69 | 60 | 62 |
| AVT7-R | 400 | 230/50/1 | 3.5 | 3.5 | 790 | 1700 | 1 | 80 | 77 | 75 | 75 | 69 | 66 | 63 | 58 | |
| | | | | | | | 2 | 80 | 78 | 79 | 81 | 79 | 75 | 70 | 63 | 63 |
| AVT8-R | 500 | 230/50/1 | 3.2 | 3.2 | 710 | 1100 | 1 | 76 | 77 | 73 | 68 | 64 | 65 | 61 | 55 | |
| | | | | | | | 2 | 76 | 78 | 77 | 74 | 74 | 74 | 68 | 60 | 59 |
| AVT9-R | 500 | 400/50/1 | 1.85 | 1.85 | 1000 | 1500 | 1 | 81 | 78 | 78 | 75 | 68 | 67 | 67 | 59 | |
| | | | | | | | 2 | 81 | 79 | 82 | 81 | 78 | 76 | 74 | 64 | 63 |

| Dalair Estimating System v4.0f | | | | | | | | | January 30th, 2018 |
|---|---|---|---|---|---|---|---|---|---|
| **Electric Frost Heater** | | | | | | | | | |
| Volume | 8.7 m³/s | | | | | | | | |
| Air On Coil Db | -5 °C | | | | | | | | |
| Air Off Coil Db | 10 °C | | | | | | | | |
| Duty | 157 kW | | | | | | | | |
| Medium | Electric 400V-3Ph-50Hz | | | | | | | | |
| Type of Control | Thyristor | | | | | | | | |
| Controls | Excluded | | | | | | | | |
| Construction | Sheathed elements | | | | | | | | |
| **G4 Panel Filters** | | | | | | | | | |
| Type | Panel | | | | | | | | |
| Efficiency | G4 | | | | | | | | |
| Arrangement | 5W x 2.5H | | | | | | | | |
| Withdrawal | Front | | | | | | | | |
| Manometer | Magnahelic | | | | | | | | |
| **F7 Bag Filters** | | | | | | | | | |
| Type | Bag | | | | | | | | |
| Efficiency | F7 | | | | | | | | |
| Arrangement | 5W x 2.5H | | | | | | | | |
| Withdrawal | Front | | | | | | | | |
| Manometer | Magnahelic | | | | | | | | |
| **Run Around Coil (ErP 2018)** | | | | | | | | | |
| Volume | 8.7 m³/s | | | | | | | | |
| Air On Coil Db | 10 °C | | | | | | | | |
| Air Off Coil Db | 14 °C | | | | | | | | |
| Duty | 41.8 kW | | | | | | | | |
| Face velocity | 2.1 m/s | | | | | | | | |
| R/A Efficiency | 68 % | | | | | | | | |
| Medium | Water/Ethylene glycol mix | | | | | | | | |
| Glycol | 25 % | | | | | | | | |
| Flow Temp | 15.2 °C | | | | | | | | |
| Return Temp | 11.1 °C | | | | | | | | |
| Flow Rate | 2.65 l/s | | | | | | | | |
| Water Pd | 70 KPa | | | | | | | | |
| Rows/Fins | 12R/11F | | | | | | | | |
| No of Sections | 1 | | | | | | | | |
| Construction | Copper/Aluminium | | | | | | | | |
| **Direct Drive Supply Fan** | | | | | | | | | |
| Volume | 8.7 m³/s | | | | | | | | |
| External static | 550 Pa | | | | | | | | |
| Total static | 1011 Pa | | | | | | | | |
| Absorbed power | 12.428 kW | | | | | | | | |
| Motor power | 18.5 kW (IE2) | | | | | | | | |
| Fan type | PLUG / Backward curved / Direct driven | | | | | | | | |
| Fan speed | 1117 RPM | | | | | | | | |
| Total fan efficiency | 77.0 % | | | | | | | | |
| Electrical Supply | 400V-3Ph-50Hz | | | | | | | | |
| Fan discharge SWL levels | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | (Hz) |
| (to BS848) | 85 | 96 | 96 | 98 | 95 | 94 | 87 | 83 | |
| Includes +4dB fan in casework adjustment | | | | | | | | | |
| Door guard fitted? | YES | | | | | | | | |
| Suitable for inverters? | YES | | | | | | | | |
| Isolator fitted? | YES | | | | | | | | |
| Standby motor fitted? | NO | | | | | | | | |
| Thermistors fitted? | YES | | | | | | | | |
| **DX Heat Pump Cooling Cycle** | | | | | | | | | |
| Volume | 8.7 m³/s | | | | | | | | |
| Air On Coil Db | 28 °C | | | | | | | | |
| Air On Coil Wb | 20 °C | | | | | | | | |
| Air Off Coil Db | 14 °C | | | | | | | | |
| Air Off Coil Wb | 13.5 °C | | | | | | | | |
| Duty | 202.8 kW | | | | | | | | |
| Face velocity | 2.1 m/s | | | | | | | | |
| Medium | Refrigerant R410A | | | | | | | | |
| Evap. Temp | 8.5 °C | | | | | | | | |
| Rows/Fins | 6R/8F | | | | | | | | |
| No of Sections | 4 | | | | | | | | |
| Construction | Copper/Aluminium | | | | | | | | |

Continued ...

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|---|---|---|

**Dalair Estimating System v4.0f** January 30th, 2018

**Run Around Coil (ErP 2018)**

| | |
|---|---|
| Volume | 3.94 m³/s |
| Air On Coil Db | 21 °C |
| Air On Coil Wb | 14.6 °C |
| Air Off Coil Db | 12.1 °C |
| Air Off Coil Wb | 11 °C |
| Duty | 42.6 kW |
| Face velocity | 2.1 m/s |
| R/A Efficiency | 68 % |
| Medium | Water/Ethylene glycol mix |
| Glycol | 25 % |
| Flow Temp | 11.1 °C |
| Return Temp | 15.2 °C |
| Flow Rate | 2.65 l/s |
| Water Pd | 45 KPa |
| Rows/Fins | 12R/11F |
| No of Sections | 1 |
| Construction | Copper/Aluminium |
| Eliminators | YES |
| Drain Pan | Fixed |

**Direct Drive Extract Fan**

| | |
|---|---|
| Volume | 3.94 m³/s |
| External static | 250 Pa |
| Total static | 546 Pa |
| Absorbed power | 3.29 kW |
| Motor power | 5.5 kW (IE2) |
| Fan type | PLUG / Backward curved / Direct driven |
| Fan speed | 1331 RPM |
| Total fan efficiency | 75.1 % |
| Electrical Supply | 400V-3Ph-50Hz |

| Fan discharge SWL levels | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | (Hz) |
|---|---|---|---|---|---|---|---|---|---|
| (to BS848) | 76 | 86 | 86 | 89 | 88 | 88 | 80 | 77 | |

Includes +4dB fan in casework adjustment

| | |
|---|---|
| Door guard fitted? | YES |
| Suitable for inverters? | YES |
| Isolator fitted? | YES |
| Standby motor fitted? | NO |
| Thermistors fitted? | YES |

**Extract Air Outlet**

Louvre & Damper (Damper Seals:- Side & Blade)

Air Volume 3.94 m³/s

**Approximate weight of unit 2369 kg**

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