MJL plant information

The plant information included covers the following items:

AHUs

Located internally at level 5, level B2, level 1 and other basement areas. None are visible from outside but they will have an impact on noise levels and have been included in the acoustic model

Attenuators

Again these are located internally and not visible from outside. They have an impact on noise levels and have been included in the acoustic model.

Chillers

These are roof mounted so visible from above or adjacent high buildings. They have an impact on noise levels and have been included in the acoustic model.

Fans

ES/6A01-04 and ES/02/01-02 are dust and solvent extract systems from the conservation studios. These units are located internally and not visible from outside. They have an impact on noise levels and have been included in the acoustic model.

SEF/00/01A and B to 04A and B, SEF/01/1A and B are located on level 1 providing smoke extract, as are SEF/B2/01A and B and 02 A and B. These units are located internally and not visible from outside. They have an impact on noise levels and have been included in the acoustic model.

JEF/00/01 9No jet fans providing pollution control and smoke clearance to the road tunnel below the building. These units are located internally and not visible from outside. They have an impact on noise levels and have been included in the acoustic model.

The flue extract fan data is not yet available as discussed. When it becomes available this will be added to the model.

Michael J Lonsdale

British Museum

World Conservation
Exhibition Centre - London

Revision 05 - Technical Submission

Air Handling Equipment

Section No 2
AHU Technical Data

Reference **British Museum - WCEC**
AHU Reference **AHU B2/03 Building 5 Supply & Extract**
Unit Dimensions 2250W x 2850H x 8550L (mm) including 150 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/11/S
Quantity 1
Location Internal

SUPPLY SIDE
Volume 5.5 m³/s
External static 300 Pa

EXTRACT SIDE
Volume 4 m³/s
External static 300 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE
- Supply Air Inlet Damper
- Panel Filters
- Bag Filters
- Recuperator c/w Recirculation Damper
- Supply Fan - "Run & Standby Motors"
- Diffuser
- CW Cooler
- Service Access Section
- LPHW Heater
- Service Access Section
- Space For A Future Humidifier

EXTRACT SIDE
- Panel Filters
- Extract Fan - "Run & Standby Motors"
- Diffuser
- Recuperator c/w Recirculation Damper
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 5.5 m³/s

Panel Filters
Type Panel
Efficiency G4
Arrangement 3.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Bag Filters
Type Bag
Efficiency F9
Arrangement 3.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Recuperator c/w Recirculation Damper
Type Plate Heat Exchanger
Supply Air On -4 °C
Supply Air Off 8.9 °C
Extract Air On Db 22 °C
Extract Air On RH 50 %
Efficiency (Sup) 50.0 %
Heat Recovered 85 kW
Special Features Face & By-pass Damper
Recirculation Damper

Continued ...

Supply Fan - "Run & Standby Motors"

Volume	5.5 m³/s
External static	300 Pa
Total static	1435 Pa
Absorbed power	9.84 kW
Motor power	15 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1452 RPM
Outlet velocity	8.64 m/s
Total fan efficiency	80.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	99	93	90	89	86	82	77	69

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

CW Cooler

Volume	5.5 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	11.4 °C
Air Off Coil Wb	10.8 °C
Duty	171.66 kW
Face velocity	2.9 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	6.81 l/s
Water Pd	25 KPa
Rows/Fins	8R/8F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	5.5 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	30 °C
Duty	165 kW
Face velocity	2.9 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	1.35 l/s
Water Pd	3 KPa
Rows/Fins	2R/10F
No of Sections	1
Construction	Copper/Aluminium

Space For A Future Humidifier

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	3.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan - "Run & Standby Motors"

Volume	4 m³/s
External static	300 Pa
Total static	814 Pa
Absorbed power	4.13 kW
Motor power	7.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1513 RPM
Outlet velocity	9.92 m/s
Total fan efficiency	79.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	95	89	86	85	82	78	73	65

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

Recuperator c/w Recirculation Damper

Extract Air Outlet Damper

Damper	(Damper Seals:- Side & Blade)
Air Volume	4 m³/s

Approximate weight of unit 5757 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/B2/04 B2 Plantroom**
Unit Dimensions 1650W x 2515H x 5850L (mm) including 165 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/5/S
Quantity 1
Location Internal

SUPPLY SIDE		**EXTRACT SIDE**	
Volume	3.2 m³/s	Volume	3.2 m³/s
External static	350 Pa	External static	350 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE	**EXTRACT SIDE**
Supply Air Inlet Damper	Panel Filters
Service Access Section	Extract Fan - Internal Run Only Motor
Panel Filters	Diffuser
Bag Filters	Recirculation Damper
Hygroscopic Thermal Wheel Single Piece	Hygroscopic Thermal Wheel Single Piece
Recirculation Damper	Extract Air Outlet Damper
CW Cooler	
Service Access Section	
LPHW Heater	
Supply Fan - Internal Run Only Motor	

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 3.2 m³/s

Panel Filters
Type Panel
Efficiency G4
Arrangement 2.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Bag Filters
Type Bag
Efficiency F9
Arrangement 2.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece
Type Hygroscopic

Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	14 °C	25.9 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	69.0 %	70.0 %
Heat Recovered	99 kW	12 kW
Special Features	Speed control	

Recirculation Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 2.88 m³/s

Continued ...

CW Cooler

Volume	3.2 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	11.4 °C
Air Off Coil Wb	10.8 °C
Duty	99.87 kW
Face velocity	2.6 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	3.96 l/s
Water Pd	16 KPa
Rows/Fins	6R/10F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	3.2 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	30 °C
Duty	96.48 kW
Face velocity	2.6 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	0.78 l/s
Water Pd	7 KPa
Rows/Fins	2R/8F
No of Sections	1
Construction	Copper/Aluminium

Supply Fan - Internal Run Only Motor

Volume	3.2 m³/s
External static	350 Pa
Total static	1238 Pa
Absorbed power	5.17 kW
Motor power	7.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1709 RPM
Outlet velocity	7.94 m/s
Total fan efficiency	80.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	96	90	87	86	83	79	74	66

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	NO
Thermistors fitted?	YES

1No spare set of belts

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan - Internal Run Only Motor

Volume	3.2 m³/s
External static	350 Pa
Total static	827 Pa
Absorbed power	3.78 kW
Motor power	5.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1800 RPM
Outlet velocity	9.99 m/s
Total fan efficiency	80.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	96	90	87	86	83	79	74	66

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	NO
Thermistors fitted?	YES

1No spare set of belts

Recirculation Damper

Air Volume 2.88 m³/s

Hygroscopic Thermal Wheel Single Piece

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Air Volume 3.2 m³/s

Approximate weight of unit 3485 kg

Reference **British Museum - WCEC**
AHU Reference **AHU B3/01.02.B2/01.02,B1/01,02 & 02/01**
Unit Dimensions 1350W x 2625H x 2100L (mm)
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/2/S
Quantity 7
Location Internal

SUPPLY SIDE
Volume 1.9 m³/s
External static 250 Pa

COMPONENTS (In direction of airflow)
SUPPLY SIDE
Supply Air Inlet Damper
Recirculation Plenum
Panel Filters
Bag Filters
LPHW Heater
CW Cooler
Turning Section
600mm Silencer
Supply Fan - "Run & Standby Motors"

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 1.9 m³/s
Recirculation Plenum
Flange/Spigot
Air Volume 1.9 m³/s
Panel Filters
Type Panel
Efficiency G4
Arrangement 2W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media
Bag Filters
Type Bag
Efficiency F9
Arrangement 2W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media
LPHW Heater
Volume 1.9 m³/s
Air On Coil Db 15.5 °C
Air Off Coil Db 18.9 °C
Duty 7.79 kW
Face velocity 3.2 m/s
Medium LTHW
Flow Temp 80 °C
Return Temp 50 °C
Flow Rate 0.06 l/s
Water Pd 1 KPa
Rows/Fins 1R/5F
No of Sections 1
Construction Copper/Aluminium

Continued ...

CW Cooler

Volume	1.9 m³/s
Air On Coil Db	19.5 °C
Air On Coil Wb	13.4 °C
Air Off Coil Db	14.1 °C
Air Off Coil Wb	11.1 °C
Duty	13.06 kW
Face velocity	2.5 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	0.52 l/s
Water Pd	16 KPa
Rows/Fins	2R/10F
No of Sections	1
Construction	Copper/Aluminium
Drain Pan	Fixed

Turning Section

Air Volume	1.9 m³/s

600mm Silencer

	63	125	250	500	1000	2000	4000	8000 (Hz)
Static insertion loss	7	11	19	24	33	30	23	18

Supply Fan - "Run & Standby Motors"

Volume	1.9 m³/s
External static	250 Pa
Total static	325 Pa
Absorbed power	2.62 kW
Motor power	4 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Standard
Fan type	DIDW / Backward curved / Belt driven
Fan speed	2834 RPM
Outlet velocity	11.82 m/s
Total fan efficiency	73.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	96	91	89	90	88	84	79	70

Includes +4dB fan in casework adjustment

Door guard fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

Approximate weight of unit 1569 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/00/01 Photosuite Supply**
Unit Dimensions 1050W x 3625H x 3600L (mm) including 125 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/1/S
Quantity 1
Location Internal

SUPPLY SIDE
Volume 1.5 m³/s
External static 300 Pa

COMPONENTS (In direction of airflow)
SUPPLY SIDE
Supply Air Inlet Damper
Recirculation Damper
Panel Filters
Bag Filters
600mm Silencer
CW Cooler
Supply Fan - Internal Run Only Motor
Diffuser
LPHW Heater
900mm Silencer

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 1.5 m³/s
Recirculation Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 1.35 m³/s
Panel Filters
Type Panel
Efficiency G4
Arrangement 1.5W x 1H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media
Bag Filters
Type Bag
Efficiency F9
Arrangement 1.5W x 1H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media
600mm Silencer

	63	125	250	500	1000	2000	4000	8000 (Hz)
Static insertion loss	5	8	16	21	28	25	19	15

CW Cooler
Volume 1.5 m³/s
Air On Coil Db 26.5 °C
Air On Coil Wb 18.5 °C
Air Off Coil Db 11.44 °C
Air Off Coil Wb 10.9 °C
Duty 37.5 kW
Face velocity 3 m/s
Medium Chilled Water
Flow Temp 5 °C
Return Temp 11 °C
Flow Rate 1.49 l/s
Water Pd 13 KPa
Rows/Fins 6R/10F
No of Sections 1
Construction Copper/Aluminium

Continued ...

Drain Pan	Fixed

Supply Fan - Internal Run Only Motor

Volume	1.5 m³/s
External static	300 Pa
Total static	505 Pa
Absorbed power	2.71 kW
Motor power	4 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Standard
Fan type	DIDW / Backward curved / Belt driven
Fan speed	2948 RPM
Outlet velocity	9.33 m/s
Total fan efficiency	76.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	99	93	90	89	86	82	77	69

Includes +4dB fan in casework adjustment

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

1No spare set of belts

LPHW Heater

Volume	1.5 m³/s
Air On Coil Db	10.5 °C
Air Off Coil Db	30 °C
Duty	35.27 kW
Face velocity	3 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	0.29 l/s
Water Pd	5 KPa
Rows/Fins	2R/8F
No of Sections	1
Construction	Copper/Aluminium

900mm Silencer

	63	125	250	500	1000	2000	4000	8000 (Hz)
Static insertion loss	9	15	26	31	44	46	34	22

Approximate weight of unit 1778 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/00/01 Photosuite Extract**

BASIC UNIT INFORMATION

Model Ref	MA50/1/S
Quantity	1
Location	Internal

EXTRACT SIDE

Volume	1.5 m³/s
External static	300 Pa

COMPONENTS (In direction of airflow)

Panel Filters	Extract Fan - Internal Run Only Motor
Service Access Section	Diffuser
900mm Silencer	600mm Silencer
Turning Section	Service Access Section
	Recirculation Damper
	Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	1.5W x 1H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

900mm Silencer

	63	125	250	500	1000	2000	4000	8000 (Hz)
Static insertion loss	9	15	26	31	44	46	34	22

Turning Section

Air Volume	1.5 m³/s

Extract Fan - Internal Run Only Motor

Volume	1.5 m³/s
External static	300 Pa
Total static	527 Pa
Absorbed power	1.7 kW
Motor power	3 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Standard
Fan type	DIDW / Backward curved / Belt driven
Fan speed	2471 RPM
Outlet velocity	9.33 m/s
Total fan efficiency	75.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	96	90	87	86	83	79	74	66

Includes +4dB fan in casework adjustment

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

1No spare set of belts

Continued ...

600mm Silencer

	63	125	250	500	1000	2000	4000	8000 (Hz)
Static insertion loss	5	8	16	21	28	25	19	15

Recirculation Damper

Air Volume 1.35 m³/s

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Air Volume 1.5 m³/s

Approximate weight of unit 1399 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/01/01 & AHU/01/02 Supply & Extract**
Unit Dimensions 1050W x 1625H x 5650L (mm) including 125 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION

Model Ref	MA50/1/S
Quantity	2
Location	Internal

SUPPLY SIDE

Volume	0.6 m³/s
External static	250 Pa

EXTRACT SIDE

Volume	0.6 m³/s
External static	250 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE
- Supply Air Inlet Damper
- Service Access Section
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- Service Access Section
- CW Cooler
- Service Access Section
- LPHW Heater
- Supply Fan

EXTRACT SIDE
- Service Access Section
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- Extract Fan
- Diffuser
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper

Damper	(Damper Seals:- Side & Blade)
Air Volume	0.6 m³/s

Bag Filters

Type	Bag
Efficiency	F9
Arrangement	1.5W x 1H
Withdrawal	Front
Manometer	Inclined

1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece

Type	Hygroscopic

Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	16.6 °C	25.6 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	79.0 %	80.0 %
Heat Recovered	21 kW	3 kW

Special Features Speed control

CW Cooler

Volume	0.6 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	16.45 °C
Air Off Coil Wb	14.6 °C
Duty	11.72 kW
Face velocity	2 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	0.46 l/s
Water Pd	5 KPa
Rows/Fins	3R/10F
No of Sections	1
Construction	Copper/Aluminium

Continued ...

Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	0.6 m³/s
Air On Coil Db	15.3 °C
Air Off Coil Db	21 °C
Duty	4.1 kW
Face velocity	2 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	0.03 l/s
Water Pd	5 KPa
Rows/Fins	1R/5F
No of Sections	1
Construction	Copper/Aluminium

Supply Fan

Volume	0.6 m³/s
External static	250 Pa
Total static	700 Pa
Absorbed power	0.62 kW
Motor power	1.1 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Standard
Fan type	DIDW / Backward curved / Belt driven
Fan speed	3073 RPM
Outlet velocity	7.33 m/s
Total fan efficiency	71.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	90	88	84	82	76	72	65	54

Includes +4dB fan in casework adjustment

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

1No spare set of belts

Bag Filters

Type	Bag
Efficiency	F9
Arrangement	1.5W x 1H
Withdrawal	Front
Manometer	Inclined

1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece

Extract Fan

Volume	0.6 m³/s
External static	250 Pa
Total static	727 Pa
Absorbed power	0.64 kW
Motor power	1.1 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Standard
Fan type	DIDW / Backward curved / Belt driven
Fan speed	3121 RPM
Outlet velocity	7.33 m/s
Total fan efficiency	71.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	91	89	85	83	77	73	66	55

Includes +4dB fan in casework adjustment

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

1No spare set of belts

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Continued ...

Air Volume 0.6 m³/s

Approximate weight of unit 2122 kg

Reference	**British Museum - WCEC**
AHU Reference	**AHU/05/01 Level 5 Supply & Extract**
Unit Dimensions	2100W x 2865H x 5400L (mm) including 165 base The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION

Model Ref	MA50/10/S
Quantity	1
Location	Internal

SUPPLY SIDE

Volume	5.2 m³/s
External static	300 Pa

EXTRACT SIDE

Volume	5.2 m³/s
External static	300 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE

- Supply Air Inlet Damper
- Recirculation Damper
- Panel Filters
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- CW Cooler
- Service Access Section
- LPHW Heater
- Supply Fan - Internal Run Only Motor

EXTRACT SIDE

- Panel Filters
- Extract Fan - Internal Run Only Motor
- Diffuser
- Hygroscopic Thermal Wheel Single Piece
- Spacer Section
- Recirculation Damper
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA

Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper

Damper	(Damper Seals:- Side & Blade)
Air Volume	5.2 m³/s

Recirculation Damper

Damper	(Damper Seals:- Side & Blade)
Air Volume	4.68 m³/s

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	3W x 2H
Withdrawal	Front
Manometer	Inclined

1No Set of spare filter media

Bag Filters

Type	Bag
Efficiency	F9
Arrangement	3W x 2H
Withdrawal	Front
Manometer	Inclined

1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece

Type	Hygroscopic	
Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	14.1 °C	25.9 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	70.0 %	70.0 %
Heat Recovered	162 kW	20 kW
Special Features	Speed control	

Continued ...

CW Cooler

Volume	5.2 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	11.6 °C
Air Off Coil Wb	11 °C
Duty	159.3 kW
Face velocity	2.9 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	6.32 l/s
Water Pd	28 KPa
Rows/Fins	7R/8F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	5.2 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	26 °C
Duty	131.69 kW
Face velocity	3 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	1.07 l/s
Water Pd	11 KPa
Rows/Fins	2R/8F
No of Sections	1
Construction	Copper/Aluminium

Supply Fan - Internal Run Only Motor

Volume	5.2 m³/s
External static	300 Pa
Total static	1207 Pa
Absorbed power	8.62 kW
Motor power	15 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1933 RPM
Outlet velocity	12.9 m/s
Total fan efficiency	79.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	101	95	92	91	88	84	79	71

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	NO
Thermistors fitted?	YES

1No spare set of belts

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	3W x 2H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan - Internal Run Only Motor

Volume	5.2 m³/s
External static	300 Pa
Total static	865 Pa
Absorbed power	6.65 kW
Motor power	11 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1764 RPM
Outlet velocity	12.9 m/s
Total fan efficiency	75.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels (to BS848)	63	125	250	500	1000	2000	4000	8000 (Hz)
	97	92	90	91	89	85	80	71

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	NO
Thermistors fitted?	YES

1No spare set of belts

Hygroscopic Thermal Wheel Single Piece

Recirculation Damper

Air Volume 4.68 m³/s

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Air Volume 5.2 m³/s

Approximate weight of unit 4291 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/05/02 Level 5 Supply & Extract**
Unit Dimensions 1650W x 2465H x 5250L (mm) including 165 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/3/S
Quantity 1
Location Internal

SUPPLY SIDE
Volume 3.1 m³/s
External static 300 Pa

EXTRACT SIDE
Volume 3.1 m³/s
External static 300 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE
- Supply Air Inlet Damper
- Recirculation Damper
- Panel Filters
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- CW Cooler
- Service Access Section
- LPHW Heater
- Supply Fan - Internal Run Only Motor

EXTRACT SIDE
- Panel Filters
- Extract Fan - Internal Run Only Motor
- Diffuser
- Hygroscopic Thermal Wheel Single Piece
- Spacer Section
- Recirculation Damper
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 3.1 m³/s

Recirculation Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 2.79 m³/s

Panel Filters
Type Panel
Efficiency G4
Arrangement 2.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Bag Filters
Type Bag
Efficiency F9
Arrangement 2.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece
Type Hygroscopic

Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	14 °C	25.9 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	69.0 %	70.0 %
Heat Recovered	99 kW	12 kW

Special Features Speed control

Continued ...

CW Cooler

Volume	3.1 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	12.1 °C
Air Off Coil Wb	11.4 °C
Duty	91.36 kW
Face velocity	2.58 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	3.62 l/s
Water Pd	14 KPa
Rows/Fins	6R/8F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	3.1 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	30 °C
Duty	93.46 kW
Face velocity	2.6 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	0.76 l/s
Water Pd	6 KPa
Rows/Fins	2R/8F
No of Sections	1
Construction	Copper/Aluminium

Supply Fan - Internal Run Only Motor

Volume	3.1 m³/s
External static	300 Pa
Total static	1161 Pa
Absorbed power	5.09 kW
Motor power	7.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	2401 RPM
Outlet velocity	12.2 m/s
Total fan efficiency	79.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	101	95	92	91	88	84	79	71

Includes +4dB fan in casework adjustment

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

1No spare set of belts

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan - Internal Run Only Motor

Volume	3.1 m³/s
External static	300 Pa
Total static	856 Pa
Absorbed power	3.83 kW
Motor power	5.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	2167 RPM
Outlet velocity	12.2 m/s
Total fan efficiency	75.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	96	91	89	90	88	84	79	70

Includes +4dB fan in casework adjustment

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

1No spare set of belts

Hygroscopic Thermal Wheel Single Piece

Recirculation Damper

Air Volume 2.79 m³/s

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Air Volume 3.1 m³/s

Approximate weight of unit 3318 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/05/03 & 07 Level 5 Supply & Extract**
Unit Dimensions 1850W x 2715H x 7350L (mm) including 165 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/6/S
Quantity 2
Location Internal

SUPPLY SIDE
Volume 4.2 m³/s
External static 300 Pa

EXTRACT SIDE
Volume 4.2 m³/s
External static 300 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE
- Supply Air Inlet Damper
- Recirculation Damper
- Panel Filters
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- CW Cooler
- Service Access Section
- LPHW Heater
- Service Access Section
- Space For A Future Humidifier
- Supply Fan - Internal Run Only Motor

EXTRACT SIDE
- Panel Filters
- Extract Fan - Internal Run Only Motor
- Diffuser
- Hygroscopic Thermal Wheel Single Piece
- Spacer Section
- Recirculation Damper
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 4.2 m³/s

Recirculation Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 3.78 m³/s

Panel Filters
Type Panel
Efficiency G4
Arrangement 2.5W x 2H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Bag Filters
Type Bag
Efficiency F9
Arrangement 2.5W x 2H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece
Type Hygroscopic

Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	14 °C	25.9 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	69.0 %	70.0 %
Heat Recovered	130 kW	16 kW

Special Features Speed control

Continued ...

CW Cooler

Volume	4.2 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	11.9 °C
Air Off Coil Wb	11.2 °C
Duty	126.23 kW
Face velocity	2.9 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	5.01 l/s
Water Pd	19 KPa
Rows/Fins	7R/8F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	4.2 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	26 °C
Duty	106.37 kW
Face velocity	2.9 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	0.86 l/s
Water Pd	9 KPa
Rows/Fins	2R/8F
No of Sections	1
Construction	Copper/Aluminium

Space For A Future Humidifier

Supply Fan - Internal Run Only Motor

Volume	4.2 m³/s
External static	300 Pa
Total static	1304 Pa
Absorbed power	7.08 kW
Motor power	11 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1839 RPM
Outlet velocity	10.42 m/s
Total fan efficiency	82.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	98	92	89	88	85	81	76	68

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	NO
Thermistors fitted?	YES

1No spare set of belts

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan - Internal Run Only Motor

Volume	4.2 m³/s
External static	300 Pa
Total static	893 Pa
Absorbed power	5.05 kW
Motor power	7.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1621 RPM
Outlet velocity	10.42 m/s
Total fan efficiency	80.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	97	91	88	87	84	80	75	67

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	NO
Thermistors fitted?	YES

1No spare set of belts

Hygroscopic Thermal Wheel Single Piece

Recirculation Damper

Air Volume 3.78 m³/s

Extract Air Outlet Damper

Damper	(Damper Seals:- Side & Blade)
Air Volume	4.2 m³/s

Approximate weight of unit 4697 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/05/04 Level 5 Supply & Extract**
Unit Dimensions 1800W x 2565H x 7850L (mm) including 165 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/6/S
Quantity 1
Location Internal

SUPPLY SIDE
Volume 3.8 m³/s
External static 300 Pa

EXTRACT SIDE
Volume 3.8 m³/s
External static 300 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE
- Supply Air Inlet Damper
- Recirculation Damper
- Panel Filters
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- CW Cooler
- Service Access Section
- LPHW Heater
- Service Access Section
- Space For A Future Humidifier
- Supply Fan "Run & Standby Motors"

EXTRACT SIDE
- Panel Filters
- Extract Fan "Run & Standby Motors"
- Diffuser
- Hygroscopic Thermal Wheel Single Piece
- Spacer Section
- Recirculation Damper
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 3.8 m³/s

Recirculation Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 3.42 m³/s

Panel Filters
Type Panel
Efficiency G4
Arrangement 2.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Bag Filters
Type Bag
Efficiency F9
Arrangement 2.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece
Type Hygroscopic

Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	14 °C	25.9 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	69.0 %	70.0 %
Heat Recovered	118 kW	14 kW
Special Features	Speed control	

Continued ...

CW Cooler

Volume	3.8 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	11.85 °C
Air Off Coil Wb	11.2 °C
Duty	114.2 kW
Face velocity	2.7 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	4.53 l/s
Water Pd	17 KPa
Rows/Fins	7R/8F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	3.8 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	26 °C
Duty	96.24 kW
Face velocity	3 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	0.78 l/s
Water Pd	1 KPa
Rows/Fins	2R/10F
No of Sections	1
Construction	Copper/Aluminium

Space For A Future Humidifier

Supply Fan "Run & Standby Motors"

Volume	3.8 m³/s
External static	300 Pa
Total static	1351 Pa
Absorbed power	6.56 kW
Motor power	11 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1816 RPM
Outlet velocity	9.42 m/s
Total fan efficiency	81.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels (to BS848)	63	125	250	500	1000	2000	4000	8000 (Hz)
	98	92	89	88	85	81	76	68

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan "Run & Standby Motors"

Volume	3.8 m³/s
External static	300 Pa
Total static	850 Pa
Absorbed power	4.27 kW
Motor power	7.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1539 RPM
Outlet velocity	9.42 m/s
Total fan efficiency	81.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	95	89	86	85	82	78	73	65

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

Hygroscopic Thermal Wheel Single Piece

Recirculation Damper

Air Volume 3.42 m³/s

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Air Volume 3.8 m³/s

Approximate weight of unit 4814 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/05/05 Level 5 Supply & Extract**
Unit Dimensions 1800W x 2565H x 7550L (mm) including 165 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/6/S
Quantity 1
Location Internal

SUPPLY SIDE
Volume 3.85 m³/s
External static 300 Pa

EXTRACT SIDE
Volume 3.85 m³/s
External static 300 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE
- Supply Air Inlet Damper
- Recirculation Damper
- Panel Filters
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- CW Cooler
- Service Access Section
- LPHW Heater
- Service Access Section
- Space For A Future Humidifier
- Supply Fan - Internal Run Only Motor

EXTRACT SIDE
- Panel Filters
- Extract Fan - Internal Run Only Motor
- Diffuser
- Hygroscopic Thermal Wheel Single Piece
- Spacer Section
- Recirculation Damper
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 3.85 m³/s

Recirculation Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 3.465 m³/s

Panel Filters
Type Panel
Efficiency G4
Arrangement 2.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Bag Filters
Type Bag
Efficiency F9
Arrangement 2.5W x 1.5H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece
Type Hygroscopic

Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	14 °C	25.9 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	69.0 %	70.0 %
Heat Recovered	119 kW	15 kW
Special Features	Speed control	

Continued ...

CW Cooler

Volume	3.85 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	11.85 °C
Air Off Coil Wb	11.2 °C
Duty	115.71 kW
Face velocity	2.9 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	4.59 l/s
Water Pd	17 KPa
Rows/Fins	7R/8F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	3.85 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	26 °C
Duty	97.5 kW
Face velocity	3 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	1.14 l/s
Water Pd	1 KPa
Rows/Fins	2R/10F
No of Sections	1
Construction	Copper/Aluminium

Space For A Future Humidifier

Supply Fan - Internal Run Only Motor

Volume	3.85 m³/s
External static	300 Pa
Total static	1358 Pa
Absorbed power	6.7 kW
Motor power	11 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1826 RPM
Outlet velocity	9.55 m/s
Total fan efficiency	81.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	98	92	89	88	85	81	76	68

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	NO
Thermistors fitted?	YES

1No spare set of belts

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan - Internal Run Only Motor

Volume	3.85 m³/s
External static	300 Pa
Total static	855 Pa
Absorbed power	4.34 kW
Motor power	7.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1547 RPM
Outlet velocity	9.55 m/s
Total fan efficiency	81.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	95	89	86	85	82	78	73	65

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	NO
Thermistors fitted?	YES

1No spare set of belts

Hygroscopic Thermal Wheel Single Piece

Recirculation Damper

Air Volume 3.465 m³/s

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Air Volume 3.85 m³/s

Approximate weight of unit 4598 kg

Reference **British Museum - WCEC**
AHU Reference **AHU/05/06 Level 5 Supply & Extract**
Unit Dimensions 1850W x 2715H x 7750L (mm) including 165 base
The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION
Model Ref MA50/6/S
Quantity 1
Location Internal

SUPPLY SIDE
Volume 4 m³/s
External static 300 Pa

EXTRACT SIDE
Volume 4 m³/s
External static 300 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE
- Supply Air Inlet Damper
- Recirculation Damper
- Panel Filters
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- CW Cooler
- Service Access Section
- LPHW Heater
- Service Access Section
- Space For A Future Humidifier
- Supply Fan "Run & Standby Motors"

EXTRACT SIDE
- Panel Filters
- Extract Fan "Run & Standby Motors"
- Diffuser
- Hygroscopic Thermal Wheel Single Piece
- Spacer Section
- Recirculation Damper
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA
Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 4 m³/s

Recirculation Damper
Damper (Damper Seals:- Side & Blade)
Air Volume 3.6 m³/s

Panel Filters
Type Panel
Efficiency G4
Arrangement 2.5W x 2H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Bag Filters
Type Bag
Efficiency F9
Arrangement 2.5W x 2H
Withdrawal Front
Manometer Inclined
1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece
Type Hygroscopic

Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	14.2 °C	25.9 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	70.0 %	71.0 %
Heat Recovered	125 kW	15 kW
Special Features	Speed control	

Continued ...

CW Cooler

Volume	4 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	11.85 °C
Air Off Coil Wb	11.2 °C
Duty	120.22 kW
Face velocity	2.8 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	4.77 l/s
Water Pd	18 KPa
Rows/Fins	7R/8F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	4 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	26 °C
Duty	101.3 kW
Face velocity	2.8 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	0.82 l/s
Water Pd	8 KPa
Rows/Fins	2R/8F
No of Sections	1
Construction	Copper/Aluminium

Space For A Future Humidifier

Supply Fan "Run & Standby Motors"

Volume	4 m³/s
External static	300 Pa
Total static	1279 Pa
Absorbed power	6.57 kW
Motor power	11 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1800 RPM
Outlet velocity	9.92 m/s
Total fan efficiency	82.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	98	92	89	88	85	81	76	68

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan "Run & Standby Motors"

Volume	4 m³/s
External static	300 Pa
Total static	876 Pa
Absorbed power	4.67 kW
Motor power	7.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1582 RPM
Outlet velocity	9.92 m/s
Total fan efficiency	80.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels (to BS848)	63	125	250	500	1000	2000	4000	8000 (Hz)
	96	90	87	86	83	79	74	66

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

Hygroscopic Thermal Wheel Single Piece

Recirculation Damper

Air Volume 3.6 m³/s

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Air Volume 4 m³/s

Approximate weight of unit 4964 kg

Reference	**British Museum - WCEC**
AHU Reference	**AHU/05/08 Level 5 Supply & Extract**
Unit Dimensions	1950W x 2715H x 7900L (mm) including 165 base The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION

Model Ref	MA50/6/S
Quantity	1
Location	Internal

SUPPLY SIDE		**EXTRACT SIDE**	
Volume	4.6 m³/s	Volume	4.6 m³/s
External static	300 Pa	External static	300 Pa

COMPONENTS (In direction of airflow)

SUPPLY SIDE
- Supply Air Inlet Damper
- Recirculation Damper
- Panel Filters
- Bag Filters
- Hygroscopic Thermal Wheel Single Piece
- CW Cooler
- Service Access Section
- LPHW Heater
- Service Access Section
- Space For A Future Humidifier
- Supply Fan - "Run & Standby Motors"

EXTRACT SIDE
- Panel Filters
- Extract Fan "Run & Standby Motors"
- Diffuser
- Hygroscopic Thermal Wheel Single Piece
- Spacer Section
- Recirculation Damper
- Extract Air Outlet Damper

SEE SEPARATE UNIT SKETCH

TECHNICAL DATA

Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet Damper

Damper	(Damper Seals:- Side & Blade)
Air Volume	4.6 m³/s

Recirculation Damper

Damper	(Damper Seals:- Side & Blade)
Air Volume	4.14 m³/s

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	3W x 2H
Withdrawal	Front
Manometer	Inclined

1No Set of spare filter media

Bag Filters

Type	Bag
Efficiency	F9
Arrangement	3W x 2H
Withdrawal	Front
Manometer	Inclined

1No Set of spare filter media

Hygroscopic Thermal Wheel Single Piece

Type	Hygroscopic	
Conditions	Winter	Summer
Supply Air On	-4 °C	28 °C
Supply Air Off	13.9 °C	25.9 °C
Extract Air On Db	22 °C	25 °C
Extract Air On RH	50 %	50 %
Efficiency (Sup)	69.0 %	70.0 %
Heat Recovered	141 kW	17 kW
Special Features	Speed control	

Continued ...

CW Cooler

Volume	4.6 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air Off Coil Db	11.9 °C
Air Off Coil Wb	11.2 °C
Duty	138.25 kW
Face velocity	2.9 m/s
Medium	Chilled Water
Flow Temp	5 °C
Return Temp	11 °C
Flow Rate	5.48 l/s
Water Pd	21 KPa
Rows/Fins	7R/8F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	4.6 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	26 °C
Duty	116.5 kW
Face velocity	3.1 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	50 °C
Flow Rate	0.95 l/s
Water Pd	10 KPa
Rows/Fins	2R/8F
No of Sections	1
Construction	Copper/Aluminium

Space For A Future Humidifier

Supply Fan - "Run & Standby Motors"

Volume	4.6 m³/s
External static	300 Pa
Total static	1322 Pa
Absorbed power	8.03 kW
Motor power	11 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1906 RPM
Outlet velocity	11.41 m/s
Total fan efficiency	81.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	100	94	91	90	87	83	78	70

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	3W x 1.5H
Withdrawal	Side
Manometer	Inclined

1No Set of spare filter media

Continued ...

Extract Fan "Run & Standby Motors"

Volume	4.6 m³/s
External static	300 Pa
Total static	884 Pa
Absorbed power	5.68 kW
Motor power	7.5 kW (IE2)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1679 RPM
Outlet velocity	11.41 m/s
Total fan efficiency	78.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	94	89	87	88	86	82	77	68

Includes +4dB fan in casework adjustment

Drive guards fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	YES
Standby motor fitted?	YES
Thermistors fitted?	YES

1No spare set of belts

Hygroscopic Thermal Wheel Single Piece

Recirculation Damper

Air Volume 4.14 m³/s

Extract Air Outlet Damper

Damper (Damper Seals:- Side & Blade)

Air Volume 4.6 m³/s

Approximate weight of unit 5264 kg

Michael J Lonsdale

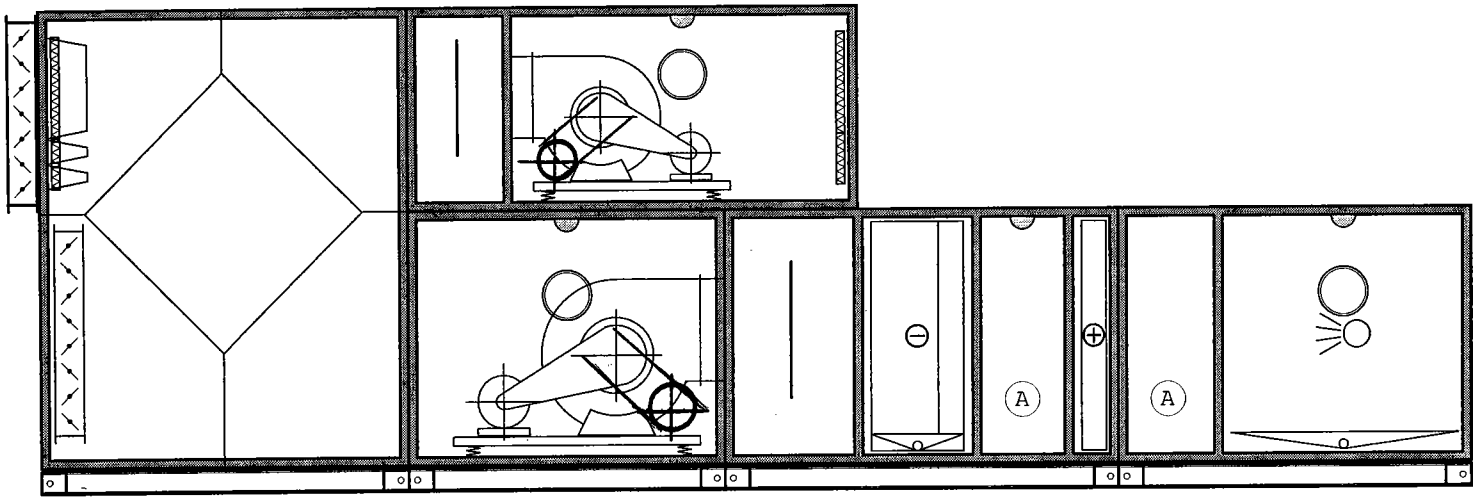
British Museum

World Conservation
Exhibition Centre - London

Revision 05 - Technical Submission

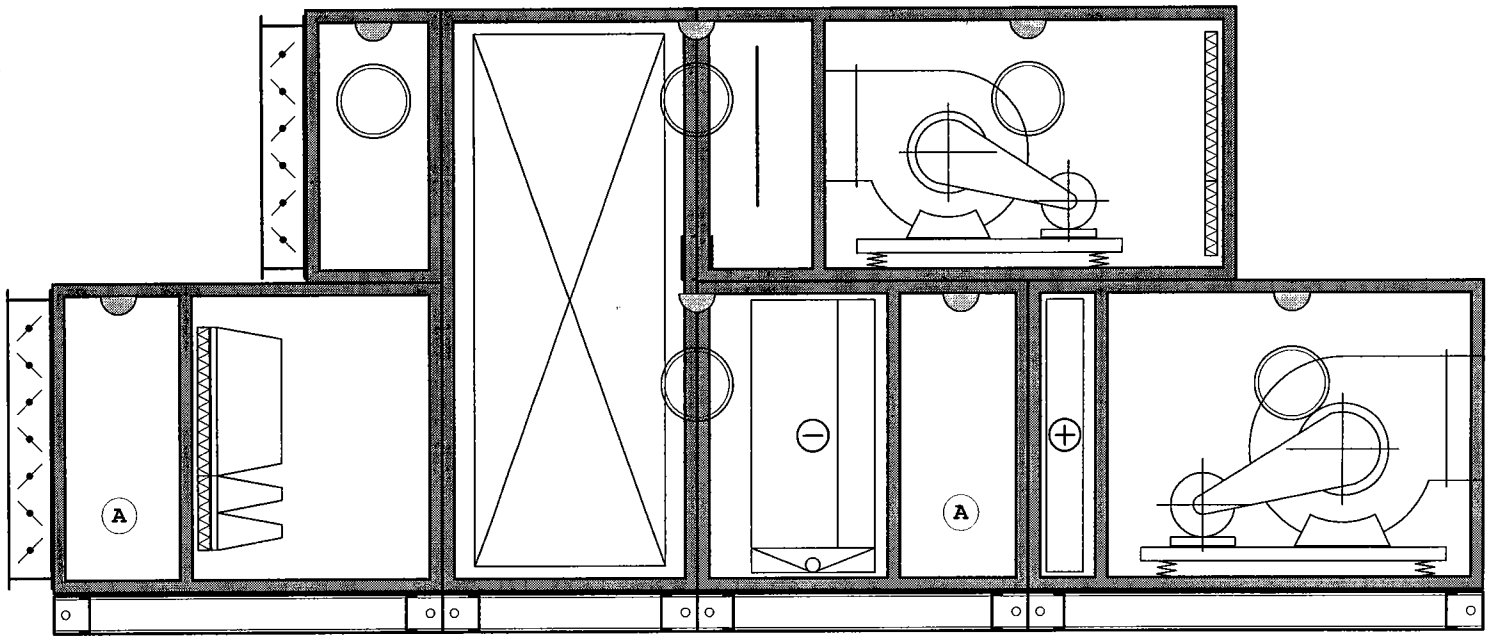
Air Handling Equipment

Section No 3
AHU Proposal Sketches



Quote Reference **E090737U British Museum - WCEC**
AHU Reference **AHU B2/03 Building 5 Supply & Extract**

Dalair



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AHU Reference **AHU/B2/04 B2 Plantroom**

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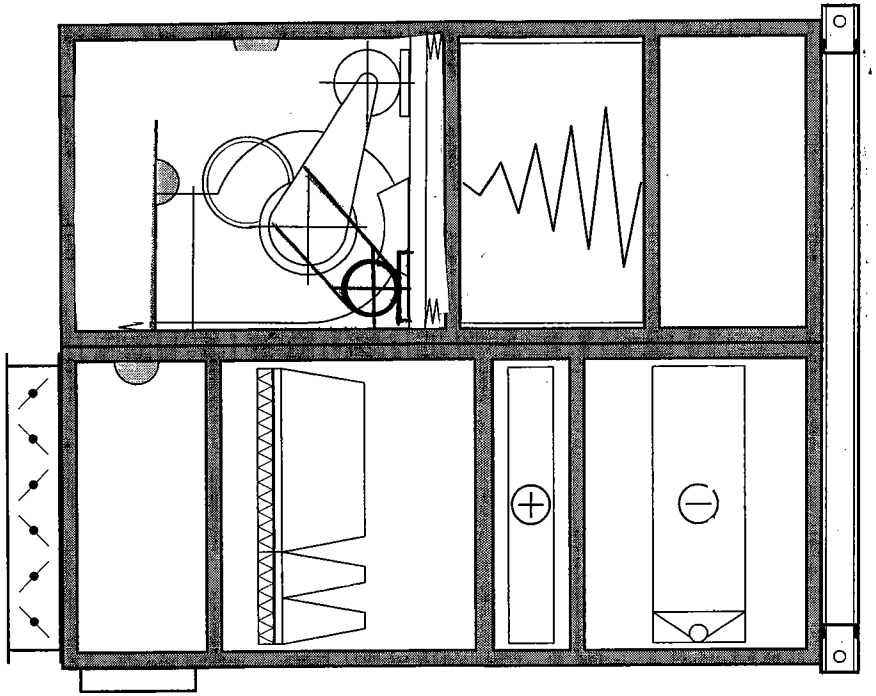

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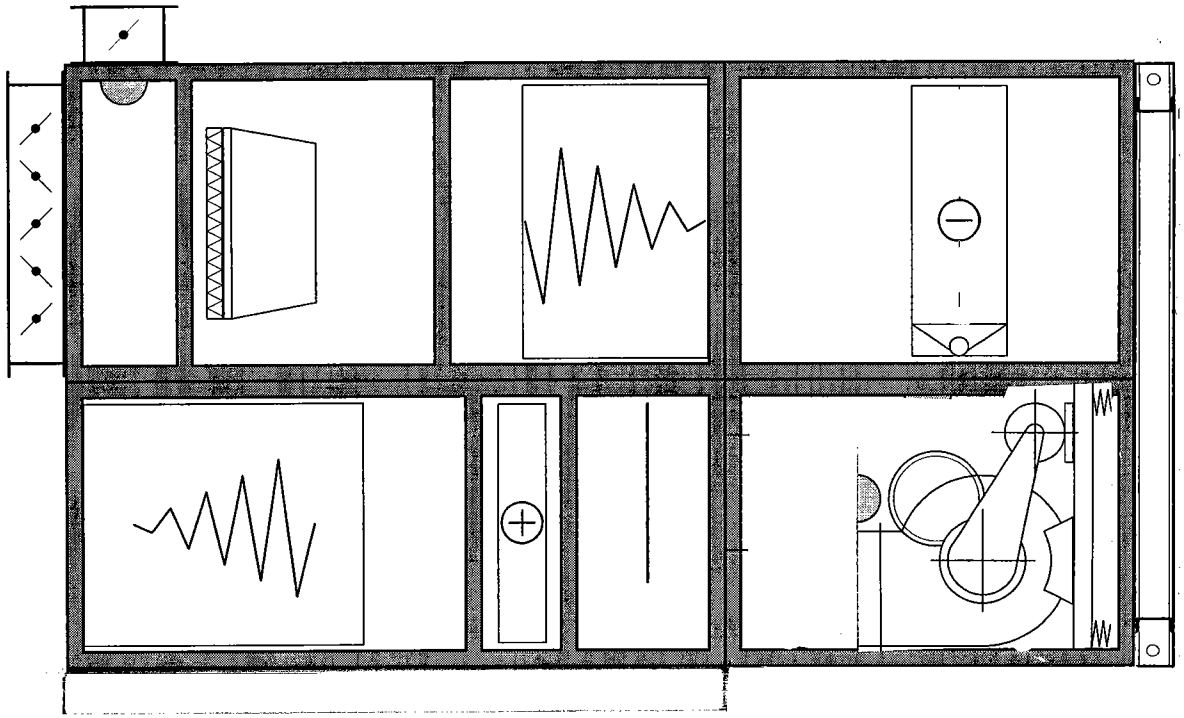

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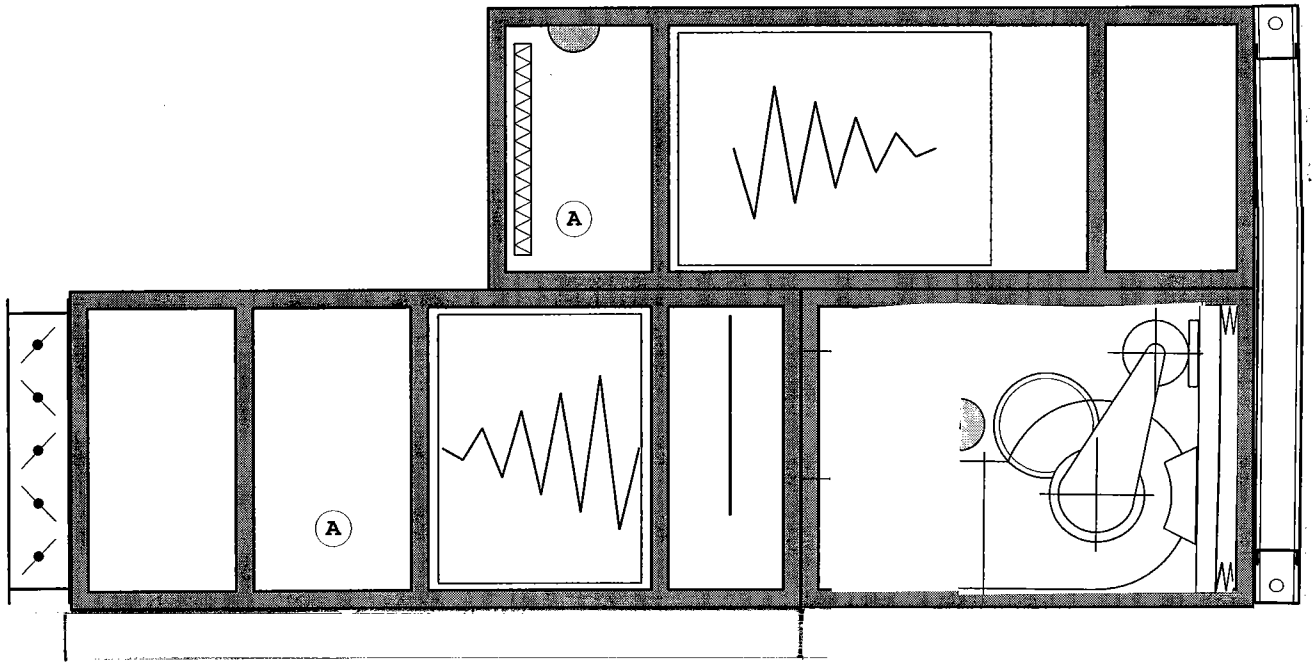

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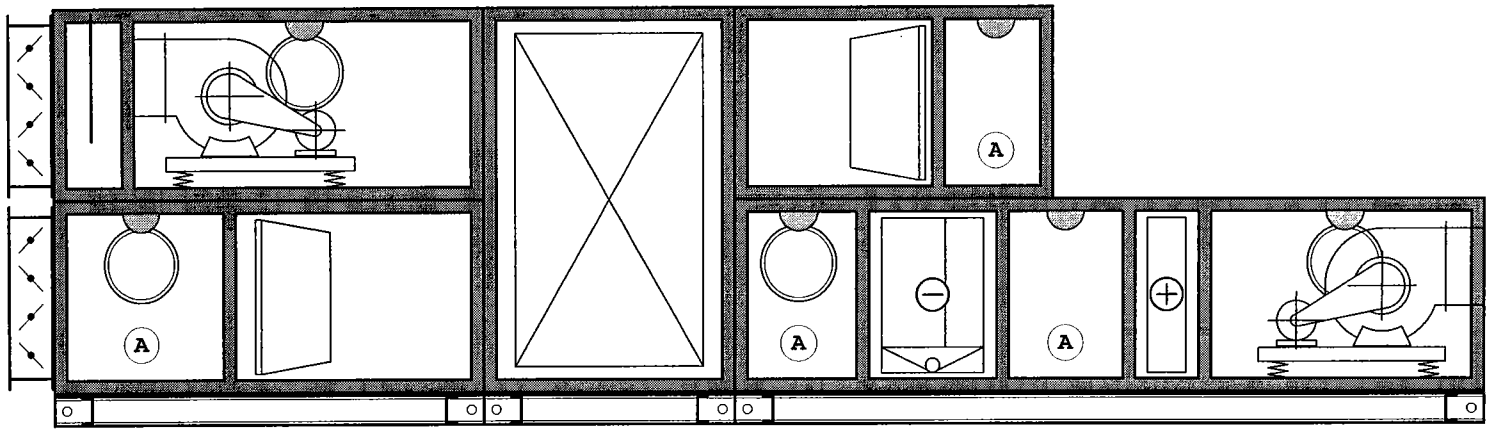

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AHU Reference **AHU/01/01 & AHU/01/02 Supply & Extract**

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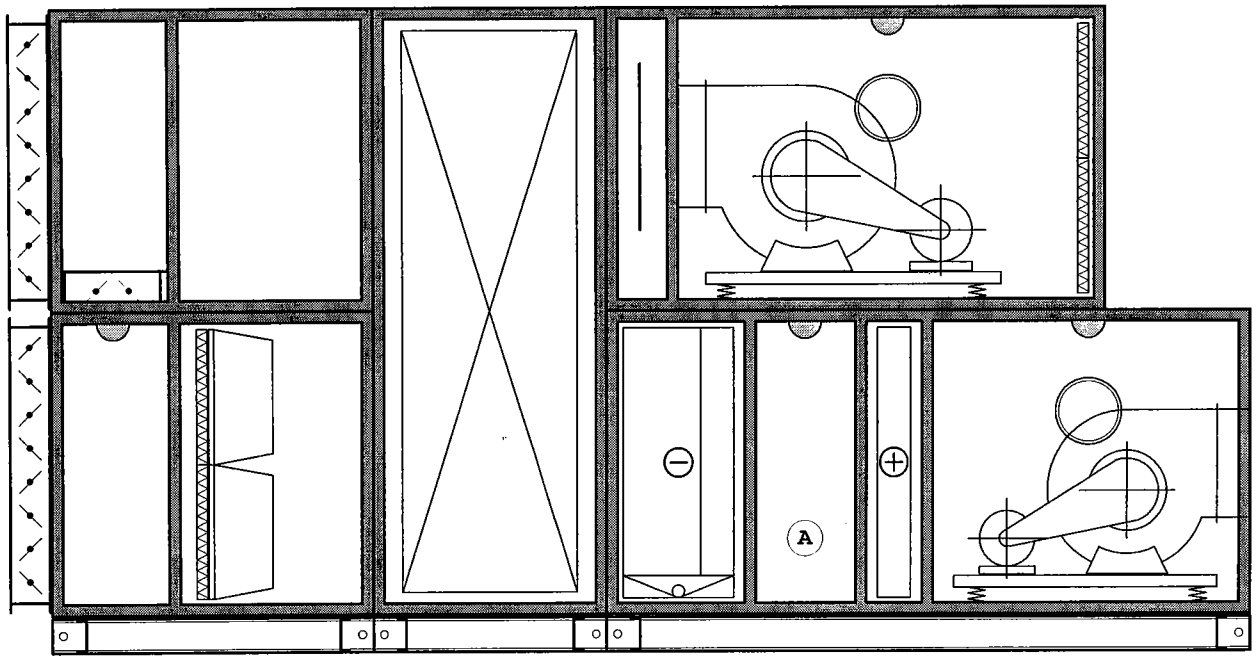

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AHU Reference **AHU/05/01 Level 5 Supply & Extract**

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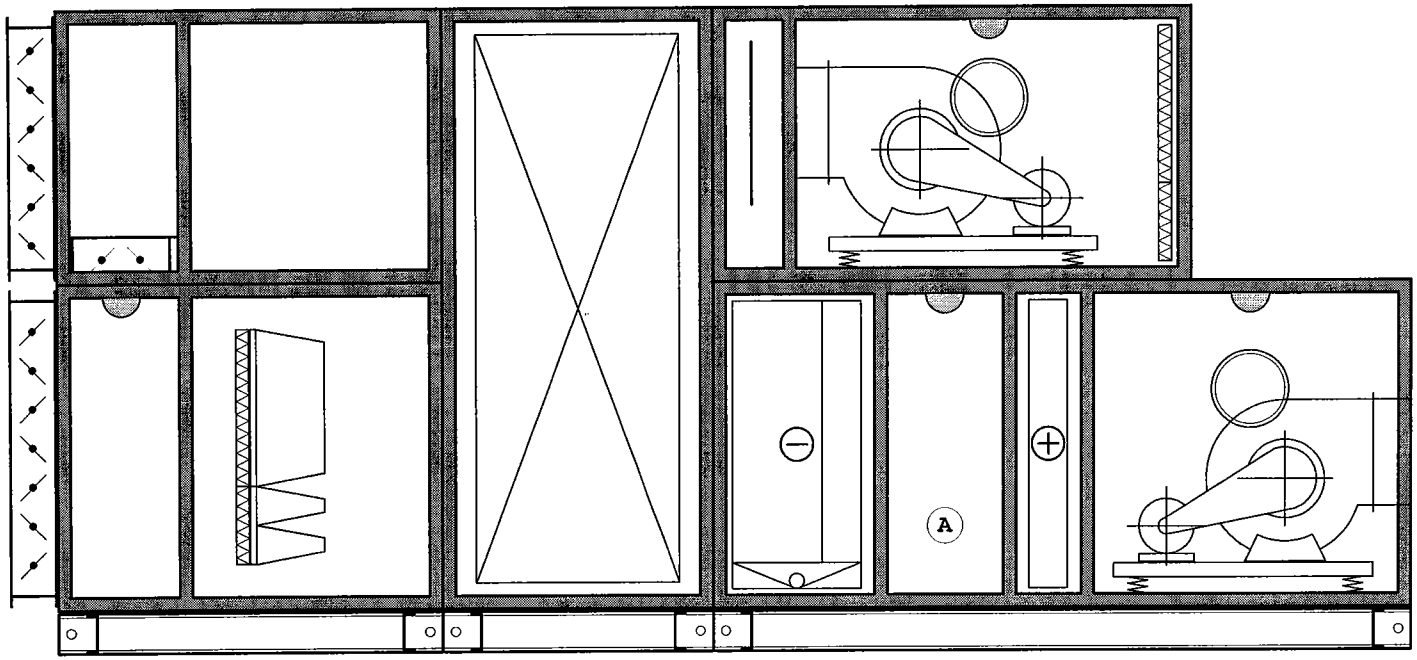

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AHU Reference **AHU/05/02 Level 5 Supply & Extract**

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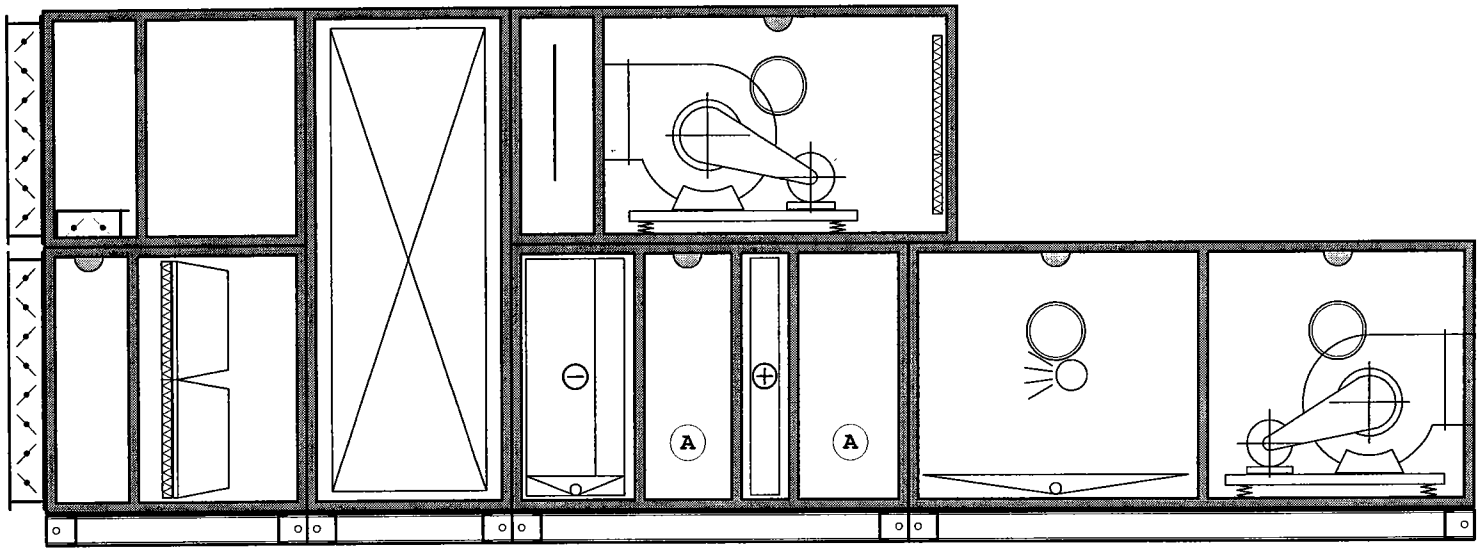

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AHU Reference **AHU/05/03 & 07 Level 5 Supply & Extract**

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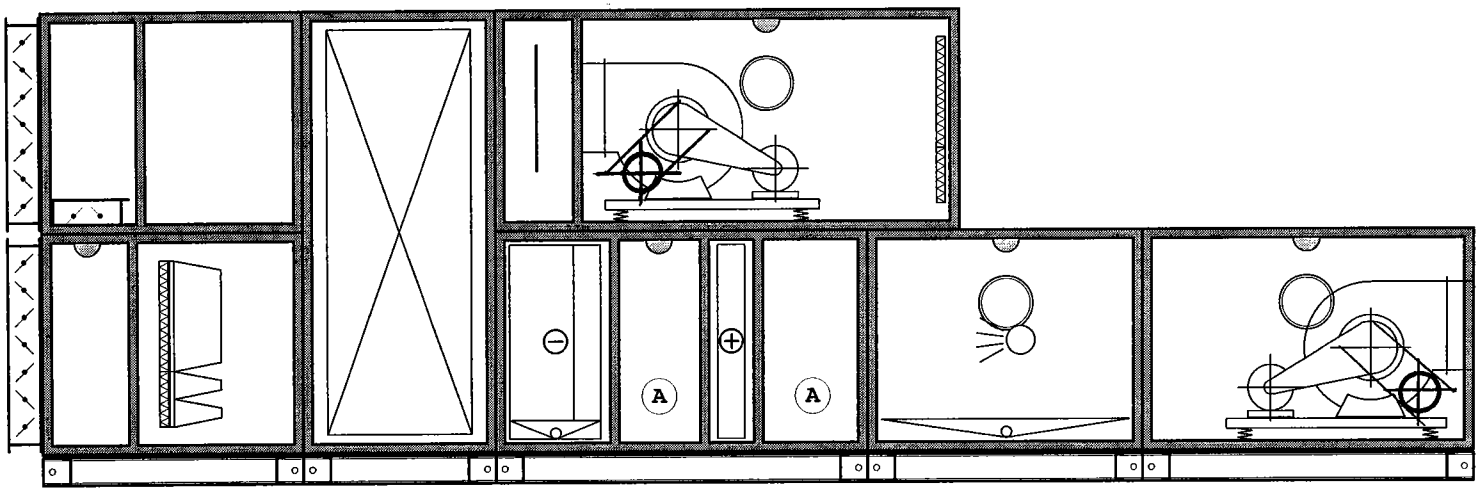

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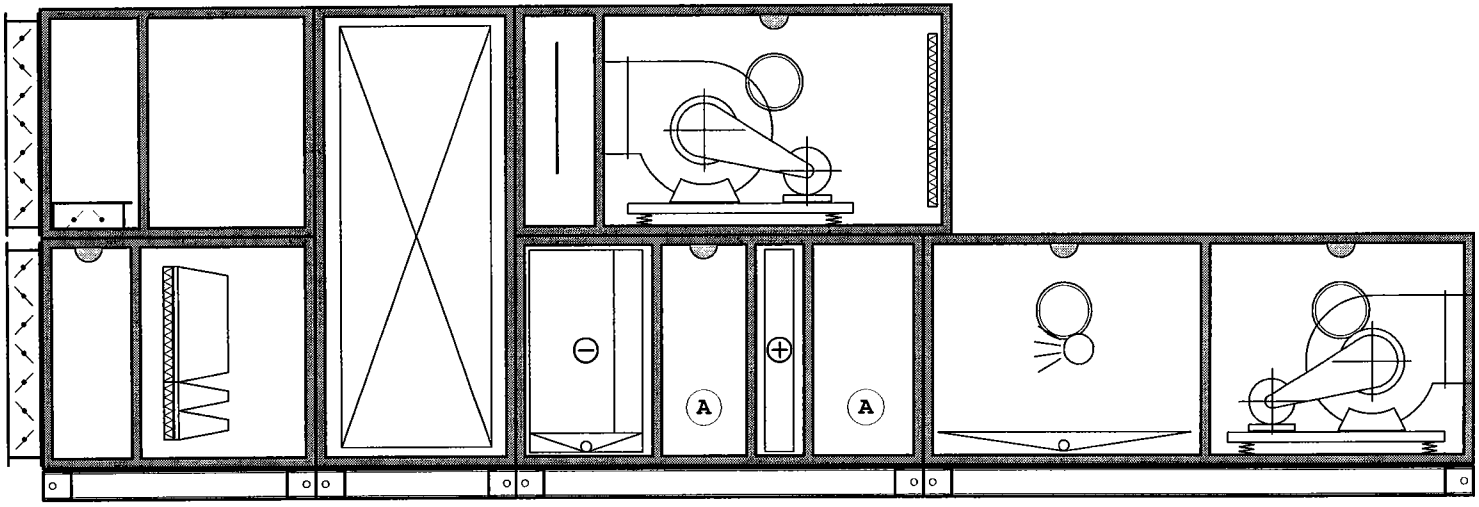

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AHU Reference **AHU/05/05 Level 5 Supply & Extract**

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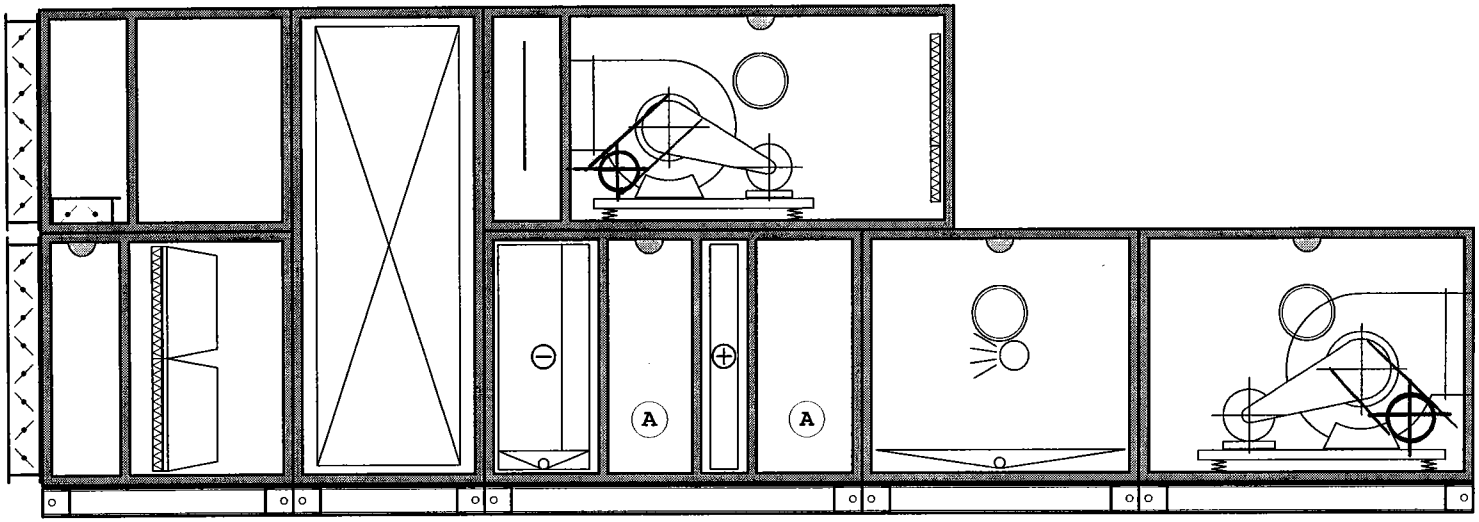

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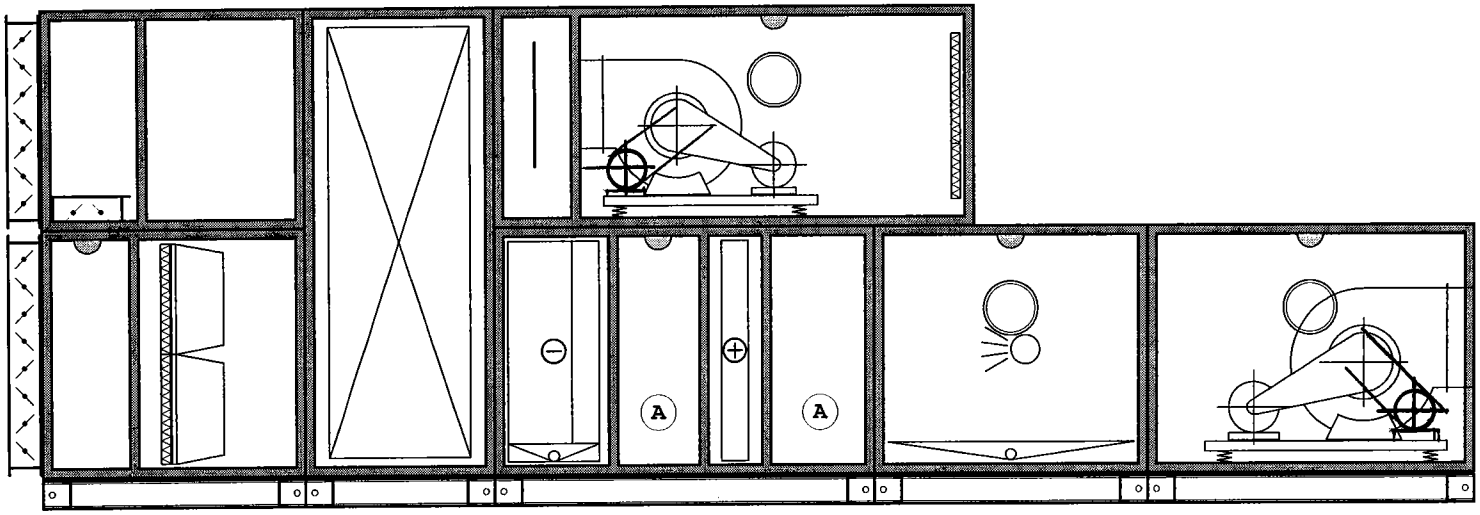
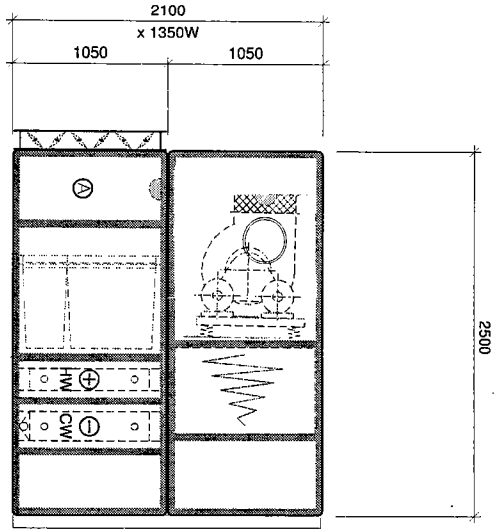
AHU Reference **AHU/05/06 Level 5 Supply & Extract**



Quote Reference **E090737U British Museum - WCEC**
AHU Reference **AHU/05/08 Level 5 Supply & Extract**

Dalair

AHU Overall Size - 1350mm (W) x 2790mm (H) (Inc base & damper) x 2100mm (L)



Elevation

Dalair	Project Reference: British Museum - WCEC - Rev U	Date: 07/06/12	Supply Volume & External Static: 1.9m³/s @ 250Pa	Notes:	Drawing Scale: 1:50
	Unit Reference: AHU B3/01,02, B2/01,02, B1/01, 02 & 02/01	Model Reference: MA50/2/S	Extract Volume: N/A		Drawing Number: E090737U/1

Michael J Lonsdale

British Museum

World Conservation
Exhibition Centre - London

Revision 05 - Technical Submission

Air Handling Equipment

Section No 4
AHU Fan Curves

GebhardtVentilatoren

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E-Mail info@gebhardt.de

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B3/01 & AHU/B1/02 Supply**

Date : **07.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 11-0315

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	1.60	m3/s
Total pressure (dpt)	:	929	Pa
Dyn. pressure (pd2) at discharge	:	59	Pa
Static pressure (dpfa)	:	870	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2595	1/min *1.)*
Power on shaft (Pw)	:	1.97	kW
Efficiency (ETA_t)	:	75	%
Fan weight	:	24	kg
A-Sound power level $LwA_{4;7}$	:	86	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	93/79	dB *2.)*
unweighted	125 Hz	:	87/82	dB
Octave sound power level	250 Hz	:	84/81	dB
acc. to discharge/intake	500 Hz	:	83/85	dB
$LwOkt_{4/7}$ at	1000 Hz	:	80/80	dB
Octave band frequency	2000 Hz	:	76/77	dB
	4000 Hz	:	71/72	dB
	8000 Hz	:	63/65	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 100L-2

Size	:	100L-2	
Speed	:	2890	rpm
Power	:	3	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	6.1/3.5	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B3/01 & AHU/B1/02 Supply**

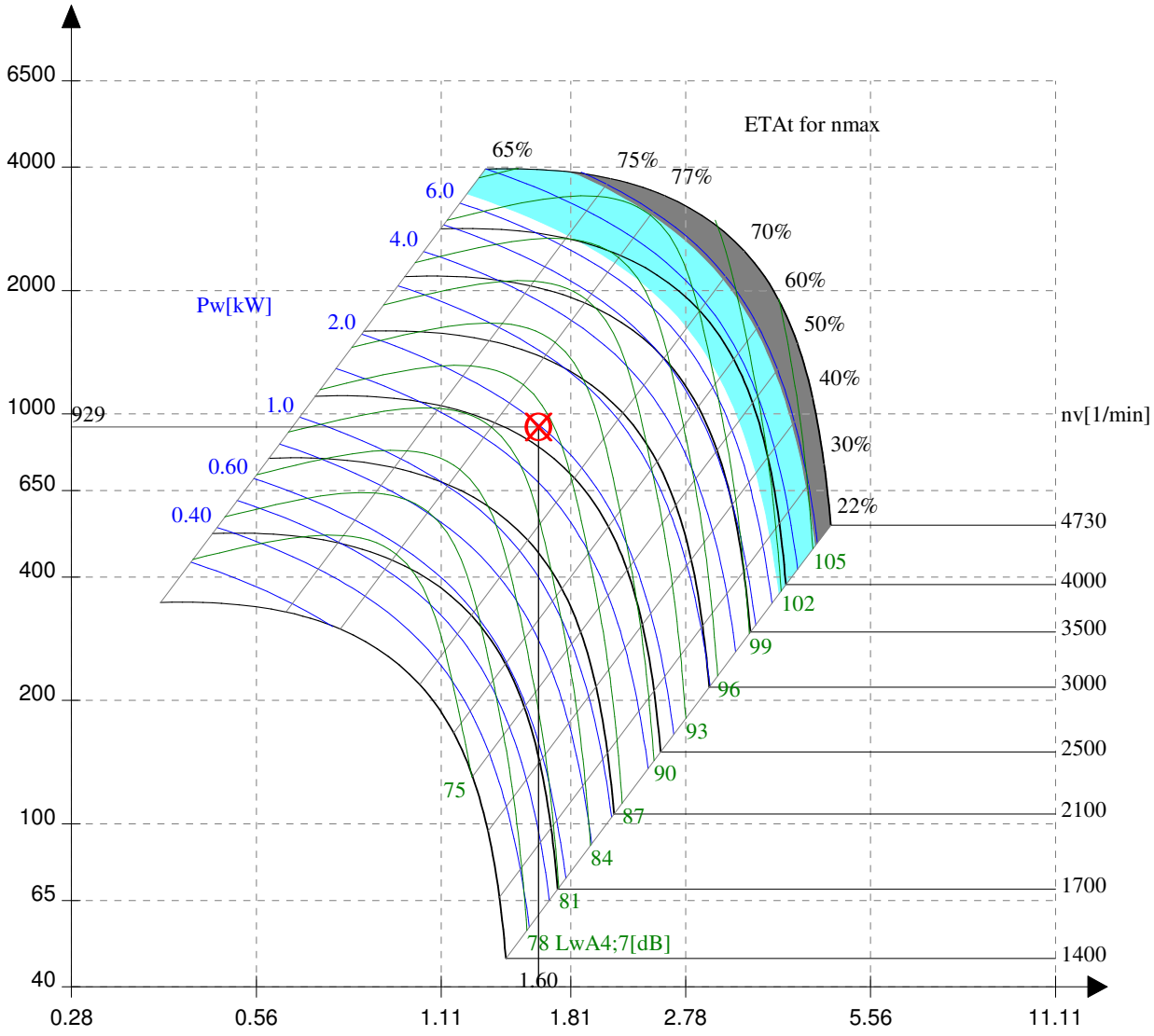
Date : **07.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0315

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 19- ... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B3/02 Supply**

Date : **07.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 11-0315

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	1.30	m3/s
Total pressure (dpt)	:	869	Pa
Dyn. pressure (pd2) at discharge	:	39	Pa
Static pressure (dpfa)	:	830	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2390	1/min *1.)*
Power on shaft (Pw)	:	1.49	kW
Efficiency (ETA_t)	:	76	%
Fan weight	:	24	kg
A-Sound power level $LwA_{4;7}$	:	83	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	90/76	dB *2.)*
unweighted	125 Hz	:	84/79	dB
Octave sound power level	250 Hz	:	81/78	dB
acc. to discharge/intake	500 Hz	:	80/82	dB
$LwOkt_{4/7}$ at	1000 Hz	:	77/77	dB
Octave band frequency	2000 Hz	:	73/74	dB
	4000 Hz	:	68/69	dB
	8000 Hz	:	60/62	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 90L-2

Size	:	90L-2	
Speed	:	2880	rpm
Power	:	2,2	kW
Voltage/Frequency	:	230/400/50	V/Hz
Electric current	:	7.9/4.55	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B3/02 Supply**

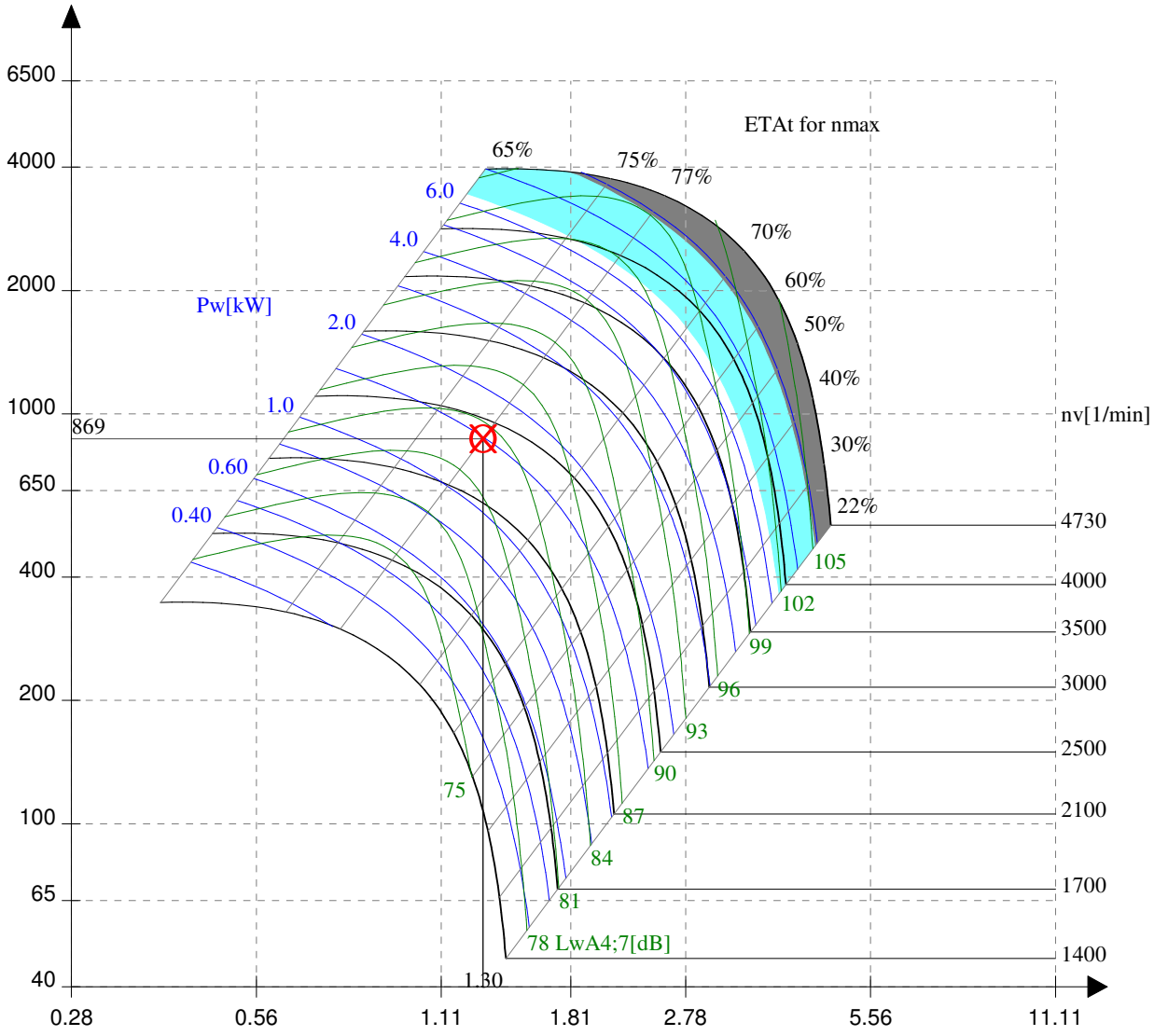
Date : **07.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0315

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 19- ... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/01 & AHU/B1/01 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 11-0315

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	1.90	m3/s
Total pressure (dpt)	:	1014	Pa
Dyn. pressure (pd2) at discharge	:	84	Pa
Static pressure (dpfa)	:	930	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2834	1/min *1.)*
Power on shaft (Pw)	:	2.62	kW
Efficiency (ETA_t)	:	73	%
Fan weight	:	24	kg
A-Sound power level $LwA_{4;7}$	:	89	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	92/79	dB *2.)*
unweighted	125 Hz	:	87/82	dB
Octave sound power level	250 Hz	:	85/81	dB
acc. to discharge/intake	500 Hz	:	86/88	dB
$LwOkt_{4/7}$ at	1000 Hz	:	84/84	dB
Octave band frequency	2000 Hz	:	80/81	dB
	4000 Hz	:	75/76	dB
	8000 Hz	:	66/68	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 112M-2

Size	:	112M-2	
Speed	:	2905	rpm
Power	:	4	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	7.8/4.5	A

GebhardtVentilatoren

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/01 & AHU/B1/01 Supply**

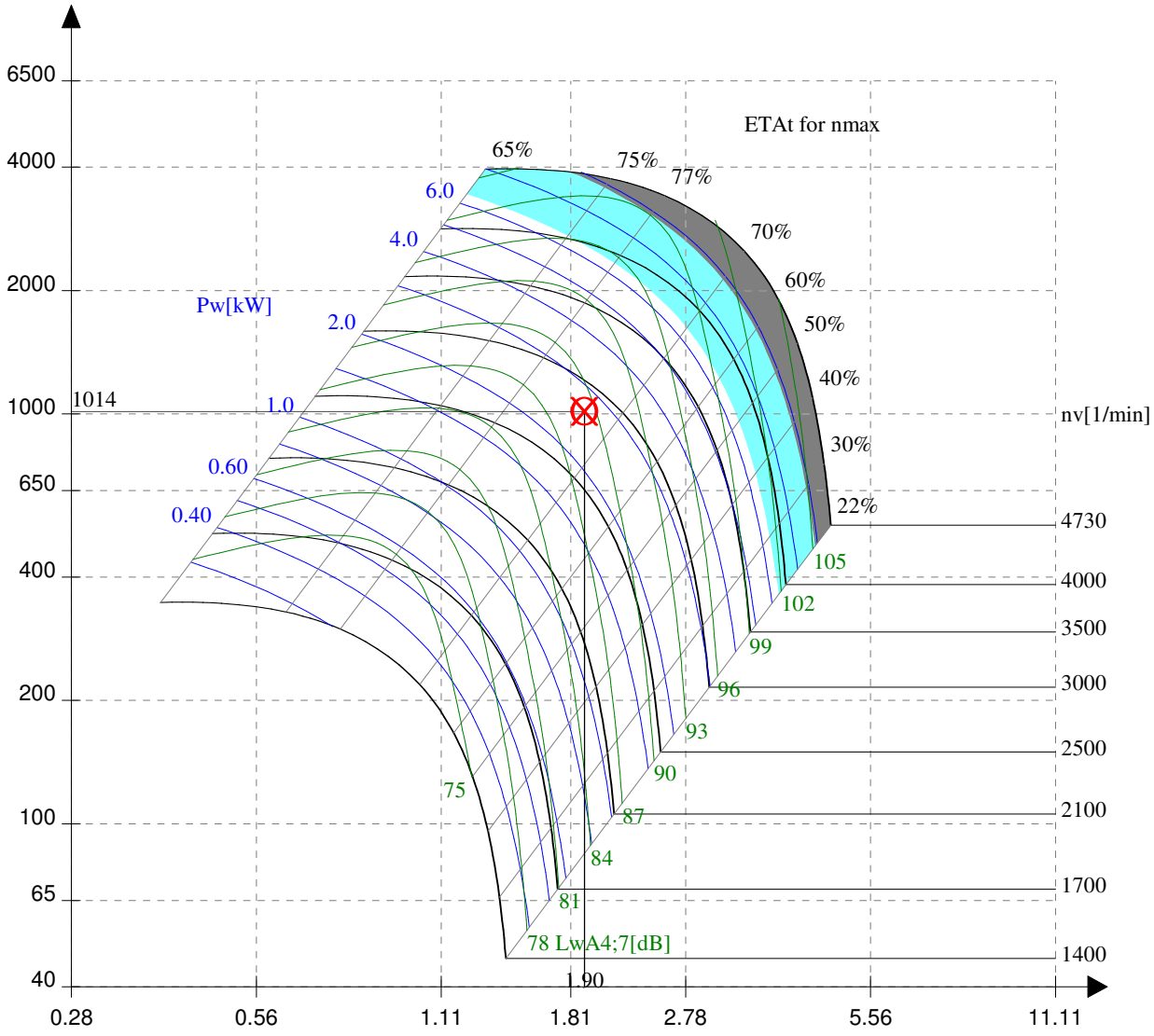
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0315

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 19- ... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/02 Supply**

Date : **07.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 11-0315

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	1.70	m3/s
Total pressure (dpt)	:	947	Pa
Dyn. pressure (pd2) at discharge	:	67	Pa
Static pressure (dpfa)	:	880	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2665	1/min *1.)*
Power on shaft (Pw)	:	2.16	kW
Efficiency (ETA_t)	:	75	%
Fan weight	:	24	kg
A-Sound power level $LwA_{4;7}$	:	87	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	94/80	dB *2.)*
unweighted	125 Hz	:	88/83	dB
Octave sound power level	250 Hz	:	85/82	dB
acc. to discharge/intake	500 Hz	:	84/86	dB
$LwOkt_{4/7}$ at	1000 Hz	:	81/81	dB
Octave band frequency	2000 Hz	:	77/78	dB
	4000 Hz	:	72/73	dB
	8000 Hz	:	64/66	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 112M-2

Size	:	112M-2	
Speed	:	2905	rpm
Power	:	4	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	7.8/4.5	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/02 Supply**

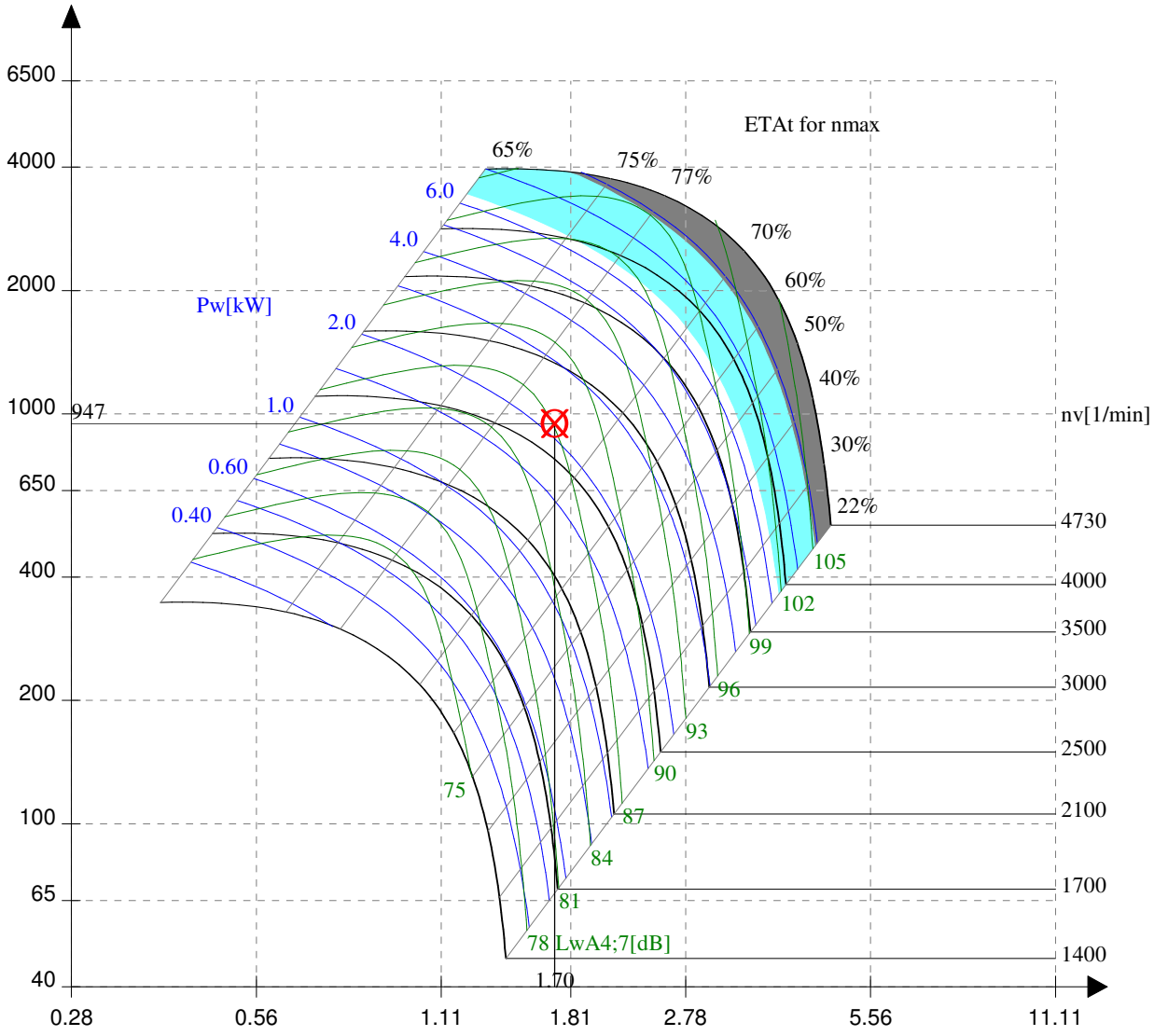
Date : **07.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0315

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 19- ... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/03 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0630

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	5.50	m3/s
Total pressure (dpt)	:	1440	Pa
Dyn. pressure (pd2) at discharge	:	45	Pa
Static pressure (dpfa)	:	1395	Pa
Pressure losses (pv) at intake	:	45	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1452	1/min *1.)*
Power on shaft (Pw)	:	9.84	kW
Efficiency (ETA_t)	:	80	%
Fan weight	:	149	kg
A-Sound power level $LwA_{4;7}$	:	88	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	95/81	dB *2.)*
unweighted	125 Hz	:	89/84	dB
Octave sound power level	250 Hz	:	86/83	dB
acc. to discharge/intake	500 Hz	:	85/87	dB
$LwOkt_{4/7}$ at	1000 Hz	:	82/82	dB
Octave band frequency	2000 Hz	:	78/79	dB
	4000 Hz	:	73/74	dB
	8000 Hz	:	65/67	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 160L-4

Size	:	160L-4
Speed	:	1460 rpm
Power	:	15 kW
Voltage/Frequency	:	400/690/50 V/Hz
Electric current	:	28.5/16.5 A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/03 Supply**

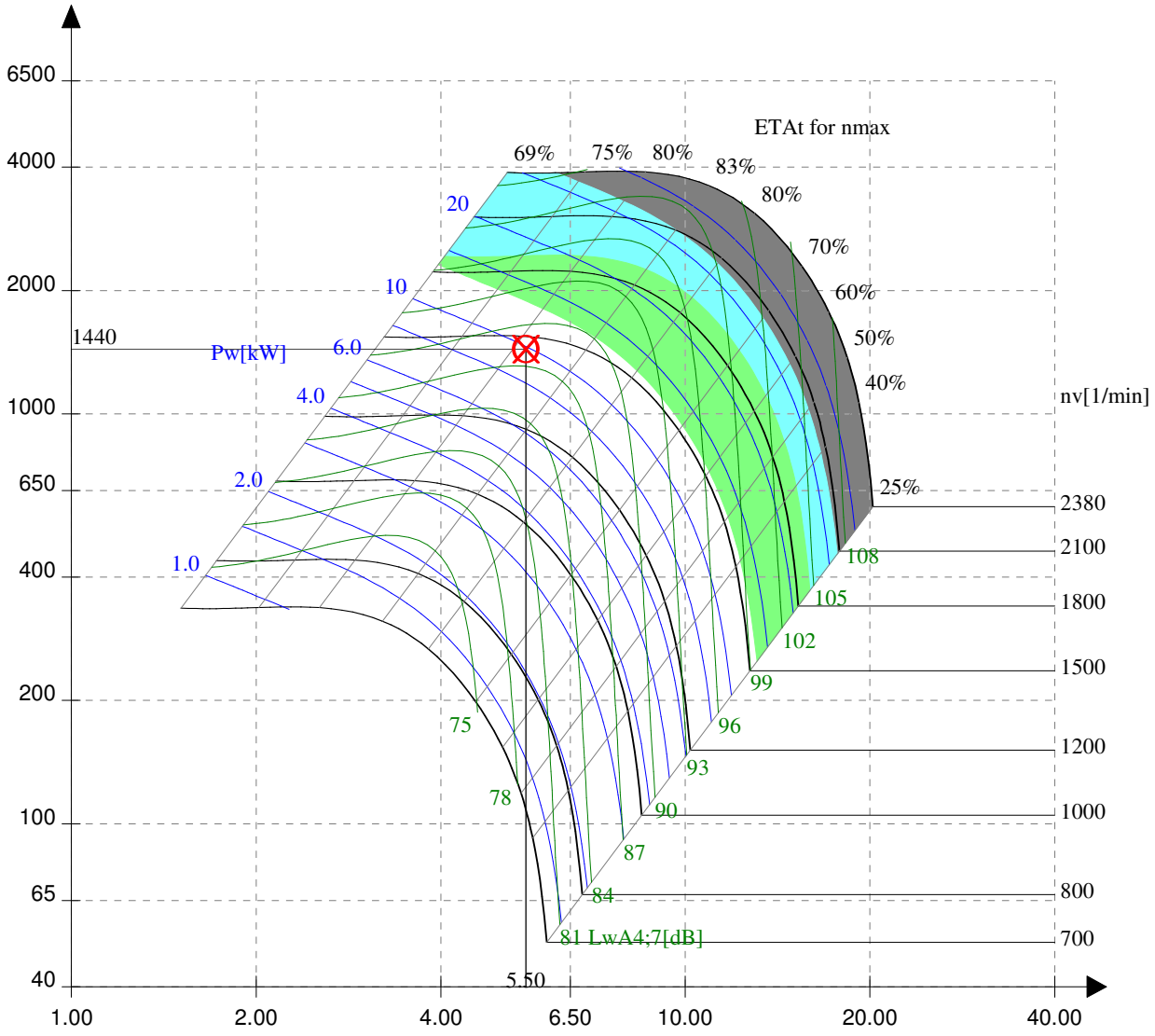
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0630

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only
RZR 13-/18- ... only
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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/03 Extract**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	4.00	m3/s
Total pressure (dpt)	:	818	Pa
Dyn. pressure (pd2) at discharge	:	59	Pa
Static pressure (dpfa)	:	759	Pa
Pressure losses (pv) at intake	:	59	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1513	1/min *1.)*
Power on shaft (Pw)	:	4.13	kW
Efficiency (ETA_t)	:	79	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	84	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	91/77	dB *2.)*
unweighted	125 Hz	:	85/80	dB
Octave sound power level	250 Hz	:	82/79	dB
acc. to discharge/intake	500 Hz	:	81/83	dB
$LwOkt_{4/7}$ at	1000 Hz	:	78/78	dB
Octave band frequency	2000 Hz	:	74/75	dB
	4000 Hz	:	69/70	dB
	8000 Hz	:	61/63	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132M-4

Size	:	132M-4	
Speed	:	1455	rpm
Power	:	7,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	15.2/8.8	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/03 Extract**

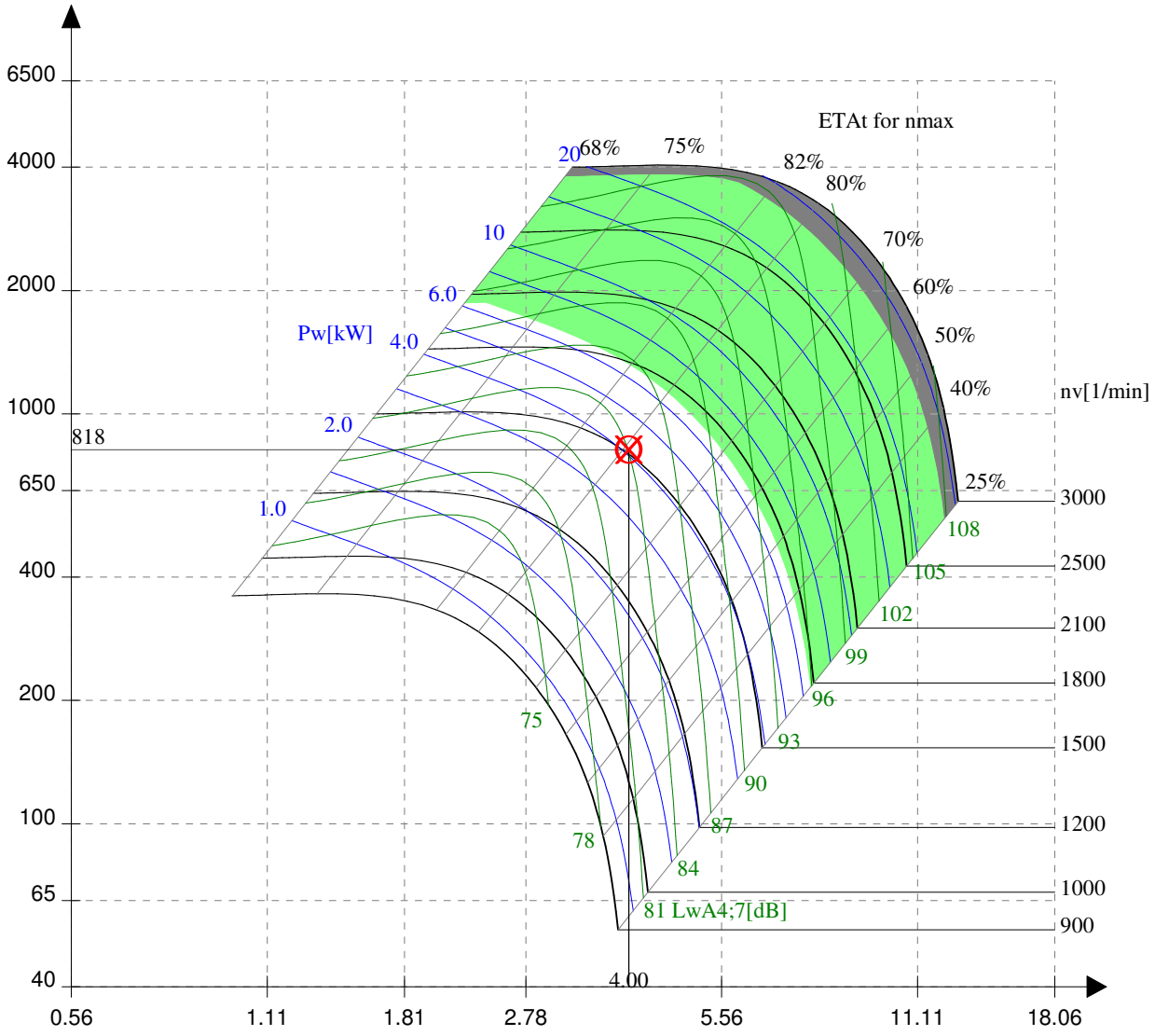
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/04 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	3.20	m3/s
Total pressure (dpt)	:	1288	Pa
Dyn. pressure (pd2) at discharge	:	38	Pa
Static pressure (dpfa)	:	1250	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1709	1/min *1.)*
Power on shaft (Pw)	:	5.17	kW
Efficiency (ETA_t)	:	80	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	85	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	92/78	dB *2.)*
unweighted	125 Hz	:	86/81	dB
Octave sound power level	250 Hz	:	83/80	dB
acc. to discharge/intake	500 Hz	:	82/84	dB
$LwOkt_{4/7}$ at	1000 Hz	:	79/79	dB
Octave band frequency	2000 Hz	:	75/76	dB
	4000 Hz	:	70/71	dB
	8000 Hz	:	62/64	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132M-4

Size	:	132M-4	
Speed	:	1455	rpm
Power	:	7,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	15.2/8.8	A

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Customer : **MJL**
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Item No : **AHU/B2/04 Supply**

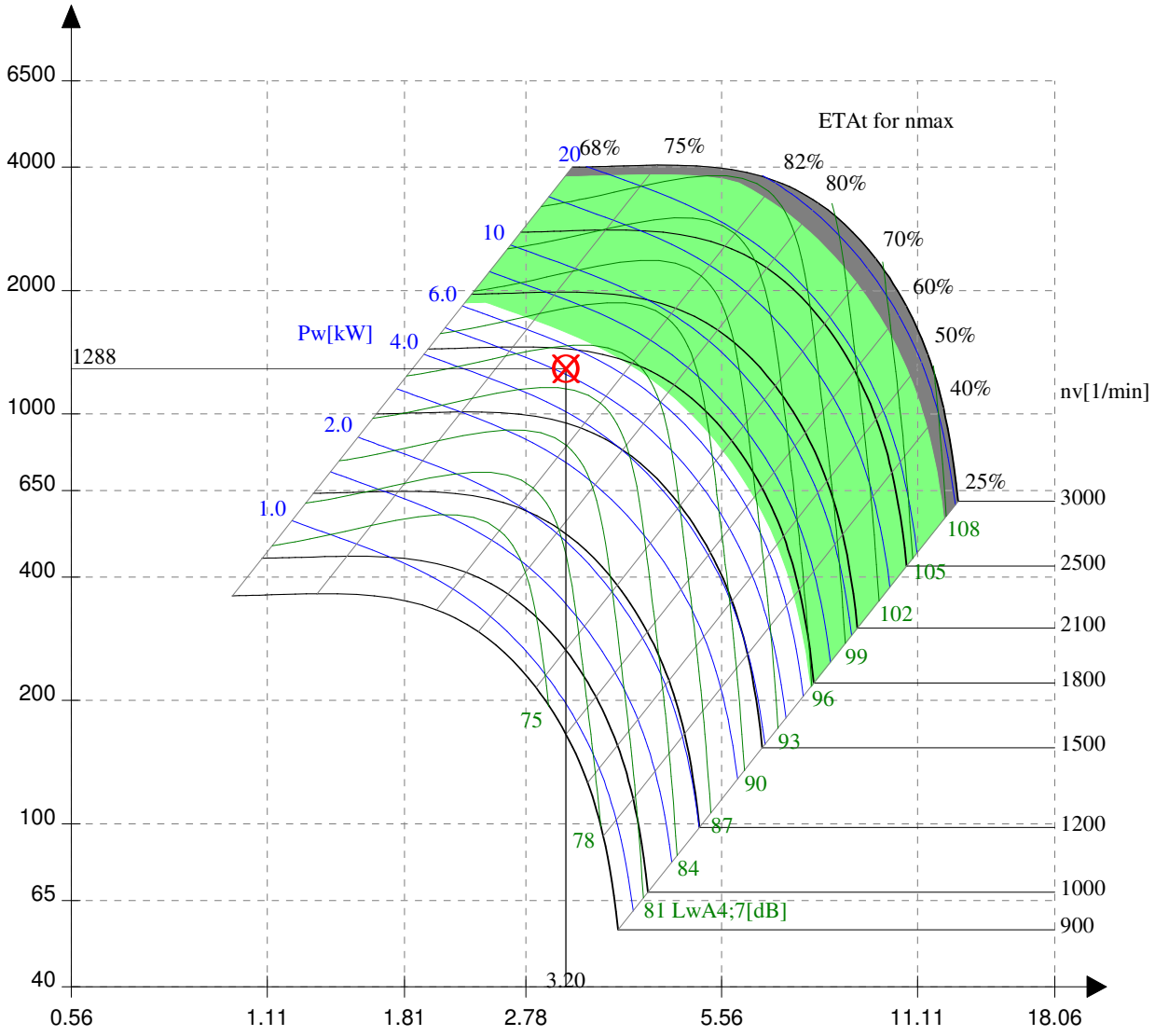
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/04 Extract**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0450

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	3.20	m3/s
Total pressure (dpt)	:	940	Pa
Dyn. pressure (pd2) at discharge	:	60	Pa
Static pressure (dpfa)	:	880	Pa
Pressure losses (pv) at intake	:	60	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1800	1/min *1.)*
Power on shaft (Pw)	:	3.78	kW
Efficiency (ETA_t)	:	80	%
Fan weight	:	73	kg
A-Sound power level $LwA_{4;7}$	:	85	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	92/78	dB *2.)*
unweighted	125 Hz	:	86/81	dB
Octave sound power level	250 Hz	:	83/80	dB
acc. to discharge/intake	500 Hz	:	82/84	dB
$LwOkt_{4/7}$ at	1000 Hz	:	79/79	dB
Octave band frequency	2000 Hz	:	75/76	dB
	4000 Hz	:	70/71	dB
	8000 Hz	:	62/64	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132S-4

Size	:	132S-4	
Speed	:	1455	rpm
Power	:	5,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	11.4/6.6	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/B2/04 Extract**

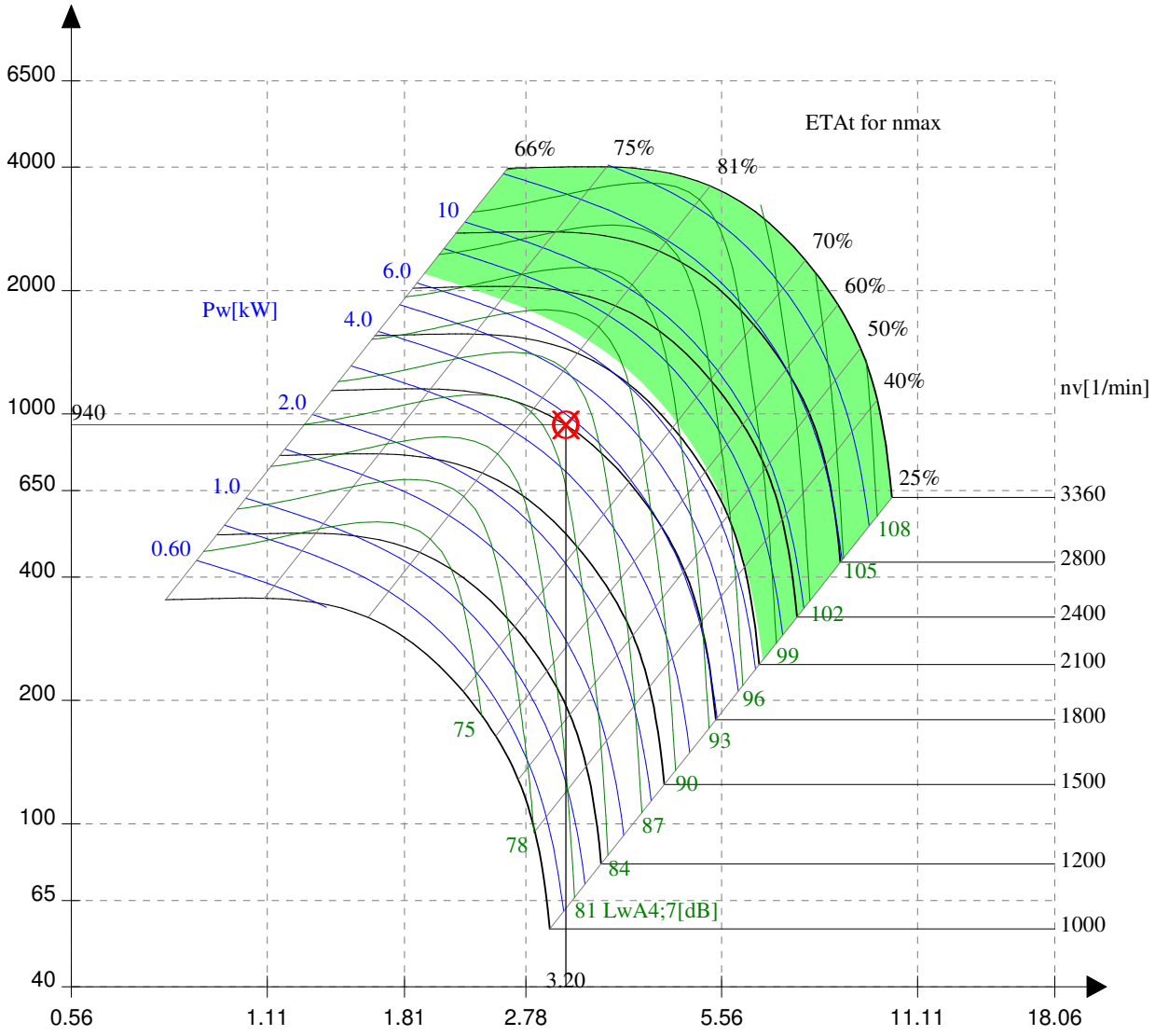
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0450

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/00/01 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 11-0315

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	1.50	m3/s
Total pressure (dpt)	:	1374	Pa
Dyn. pressure (pd2) at discharge	:	52	Pa
Static pressure (dpfa)	:	1322	Pa
Pressure losses (pv) at intake	:	52	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2948	1/min *1.)*
Power on shaft (Pw)	:	2.71	kW
Efficiency (ETA_t)	:	76	%
Fan weight	:	24	kg
A-Sound power level $LwA_{4;7}$	:	88	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	95/81	dB *2.)*
unweighted	125 Hz	:	89/84	dB
Octave sound power level	250 Hz	:	86/83	dB
acc. to discharge/intake	500 Hz	:	85/87	dB
$LwOkt_{4/7}$ at	1000 Hz	:	82/82	dB
Octave band frequency	2000 Hz	:	78/79	dB
	4000 Hz	:	73/74	dB
	8000 Hz	:	65/67	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 112M-2

Size	:	112M-2	
Speed	:	2905	rpm
Power	:	4	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	7.8/4.5	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/00/01 Supply**

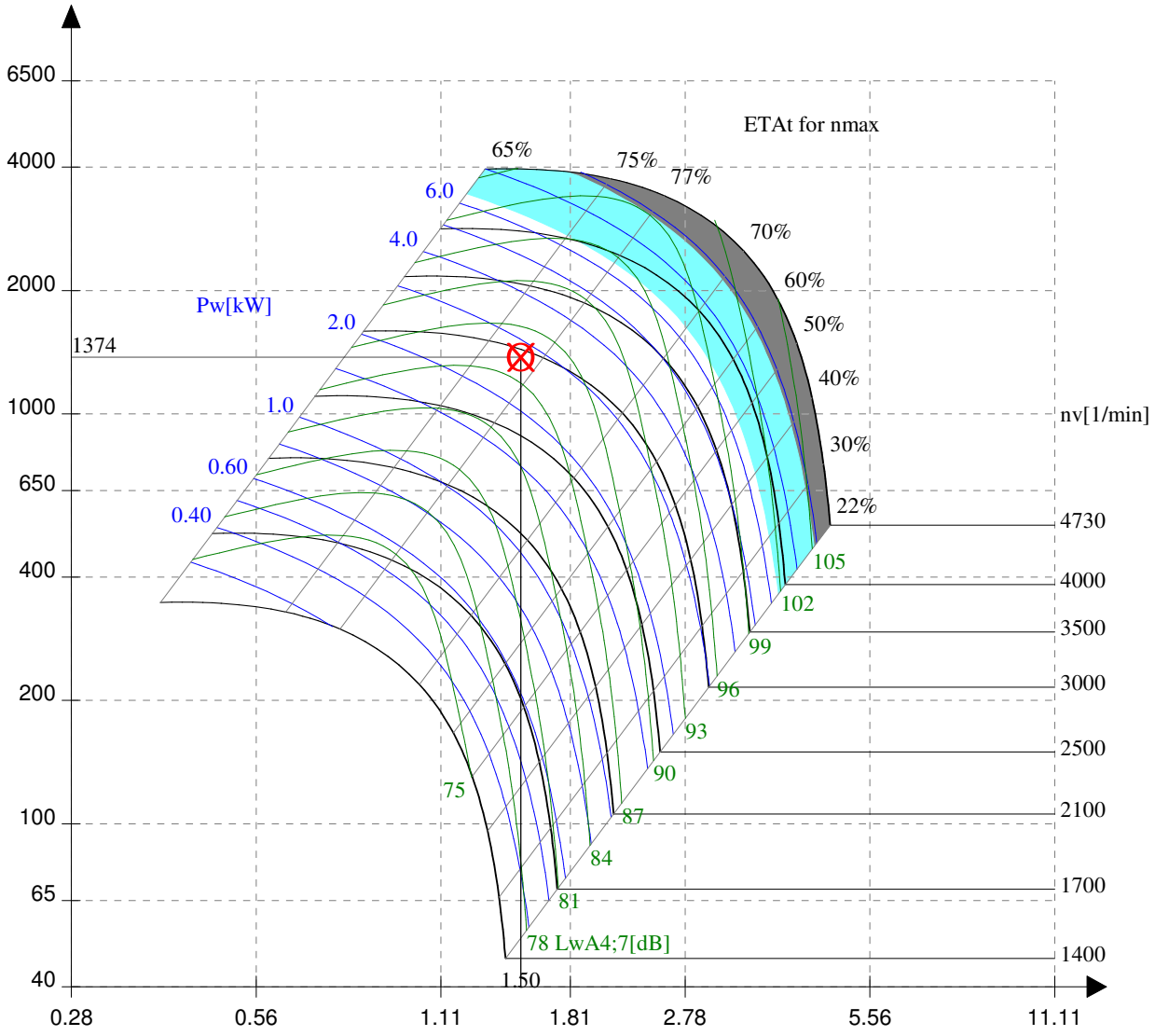
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0315

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 19- ... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/00/01 Extract**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 11-0315

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	1.50	m3/s
Total pressure (dpt)	:	854	Pa
Dyn. pressure (pd2) at discharge	:	52	Pa
Static pressure (dpfa)	:	802	Pa
Pressure losses (pv) at intake	:	52	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2471	1/min *1.)*
Power on shaft (Pw)	:	1.70	kW
Efficiency (ETA_t)	:	75	%
Fan weight	:	24	kg
A-Sound power level $LwA_{4;7}$	:	85	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	92/78	dB *2.)*
unweighted	125 Hz	:	86/81	dB
Octave sound power level	250 Hz	:	83/80	dB
acc. to discharge/intake	500 Hz	:	82/84	dB
$LwOkt_{4/7}$ at	1000 Hz	:	79/79	dB
Octave band frequency	2000 Hz	:	75/76	dB
	4000 Hz	:	70/71	dB
	8000 Hz	:	62/64	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 100L-2

Size	:	100L-2	
Speed	:	2890	rpm
Power	:	3	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	6.1/3.5	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/00/01 Extract**

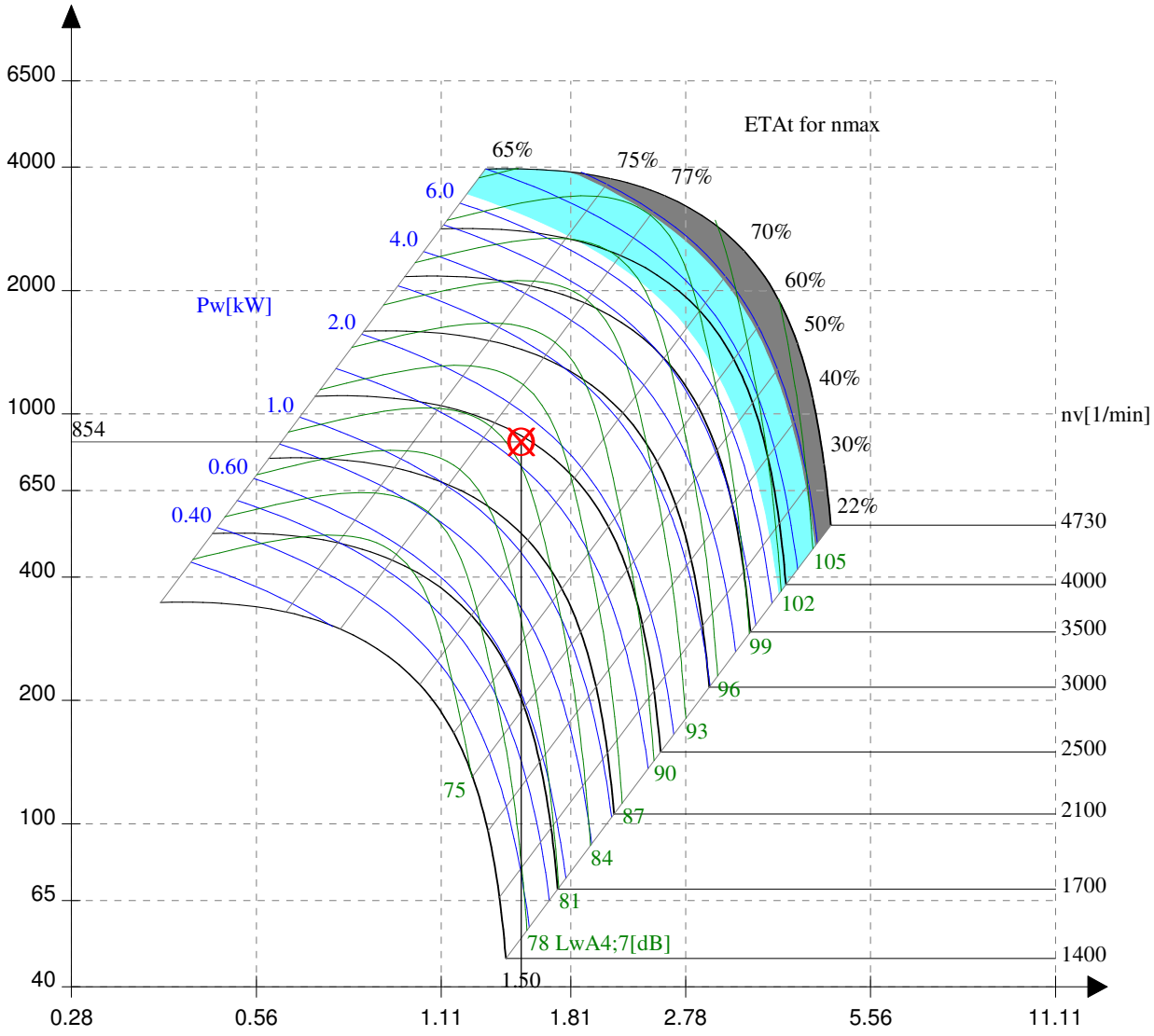
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0315

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 19- ... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/01/01 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 11-0225

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	0.50	m3/s
Total pressure (dpt)	:	692	Pa
Dyn. pressure (pd2) at discharge	:	22	Pa
Static pressure (dpfa)	:	670	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2879	1/min *1.)*
Power on shaft (Pw)	:	0.49	kW
Efficiency (ETA_t)	:	70	%
Fan weight	:	13	kg
A-Sound power level $LwA_{4;7}$	:	77	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	84/70	dB *2.)*
unweighted	125 Hz	:	82/77	dB
Octave sound power level	250 Hz	:	78/75	dB
acc. to discharge/intake	500 Hz	:	76/75	dB
$LwOkt_{4/7}$ at	1000 Hz	:	70/72	dB
Octave band frequency	2000 Hz	:	66/68	dB
	4000 Hz	:	59/63	dB
	8000 Hz	:	48/55	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 80b-2

Size	:	80b-2	
Speed	:	2845	rpm
Power	:	1,1	kW
Voltage/Frequency	:	230/400/50	V/Hz
Electric current	:	4.2/2.4	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/01/01 Supply**

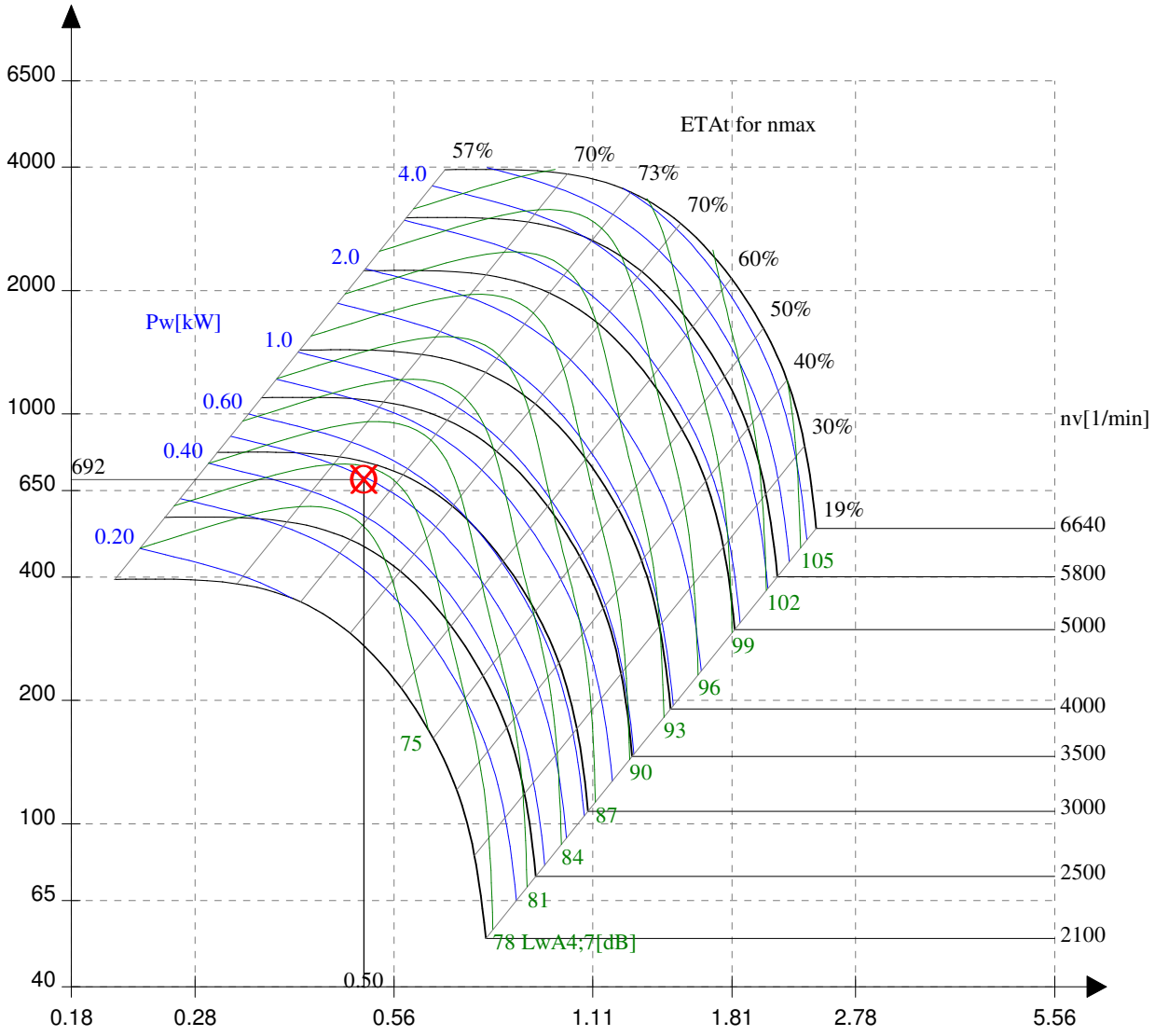
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0225

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/01/01 Extract**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 11-0225

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	0.50	m3/s
Total pressure (dpt)	:	735	Pa
Dyn. pressure (pd2) at discharge	:	22	Pa
Static pressure (dpfa)	:	712	Pa
Pressure losses (pv) at intake	:	22	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2950	1/min *1.)*
Power on shaft (Pw)	:	0.52	kW
Efficiency (ETA_t)	:	70	%
Fan weight	:	13	kg
A-Sound power level $LwA_{4;7}$	:	78	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	85/71	dB *2.)*
unweighted	125 Hz	:	83/78	dB
Octave sound power level	250 Hz	:	79/76	dB
acc. to discharge/intake	500 Hz	:	77/76	dB
$LwOkt_{4/7}$ at	1000 Hz	:	71/73	dB
Octave band frequency	2000 Hz	:	67/69	dB
	4000 Hz	:	60/64	dB
	8000 Hz	:	49/56	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 80b-2

Size	:	80b-2	
Speed	:	2845	rpm
Power	:	1,1	kW
Voltage/Frequency	:	230/400/50	V/Hz
Electric current	:	4.2/2.4	A

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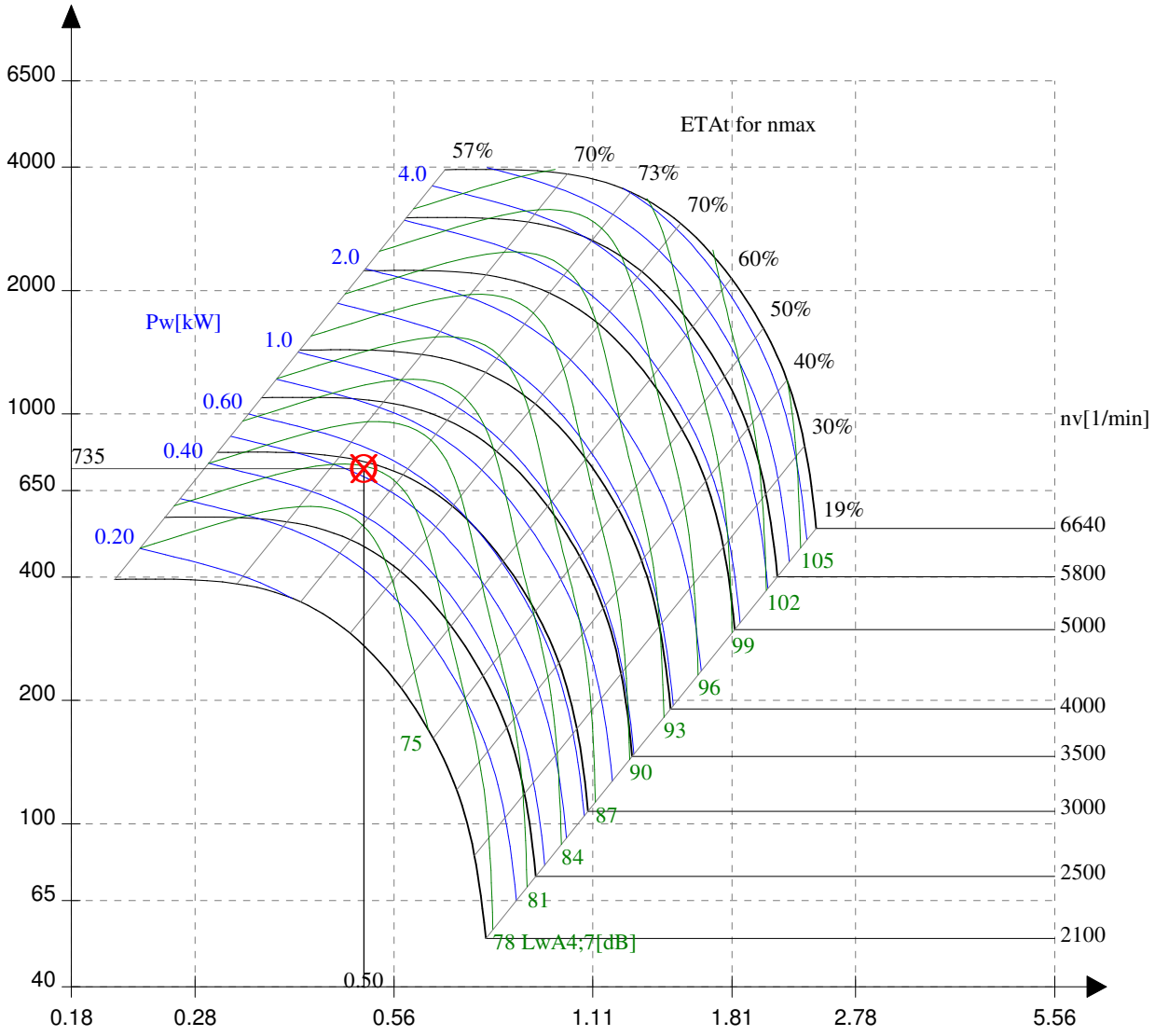
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0225

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

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Customer : **MJL**
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Item No : **AHU/01/02 Supply**

Date : **06.06.2012**
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Page : **1**

Technical data

... for fan: RZR 11-0225

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	0.60	m3/s
Total pressure (dpt)	:	732	Pa
Dyn. pressure (pd2) at discharge	:	32	Pa
Static pressure (dpfa)	:	700	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	3073	1/min *1.)*
Power on shaft (Pw)	:	0.62	kW
Efficiency (ETA_t)	:	71	%
Fan weight	:	13	kg
A-Sound power level $LwA_{4;7}$	:	79	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	86/72	dB *2.)*
unweighted	125 Hz	:	84/79	dB
Octave sound power level	250 Hz	:	80/77	dB
acc. to discharge/intake	500 Hz	:	78/77	dB
$LwOkt_{4/7}$ at	1000 Hz	:	72/74	dB
Octave band frequency	2000 Hz	:	68/70	dB
	4000 Hz	:	61/65	dB
	8000 Hz	:	50/57	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 80b-2

Size	:	80b-2	
Speed	:	2845	rpm
Power	:	1,1	kW
Voltage/Frequency	:	230/400/50	V/Hz
Electric current	:	4.2/2.4	A

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Item No : **AHU/01/02 Supply**

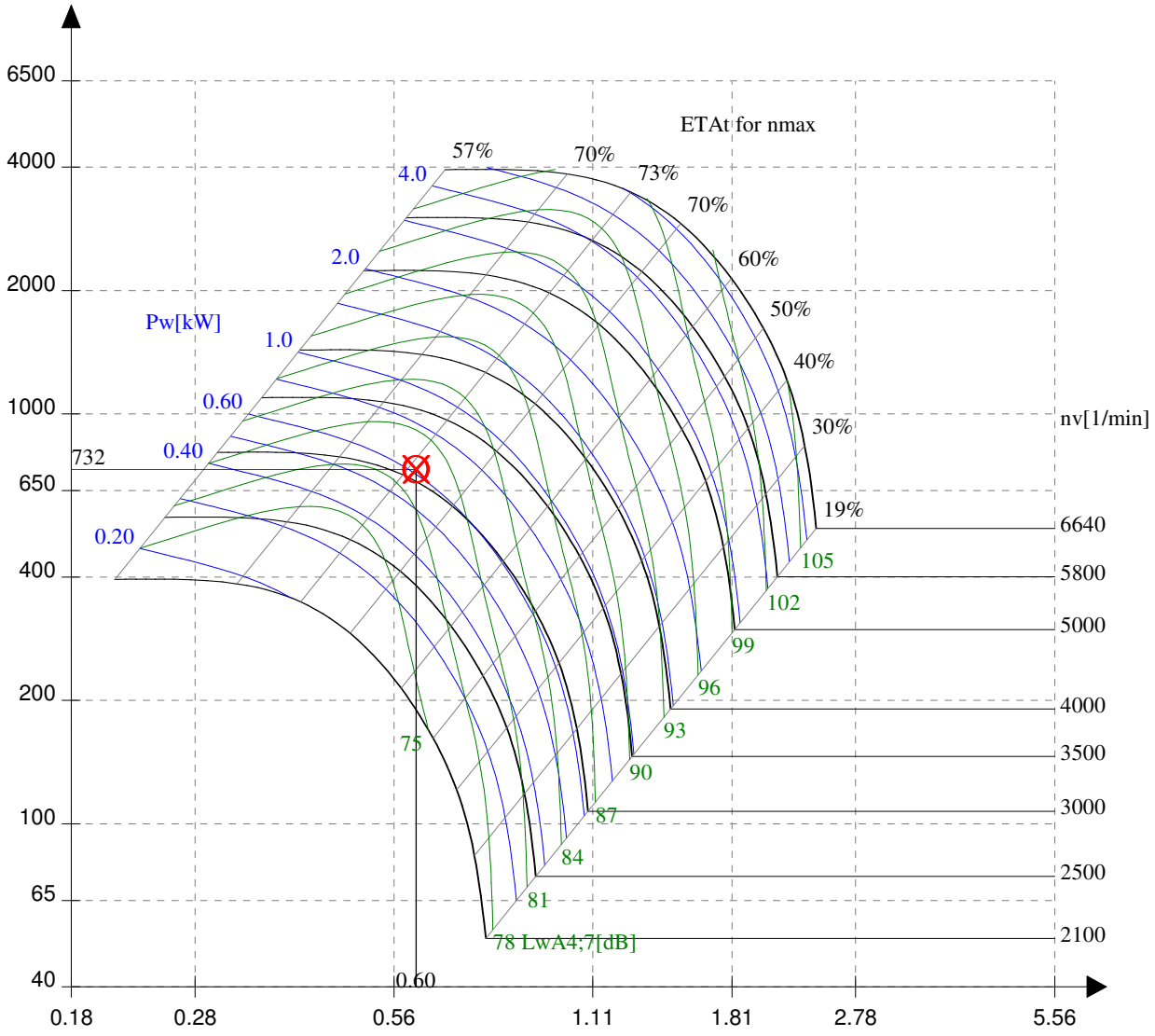
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 11-0225

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

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Date : **06.06.2012**
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Page : **1**

Technical data

... for fan: RZR 11-0225

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	0.60	m3/s
Total pressure (dpt)	:	765	Pa
Dyn. pressure (pd2) at discharge	:	32	Pa
Static pressure (dpfa)	:	732	Pa
Pressure losses (pv) at intake	:	32	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	3121	1/min *1.)*
Power on shaft (Pw)	:	0.64	kW
Efficiency (ETA_t)	:	71	%
Fan weight	:	13	kg
A-Sound power level $LwA_{4;7}$	:	80	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	87/73	dB *2.)*
unweighted	125 Hz	:	85/80	dB
Octave sound power level	250 Hz	:	81/78	dB
acc. to discharge/intake	500 Hz	:	79/78	dB
$LwOkt_{4/7}$ at	1000 Hz	:	73/75	dB
Octave band frequency	2000 Hz	:	69/71	dB
	4000 Hz	:	62/66	dB
	8000 Hz	:	51/58	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 80b-2

Size	:	80b-2	
Speed	:	2845	rpm
Power	:	1,1	kW
Voltage/Frequency	:	230/400/50	V/Hz
Electric current	:	4.2/2.4	A

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Date : **06.06.2012**
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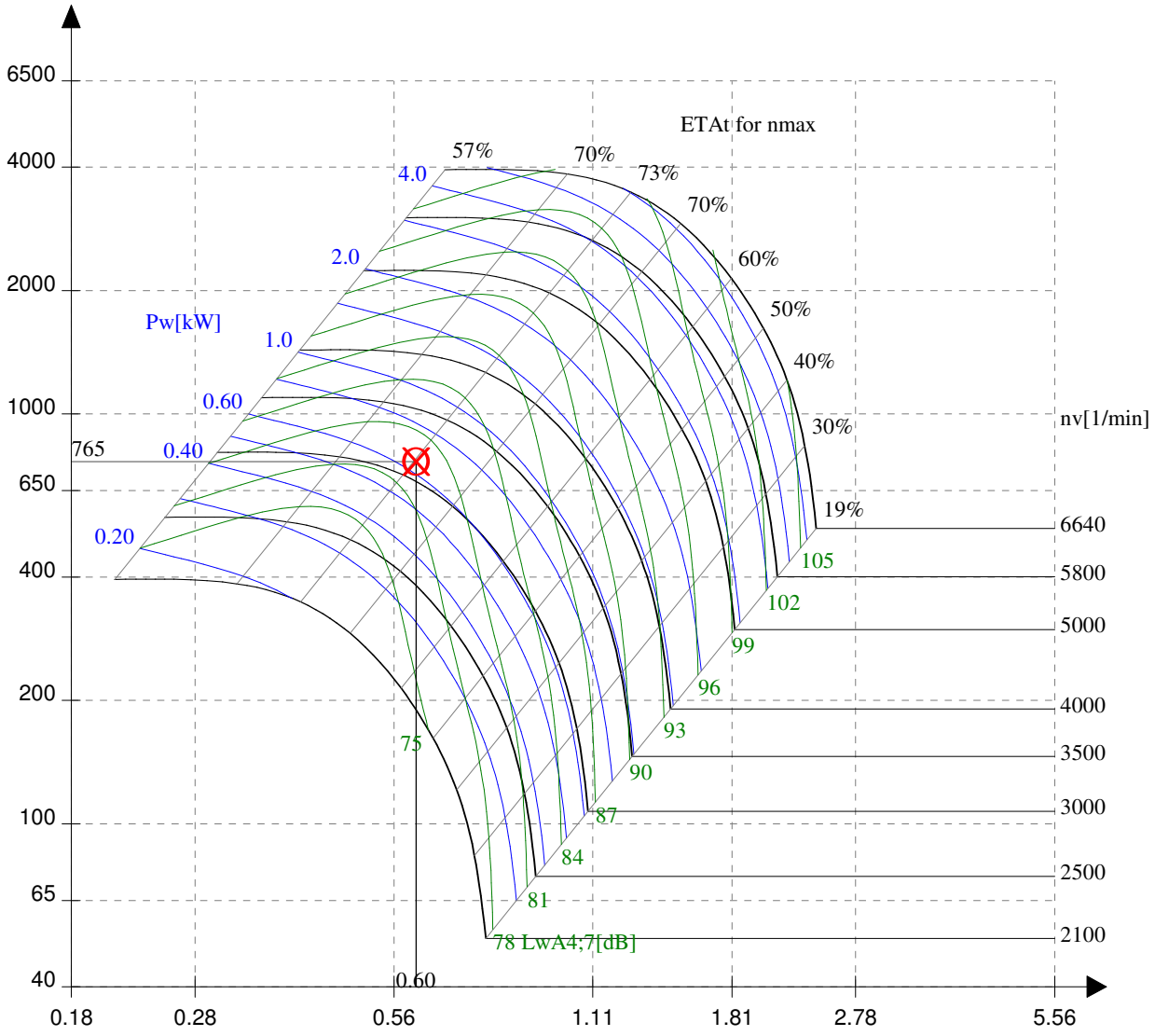
Page : **2**

Fan curves: RZR 11-0225

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

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Customer : **MJL**
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Item No : **AHU/02/01 Supply**

Date : **07.06.2012**
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Page : **1**

Technical data

... for fan: RZR 11-0315

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	1.80	m3/s
Total pressure (dpt)	:	975	Pa
Dyn. pressure (pd2) at discharge	:	75	Pa
Static pressure (dpfa)	:	900	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2745	1/min *1.)*
Power on shaft (Pw)	:	2.37	kW
Efficiency (ETA_t)	:	74	%
Fan weight	:	24	kg
A-Sound power level $LwA_{4;7}$	:	88	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	91/78	dB *2.)*
unweighted	125 Hz	:	86/81	dB
Octave sound power level	250 Hz	:	84/80	dB
acc. to discharge/intake	500 Hz	:	85/87	dB
$LwOkt_{4/7}$ at	1000 Hz	:	83/83	dB
Octave band frequency	2000 Hz	:	79/80	dB
	4000 Hz	:	74/75	dB
	8000 Hz	:	65/67	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 112M-2

Size	:	112M-2	
Speed	:	2905	rpm
Power	:	4	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	7.8/4.5	A

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Date : **07.06.2012**
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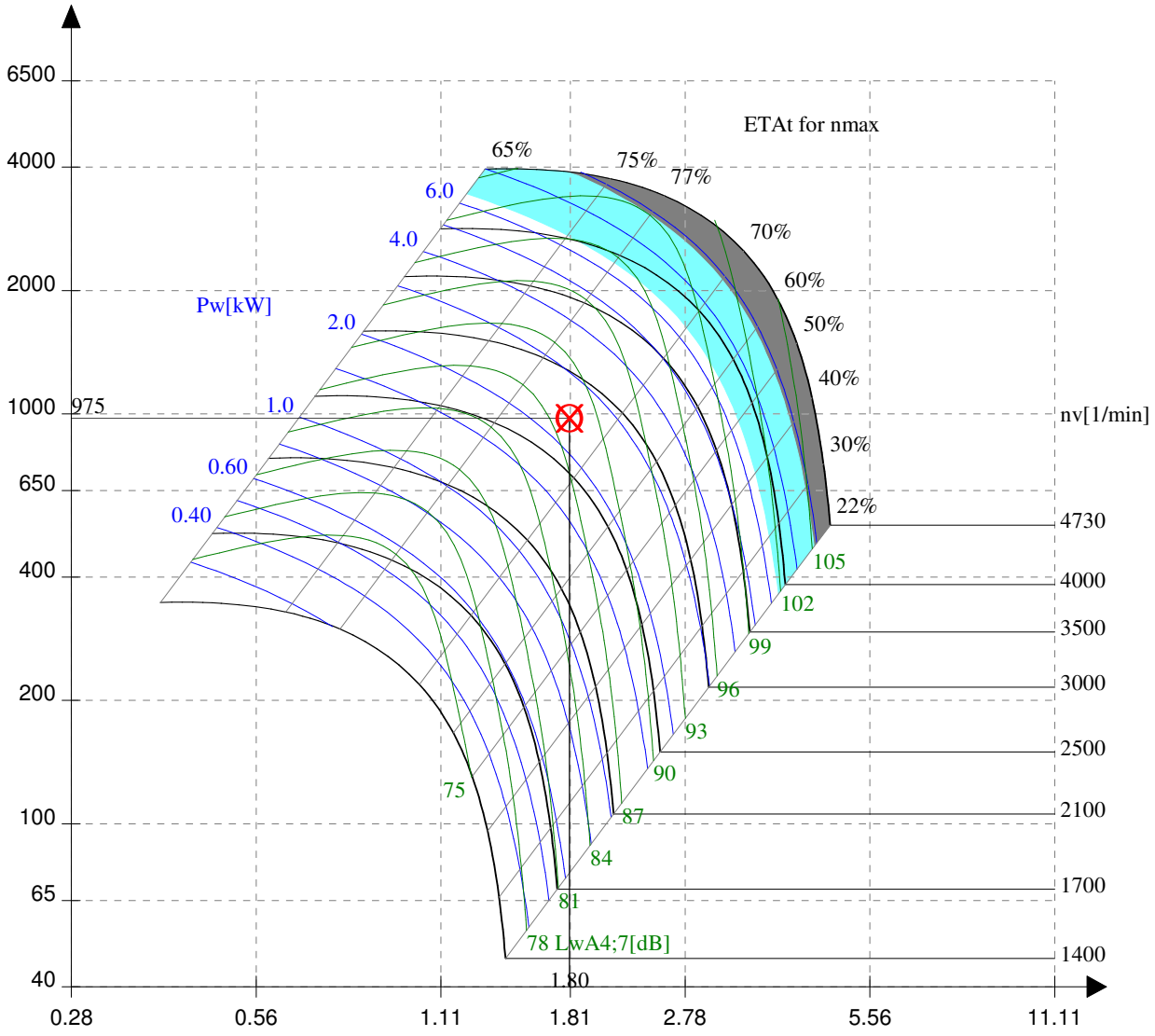
Page : **2**

Fan curves: RZR 11-0315

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 19- ... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/01 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B		
Flow rate (V)	:	5.20	m3/s	
Total pressure (dpt)	:	1310	Pa	
Dyn. pressure (pd2) at discharge	:	100		Pa
Static pressure (dpfa)	:	1210	Pa	
Pressure losses (pv) at intake	:	0	Pa	
Reference density (Rho1)	:	1.20	kg/m³	
Temperature t of the gas (t)	:	20	°C	
Speed (n_V)	:	1933	1/min *1.)*	
Power on shaft (Pw)	:	8.62	kW	
Efficiency (ETA_t)	:	79	%	
Fan weight	:	94	kg	
A-Sound power level $LwA_{4;7}$	:	90	dB	

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	97/83	dB *2.)*
unweighted	125 Hz	:	91/86	dB
Octave sound power level	250 Hz	:	88/85	dB
acc. to discharge/intake	500 Hz	:	87/89	dB
$LwOkt_{4/7}$ at	1000 Hz	:	84/84	dB
Octave band frequency	2000 Hz	:	80/81	dB
	4000 Hz	:	75/76	dB
	8000 Hz	:	67/69	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 160L-4

Size	:	160L-4	
Speed	:	1460	rpm
Power	:	15	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	28.5/16.5	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/01 Supply**

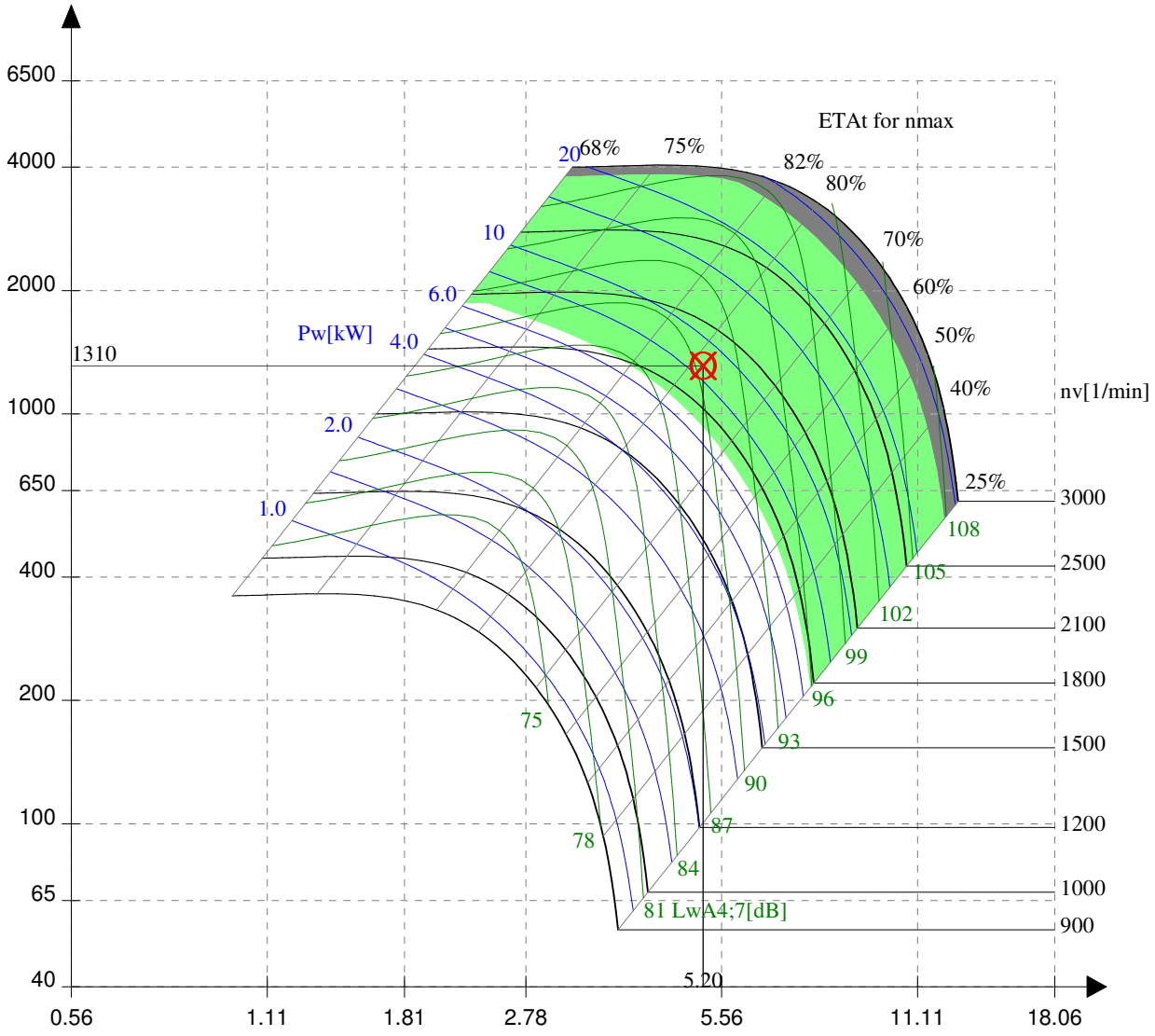
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

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Customer : **MJL**
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Item No : **AHU/05/01 Extract**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B		
Flow rate (V)	:	5.20	m3/s	
Total pressure (dpt)	:	960	Pa	
Dyn. pressure (pd2) at discharge	:	100		Pa
Static pressure (dpfa)	:	860	Pa	
Pressure losses (pv) at intake	:	100	Pa	
Reference density (Rho1)	:	1.20	kg/m³	
Temperature t of the gas (t)	:	20	°C	
Speed (n_V)	:	1764	1/min *1.)*	
Power on shaft (Pw)	:	6.65	kW	
Efficiency (ETA_t)	:	75	%	
Fan weight	:	94	kg	
A-Sound power level $LwA_{4;7}$	:	90	dB	

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	93/80	dB *2.)*
unweighted	125 Hz	:	88/83	dB
Octave sound power level	250 Hz	:	86/82	dB
acc. to discharge/intake	500 Hz	:	87/89	dB
$LwOkt_{4/7}$ at	1000 Hz	:	85/85	dB
Octave band frequency	2000 Hz	:	81/82	dB
	4000 Hz	:	76/77	dB
	8000 Hz	:	67/69	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 160M-4

Size	:	160M-4	
Speed	:	1460	rpm
Power	:	11	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	21.5/12.4	A

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Item No : **AHU/05/01 Extract**

Date : **06.06.2012**
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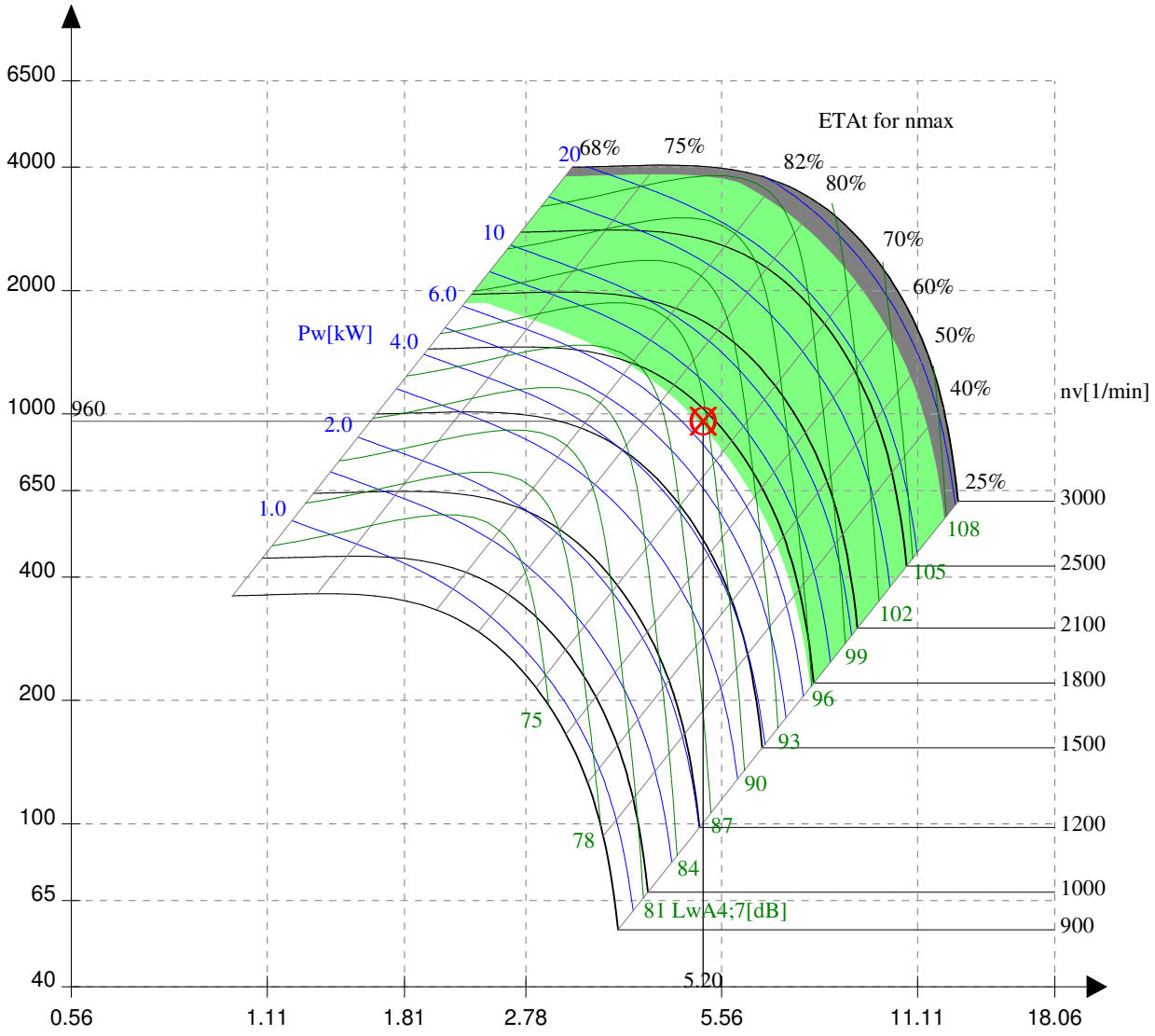
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

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Customer : **MJL**
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Item No : **AHU/05/02 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0400

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	3.10	m3/s
Total pressure (dpt)	:	1299	Pa
Dyn. pressure (pd2) at discharge	:	89	Pa
Static pressure (dpfa)	:	1210	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2401	1/min *1.)*
Power on shaft (Pw)	:	5.09	kW
Efficiency (ETA_t)	:	79	%
Fan weight	:	61	kg
A-Sound power level $LwA_{4;7}$	:	90	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	97/83	dB *2.)*
unweighted	125 Hz	:	91/86	dB
Octave sound power level	250 Hz	:	88/85	dB
acc. to discharge/intake	500 Hz	:	87/89	dB
$LwOkt_{4/7}$ at	1000 Hz	:	84/84	dB
Octave band frequency	2000 Hz	:	80/81	dB
	4000 Hz	:	75/76	dB
	8000 Hz	:	67/69	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132Sb-2

Size	:	132Sb-2	
Speed	:	2930	rpm
Power	:	7,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	13.8/8	A

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Item No : **AHU/05/02 Supply**

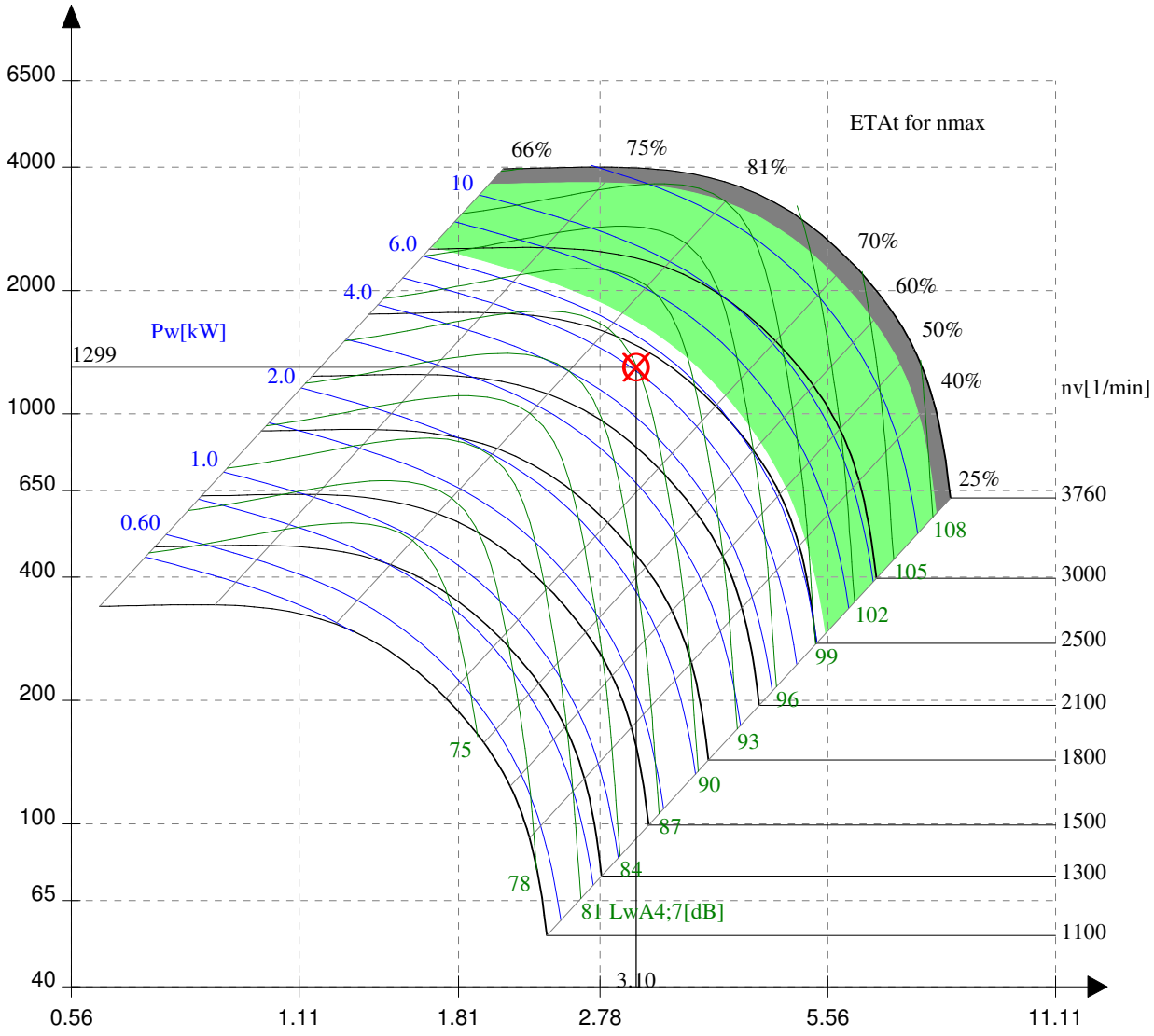
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0400

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

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Page : **1**

Technical data

... for fan: RZR 11-0400

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	3.10	m3/s
Total pressure (dpt)	:	929	Pa
Dyn. pressure (pd2) at discharge	:	89	Pa
Static pressure (dpfa)	:	839	Pa
Pressure losses (pv) at intake	:	89	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	2167	1/min *1.)*
Power on shaft (Pw)	:	3.83	kW
Efficiency (ETA_t)	:	75	%
Fan weight	:	43	kg
A-Sound power level $LwA_{4;7}$	:	89	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	92/79	dB *2.)*
unweighted	125 Hz	:	87/82	dB
Octave sound power level	250 Hz	:	85/81	dB
acc. to discharge/intake	500 Hz	:	86/88	dB
$LwOkt_{4/7}$ at	1000 Hz	:	84/84	dB
Octave band frequency	2000 Hz	:	80/81	dB
	4000 Hz	:	75/76	dB
	8000 Hz	:	66/68	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132S-4

Size	:	132S-4	
Speed	:	1455	rpm
Power	:	5,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	11.4/6.6	A

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Date : **06.06.2012**
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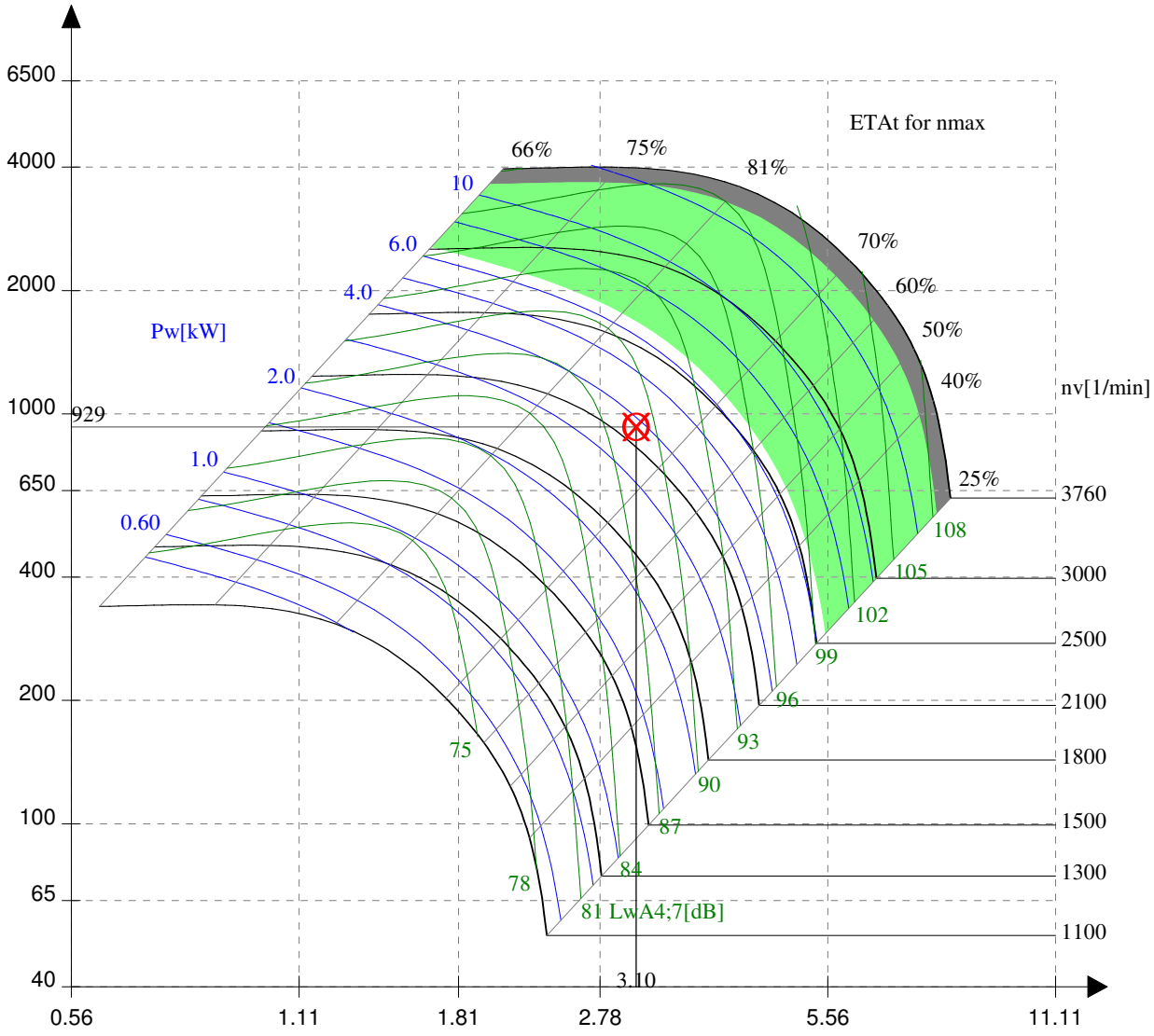
Page : **2**

Fan curves: RZR 11-0400

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/03 & AHU/05/07 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	4.20	m3/s
Total pressure (dpt)	:	1375	Pa
Dyn. pressure (pd2) at discharge	:	65	Pa
Static pressure (dpfa)	:	1310	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1839	1/min *1.)*
Power on shaft (Pw)	:	7.08	kW
Efficiency (ETA_t)	:	82	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	87	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	94/80	dB *2.)*
unweighted	125 Hz	:	88/83	dB
Octave sound power level	250 Hz	:	85/82	dB
acc. to discharge/intake	500 Hz	:	84/86	dB
$LwOkt_{4/7}$ at	1000 Hz	:	81/81	dB
Octave band frequency	2000 Hz	:	77/78	dB
	4000 Hz	:	72/73	dB
	8000 Hz	:	64/66	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 160M-4

Size	:	160M-4	
Speed	:	1460	rpm
Power	:	11	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	21.5/12.4	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/03 & AHU/05/07 Supply**

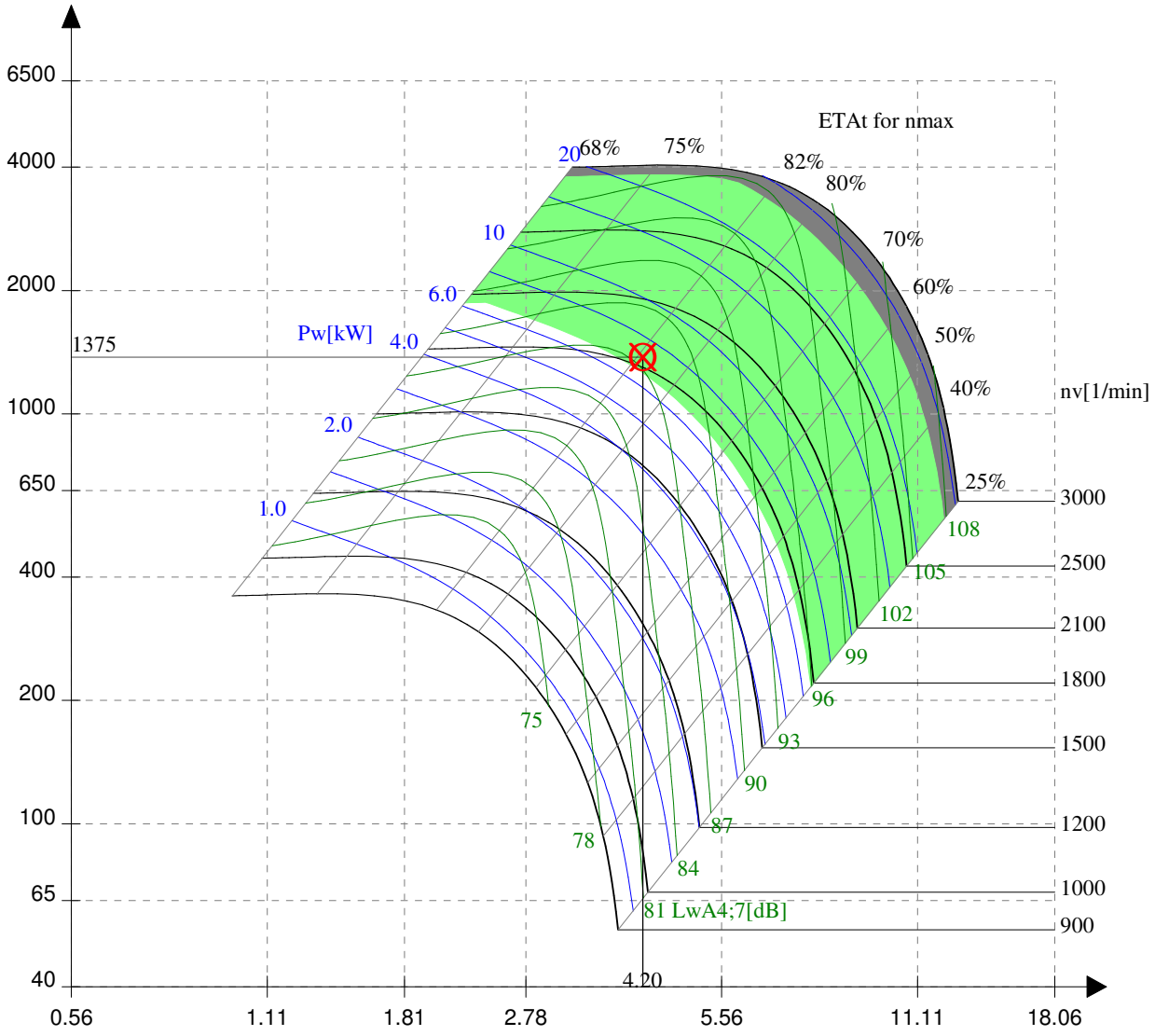
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

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Customer : **MJL**
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Item No : **AHU/05/03 & AHU/05/07 Extract**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	4.20	m3/s
Total pressure (dpt)	:	960	Pa
Dyn. pressure (pd2) at discharge	:	65	Pa
Static pressure (dpfa)	:	895	Pa
Pressure losses (pv) at intake	:	65	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1621	1/min *1.)*
Power on shaft (Pw)	:	5.05	kW
Efficiency (ETA_t)	:	80	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	86	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	93/79	dB *2.)*
unweighted	125 Hz	:	87/82	dB
Octave sound power level	250 Hz	:	84/81	dB
acc. to discharge/intake	500 Hz	:	83/85	dB
$LwOkt_{4/7}$ at	1000 Hz	:	80/80	dB
Octave band frequency	2000 Hz	:	76/77	dB
	4000 Hz	:	71/72	dB
	8000 Hz	:	63/65	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132M-4

Size	:	132M-4	
Speed	:	1455	rpm
Power	:	7,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	15.2/8.8	A

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Item No : **AHU/05/03 & AHU/05/07 Extract**

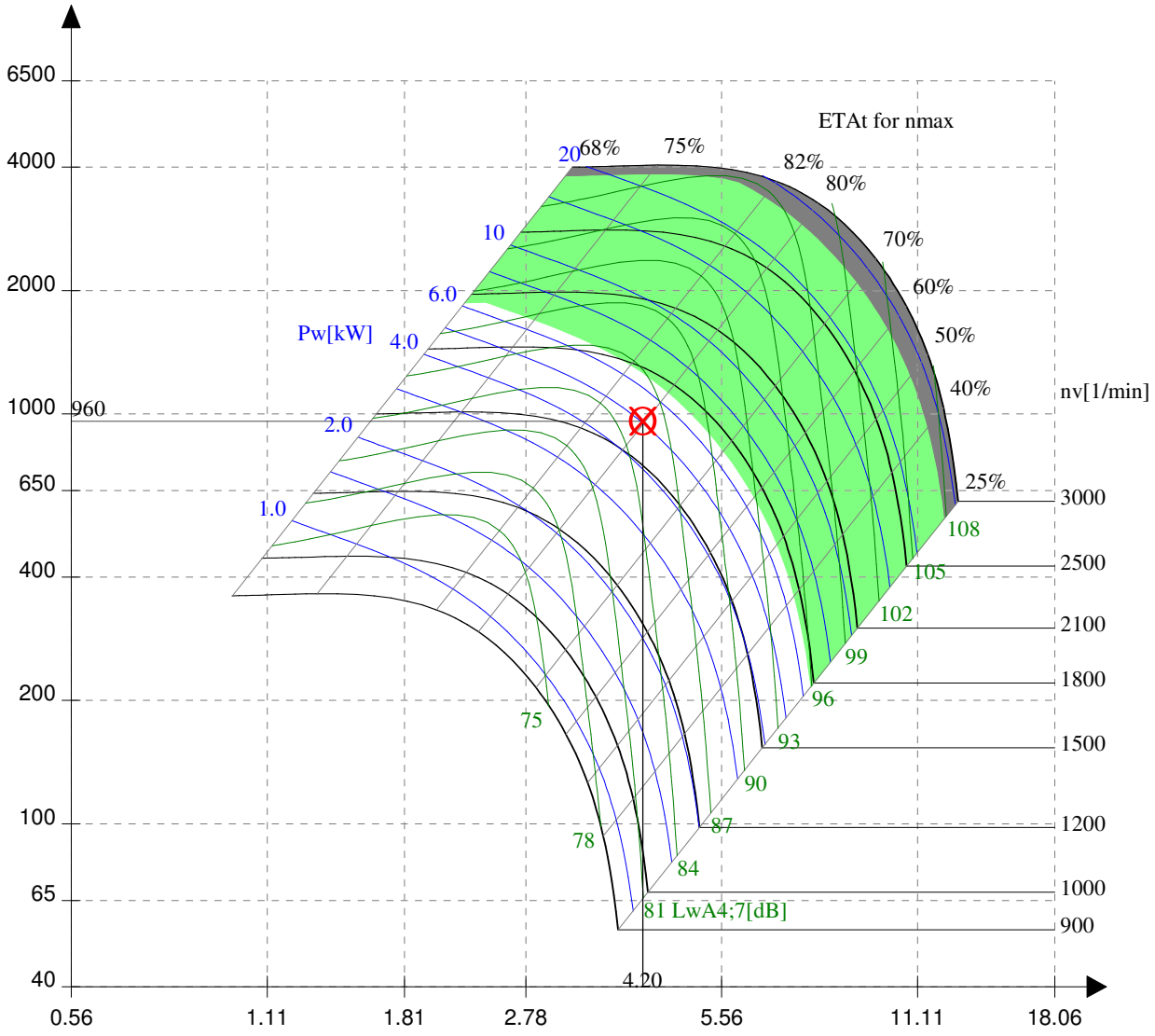
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/04 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	3.80	m3/s
Total pressure (dpt)	:	1403	Pa
Dyn. pressure (pd2) at discharge	:	53	Pa
Static pressure (dpfa)	:	1350	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1816	1/min *1.)*
Power on shaft (Pw)	:	6.56	kW
Efficiency (ETA_t)	:	81	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	87	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	94/80	dB *2.)*
unweighted	125 Hz	:	88/83	dB
Octave sound power level	250 Hz	:	85/82	dB
acc. to discharge/intake	500 Hz	:	84/86	dB
$LwOkt_{4/7}$ at	1000 Hz	:	81/81	dB
Octave band frequency	2000 Hz	:	77/78	dB
	4000 Hz	:	72/73	dB
	8000 Hz	:	64/66	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 160M-4

Size	:	160M-4	
Speed	:	1460	rpm
Power	:	11	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	21.5/12.4	A

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Reference : **British Museum - WCEC**
Item No : **AHU/05/04 Supply**

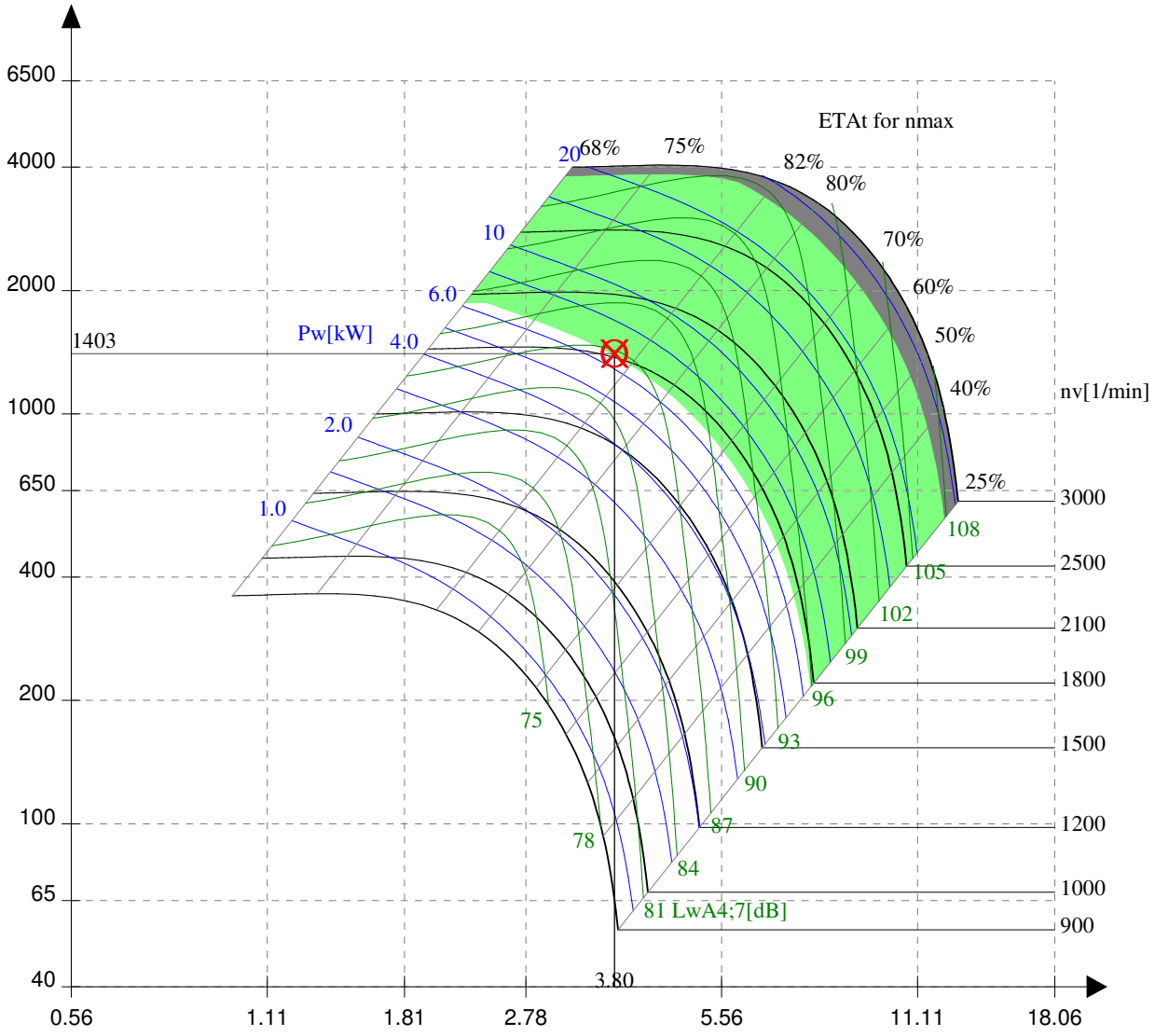
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

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Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	3.80	m3/s
Total pressure (dpt)	:	907	Pa
Dyn. pressure (pd2) at discharge	:	53	Pa
Static pressure (dpfa)	:	853	Pa
Pressure losses (pv) at intake	:	53	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1539	1/min *1.)*
Power on shaft (Pw)	:	4.27	kW
Efficiency (ETA_t)	:	81	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	84	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	91/77	dB *2.)*
unweighted	125 Hz	:	85/80	dB
Octave sound power level	250 Hz	:	82/79	dB
acc. to discharge/intake	500 Hz	:	81/83	dB
$LwOkt_{4/7}$ at	1000 Hz	:	78/78	dB
Octave band frequency	2000 Hz	:	74/75	dB
	4000 Hz	:	69/70	dB
	8000 Hz	:	61/63	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132M-4

Size	:	132M-4	
Speed	:	1455	rpm
Power	:	7,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	15.2/8.8	A

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Date : **06.06.2012**
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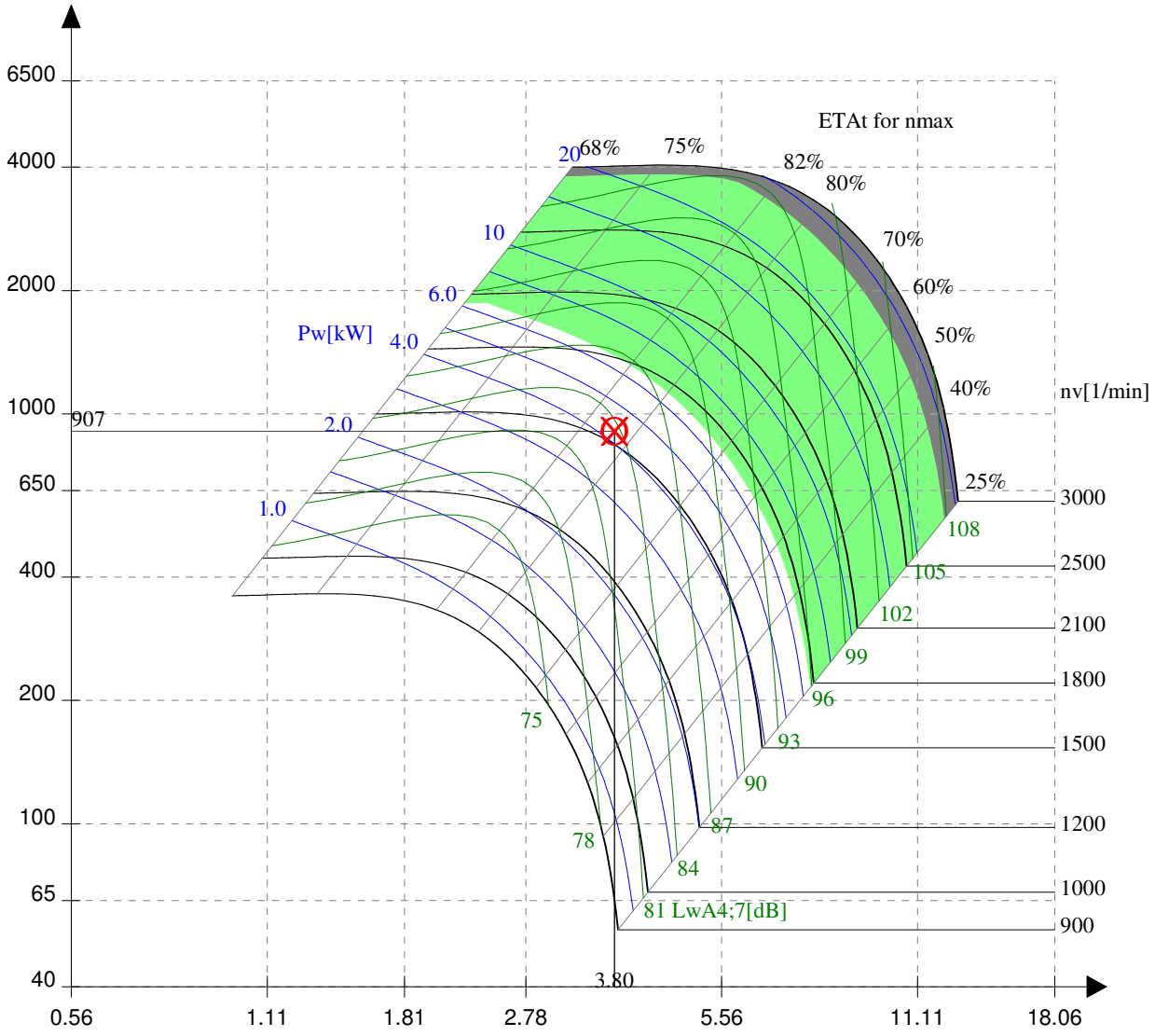
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

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Item No : **AHU/05/05 Supply**

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Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	3.85	m3/s
Total pressure (dpt)	:	1415	Pa
Dyn. pressure (pd2) at discharge	:	55	Pa
Static pressure (dpfa)	:	1360	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1826	1/min *1.)*
Power on shaft (Pw)	:	6.70	kW
Efficiency (ETA_t)	:	81	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	87	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	94/80	dB *2.)*
unweighted	125 Hz	:	88/83	dB
Octave sound power level	250 Hz	:	85/82	dB
acc. to discharge/intake	500 Hz	:	84/86	dB
$LwOkt_{4/7}$ at	1000 Hz	:	81/81	dB
Octave band frequency	2000 Hz	:	77/78	dB
	4000 Hz	:	72/73	dB
	8000 Hz	:	64/66	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 160M-4

Size	:	160M-4	
Speed	:	1460	rpm
Power	:	11	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	21.5/12.4	A

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Item No : **AHU/05/05 Supply**

Date : **06.06.2012**
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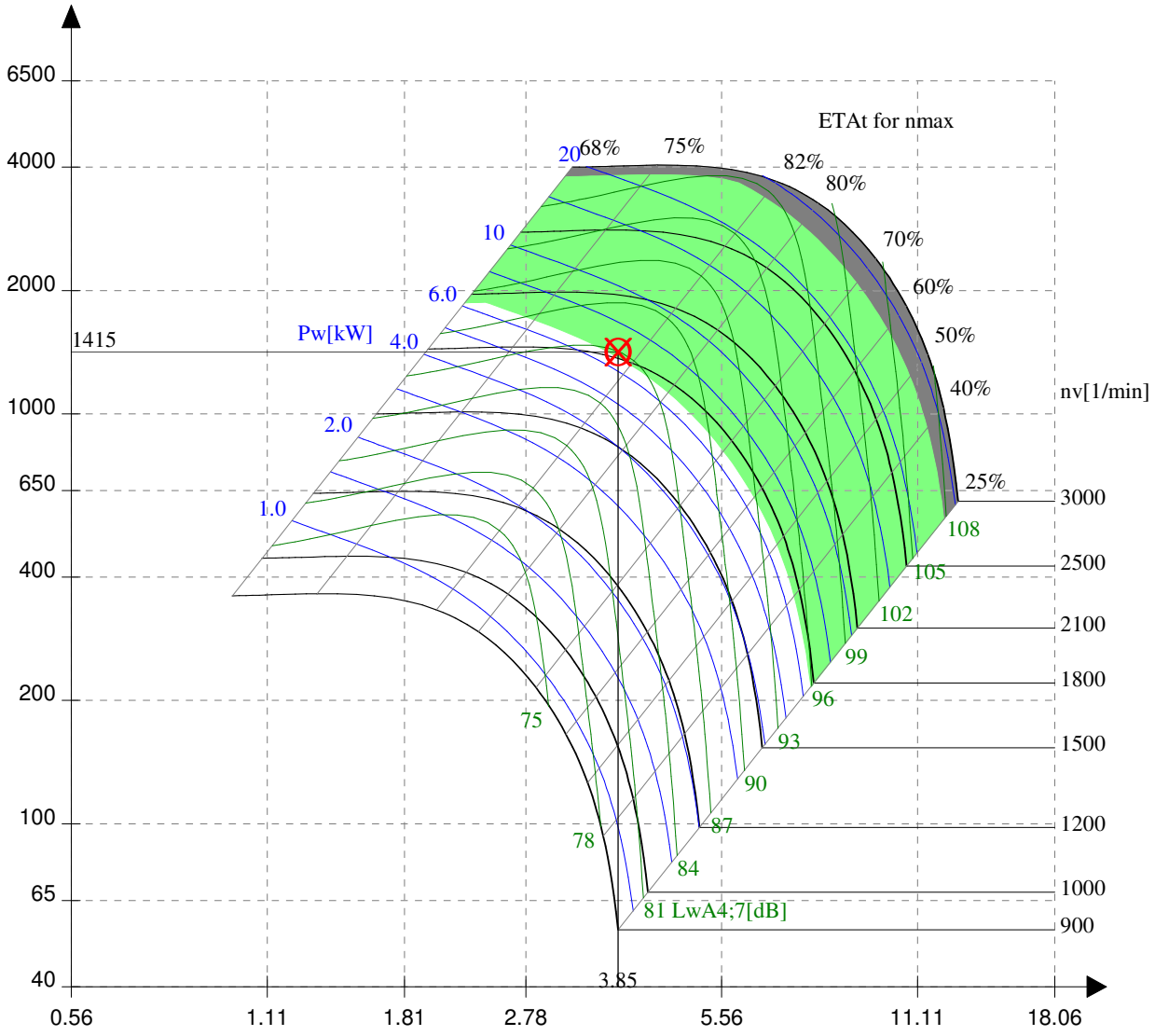
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

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Item No : **AHU/05/05 Extract**

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Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	3.85	m3/s
Total pressure (dpt)	:	909	Pa
Dyn. pressure (pd2) at discharge	:	55	Pa
Static pressure (dpfa)	:	855	Pa
Pressure losses (pv) at intake	:	55	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1547	1/min *1.)*
Power on shaft (Pw)	:	4.34	kW
Efficiency (ETA_t)	:	81	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	84	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	91/77	dB *2.)*
unweighted	125 Hz	:	85/80	dB
Octave sound power level	250 Hz	:	82/79	dB
acc. to discharge/intake	500 Hz	:	81/83	dB
$LwOkt_{4/7}$ at	1000 Hz	:	78/78	dB
Octave band frequency	2000 Hz	:	74/75	dB
	4000 Hz	:	69/70	dB
	8000 Hz	:	61/63	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132M-4

Size	:	132M-4	
Speed	:	1455	rpm
Power	:	7,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	15.2/8.8	A

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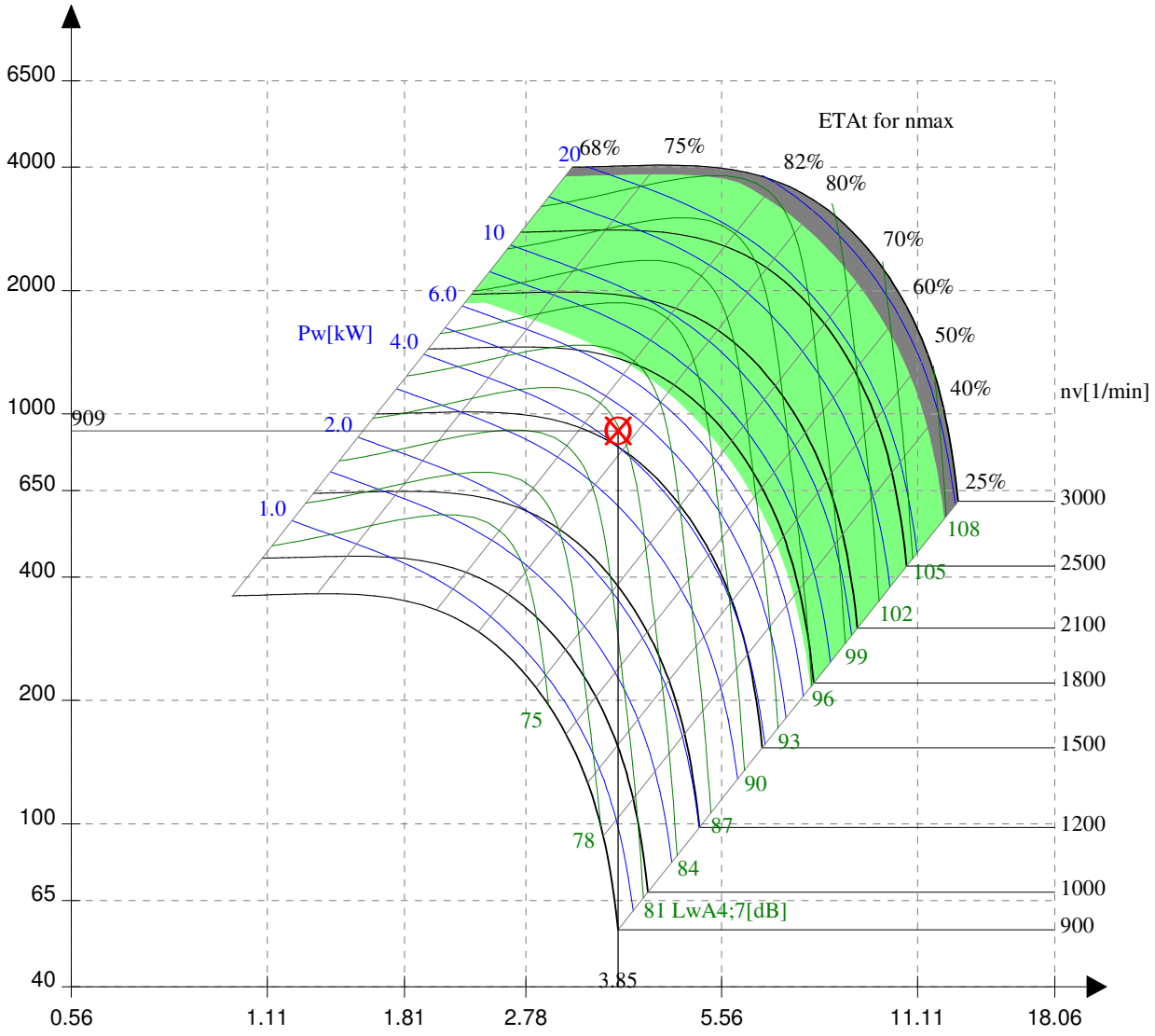
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

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Item No : **AHU/05/06 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	4.00	m3/s
Total pressure (dpt)	:	1339	Pa
Dyn. pressure (pd2) at discharge	:	59	Pa
Static pressure (dpfa)	:	1280	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1800	1/min *1.)*
Power on shaft (Pw)	:	6.57	kW
Efficiency (ETA_t)	:	82	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	87	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	94/80	dB *2.)*
unweighted	125 Hz	:	88/83	dB
Octave sound power level	250 Hz	:	85/82	dB
acc. to discharge/intake	500 Hz	:	84/86	dB
$LwOkt_{4/7}$ at	1000 Hz	:	81/81	dB
Octave band frequency	2000 Hz	:	77/78	dB
	4000 Hz	:	72/73	dB
	8000 Hz	:	64/66	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 160M-4

Size	:	160M-4	
Speed	:	1460	rpm
Power	:	11	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	21.5/12.4	A

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Reference : **British Museum - WCEC**
Item No : **AHU/05/06 Supply**

Date : **06.06.2012**
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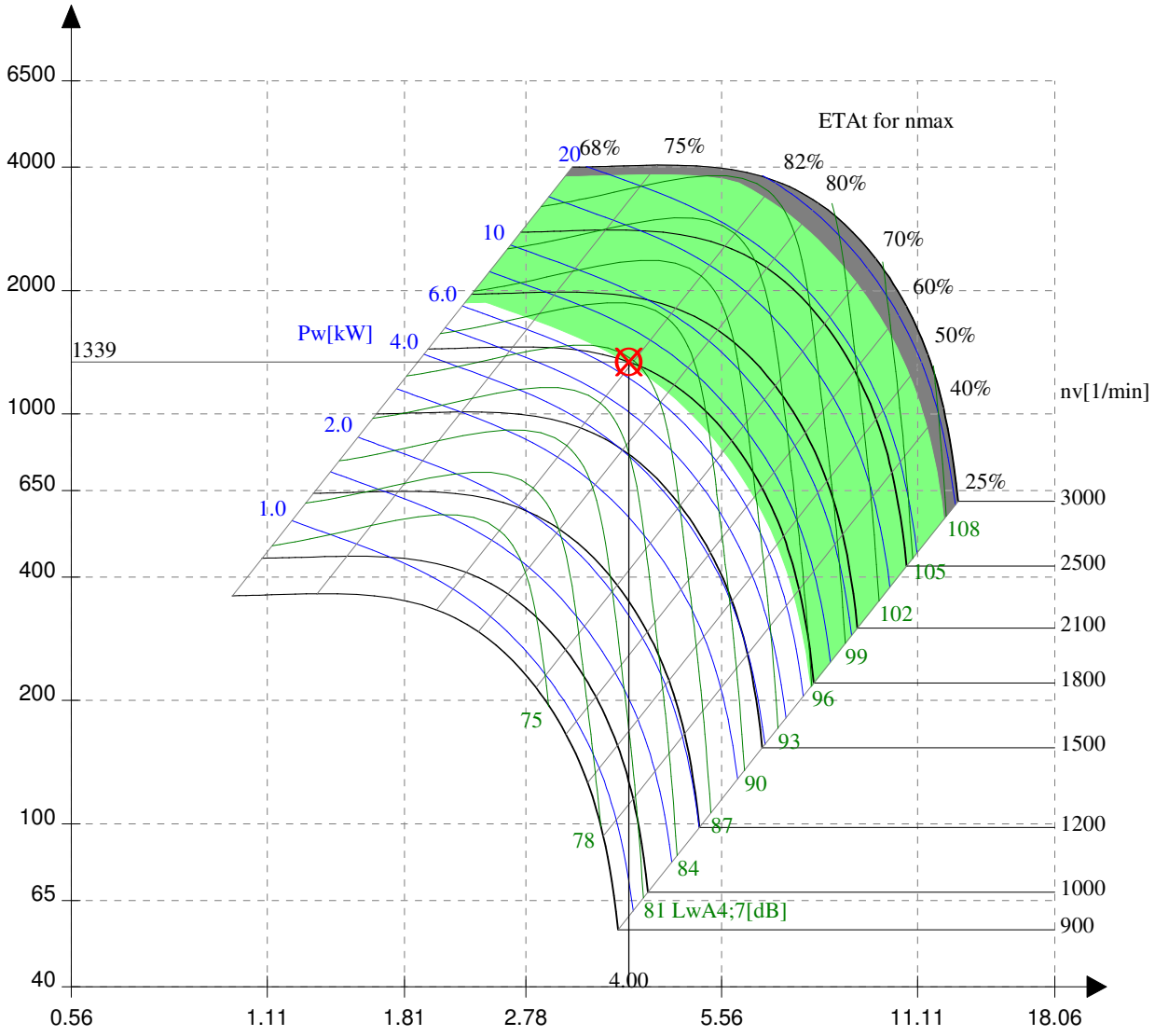
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

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Item No : **AHU/05/06 Extract**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	4.00	m3/s
Total pressure (dpt)	:	938	Pa
Dyn. pressure (pd2) at discharge	:	59	Pa
Static pressure (dpfa)	:	879	Pa
Pressure losses (pv) at intake	:	59	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1582	1/min *1.)*
Power on shaft (Pw)	:	4.67	kW
Efficiency (ETA_t)	:	80	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	85	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	92/78	dB *2.)*
unweighted	125 Hz	:	86/81	dB
Octave sound power level	250 Hz	:	83/80	dB
acc. to discharge/intake	500 Hz	:	82/84	dB
$LwOkt_{4/7}$ at	1000 Hz	:	79/79	dB
Octave band frequency	2000 Hz	:	75/76	dB
	4000 Hz	:	70/71	dB
	8000 Hz	:	62/64	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132M-4

Size	:	132M-4	
Speed	:	1455	rpm
Power	:	7,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	15.2/8.8	A

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Item No : **AHU/05/06 Extract**

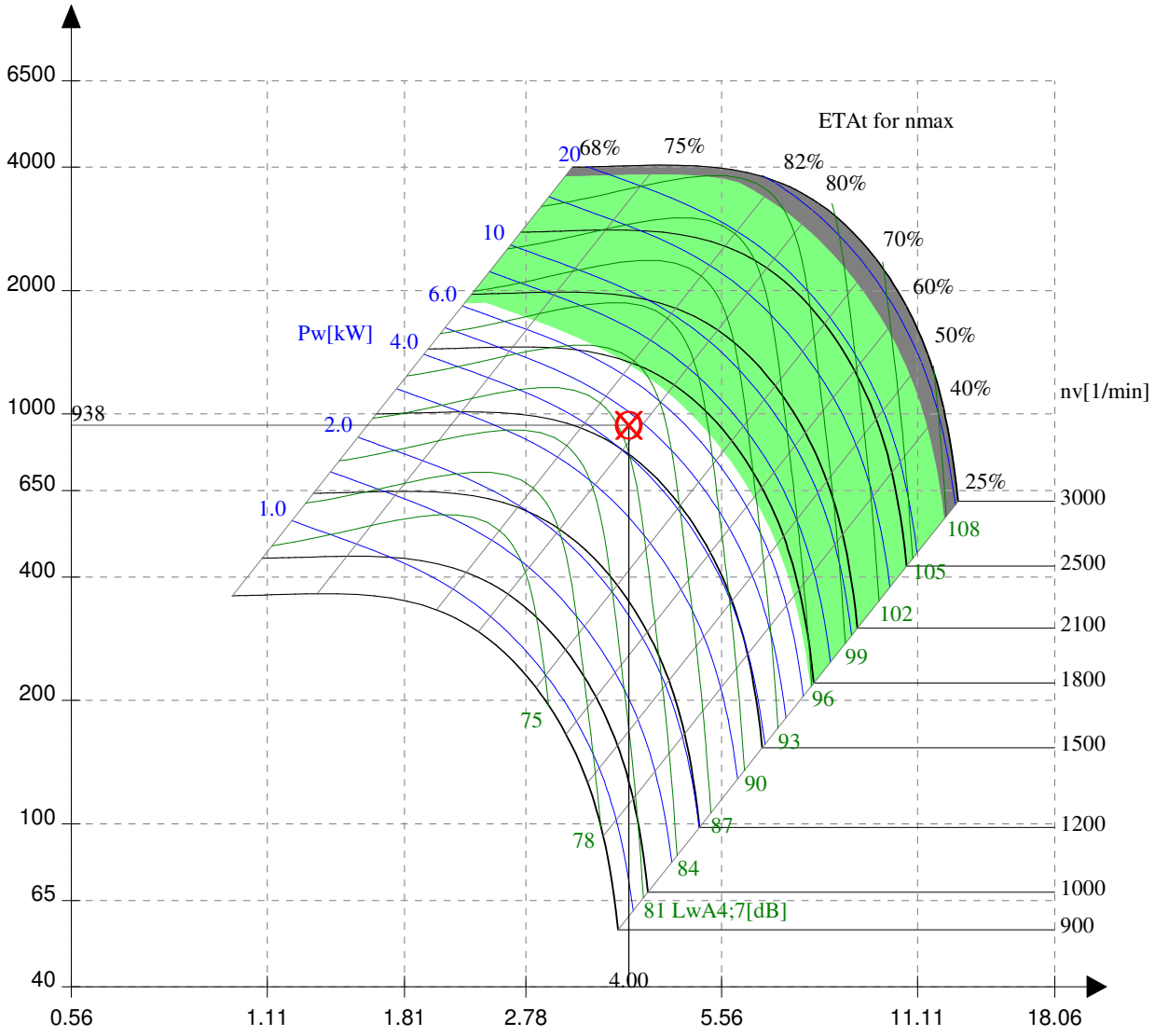
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/08 Supply**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	4.60	m3/s
Total pressure (dpt)	:	1418	Pa
Dyn. pressure (pd2) at discharge	:	78	Pa
Static pressure (dpfa)	:	1340	Pa
Pressure losses (pv) at intake	:	0	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1906	1/min *1.)*
Power on shaft (Pw)	:	8.03	kW
Efficiency (ETA_t)	:	81	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	89	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	96/82	dB *2.)*
unweighted	125 Hz	:	90/85	dB
Octave sound power level	250 Hz	:	87/84	dB
acc. to discharge/intake	500 Hz	:	86/88	dB
$LwOkt_{4/7}$ at	1000 Hz	:	83/83	dB
Octave band frequency	2000 Hz	:	79/80	dB
	4000 Hz	:	74/75	dB
	8000 Hz	:	66/68	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 160M-4

Size	:	160M-4	
Speed	:	1460	rpm
Power	:	11	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	21.5/12.4	A

GebhardtVentilatoren

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/08 Supply**

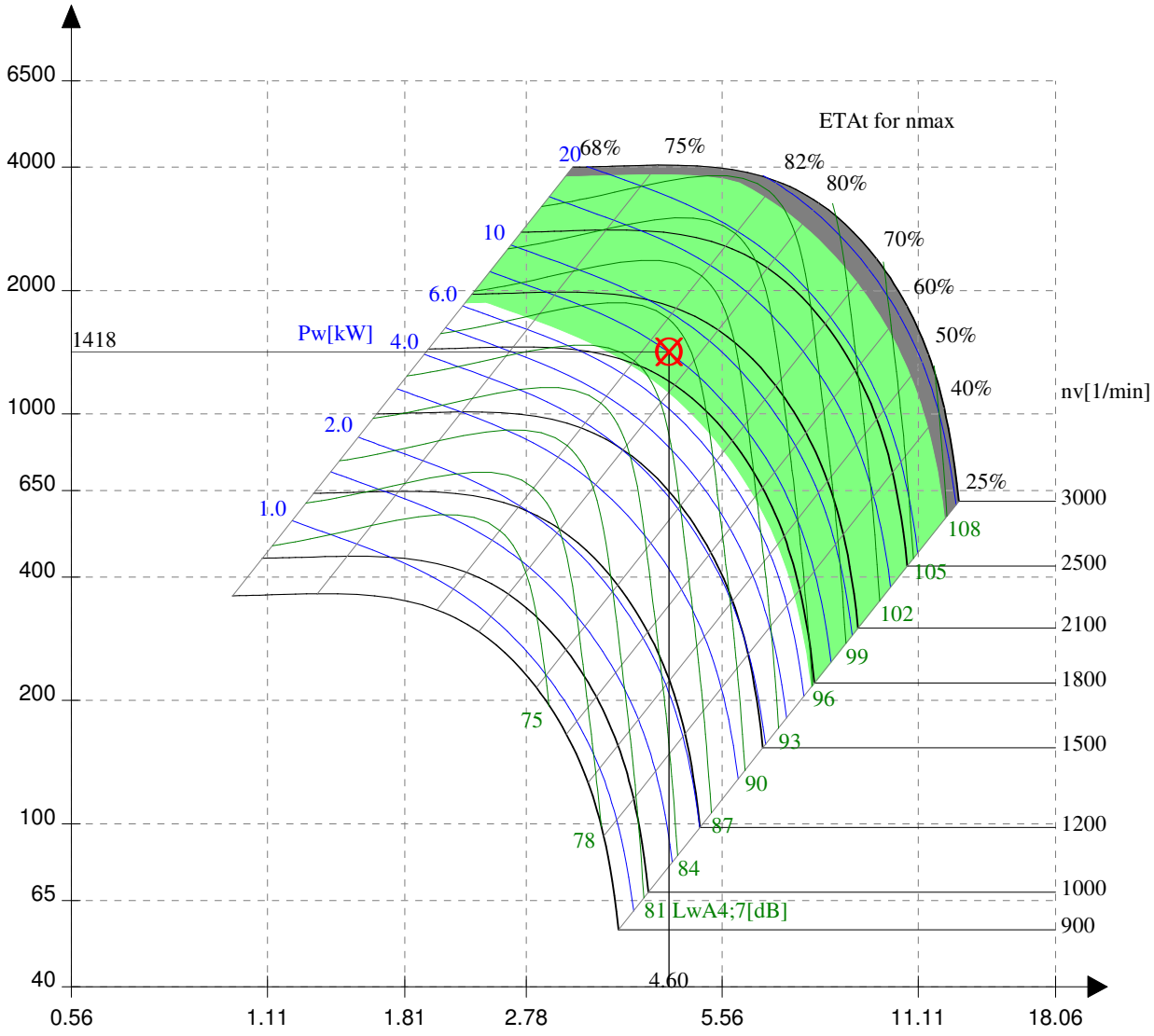
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/08 Extract**

Date : **06.06.2012**
Made by : **Jim Picken**
Page : **1**

Technical data

... for fan: RZR 15-0500

Installation acc. to DIN 24 163 part 1	:	B	
Flow rate (V)	:	4.60	m3/s
Total pressure (dpt)	:	966	Pa
Dyn. pressure (pd2) at discharge	:	78	Pa
Static pressure (dpfa)	:	888	Pa
Pressure losses (pv) at intake	:	78	Pa
Reference density (Rho1)	:	1.20	kg/m³
Temperature t of the gas (t)	:	20	°C
Speed (n_V)	:	1679	1/min *1.)*
Power on shaft (Pw)	:	5.68	kW
Efficiency (ETA_t)	:	78	%
Fan weight	:	94	kg
A-Sound power level $LwA_{4;7}$	:	87	dB

1.) Fan speed tolerances of ±4% may occur when calculating the belt drive. This may cause technical data being slightly different to the values above.

	63 Hz	:	90/77	dB *2.)*
unweighted	125 Hz	:	85/80	dB
Octave sound power level	250 Hz	:	83/79	dB
acc. to discharge/intake	500 Hz	:	84/86	dB
$LwOkt_{4/7}$ at	1000 Hz	:	82/82	dB
Octave band frequency	2000 Hz	:	78/79	dB
	4000 Hz	:	73/74	dB
	8000 Hz	:	64/66	dB

2.) The octave sound power levels can reach unpredictable higher values than calculated in the octave band of the blade passing frequencies.

... for motor: 132M-4

Size	:	132M-4	
Speed	:	1455	rpm
Power	:	7,5	kW
Voltage/Frequency	:	400/690/50	V/Hz
Electric current	:	15.2/8.8	A

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Customer : **MJL**
Reference : **British Museum - WCEC**
Item No : **AHU/05/08 Extract**

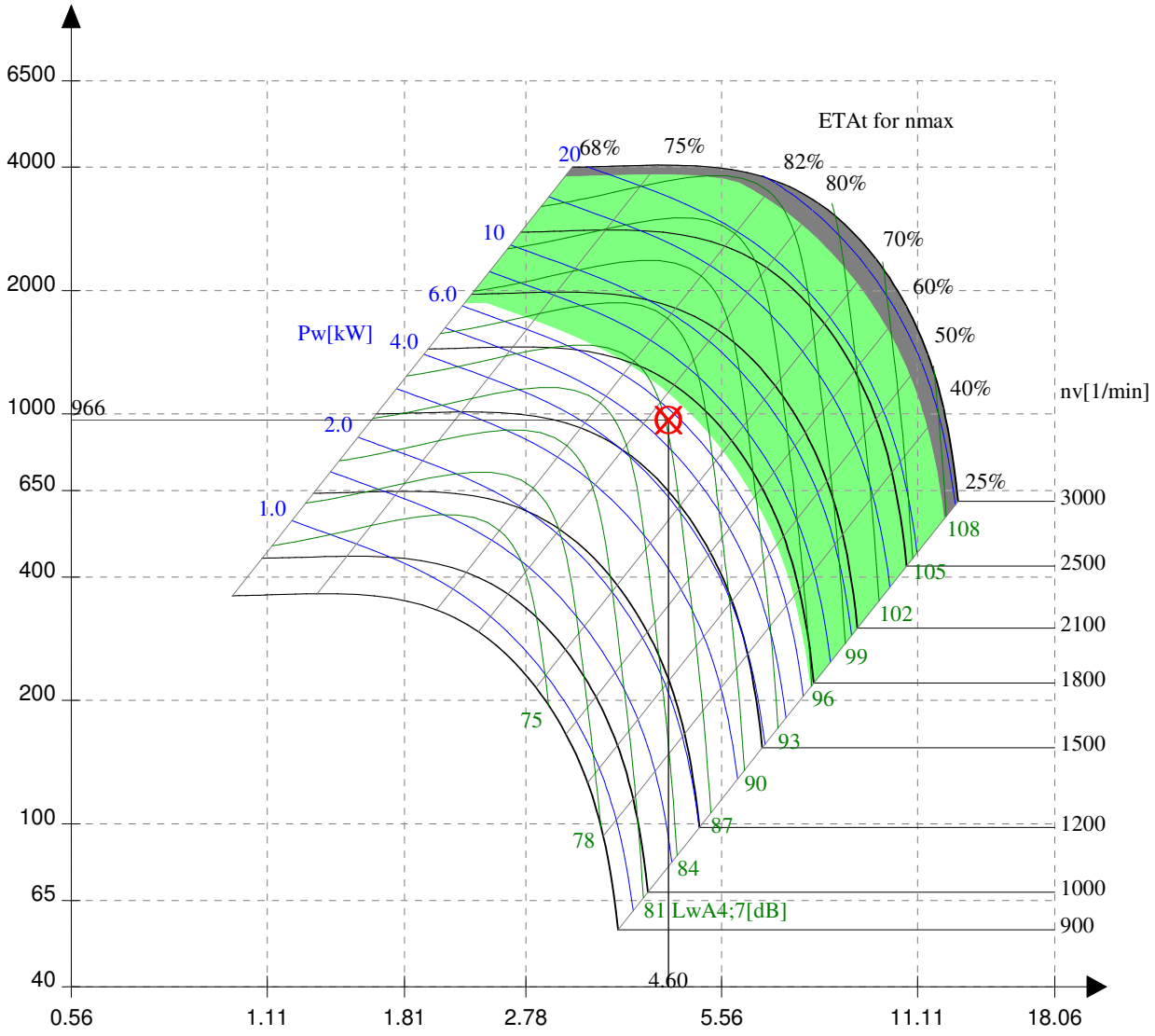
Date : **06.06.2012**
Made by : **Jim Picken**
Page : **2**

Fan curves: RZR 15-0500

Basis:

Reference density (Rho1) : 1.20 kg/m³
Install .....: B

Total pressure [Pa]



Flow rate [m3/s]

RZR 13-/15-/18-/19-... only

Do not use in this area

Michael J Lonsdale

British Museum

World Conservation
Exhibition Centre - London

Revision 05 - Technical Submission

Air Handling Equipment

Section No 11
AHU Acoustic Analysis

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/B2/03 Supply & Extract (Supply Air Volume : 5.50 m3/s & Extract Air Volume 4.00 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	99	93	90	89	86	82	77	69
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**85**	**76**	**68**	**67**	**58**	**52**	**43**	**41**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**82**	**73**	**65**	**64**	**55**	**49**	**40**	**38**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	88	87	85	87	82	79	74	67
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	0	0	0	0	0	0	0	0
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**92**	**91**	**89**	**91**	**86**	**83**	**78**	**71**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	95	89	86	85	82	78	73	65
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**99**	**93**	**90**	**89**	**86**	**82**	**77**	**69**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	84	83	81	83	78	75	70	63
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**88**	**87**	**85**	**87**	**82**	**79**	**74**	**67**

ATMOSPHIERC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	91	85	82	81	78	74	69	61
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	0	0	0	0	0	0	0	0
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**95**	**89**	**86**	**85**	**82**	**78**	**73**	**65**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/B2/04 Supply & Extract (Supply Air Volume : 3.20 m3/s & Extract Air Volume 3.20 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	96	90	87	86	83	79	74	66
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**82**	**73**	**65**	**64**	**55**	**49**	**40**	**38**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**79**	**70**	**62**	**61**	**52**	**46**	**37**	**35**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	85	84	82	84	79	76	71	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**84**	**84**	**81**	**82**	**75**	**69**	**61**	**52**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	92	86	83	82	79	75	70	62
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**96**	**90**	**87**	**86**	**83**	**79**	**74**	**66**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	85	84	82	84	79	76	71	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**89**	**88**	**86**	**88**	**83**	**80**	**75**	**68**

ATMOSPHIERC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	92	86	83	82	79	75	70	62
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**93**	**88**	**84**	**82**	**78**	**73**	**67**	**57**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/B3/01 Supply (Supply Air Volume : 1.60m³/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	97	91	88	87	84	80	75	67
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**80**	**71**	**63**	**62**	**53**	**47**	**38**	**36**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**77**	**68**	**60**	**59**	**50**	**44**	**35**	**33**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	86	85	83	85	80	77	72	65
Mounting In AHU	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-7	-11	-19	-24	-33	-30	-23	-18
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**83**	**78**	**68**	**65**	**51**	**51**	**53**	**51**

ROOMSIDE - Supply		Octave Band Centre Frequency							
DISCHARGE	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	93	87	84	83	80	76	71	63
Mounting In AHU	dB	4	4	4	4	4	4	4	4
Sound Power Level To AHU Supply Air Outlet	**SWL**	**97**	**91**	**88**	**87**	**84**	**80**	**75**	**67**

1. The above In duct power spectrum makes no allowance for room acoustics or ductwork losses.

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/B3/02 Supply (Supply Air Volume : 1.30m³/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	94	88	85	84	81	77	72	64
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**77**	**68**	**60**	**59**	**50**	**44**	**35**	**33**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**74**	**65**	**57**	**56**	**47**	**41**	**32**	**30**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	83	82	80	82	77	74	69	62
Mounting In AHU	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-7	-11	-19	-24	-33	-30	-23	-18
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**80**	**75**	**65**	**62**	**48**	**48**	**50**	**48**

ROOMSIDE - Supply		Octave Band Centre Frequency							
DISCHARGE	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	90	84	81	80	77	73	68	60
Mounting In AHU	dB	4	4	4	4	4	4	4	4
Sound Power Level To AHU Supply Air Outlet	**SWL**	**94**	**88**	**85**	**84**	**81**	**77**	**72**	**64**

1. The above In duct power spectrum makes no allowance for room acoustics or ductwork losses.

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/B2/01 Supply (Supply Air Volume : 1.90m³/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	96	91	89	90	88	84	79	70
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**79**	**71**	**64**	**65**	**57**	**51**	**42**	**39**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**76**	**68**	**61**	**62**	**54**	**48**	**39**	**36**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	86	85	85	88	84	81	76	68
Mounting In AHU	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-7	-11	-19	-24	-33	-30	-23	-18
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**83**	**78**	**70**	**68**	**55**	**55**	**57**	**54**

ROOMSIDE - Supply		Octave Band Centre Frequency							
DISCHARGE	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	92	87	85	86	84	80	75	66
Mounting In AHU	dB	4	4	4	4	4	4	4	4
Sound Power Level To AHU Supply Air Outlet	**SWL**	**96**	**91**	**89**	**90**	**88**	**84**	**79**	**70**

1. The above In duct power spectrum makes no allowance for room acoustics or ductwork losses.

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/B2/02 Supply (Supply Air Volume : 1.70m³/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	98	92	89	88	85	81	76	68
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**81**	**72**	**64**	**63**	**54**	**48**	**39**	**37**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**78**	**69**	**61**	**60**	**51**	**45**	**36**	**34**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	87	86	84	86	81	78	73	66
Mounting In AHU	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-7	-11	-19	-24	-33	-30	-23	-18
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**84**	**79**	**69**	**66**	**52**	**52**	**54**	**52**

ROOMSIDE - Supply		Octave Band Centre Frequency							
DISCHARGE	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	94	88	85	84	81	77	72	64
Mounting In AHU	dB	4	4	4	4	4	4	4	4
Sound Power Level To AHU Supply Air Outlet	**SWL**	**98**	**92**	**89**	**88**	**85**	**81**	**76**	**68**

1. The above In duct power spectrum makes no allowance for room acoustics or ductwork losses.

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/B1/01 Supply (Supply Air Volume : 1.90m³/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	96	91	89	90	88	84	79	70
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**79**	**71**	**64**	**65**	**57**	**51**	**42**	**39**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**76**	**68**	**61**	**62**	**54**	**48**	**39**	**36**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	86	85	85	88	84	81	76	68
Mounting In AHU	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-7	-11	-19	-24	-33	-30	-23	-18
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**83**	**78**	**70**	**68**	**55**	**55**	**57**	**54**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/B1/02 Supply (Supply Air Volume : 1.60m³/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	97	91	88	87	84	80	75	67
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**80**	**71**	**63**	**62**	**53**	**47**	**38**	**36**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**77**	**68**	**60**	**59**	**50**	**44**	**35**	**33**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	86	85	83	85	80	77	72	65
Mounting In AHU	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-7	-11	-19	-24	-33	-30	-23	-18
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**83**	**78**	**68**	**65**	**51**	**51**	**53**	**51**

ROOMSIDE - Supply		Octave Band Centre Frequency							
DISCHARGE	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	93	87	84	83	80	76	71	63
Mounting In AHU	dB	4	4	4	4	4	4	4	4
Sound Power Level To AHU Supply Air Outlet	**SWL**	**97**	**91**	**88**	**87**	**84**	**80**	**75**	**67**

1. The above In duct power spectrum makes no allowance for room acoustics or ductwork losses.

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/00/01 Supply & Extract (Supply Air Volume : 1.50 m3/s & Extract Air Volume 1.5 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	99	93	90	89	86	82	77	69
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**85**	**76**	**68**	**67**	**58**	**52**	**43**	**41**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**82**	**73**	**65**	**64**	**55**	**49**	**40**	**38**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	88	87	85	87	82	79	74	67
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-5	-8	-16	-21	-28	-25	-19	-15
Regenerated Noise Correction	dB	0	0	0	0	1	2	1	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**87**	**83**	**73**	**70**	**59**	**60**	**60**	**56**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	95	89	86	85	82	78	73	65
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
900mm Roomside Attenuator	dB	-9	-15	-26	-31	-44	-46	-34	-22
Regenerated Noise Correction	dB	0	0	0	0	2	5	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**90**	**78**	**64**	**58**	**44**	**41**	**43**	**47**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	85	84	82	84	79	76	71	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
900mm Roomside Attenuator	dB	-9	-15	-26	-31	-44	-46	-34	-22
Regenerated Noise Correction	dB	0	0	0	0	7	12	2	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**80**	**73**	**60**	**57**	**46**	**46**	**43**	**46**

ATMOSPHERIC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	92	86	83	82	79	75	70	62
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-5	-8	-16	-21	-28	-25	-19	-15
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**91**	**82**	**71**	**65**	**55**	**54**	**55**	**51**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/01/01 Supply & Extract (Supply Air Volume : 0.50 m3/s & Extract Air Volume 0.50 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	88	86	82	80	74	70	63	52
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**74**	**69**	**60**	**58**	**46**	**40**	**29**	**24**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**71**	**66**	**57**	**55**	**43**	**37**	**26**	**21**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	77	80	77	75	72	68	63	55
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**76**	**80**	**76**	**73**	**68**	**61**	**53**	**43**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	84	82	78	76	70	66	59	48
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**88**	**86**	**82**	**80**	**74**	**70**	**63**	**52**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	78	81	78	76	73	69	64	56
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**82**	**85**	**82**	**80**	**77**	**73**	**68**	**60**

ATMOSPHIERC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	85	83	79	77	71	67	60	49
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**86**	**85**	**80**	**77**	**70**	**65**	**57**	**44**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/01/02 Supply & Extract (Supply Air Volume : 0.60 m3/s & Extract Air Volume 0.60 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	90	88	84	82	76	72	65	54
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**76**	**71**	**62**	**60**	**48**	**42**	**31**	**26**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**73**	**68**	**59**	**57**	**45**	**39**	**28**	**23**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	79	82	79	77	74	70	65	57
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**78**	**82**	**78**	**75**	**70**	**63**	**55**	**45**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	86	84	80	78	72	68	61	50
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**90**	**88**	**84**	**82**	**76**	**72**	**65**	**54**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	80	83	80	78	75	71	66	58
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**84**	**87**	**84**	**82**	**79**	**75**	**70**	**62**

ATMOSPHIERC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	87	85	81	79	73	69	62	51
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**88**	**87**	**82**	**79**	**72**	**67**	**59**	**46**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/02/01 Supply (Supply Air Volume : 1.80m³/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	95	90	88	89	87	83	78	69
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**78**	**70**	**63**	**64**	**56**	**50**	**41**	**38**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**75**	**67**	**60**	**61**	**53**	**47**	**38**	**35**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	85	84	82	87	83	80	75	67
Mounting In AHU	dB	4	4	4	4	4	4	4	4
600mm Atmospheric Attenuator	dB	-7	-11	-19	-24	-33	-30	-23	-18
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**82**	**77**	**67**	**67**	**54**	**54**	**56**	**53**

ROOMSIDE - Supply		Octave Band Centre Frequency							
DISCHARGE	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	91	86	84	85	83	79	74	65
Mounting In AHU	dB	4	4	4	4	4	4	4	4
Sound Power Level To AHU Supply Air Outlet	**SWL**	**95**	**90**	**88**	**89**	**87**	**83**	**78**	**69**

1. The above In duct power spectrum makes no allowance for room acoustics or ductwork losses.

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/05/01 Supply & Extract (Supply Air Volume : 5.20 m3/s & Extract Air Volume 5.20 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	101	95	92	91	88	84	79	71
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**87**	**78**	**70**	**69**	**60**	**54**	**45**	**43**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**84**	**75**	**67**	**66**	**57**	**51**	**42**	**40**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	90	89	87	89	84	81	76	69
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**89**	**89**	**86**	**87**	**80**	**74**	**66**	**57**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	97	91	88	87	84	80	75	67
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**101**	**95**	**92**	**91**	**88**	**84**	**79**	**71**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	87	86	84	89	85	82	77	69
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**91**	**90**	**88**	**93**	**89**	**86**	**81**	**73**

ATMOSPHIERC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	93	88	86	87	85	81	76	67
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**94**	**90**	**87**	**87**	**84**	**79**	**73**	**62**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/05/02 Supply & Extract (Supply Air Volume : 3.10 m3/s & Extract Air Volume 3.10 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	101	95	92	91	88	84	79	71
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**87**	**78**	**70**	**69**	**60**	**54**	**45**	**43**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**84**	**75**	**67**	**66**	**57**	**51**	**42**	**40**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	90	89	87	89	84	81	76	69
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**89**	**89**	**86**	**87**	**80**	**74**	**66**	**57**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	97	91	88	87	84	80	75	67
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**101**	**95**	**92**	**91**	**88**	**84**	**79**	**71**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	86	85	83	88	84	81	76	68
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**90**	**89**	**87**	**92**	**88**	**85**	**80**	**72**

ATMOSPHERIC- Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	92	87	85	86	84	80	75	66
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**93**	**89**	**86**	**86**	**83**	**78**	**72**	**61**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/05/03 Supply & Extract (Supply Air Volume : 4.20 m3/s & Extract Air Volume 4.20 m3/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	98	92	89	88	85	81	76	68
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**84**	**75**	**67**	**66**	**57**	**51**	**42**	**40**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**81**	**72**	**64**	**63**	**54**	**48**	**39**	**37**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	87	86	84	86	81	78	73	66
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**86**	**86**	**83**	**84**	**77**	**71**	**63**	**54**

ROOMSIDE - Supply		Octave Band Centre Frequency							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	94	88	85	84	81	77	72	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**98**	**92**	**89**	**88**	**85**	**81**	**76**	**68**

ROOMSIDE - Extract		Octave Band Centre Frequency							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	86	85	83	85	80	77	72	65
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**90**	**89**	**87**	**89**	**84**	**81**	**76**	**69**

ATMOSPHERIC - Extract		Octave Band Centre Frequency							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	93	87	84	83	80	76	71	63
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**94**	**89**	**85**	**83**	**79**	**74**	**68**	**58**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/05/04 Supply & Extract (Supply Air Volume : 3.80 m3/s & Extract Air Volume 3.80 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	98	92	89	88	85	81	76	68
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**84**	**75**	**67**	**66**	**57**	**51**	**42**	**40**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**81**	**72**	**64**	**63**	**54**	**48**	**39**	**37**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	87	86	84	86	81	78	73	66
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**86**	**86**	**83**	**84**	**77**	**71**	**63**	**54**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	94	88	85	84	81	77	72	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**98**	**92**	**89**	**88**	**85**	**81**	**76**	**68**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	84	83	81	83	78	75	70	63
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**88**	**87**	**85**	**87**	**82**	**79**	**74**	**67**

ATMOSPHERIC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	91	85	82	81	78	74	69	61
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**92**	**87**	**83**	**81**	**77**	**72**	**66**	**56**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/05/05 Supply & Extract (Supply Air Volume : 3.85 m3/s & Extract Air Volume 3.85 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	98	92	89	88	85	81	76	68
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**84**	**75**	**67**	**66**	**57**	**51**	**42**	**40**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**81**	**72**	**64**	**63**	**54**	**48**	**39**	**37**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	87	86	84	86	81	78	73	66
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**86**	**86**	**83**	**84**	**77**	**71**	**63**	**54**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	94	88	85	84	81	77	72	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**98**	**92**	**89**	**88**	**85**	**81**	**76**	**68**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	84	83	81	83	78	75	70	63
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**88**	**87**	**85**	**87**	**82**	**79**	**74**	**67**

ATMOSPHERIC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	91	85	82	81	78	74	69	61
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**92**	**87**	**83**	**81**	**77**	**72**	**66**	**56**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/05/06 Supply & Extract (Supply Air Volume : 4.00 m3/s & Extract Air Volume 4.00 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	98	92	89	88	85	81	76	68
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**84**	**75**	**67**	**66**	**57**	**51**	**42**	**40**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**81**	**72**	**64**	**63**	**54**	**48**	**39**	**37**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	87	86	84	86	81	78	73	66
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**86**	**86**	**83**	**84**	**77**	**71**	**63**	**54**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	94	88	85	84	81	77	72	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**98**	**92**	**89**	**88**	**85**	**81**	**76**	**68**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	85	84	82	84	79	76	71	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**89**	**88**	**86**	**88**	**83**	**80**	**75**	**68**

ATMOSPHERIC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	92	86	83	82	79	75	70	62
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**93**	**88**	**84**	**82**	**78**	**73**	**67**	**57**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/05/07 Supply & Extract (Supply Air Volume : 4.20 m3/s & Extract Air Volume 4.20 m3/s)

CASING		**Octave Band Centre Frequency**							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	98	92	89	88	85	81	76	68
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**84**	**75**	**67**	**66**	**57**	**51**	**42**	**40**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**81**	**72**	**64**	**63**	**54**	**48**	**39**	**37**

ATMOSPHERIC - Supply		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	87	86	84	86	81	78	73	66
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**86**	**86**	**83**	**84**	**77**	**71**	**63**	**54**

ROOMSIDE - Supply		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	94	88	85	84	81	77	72	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**98**	**92**	**89**	**88**	**85**	**81**	**76**	**68**

ROOMSIDE - Extract		**Octave Band Centre Frequency**							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	86	85	83	85	80	77	72	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**90**	**89**	**87**	**89**	**84**	**81**	**76**	**68**

ATMOSPHERIC - Extract		**Octave Band Centre Frequency**							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	93	87	84	83	80	76	71	63
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**94**	**89**	**85**	**83**	**79**	**74**	**68**	**58**

Dalair Limited (Technical Centre)
Project Reference : British Museum - WCEC
Client : Michael J Lonsdale
Date : Thursday 07th June 2012

Dalair Limited
Air Handling Equipment

Air Handling Unit Acoustic Analysis

AHU Reference : AHU/05/08 Supply & Extract (Supply Air Volume : 4.60 m3/s & Extract Air Volume 4.60 m3/s)

CASING		Octave Band Centre Frequency							
RADIATED	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum (Fan + Includes 4dB for mounting fans within AHU section)	SWL	100	94	91	90	87	83	78	70
2 No Fans Running Together Supply & Extract In AHU	dB	3	3	3	3	3	3	3	3
50mm Panel Transmission Loss (Rockwool - 100Kg/m3)	dB	-17	-20	-25	-25	-31	-33	-37	-31
SPL Panel	**dB**	**86**	**77**	**69**	**68**	**59**	**53**	**44**	**42**
Distance @ 1 metre (Corrected to Actual Test Values)	dB	-3	-3	-3	-3	-3	-3	-3	-3
RESULTANT Sound Pressure Level	**dB**	**83**	**74**	**66**	**65**	**56**	**50**	**41**	**39**

ATMOSPHERIC - Supply		Octave Band Centre Frequency							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Supply Fan)	SWL	89	88	86	88	83	80	75	68
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-5	-4	-5	-6	-8	-11	-14	-16
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Fresh Air Inlet	**SWL**	**88**	**88**	**85**	**86**	**79**	**73**	**65**	**56**

ROOMSIDE - Supply		Octave Band Centre Frequency							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Supply Fan)	SWL	96	90	87	86	83	79	74	66
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Supply Air Outlet	**SWL**	**100**	**94**	**91**	**90**	**87**	**83**	**78**	**70**

ROOMSIDE - Extract		Octave Band Centre Frequency							
INLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Inlet (Extract Fan)	SWL	84	83	81	86	82	79	74	66
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Reutrn Air Inlet	**SWL**	**88**	**87**	**85**	**90**	**86**	**83**	**78**	**70**

ATMOSPHERIC - Extract		Octave Band Centre Frequency							
OUTLET - ATTENUATOR DUCT MOUNTED BY OTHERS	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Power Spectrum Outlet (Extract Fan)	SWL	90	85	83	84	82	78	73	64
Mounting Fans Within AHU Section	dB	4	4	4	4	4	4	4	4
AHU Mounted Component Losses	dB	-3	-2	-3	-4	-5	-6	-7	-9
Regenerated Noise Correction	dB	0	0	0	0	0	0	0	0
Sound Power Level To AHU Exhaust Air Outlet	**SWL**	**91**	**87**	**84**	**84**	**81**	**76**	**70**	**59**

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/05/01 AHU/05/01 FAI

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
FAI:								
DALAIR SWL	89	89	86	87	80	74	66	57
- Mitre Bend 1.5m	-1	-5	-8	-4	-3	-3	-3	-3
=	88	84	78	83	77	71	63	54
- Primary Attenuator Insertion loss	9	16	27	38	43	30	24	15
=	79	68	51	45	34	41	39	39
+ Attenuator self regenerated LW (at 5.2m3/s total airflow)	+56	+56	+51	+52	+51	+50	+49	+42
= LW in duct after primary attenuator	79	68	54	52	51	50	49	44
- Secondary Attenuator Insertion Loss	-13	-22	-34	-47	-55	-44	-35	-21
=	66	46	20	3	0	6	14	23
+ Attenuator regenerated LW	+54	+54	+49	+50	+49	+48	+47	+40
= LW in duct after secondary attenuator	66	55	49	50	49	48	47	40

Atmos Lp calculated by others

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/05/01 AHU/05/01 FAI

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
FAI:								
DALAIR SWL	89	89	86	87	80	74	66	57
- Mitre Bend 1.5m	-1	-5	-8	-4	-3	-3	-3	-3
=	88	84	78	83	77	71	63	54
- Primary Attenuator Insertion loss	9	16	27	38	43	30	24	15
=	79	68	51	45	34	41	39	39
+ Attenuator self regenerated LW (at 5.2m3/s total airflow)	+56	+56	+51	+52	+51	+50	+49	+42
= LW in duct after primary attenuator	79	68	54	52	51	50	49	44
- Secondary Attenuator Insertion Loss	-13	-22	-34	-47	-55	-44	-35	-21
=	66	46	20	3	0	6	14	23
+ Attenuator regenerated LW	+54	+54	+49	+50	+49	+48	+47	+40
= LW in duct after secondary attenuator	66	55	49	50	49	48	47	40
To Atmos								
- End Reflection (1.5mx0.5m)	-5	-1	0	0	0	0	0	0
- Distance 1m attenuation	-11	-11	-11	-11	-11	-11	-11	-11
- Directivity	0	0	0	0	0	0	0	0
+ Plane Source	+3	+3	+3	+3	+3	+3	+3	+3
+ contribution from other sources	+3	+3	+3	+3	+3	+3	+3	+3
= Resultant Lp at 1m from intake louvre	**56**	**49**	**44**	**45**	**38**	**43**	**42**	**35**
Equates to 49dBA at 1m distance								

Allaway Acoustics Ltd

Acoustical Analysis

Room Noise Calculation – ATT/05/14 AHU/05/04 SUPPLY

Calculation to Special Exhibition Galleries

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
SUPPLY:								
Dalair SWL	98	92	89	88	85	81	76	68
- Primary Attenuator Insertion loss	-9	-16	-27	-38	-43	-30	-24	-15
=	89	76	62	50	42	51	52	53
+ Attenuator self regenerated LW (at 3.8m3/s total airflow)	+48	+48	+43	+44	+43	+42	+41	+34
= LW in duct after primary attenuator	89	76	62	51	46	52	52	53
- Secondary Attenuator Insertion loss	-13	-22	-34	-47	-55	-44	-35	-21
=	76	54	28	4	0	8	17	32
+ Attenuator self regenerated LW (at 3.8m3/s total airflow)	+46	+46	+41	+42	+41	+40	+39	+32
= LW in duct after secondary attenuator	76	55	41	42	41	40	39	35
- LW split 28% into 0.406m	-6	-7	-11	-14	-10	-9	-9	-9
=	70	48	30	28	31	31	30	26
+ Bend regenerated LW	+27	+26	+21	+20	+18	+16	+13	+9
=	70	48	31	29	31	31	30	26
- Mitre Bend 0.406m	-0	-1	-5	-8	-4	-3	-3	-3
=	70	47	26	21	27	28	27	23
+ Bend regenerated LW	+27	+26	+21	+20	+18	+16	+13	+9
=	70	47	27	24	28	28	27	23
To Room								
End Reflection 0.315m	-10	-6	-2	0	0	0	0	0
Distance to listener 1.5m	-2	-2	-2	-2	-2	-2	-2	-2
Room Volume (20x20x6)	-17	-17	-17	-17	-17	-17	-17	-17
Other Grilles on system (3)	+6	+6	+6	+6	+6	+6	+6	+6
Other Sources (2)	+4	+4	+4	+4	+4	+4	+4	+4
Room Condition (Live)	+11	+10	+8	+8	+7	+6	+5	+4
= Room Sound Pressure Level	**62**	**42**	**24**	**23**	**26**	**25**	**23**	**18**
Equates to NR34								

SG/2/15 published noise NR38

Potential resultant room noise level = NR39

Allaway Acoustics Ltd

Acoustical Analysis

Room Noise Calculation – ATT/05/02 AHU/05/01 SUPPLY

Calculation to Logistics Office & Reception

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
SUPPLY:								
Dalair SWL	101	95	92	91	88	84	79	71
- Primary Attenuator Insertion loss	-9	-16	-27	-38	-43	-30	-24	-15
=	92	79	65	53	45	54	55	56
+ Attenuator self regenerated LW (at 5.2m3/s total airflow)	+56	+56	+51	+52	+51	+50	+49	+42
= LW in duct after primary attenuator	92	79	65	56	52	55	56	56
- Mitre Bend 0.5m	-0	-1	-5	-8	-4	-3	-3	-3
=	92	78	60	46	48	52	53	53
+ Bend regenerated LW	+58	+57	+52	+51	+49	+47	+44	+40
=	92	78	61	52	52	53	54	53
- Secondary Attenuator Insertion loss	-13	-22	-34	-47	-55	-44	-35	-21
=	79	56	27	5	0	9	19	32
+ Attenuator self regenerated LW (at 5.2m3/s total airflow)	+54	+54	+49	+50	+49	+48	+47	+40
= LW in duct after primary attenuator	79	58	49	50	49	48	47	41
- Duct loss 0.5mx1.5m x 7.5Ml (lagged)	-13	-8	-6	-2	-2	-2	-2	-2
=	66	50	43	48	47	46	45	39
+ Duct regenerated LW	+38	+37	+32	+31	+29	+27	+24	+20
=	66	50	43	48	47	46	45	39
- Mitre Bend 0.5m	-0	-1	-5	-8	-4	-3	-3	-3
=	66	49	38	40	43	43	42	36
+ Bend regenerated LW	+58	+57	+52	+51	+49	+47	+44	+40
=	67	58	61	60	59	57	57	58
- LW split 44% into 0.45m	-4	-5	-9	-12	-8	-7	-7	-7
=	63	53	52	48	51	50	50	51
+ Bend regenerated LW	+50	+49	+44	+43	+41	+39	+36	+32
=	63	54	53	49	51	50	50	51
- LW split 54% into 0.787m	-4	-4	-8	-11	-7	-6	-6	-6
=	59	50	45	38	44	44	44	45
+ Bend regenerated LW	+43	+42	+37	+36	+34	+32	+29	+25
=	59	51	46	40	44	44	44	45
ATT/06/02 Insertion loss	-4	-8	-15	-21	-25	-19	-14	-8
=	55	43	31	19	19	25	30	37
+ Attenuator self regenerated LW (at 1.614m3/s total airflow)	+38	+38	+33	+34	+33	+32	+31	+24

= LW in duct after attenuator	55	44	35	34	33	33	34	37
- LW split 45% into 0.632m	-3	-4	-8	-11	-7	-6	-6	-6
=	52	40	47	23	26	26	27	31
+ Bend regenerated LW	+36	+35	+30	+29	+27	+25	+22	+18
=	52	41	47	30	30	29	28	31
- LW split 20% into 0.2m	-7	-7	-8	-8	-12	-15	-11	-10
=	45	34	39	22	18	14	17	21
+ Bend regenerated LW	+26	+25	+20	+19	+17	+15	+12	+8
=	45	35	39	24	21	18	18	13
+ TROX VAV/06/11 Lw	+55	+49	+43	+39	+37	+35	+32	+29
=	55	49	44	39	37	35	32	29
- LW split 50% into 0.355m	-3	-3	-4	-8	-11	-7	-6	-6
=	52	46	40	31	26	28	26	23
+ Bend regenerated LW	+0	+0	+0	+0	+0	+0	+0	+0
=	52	46	40	31	26	28	26	23
+ Radius bend 0.2m	-0	-1	-1	-2	-3	-3	-3	-3
=	52	45	39	29	23	25	23	20
+ Bend regenerated LW	+0	+0	+0	+0	+0	+0	+0	+0
=	52	45	39	29	23	25	23	20
To Room								
End Reflection 0.2m	-13	-9	-5	-1	0	0	0	0
Distance to listener 1.5m	-2	-2	-2	-2	-2	-2	-2	-2
Room Volume (12x10x2.6)	-12	-12	-12	-12	-12	-12	-12	-12
Other Grilles on system (4)	+6	+6	+6	+6	+6	+6	+6	+6
Other Sources (5)	+7	+7	+7	+7	+7	+7	+7	+7
Room Condition (Live)	+11	+10	+8	+8	+7	+6	+5	+4
= Room Sound Pressure Level	**49**	**45**	**41**	**35**	**29**	**30**	**27**	**23**
Equates to NR33								

SG/06/05-11 Published noise NR38 (worst case SG/06/09)

Potential resultant room noise level = NR39

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/05/03 AHU/05/01 Exhaust

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Exhaust:								
DALAIR SWL	94	90	87	87	84	79	73	62
- Primary Attenuator Insertion loss	9	16	27	38	43	30	24	15
=	85	73	60	49	41	49	49	47
+ Attenuator self regenerated LW (at 5.2m3/s total airflow)	+56	+56	+51	+52	+51	+50	+49	+42
= LW in duct after primary attenuator	85	73	61	54	51	53	52	48
- Mitre Bend 0.5m	-0	-1	-5	-8	-4	-3	-3	-3
=	85	72	56	46	47	50	49	45
+ Bend regenerated LW	+58	+57	+52	+51	+49	+47	+44	+40
=	85	72	57	52	51	52	50	46
- Secondary Attenuator Insertion Loss	-13	-22	-34	-47	-55	-44	-35	-21
=	72	50	23	5	0	8	15	25
+ Attenuator regenerated LW	+54	+54	+49	+50	+49	+48	+47	+40
= LW in duct after secondary attenuator	72	55	49	50	49	48	47	40
- Duct loss 0.5mx1.5m x 5M (unlagged)	-6	-4	-2	-1	-1	-1	-1	-1
=	66	51	47	49	48	47	46	39
+ Duct regenerated LW	+38	+37	+32	+31	+29	+27	+24	+20
=	66	51	47	49	48	47	46	39
- Mitre Bend 0.45m	-0	-1	-5	-8	-4	-3	-3	-3
=	66	50	42	41	44	44	43	36
+ Bend regenerated LW	+58	+57	+52	+51	+49	+47	+44	+40
=	67	58	52	51	50	49	47	41
- Duct loss 1.1mx0.45m x 6M (unlagged)	-9	-6	-3	-2	-2	-2	-2	-2
=	58	52	49	49	48	47	45	39
+ Duct regenerated LW	+38	+37	+32	+31	+29	+27	+24	+20
=	58	52	49	49	48	47	45	39

Atmos Lp calculated by others

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/05/03 AHU/05/01 Exhaust

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Exhaust:								
DALAIR SWL	94	90	87	87	84	79	73	62
- Primary Attenuator Insertion loss	9	16	27	38	43	30	24	15
=	85	73	60	49	41	49	49	47
+ Attenuator self regenerated LW (at 5.2m3/s total airflow)	+56	+56	+51	+52	+51	+50	+49	+42
= LW in duct after primary attenuator	85	73	61	54	51	53	52	48
- Mitre Bend 0.5m	-0	-1	-5	-8	-4	-3	-3	-3
=	85	72	56	46	47	50	49	45
+ Bend regenerated LW	+58	+57	+52	+51	+49	+47	+44	+40
=	85	72	57	52	51	52	50	46
- Secondary Attenuator Insertion Loss	-13	-22	-34	-47	-55	-44	-35	-21
=	72	50	23	5	0	8	15	25
+ Attenuator regenerated LW	+54	+54	+49	+50	+49	+48	+47	+40
= LW in duct after secondary attenuator	72	55	49	50	49	48	47	40
- Duct loss 0.5mx1.5m x 5M (unlagged)	-6	-4	-2	-1	-1	-1	-1	-1
=	66	51	47	49	48	47	46	39
+ Duct regenerated LW	+38	+37	+32	+31	+29	+27	+24	+20
=	66	51	47	49	48	47	46	39
- Mitre Bend 0.45m	-0	-1	-5	-8	-4	-3	-3	-3
=	66	50	42	41	44	44	43	36
+ Bend regenerated LW	+58	+57	+52	+51	+49	+47	+44	+40
=	67	58	52	51	50	49	47	41
- Duct loss 1.1mx0.45m x 6M (unlagged)	-9	-6	-3	-2	-2	-2	-2	-2
=	58	52	49	49	48	47	45	39
+ Duct regenerated LW	+38	+37	+32	+31	+29	+27	+24	+20
=	58	52	49	49	48	47	45	39
To Atmos								
End Reflection (1.1mx0.45m)	-6	-2	0	0	0	0	0	0
- Distance 1m attenuation	-11	-11	-11	-11	-11	-11	-11	-11
- Directivity	0	0	0	0	0	0	0	0
+ Plane Source	+3	+3	+3	+3	+3	+3	+3	+3

+ contribution from other sources	+3	+3	+3	+3	+3	+3	+3	+3
= Resultant Lp at 1m from exhaust louvre	**47**	**45**	**44**	**44**	**43**	**42**	**40**	**34**
Equates to 49dBA at 1m distance								

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/05/13 AHU/05/04 FAI

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
FAI:								
DALAIR SWL	86	86	83	84	77	71	63	54
- Mitre Bend 1.5m	-1	-5	-8	-4	-3	-3	-3	-3
=	85	81	75	80	74	68	60	51
- Primary Attenuator Insertion loss	9	16	27	38	43	30	24	15
=	76	65	48	42	31	38	36	36
+ Attenuator self regenerated LW (at 3.8m3/s total airflow)	+48	+48	+43	+44	+43	+42	+41	+34
= LW in duct after primary attenuator	76	65	49	46	43	43	41	38
- Secondary Attenuator Insertion Loss	-13	-22	-34	-47	-55	-44	-35	-21
=	63	43	15	0	0	0	6	17
+ Attenuator regenerated LW	+46	+46	+41	+42	+41	+40	+39	+32
= LW in duct after secondary attenuator	63	48	41	42	41	40	39	32

Atmos Lp calculated by others

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/05/13 AHU/05/04 FAI

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
FAI:								
DALAIR SWL	86	86	83	84	77	71	63	54
- Mitre Bend 1.5m	-1	-5	-8	-4	-3	-3	-3	-3
=	85	81	75	80	74	68	60	51
- Primary Attenuator Insertion loss	9	16	27	38	43	30	24	15
=	76	65	48	42	31	38	36	36
+ Attenuator self regenerated LW (at 3.8m3/s total airflow)	+48	+48	+43	+44	+43	+42	+41	+34
= LW in duct after primary attenuator	76	65	49	46	43	43	41	38
- Secondary Attenuator Insertion Loss	-13	-22	-34	-47	-55	-44	-35	-21
=	63	43	15	0	0	0	6	17
+ Attenuator regenerated LW	+46	+46	+41	+42	+41	+40	+39	+32
= LW in duct after secondary attenuator	63	48	41	42	41	40	39	32
To Atmos								
- End Reflection (1.5mx0.5m)	-5	-1	0	0	0	0	0	0
- Distance 1m attenuation	-11	-11	-11	-11	-11	-11	-11	-11
- Directivity	0	0	0	0	0	0	0	0
+ Plane Source	+3	+3	+3	+3	+3	+3	+3	+3
+ contribution from other sources	+3	+3	+3	+3	+3	+3	+3	+3
= Resultant Lp at 1m from intake louvre	**53**	**42**	**36**	**37**	**36**	**35**	**34**	**27**
Equates to 42dBA at 1m distance								

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/05/16 AHU/05/04 Exhaust

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Exhaust:								
DALAIR SWL	92	87	83	81	77	72	66	56
- Primary Attenuator Insertion loss	9	16	27	38	43	30	24	15
=	83	71	56	43	34	42	42	41
+ Attenuator self regenerated LW (at 3.8m3/s total airflow)	+48	+48	+43	+44	+43	+42	+41	+34
= LW in duct after primary attenuator	83	71	56	47	44	45	45	42
- Mitre Bend 0.5m	-0	-1	-5	-8	-4	-3	-3	-3
=	85	72	56	46	47	50	49	45
+ Bend regenerated LW	+50	+49	+44	+43	+41	+39	+36	+32
=	82	72	56	48	48	50	49	45
- Secondary Attenuator Insertion Loss	-13	-22	-34	-47	-55	-44	-35	-21
=	69	50	22	1	0	6	14	24
+ Attenuator regenerated LW	+46	+46	+41	+42	+41	+40	+39	+32
= LW in duct after secondary attenuator	69	51	41	42	41	40	39	33
- Duct loss 0.5mx1.5m x 4.5M (unlagged)	-7	-4	-3	-1	-1	-1	-1	-1
=	62	47	38	41	40	39	38	32
+ Duct regenerated LW	+30	+29	+24	+23	+21	+19	+16	+12
=	62	47	38	41	40	39	38	32
- Mitre Bend 0.45m	-0	-1	-5	-8	-4	-3	-3	-3
=	62	46	33	33	36	36	35	29
+ Bend regenerated LW	+52	+51	+46	+45	+43	+41	+38	+34
=	62	52	47	46	44	42	40	35
- Duct loss 1.1mx0.45m x 6M (unlagged)	-9	-6	-3	-2	-2	-2	-2	-2
=	53	56	44	44	42	40	38	33
+ Duct regenerated LW	+30	+29	+24	+23	+21	+19	+16	+12
=	53	56	44	44	42	40	38	33

Atmos Lp calculated by others

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/05/16 AHU/05/04 Exhaust

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Exhaust:								
DALAIR SWL	92	87	83	81	77	72	66	56
- Primary Attenuator Insertion loss	9	16	27	38	43	30	24	15
=	83	71	56	43	34	42	42	41
+ Attenuator self regenerated LW (at 3.8m3/s total airflow)	+48	+48	+43	+44	+43	+42	+41	+34
= LW in duct after primary attenuator	83	71	56	47	44	45	45	42
- Mitre Bend 0.5m	-0	-1	-5	-8	-4	-3	-3	-3
=	85	72	56	46	47	50	49	45
+ Bend regenerated LW	+50	+49	+44	+43	+41	+39	+36	+32
=	82	72	56	48	48	50	49	45
- Secondary Attenuator Insertion Loss	-13	-22	-34	-47	-55	-44	-35	-21
=	69	50	22	1	0	6	14	24
+ Attenuator regenerated LW	+46	+46	+41	+42	+41	+40	+39	+32
= LW in duct after secondary attenuator	69	51	41	42	41	40	39	33
- Duct loss 0.5mx1.5m x 4.5M (unlagged)	-7	-4	-3	-1	-1	-1	-1	-1
=	62	47	38	41	40	39	38	32
+ Duct regenerated LW	+30	+29	+24	+23	+21	+19	+16	+12
=	62	47	38	41	40	39	38	32
- Mitre Bend 0.45m	-0	-1	-5	-8	-4	-3	-3	-3
=	62	46	33	33	36	36	35	29
+ Bend regenerated LW	+52	+51	+46	+45	+43	+41	+38	+34
=	62	52	47	46	44	42	40	35
- Duct loss 1.1mx0.45m x 6M (unlagged)	-9	-6	-3	-2	-2	-2	-2	-2
=	53	56	44	44	42	40	38	33
+ Duct regenerated LW	+30	+29	+24	+23	+21	+19	+16	+12
=	53	56	44	44	42	40	38	33
To Atmos								
End Reflection (1.1mx0.45m)	-6	-2	0	0	0	0	0	0
- Distance 1m attenuation	-11	-11	-11	-11	-11	-11	-11	-11
- Directivity	0	0	0	0	0	0	0	0
+ Plane Source	+3	+3	+3	+3	+3	+3	+3	+3

+ contribution from other sources	+3	+3	+3	+3	+3	+3	+3	+3
= Resultant Lp at 1m from exhaust louvre	**42**	**49**	**39**	**39**	**37**	**35**	**33**	**28**
Equates to 43dBA at 1m distance								

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/B2/05 AHU/B2/03 FAI

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
FAI:								
DALAIR SWL	92	91	89	91	86	83	78	71
- Attenuator Insertion loss	13	21	33	47	55	45	33	20
=	79	70	56	44	31	38	45	51
+ Attenuator self regenerated LW (at 8.7m3/s total airflow – combined with AHU/B2/04)	+56	+56	+51	+52	+51	+50	+49	+42
= LW in duct after attenuator	79	70	57	53	51	50	50	52
- Mitre Bend 1m	-1	-5	-8	-4	-3	-3	-3	-3
=	78	65	49	49	48	47	47	49
+ Bend regenerated LW	+53	+52	+47	+46	+44	+42	+39	+35
=	78	65	51	51	49	48	48	49
- Mitre Bend 1.8m	-5	-8	-4	-3	-3	-3	-3	-3
=	73	57	47	48	46	45	45	46
+ Bend regenerated LW	+53	+52	+47	+46	+44	+42	+39	+35
=	73	58	50	50	48	47	46	47
- Duct loss 1.8mx1m x 3Ml (unlagged)	-3	-2	-1	-1	-1	-1	-1	-1
=	70	56	49	49	47	46	45	46
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	70	56	49	49	47	46	45	46
- Duct loss 2.7mx0.65m x 3Ml (unlagged)	-3	-2	-2	-1	-1	-1	-1	-1
=	67	54	47	48	46	45	44	45
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	67	54	47	48	46	45	44	45
- Mitre Bend 0.65m	0	-1	-5	-8	-4	-3	-3	-3
=	67	53	42	40	42	42	41	42
+ Bend regenerated LW	+53	+52	+47	+46	+44	+42	+39	+35
=	67	56	48	47	46	45	43	43
- Duct loss 2.7mx0.65m x 7Ml (unlagged)	-8	-5	-4	-1	-1	-1	-1	-1
=	59	51	44	46	45	44	42	42
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	59	51	44	46	45	44	42	42
- Acoustic Louvre (L/01/05)	-5	-6	-8	-11	-18	-25	-20	-16
=	53	45	36	35	27	19	22	26
+ Louvre Regen (ARUP spec max Lw)	+55	+45	+40	+42	+40	+32	+30	+30
=	57	48	41	43	40	32	31	31

Atmos Lp calculated by others

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/B2/05 AHU/B2/03 FAI

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
FAI:								
DALAIR SWL	92	91	89	91	86	83	78	71
- Attenuator Insertion loss	13	21	33	47	55	45	33	20
=	79	70	56	44	31	38	45	51
+ Attenuator self regenerated LW (at 8.7m3/s total airflow – combined with AHU/B2/04)	+56	+56	+51	+52	+51	+50	+49	+42
= LW in duct after attenuator	79	70	57	53	51	50	50	52
- Mitre Bend 1m	-1	-5	-8	-4	-3	-3	-3	-3
=	78	65	49	49	48	47	47	49
+ Bend regenerated LW	+53	+52	+47	+46	+44	+42	+39	+35
=	78	65	51	51	49	48	48	49
- Mitre Bend 1.8m	-5	-8	-4	-3	-3	-3	-3	-3
=	73	57	47	48	46	45	45	46
+ Bend regenerated LW	+53	+52	+47	+46	+44	+42	+39	+35
=	73	58	50	50	48	47	46	47
- Duct loss 1.8mx1m x 3Ml (unlagged)	-3	-2	-1	-1	-1	-1	-1	-1
=	70	56	49	49	47	46	45	46
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	70	56	49	49	47	46	45	46
- Duct loss 2.7mx0.65m x 3Ml (unlagged)	-3	-2	-2	-1	-1	-1	-1	-1
=	67	54	47	48	46	45	44	45
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	67	54	47	48	46	45	44	45
- Mitre Bend 0.65m	0	-1	-5	-8	-4	-3	-3	-3
=	67	53	42	40	42	42	41	42
+ Bend regenerated LW	+53	+52	+47	+46	+44	+42	+39	+35
=	67	56	48	47	46	45	43	43
- Duct loss 2.7mx0.65m x 7Ml (unlagged)	-8	-5	-4	-1	-1	-1	-1	-1
=	59	51	44	46	45	44	42	42
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	59	51	44	46	45	44	42	42
- Acoustic Louvre (L/01/05)	-5	-6	-8	-11	-18	-25	-20	-16
=	53	45	36	35	27	19	22	26
+ Louvre Regen (8.7m3/s)	+57	+56	+55	+53	+54	+54	+52	+44
=	58	56	55	53	54	54	52	44
To Atmos								
- End Reflection (2.7mx0.5m)	-5	-1	0	0	0	0	0	0

- Distance 1m attenuation	-11	-11	-11	-11	-11	-11	-11	-11
- Directivity	0	0	0	0	0	0	0	0
+ Plane Source	+3	+3	+3	+3	+3	+3	+3	+3
+ contribution from other sources	+3	+3	+3	+3	+3	+3	+3	+3
= Resultant Lp at 1m from intake louvre	**48**	**50**	**50**	**48**	**49**	**49**	**47**	**39**
Equates to 55dBA at 1m distance								

Allaway Acoustics Ltd

Acoustical Analysis

Room Noise Calculation – ATT/B2/06 AHU/B2/03 SUPPLY

Calculation to Experimental Chemistry

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
SUPPLY:								
Dalair SWL	99	93	90	89	86	82	77	69
- Attenuator Insertion loss	-14	-24	-34	-47	-55	-54	-41	-29
=	75	69	56	42	31	28	36	40
+ Attenuator self regenerated LW (at 5.5m3/s total airflow)	+41	+41	+36	+37	+36	+35	+34	+27
= LW in duct after attenuator	75	69	56	43	37	36	38	40
- LW split 15% into 0.400m	-8	-9	-9	-13	-16	-12	-11	-11
=	67	60	47	30	21	24	27	29
+ Bend regenerated LW	+31	+30	+25	+24	+22	+20	+17	+13
=	67	60	47	31	26	25	27	29
- Duct loss 0.7mx0.3m x 5M (lagged)	-12	-8	-4	-2	-2	-2	-2	-2
=	55	52	43	29	24	23	25	27
+ Duct regenerated LW	+18	+17	+12	+11	+9	+7	+4	+0
=	55	52	43	29	24	23	25	27
- LW split 67% into 0.35m	-2	-2	-3	-7	-10	-6	-5	-5
=	53	50	40	22	14	17	20	22
+ Bend regenerated LW	+31	+30	+25	+24	+22	+20	+17	+13
=	53	50	40	26	22	21	22	22
- Mitre Bend 0.7m	0	-1	-5	-8	-4	-3	-3	-3
=	53	49	35	18	18	18	19	19
+ Bend regenerated LW	+31	+30	+25	+24	+22	+20	+17	+13
=	53	49	35	25	23	22	21	20
- LW split 66% into 0.315m	-2	-2	-3	-7	-10	-6	-5	-5
=	51	47	32	18	13	16	16	15
+ Bend regenerated LW	+30	+29	+24	+23	+21	+19	+13	+12
=	51	47	33	24	22	21	18	17
+ TROX VAV/B1/13 Lw	+59	+54	+49	+47	+45	+43	+41	+38
=	60	55	49	47	45	43	41	38
- LW split 50% into 0.355m	-3	-3	-4	-8	-11	-7	-6	-6
=	57	52	45	39	34	36	35	32
+ Bend regenerated LW	+7	+6	+1	0	0	0	0	0
=	57	52	45	39	34	36	35	32
- LW split 50% into 0.250m	-3	-3	-4	-8	-11	-7	-6	-6
=	54	49	41	31	23	29	29	26
+ Bend regenerated LW	+7	+6	+1	0	0	0	0	0
=	54	49	41	31	23	29	29	26
To Room								
End Reflection 0.25m	-12	-8	-4	0	0	0	0	0
Distance to listener 1.5m	-2	-2	-2	-2	-2	-2	-2	-2
Room Volume (8x6x2.6)	-10	-10	-10	-10	-10	-10	-10	-10

Other Grilles on system (3)	+5	+5	+5	+5	+5	+5	+5	+5
Other Sources (2)	+4	+4	+4	+4	+4	+4	+4	+4
Room Condition (Live)	+11	+10	+8	+8	+7	+6	+5	+4
= Room Sound Pressure Level	**50**	**48**	**42**	**40**	**27**	**32**	**31**	**27**
Equates to NR35								

SG/B1/70 – 76 published noise NR33
Potential resultant room noise level = NR37

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/B2/08 AHU/B2/03 Exhaust

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Exhaust:								
DALAIR SWL	95	89	86	85	82	78	73	65
- Mitre Bend 1.3m	-1	-5	-8	-4	-3	-3	-3	-3
=	94	84	78	81	79	75	70	62
+ Bend regenerated LW	+42	+41	+36	+35	+33	+31	+28	+24
=	94	84	78	81	79	75	70	62
- Mitre Bend 0.9m	-1	-5	-8	-4	-3	-3	-3	-3
=	93	79	70	77	76	72	67	59
+ Bend regenerated LW	+42	+41	+36	+35	+33	+31	+28	+24
=	93	79	70	77	76	72	67	59
- Primary Attenuator Insertion loss	8	14	21	26	29	20	14	8
=	85	65	49	51	47	52	53	51
+ Attenuator self regenerated LW (at 7.2m3/s total airflow – combined AHU/B2/04)	+57	+57	+52	+53	+52	+51	+50	+43
= LW in duct after primary attenuator	85	66	54	55	53	55	55	52
- Secondary Attenuator Insertion loss	8	14	21	26	29	20	14	8
=	78	52	33	29	24	35	41	44
+ Attenuator self regenerated LW (at 7.2m3/s total airflow – combined AHU/B2/04)	+57	+57	+52	+53	+52	+51	+50	+43
= LW in duct after secondary attenuator	78	58	52	53	52	51	51	47
- Duct loss 1.3mx0.9m x 3Ml (unlagged)	-3	-2	-1	-1	-1	-1	-1	-1
=	75	56	51	52	51	50	50	46
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	75	56	51	52	51	50	50	46
- Duct loss 2.4mx0.45m x 3Ml (unlagged)	-4	-3	-2	-1	-1	-1	-1	-1
=	71	53	49	51	50	49	49	45
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	71	53	49	51	50	49	49	45
- Mitre Bend 0.45m	0	-1	-5	-8	-4	-3	-3	-3
=	71	52	44	43	46	46	46	42
+ Bend regenerated LW	+59	+58	+53	+52	+50	+48	+45	+41

=	71	59	54	53	51	50	49	45
- Duct loss 2.4mx0.45m x 7Ml (unlagged)	-10	-7	-4	-2	-2	-2	-2	-2
=	61	52	50	51	49	48	47	43
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	61	52	50	51	49	48	47	43

Atmos Lp calculated by others

Allaway Acoustics Ltd

Acoustical Analysis

Atmosphere Noise Calculation – ATT/B2/08 AHU/B2/03 Exhaust

Component	Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
Exhaust:								
DALAIR SWL	95	89	86	85	82	78	73	65
- Mitre Bend 1.3m	-1	-5	-8	-4	-3	-3	-3	-3
=	94	84	78	81	79	75	70	62
+ Bend regenerated LW	+42	+41	+36	+35	+33	+31	+28	+24
=	94	84	78	81	79	75	70	62
- Mitre Bend 0.9m	-1	-5	-8	-4	-3	-3	-3	-3
=	93	79	70	77	76	72	67	59
+ Bend regenerated LW	+42	+41	+36	+35	+33	+31	+28	+24
=	93	79	70	77	76	72	67	59
- Primary Attenuator Insertion loss	8	14	21	26	29	20	14	8
=	85	65	49	51	47	52	53	51
+ Attenuator self regenerated LW (at 7.2m3/s total airflow – combined AHU/B2/04)	+57	+57	+52	+53	+52	+51	+50	+43
= LW in duct after primary attenuator	85	66	54	55	53	55	55	52
- Secondary Attenuator Insertion loss	8	14	21	26	29	20	14	8
=	78	52	33	29	24	35	41	44
+ Attenuator self regenerated LW (at 7.2m3/s total airflow – combined AHU/B2/04)	+57	+57	+52	+53	+52	+51	+50	+43
= LW in duct after secondary attenuator	78	58	52	53	52	51	51	47
- Duct loss 1.3mx0.9m x 3Ml (unlagged)	-3	-2	-1	-1	-1	-1	-1	-1
=	75	56	51	52	51	50	50	46
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	75	56	51	52	51	50	50	46
- Duct loss 2.4mx0.45m x 3Ml (unlagged)	-4	-3	-2	-1	-1	-1	-1	-1
=	71	53	49	51	50	49	49	45
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	71	53	49	51	50	49	49	45
- Mitre Bend 0.45m	0	-1	-5	-8	-4	-3	-3	-3
=	71	52	44	43	46	46	46	42
+ Bend regenerated LW	+59	+58	+53	+52	+50	+48	+45	+41

=	71	59	54	53	51	50	49	45
- Duct loss 2.4mx0.45m x 7Ml (unlagged)	-10	-7	-4	-2	-2	-2	-2	-2
=	61	52	50	51	49	48	47	43
+ Duct regenerated LW	+33	+32	+27	+26	+24	+22	+19	+15
=	61	52	50	51	49	48	47	43
To Atmos								
End Reflection (2.4mx0.45m)	-4	0	0	0	0	0	0	0
- Distance 1m attenuation	-11	-11	-11	-11	-11	-11	-11	-11
- Directivity	0	0	0	0	0	0	0	0
+ Plane Source	+3	+3	+3	+3	+3	+3	+3	+3
+ contribution from other sources	+3	+3	+3	+3	+3	+3	+3	+3
= Resultant Lp at 1m from exhaust louvre	**52**	**47**	**45**	**46**	**44**	**43**	**42**	**38**
Equates to 50dBA at 1m distance								

APPENDIX 2

Unit noise test data

Norsonic 840 Measurement Report - Circuit 2

Norsonic 840 Measurement Report - Circuit 1

Dual Source Calculator

Third Band Distance Calculator

- Airedale will remove all punched logos on chiller casework.

View of chiller. 2No to be mounted on roof.

Measurement Report of Sound Power Levels

Sound power of TURBOCHILL was measured 29/01/13 at CHILLER TEST BAY.
The measurement was carried out in accordance with standard ISO 9614-1.

The report is divided into six paragraphs as follows:

1. Source of noise
2. Acoustic environment
3. Instrumentation
4. Measurement procedure
5. Acoustic data

1. Source of noise

a) Description of the source

Name, model, serial number: TURBOCHILL, TTC23E514X70, 63232613.
Manufacturer, year of manufacture: AIREDALE, 2013.

Technical data

b) Description of the source under test

TTC23E514X70

Shape and dimensions : Parallelepiped, length 8.10 m, width 2.20 m, height 2.60 m.
Measurement surface : Parallelepiped, length 9.10 m, width 3.20 m, height 3.10 m.
Number of points: 40
The distribution of points on the surface is shown in Fig.1.
The coordinates of points and corresponding surface are given in Table 1.

c) Noise characteristic

Variability: No
Occurrence of cycle: No
Tonal quality: No

d) Operating conditions

2 COMPRESSORS 51% FANS 700RPM

e) Montage

ANTI VIBRATION MOUNTS

2. Acoustic environment

a) Environment description

b) Description of extraneous noise sources

c) Temperature, pressure, and humidity of air

Temperature: 28.0 °C
Air pressure: 101.0 kPa
Relative humidity: 45.0 %

d) Wind

Velocity: 0.0 m/s
Direction:

e) Devices and procedures to reduce extraneous noise

f) Description of gas / air flow

3. Instruments

a) Description of instruments (type, serial number, manufacturer)

Analyser: Real Time Analyser, nor 840, 18759, Norsonic, Norway
Probe: 50 AI, 6643, G.R.A.S., Denmark
Principle of probe: p - p
Microphones: 40 AI, 14733 / 14744, G.R.A.S., Denmark
Microphone calibrator: Nor-1251, 15300, Norsonic, Norway
Intensity calibrator: Nor-1254, 6879, Norsonic, Norway

Form of wind screen used:

Mounting of the intensity probe:

b) Calibration

Date: 29/01/13
Place: TEST CENTRE

Calibration of microphones

Calibration level: 114.0 dB
Frequency: 250 Hz
Sensitivity of channel A: -32.4 dB
Sensitivity of channel B: -32.9 dB

Using the intensity calibrator.

The instrument was suited for class 1 according to IEC 1043.

The results in the form P -RI index are in Table 2.

c) Pressure - residual intensity index

The results of measurement in the form P - RI index are in Table 2.

d) Place and date of the verification of the intensity measurement device

GRAS Denmark, 07/02/99

4. Measurement procedure

Description of the measurement

Setup of measurement

Bandwidth: 1/3 octave
Time constant: 1/8s F
Frequency range: 50 - 6300 Hz

1st measurement

Spacer length: 100 mm
Averaging time: 35 s
Frequency range: 50 - 500 Hz

2nd measurement

Spacer length: 8 mm
Averaging time: 4 s
Frequency range: 630 - 6300 Hz

Measurement of temporal variability of the sound field

F1 was not carried out.

5. Acoustic data

a) Table of indicators

The field indicators F1 to F4 and criterions are given in Table 3.

b) Sound power levels

Frequency range: 50 - 6300 Hz
Total sound power
LW: 86.9 dB

LW (A): 80.4 dB (A)

The calculated values of sound power level in all frequency bands are given in Fig. 3 and also in Table 4.

c) The predicted uncertainty in the sound power level determined

In table 4 are stated the maximum uncertainties predicted according to ISO 9614 - 1 (table 2 or equation B.3 of standard).

Sound power of TURBOCHILL was measured 29/01/13 at CHILLER TEST BAY.
The measurement was carried out in accordance with standard ISO 9614-1.

The report is divided into six paragraphs as follows:

1. Source of noise
2. Acoustic environment
3. Instrumentation
4. Measurement procedure
5. Acoustic data

1. Source of noise

a) Description of the source

Name, model, serial number: TURBOCHILL, TTC23E514X70, 63232613.
Manufacturer, year of manufacture: AIREDALE, 2013.

Technical data

b) Description of the source under test

TTC23E514X70

Shape and dimensions : Parallelepiped, length 8.10 m, width 2.20 m, height 2.60 m.
Measurement surface : Parallelepiped, length 9.10 m, width 3.20 m, height 3.10 m.
Number of points: 40
The distribution of points on the surface is shown in Fig.1.
The coordinates of points and corresponding surface are given in Table 1.

c) Noise characteristic

Variability: No
Occurrence of cycle: No
Tonal quality: No

d) Operating conditions

2 COMPRESSORS 51% FANS 700RPM

e) Montage

ANTI VIBRATION MOUNTS

2. Acoustic environment

a) Environment description

CHILLER TEST BAY NEXT TO PRODUCTION AREA

b) Description of extraneous noise sources

c) Temperature, pressure, and humidity of air

Temperature: 28.0 °C

Air pressure: 101.0 kPa
Relative humidity: 45.0 %

d) Wind

Velocity: 0.0 m/s
Direction:

e) Devices and procedures to reduce extraneous noise

f) Description of gas / air flow

3. Instruments

a) Description of instruments (type, serial number, manufacturer)

Analyser: Real Time Analyser, nor 840, 18759, Norsonic, Norway
Probe: 50 AI, 6643, G.R.A.S., Denmark
Principle of probe: p - p
Microphones: 40 AI, 14733 / 14744, G.R.A.S., Denmark
Microphone calibrator: Nor-1251, 15300, Norsonic, Norway
Intensity calibrator: Nor-1254, 6879, Norsonic, Norway

Form of wind screen used:

Mounting of the intensity probe:

b) Calibration

Date: 29/01/13
Place: TEST CENTRE

Calibration of microphones

Calibration level: 114.0 dB
Frequency: 250 Hz
Sensitivity of channel A: -32.4 dB
Sensitivity of channel B: -32.9 dB

Intensity calibration

Using the intensity calibrator.
The instrument was suited for class 1 according to IEC 1043.
The results in the form P -RI index are in Table 2.

c) Pressure - residual intensity index

The results of measurement in the form P - RI index are in Table 2.

d) Place and date of the verification of the intensity measurement device

GRAS Denmark, 07/02/99

4. Measurement procedure

Description of the measurement

Setup of measurement

Bandwidth: 1/3 octave
Time constant: 1/8s F
Frequency range: 50 - 6300 Hz

1st measurement

Spacer length: 100 mm
Averaging time: 35 s
Frequency range: 50 - 500 Hz

2nd measurement

Spacer length: 8 mm
Averaging time: 4 s
Frequency range: 630 - 6300 Hz

Measurement of temporal variability of the sound field

Point: 25
Number of samples: 10

5. Acoustic data

a) Table of indicators

The field indicators F1 to F4 and criterions are given in Table 3.

b) Sound power levels

Frequency range: 50 - 6300 Hz
Total sound power
LW: 90.7 dB

LW (A): 83.4 dB (A)

The calculated values of sound power level in all frequency bands are given in Fig. 3 and also in Table 4.

c) The predicted uncertainty in the sound power level determined

In table 4 are stated the maximum uncertainties predicted according to ISO 9614 - 1 (table 2 or equation B.3 of standard).

TTC23E514X70. 63232613. Dual Source calculator. Circuits 1 & 2

Noise Source No1				
Frequency Third Octave(hz)	dB value	Frequency Single Octave(hz)	dB value	dB(A) value
50	72.5			
63	86.8	*63*	*87.2*	61.2
80	74.6			
100	73.4			
125	80.3	*125*	*82.3*	66.3
160	76.3			
200	80.4			
250	78.8	*250*	*83.8*	74.8
315	77.4			
400	76			
500	74.6	*500*	*80.1*	77.1
630	75.3			
800	76			
1000	75.7	*1000*	*79.9*	79.9
1250	73.3			
1600	69.8			
2000	67.9	*2000*	*72.9*	73.9
2500	65.7			
3150	64.2			
4000	63.2	*4000*	*69.5*	70.5
5000	66.2			
6300	62.0			
8000	60.0	*8000*	*65.1*	64.1
10k	58.2			
Overall			*90.7*	*83.50*

Noise Source No2				
Frequency Third Octave(hz)	dB value	Frequency Single Octave(hz)	dB value	dB(A) value
50	70.6			
63	82.4	*63*	*83.0*	57.0
80	70.9			
100	70.5			
125	75.8	*125*	*78.4*	62.4
160	73			
200	76.7			
250	75.6	*250*	*80.2*	71.2
315	73.4			
400	72.4			
500	72.1	*500*	*77.1*	74.1
630	72.5			
800	72.7			
1000	73.1	*1000*	*76.9*	76.9
1250	70			
1600	66.9			
2000	64.9	*2000*	*70.4*	71.4
2500	64.7			
3150	61.9			
4000	60.9	*4000*	*66.8*	67.8
5000	63.1			
6300	61.2			
8000	59.2	*8000*	*64.3*	63.3
10k	57.4			
Overall			*86.9*	*80.50*

Dual Noise Source No1 + No2				
Frequency Third Octave(hz)	dB value	Frequency Single Octave(hz)	dB value	dB(A) value
50	*74.7*			
63	*88.1*	*63*	*88.6*	62.6
80	*76.1*			
100	*75.2*			
125	*81.6*	*125*	*83.8*	67.8
160	*78.0*			
200	*81.9*			
250	*80.5*	*250*	*85.4*	76.4
315	*78.9*			
400	*77.6*			
500	*76.5*	*500*	*81.9*	78.9
630	*77.1*			
800	*77.7*			
1000	*77.6*	*1000*	*81.7*	81.7
1250	*75.0*			
1600	*71.6*			
2000	*69.7*	*2000*	*74.8*	75.8
2500	*68.2*			
3150	*66.2*			
4000	*65.2*	*4000*	*71.4*	72.4
5000	*67.9*			
6300	*64.6*			
8000	*62.6*	*8000*	*67.7*	66.7
10k	*60.8*			
Overall			*92.2*	*85.26*

Get Third Octave Values From 'Calculator' Worksheet

Noise Propogation

- ○ Hemi-Spherical
- ○ Linear Source
- ○ Spherical
- ◉ Cuboid Distribution

Information :

Michael J Lonsdale.TTC23E514X70.63232613.Circuit 1&2 @ 3 metres sound pressure

Enter Dimensions Of Source

L:	**8.1 metres**
W :	**2.2 metres**
H:	**2.6 metres**

Octave-Band Sound Power Level, dB		***Sound Power, dBA***		***Cuboid Sound Pressure @ 3 metres, dB***	***Cuboid Sound Pressure @ 3 metres, dBA***
63	*88.6*	*63Hz*	62.6	63	37
125	*83.8*	*125Hz*	67.8	58	42
250	*85.4*	*250Hz*	76.4	60	51
500	*81.9*	*500Hz*	78.9	56	53
1000	*81.7*	*1000Hz*	81.7	56	56
2000	*74.8*	*2000Hz*	75.8	49	50
4000	*71.4*	*4000Hz*	72.4	46	47
8000	*67.7*	*8000Hz*	66.7	42	41
Overall	*92.2*	***Overall***	*85.3*	*66.6*	*59.6*
	dB Only		**'A' Weighted**	**dB Only**	**'A' Weighted**

AMR/Q005/59999E13
Michael J Lonsdale Limited
British Museum - Smoke Extract

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Ref	Required Duty	Product Code	Motor Frame	Speed (rpm)	Sound Level (dB)	Motor Power (kW)	Full Load Current (A)	Starting Current (A)	Electrical Supply (V/Hz/ph)
ES/6A/01	115l/s @ 400Pa (static)	ILC - MS315L	Integral	2440		0.300	1.300		220-240/50/1
ES/6A/02	220l/s @ 650Pa (static)	ILC - MS355L	Integral	2340		0.610	2.600		220-240/50/1
ES/6A/03	110l/s @ 650Pa (static)	ILC - MS355L	Integral	2340		0.610	2.600		220-240/50/1
ES/6A/04	215l/s @ 400Pa (static)	35JM/16/2/5/8	(P) BT5	2840		0.215	1.420	3.300	220-240/50/1
ES/02/01	410l/s @ 400Pa (static)	40JM/16/2/5/8	(P) BT9	2840		0.480	3.100	6.700	220-240/50/1
ES/02/02	165l/s @ 650Pa (static)	ILC - MS355L	Integral	2340		0.610	2.600		220-240/50/1

AMR/Q005/59999E13 - ES/6A/01

British Museum - Smoke Extract
SuperLite - Tube Fans Metal
ILC - MS315L

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Product Specification

Requested Duty: 115l/s @ 400Pa (static)
Actual Duty: 132l/s @ 527Pa (static)
Obtained Duty: 115%

Fan Code: ILC - MS315L
Fan Diameter: 315 mm

Fan Speed: 2 Pole, 2440 rpm

Form of Running: B
Fan Casing: Long Cased
Motor Frame Size: Integral

Electrical Supply: 220-240volts 50Hz 1phase
Rated Motor Power: 0.300 kW
Full Load Current: 1.300 A

Start Type: Direct on Line

Peak Power: 0.300 kW

	Sound Power Level Spectrum (Lw)								Lw	LpA @ 3.00m
	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz		
Inlet	0dB	63dB	68dB	71dB	69dB	66dB	65dB	62dB	76dB	53dB
Outlet	0dB	62dB	67dB	65dB	68dB	67dB	64dB	64dB	74dB	52dB
Breakout	0dB	57dB	58dB	54dB	51dB	49dB	46dB	39dB	62dB	36dB

Special Features

Ancillaries & Price

	Qty	Price	Total
TF315011: SuperLite - Tube Fans Metal: ILC - MS315L	1.0		
Duct mounting clamps	2.0		
Key Information White/black/white Traffolyte Labels - Loose	1.0		

Despatch: 5.0 working weeks

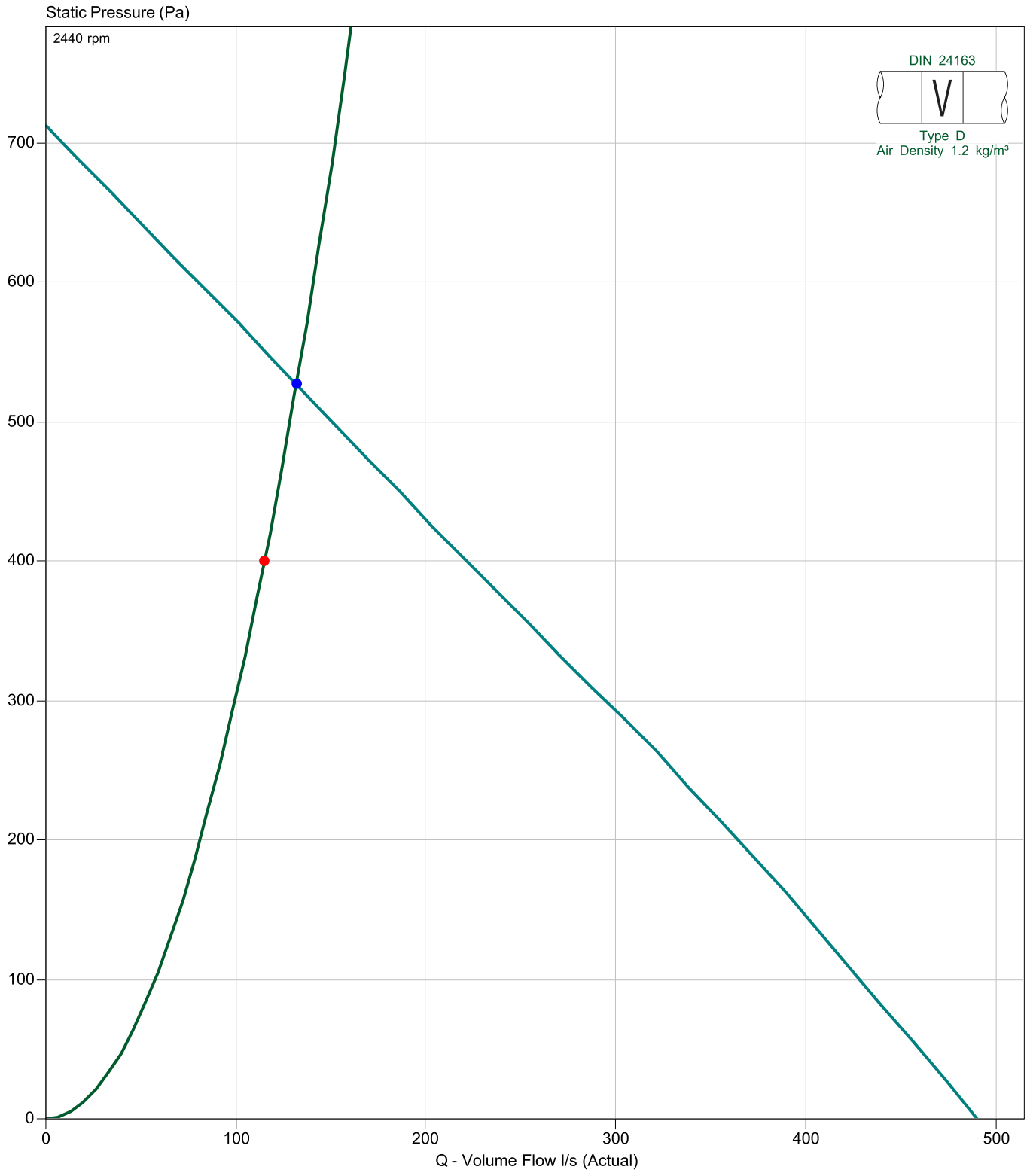
Performance and Sound Data are to BS 848 parts 1 & 2.
This offer is made subject to the terms and conditions detailed on the accompanying letter.

Fläkt Woods Limited

Performance Chart

SuperLite - Tube Fans Metal

Project Name	: British Museum	Date:	: Thursday, July 5, 2012
Quotation Number	: 59999E12	Fan Code	: ILC - MS315L
Customer	: Michael J Lonsdale Limited	Item Reference:	: ES/6A/01



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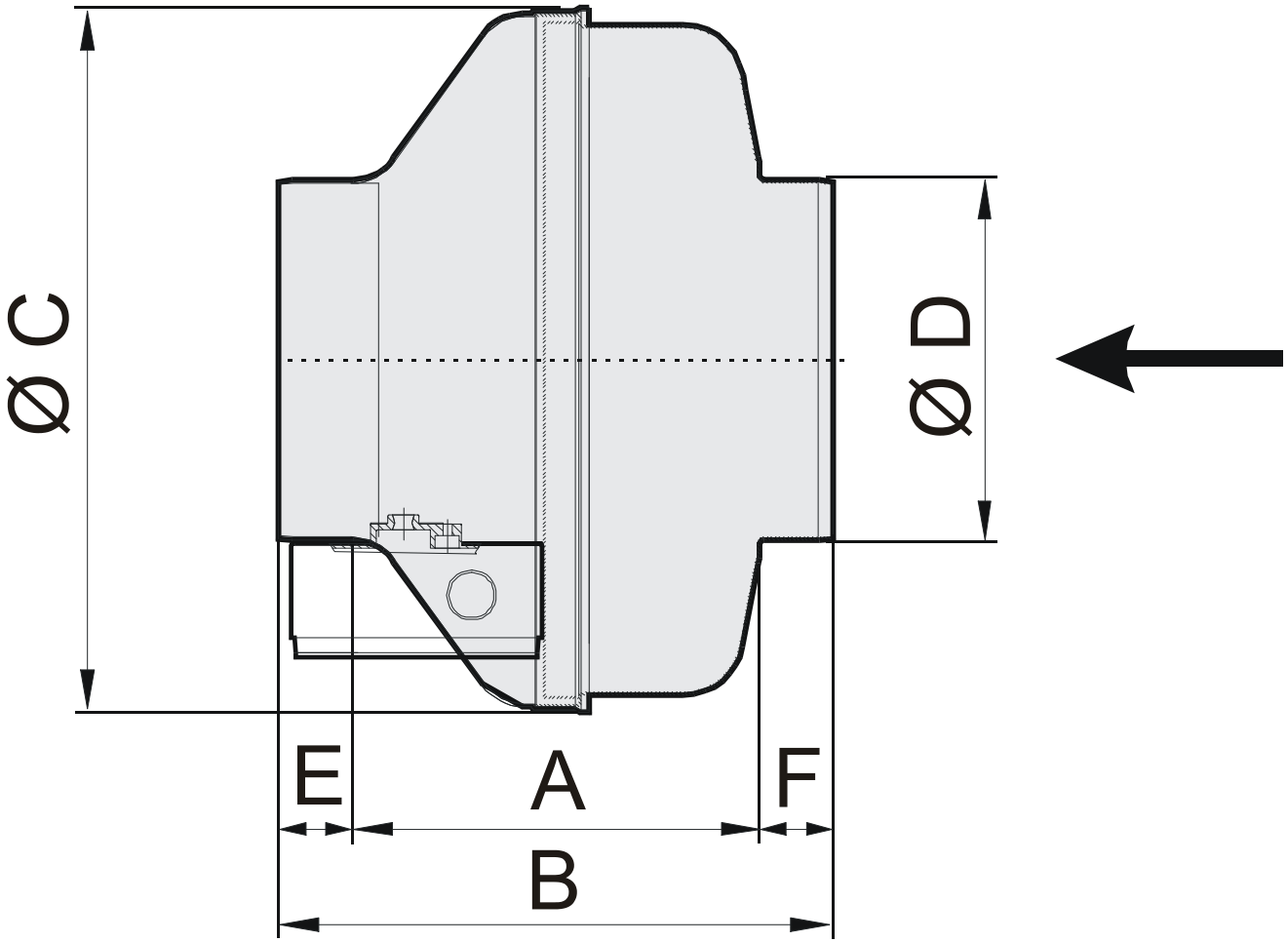
Fläkt Woods Limited

Drawing and Dimensions

SuperLite - Tube Fans Metal

Date:	:	Thursday, July 5, 2012
Fan Code	:	ILC - MS315L
Item Reference:	:	ES/6A/01

Project Name	:	British Museum
Quotation Number	:	59999E12
Customer	:	Michael J Lonsdale Limited



A	195
B	255
C	402
D	315
E	30
F	30
Weight	6

Notes : Dimensions shown in mm / Weight in kg

Reference :Catalogue drawing

This drawing shows dimensions that should be used as a guide only and are subject to change. Certified drawings are available on request.

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AMR/Q005/59999E13 - ES/6A/02

British Museum - Smoke Extract
SuperLite - Tube Fans Metal
ILC - MS355L

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Product Specification

Requested Duty: 220l/s @ 650Pa (static)
Actual Duty: 224l/s @ 674Pa (static)
Obtained Duty: 102%

Fan Code: ILC - MS355L
Fan Diameter: 355 mm

Fan Speed: 2 Pole, 2340 rpm

Form of Running: B
Fan Casing: Long Cased
Motor Frame Size: Integral

Electrical Supply: 220-240volts 50Hz 1phase
Rated Motor Power: 0.610 kW
Full Load Current: 2.600 A

Start Type: Direct on Line

Peak Power: 0.610 kW

	Sound Power Level Spectrum (Lw)								Lw	LpA @ 3.00m
	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz		
Inlet	0dB	72dB	78dB	72dB	70dB	64dB	62dB	56dB	80dB	54dB
Outlet	0dB	73dB	69dB	72dB	72dB	69dB	65dB	61dB	79dB	55dB
Breakout	0dB	62dB	65dB	60dB	61dB	57dB	54dB	41dB	69dB	44dB

Special Features

Ancillaries & Price

	Qty	Price	Total
TF355012: SuperLite - Tube Fans Metal: ILC - MS355L	1.0		
Duct mounting clamps	2.0		
Key Information White/black/white Traffolyte Labels - Loose	1.0		

Despatch: 5.0 working weeks

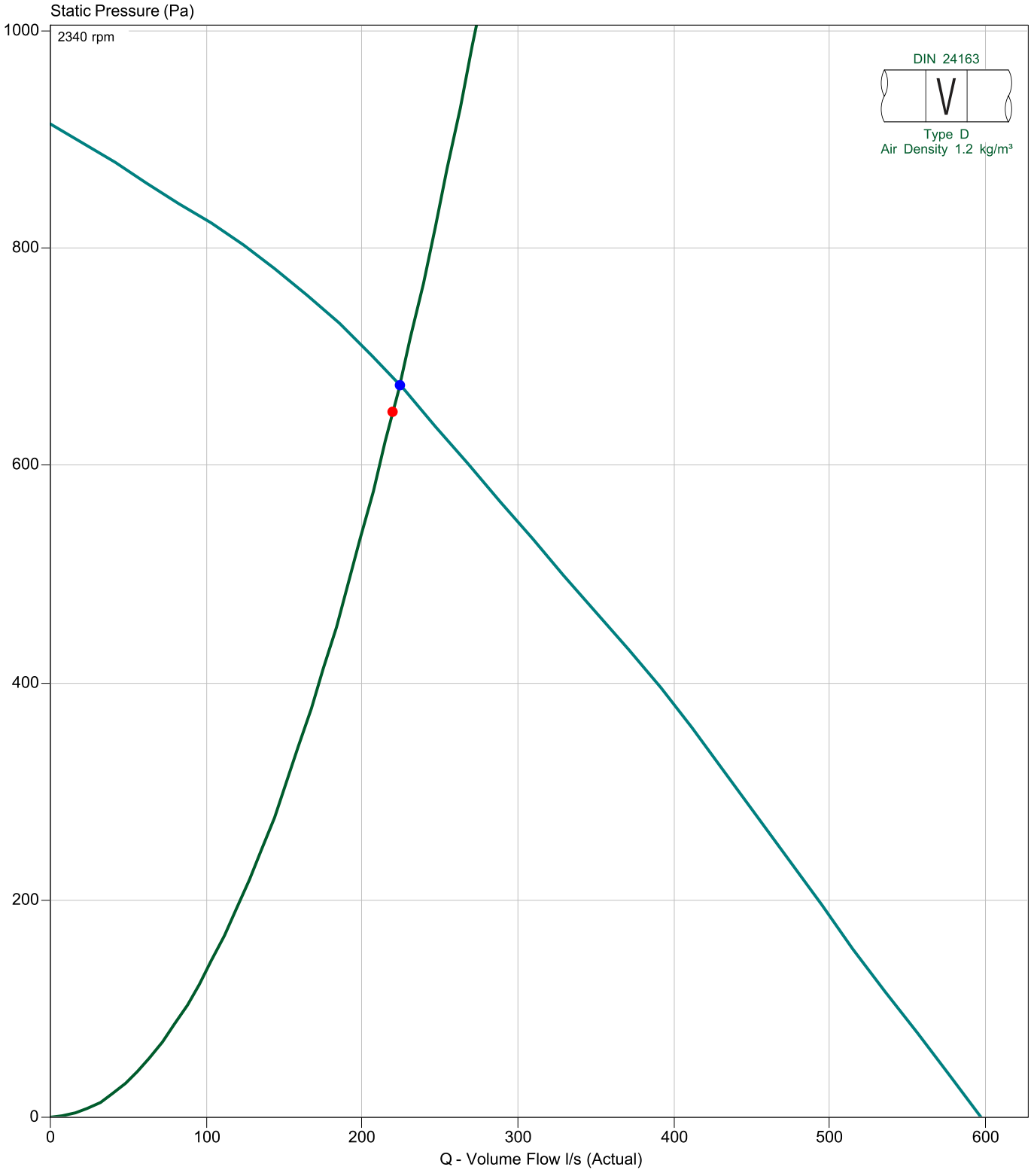
Performance and Sound Data are to BS 848 parts 1 & 2.
This offer is made subject to the terms and conditions detailed on the accompanying letter.

Fläkt Woods Limited

Performance Chart

SuperLite - Tube Fans Metal

Project Name	: British Museum	Date:	: Thursday, July 5, 2012
Quotation Number	: 59999E12	Fan Code	: ILC - MS355L
Customer	: Michael J Lonsdale Limited	Item Reference:	: ES/6A/02



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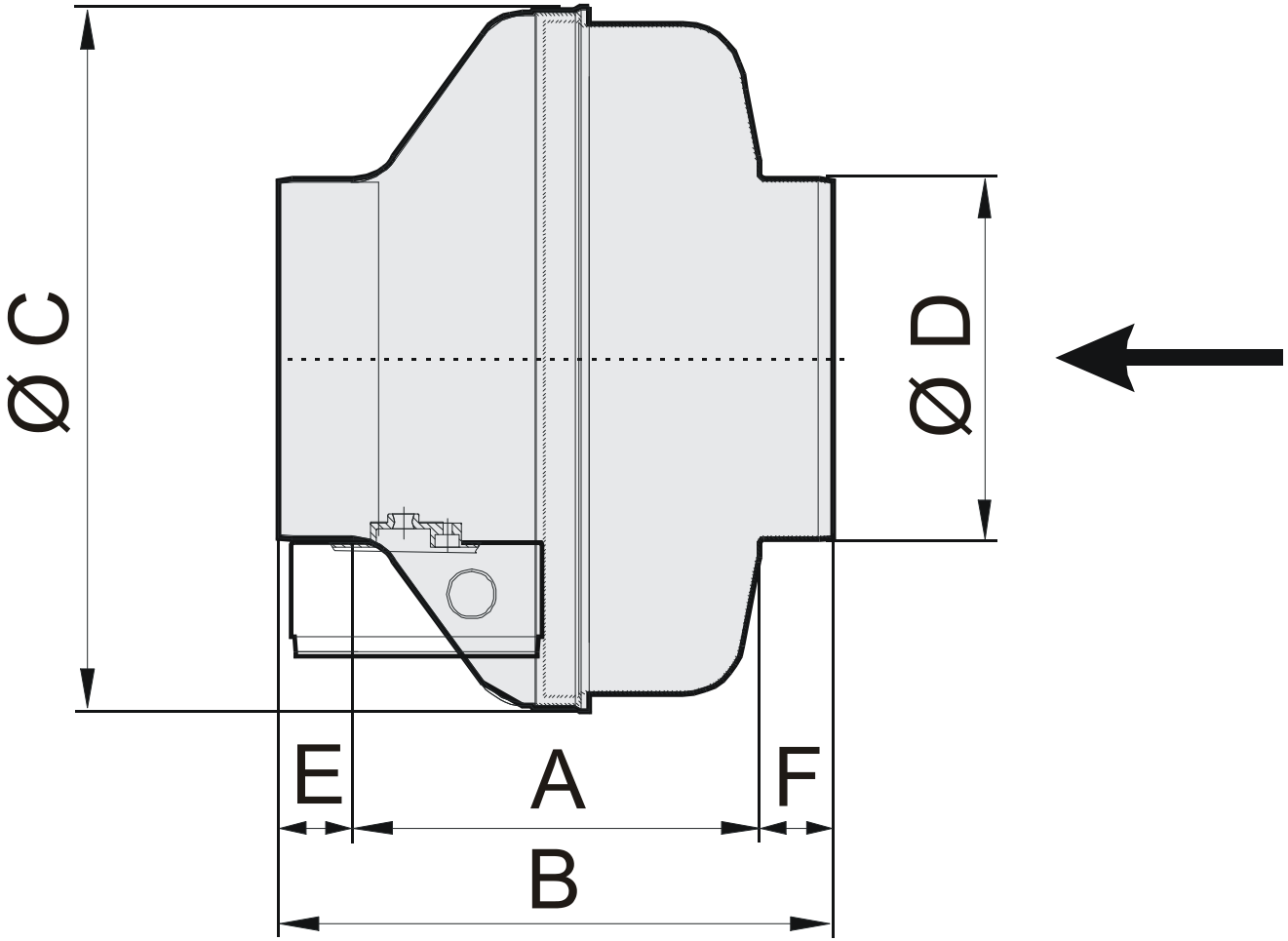
Fläkt Woods Limited

Drawing and Dimensions

SuperLite - Tube Fans Metal

Date: : Thursday, July 5, 2012
Fan Code : ILC - MS355L
Item Reference: : ES/6A/02

Project Name : British Museum
Quotation Number : 59999E12
Customer : Michael J Lonsdale Limited



A	320
B	395
C	490
D	355
E	40
F	35
Weight	14

Notes : Dimensions shown in mm / Weight in kg

Reference :Catalogue drawing

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AMR/Q005/59999E13 - ES/6A/03

British Museum - Smoke Extract
SuperLite - Tube Fans Metal
ILC - MS355L

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Product Specification

Requested Duty: 110l/s @ 650Pa (static)
Actual Duty: 122l/s @ 804Pa (static)
Obtained Duty: 111%

Fan Code: ILC - MS355L
Fan Diameter: 355 mm

Fan Speed: 2 Pole, 2340 rpm

Form of Running: B
Fan Casing: Long Cased
Motor Frame Size: Integral

Electrical Supply: 220-240volts 50Hz 1phase
Rated Motor Power: 0.610 kW
Full Load Current: 2.600 A

Start Type: Direct on Line

Peak Power: 0.610 kW

	Sound Power Level Spectrum (Lw)								Lw	LpA @ 3.00m
	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz		
Inlet	0dB	72dB	78dB	72dB	70dB	64dB	62dB	56dB	80dB	54dB
Outlet	0dB	73dB	69dB	72dB	72dB	69dB	65dB	61dB	79dB	55dB
Breakout	0dB	62dB	65dB	60dB	61dB	57dB	54dB	41dB	69dB	44dB

Special Features

Ancillaries & Price

	Qty	Price	Total
TF355012: SuperLite - Tube Fans Metal: ILC - MS355L	1.0		
Duct mounting clamps	2.0		
Key Information White/black/white Traffolyte Labels - Loose	1.0		

Despatch: 5.0 working weeks

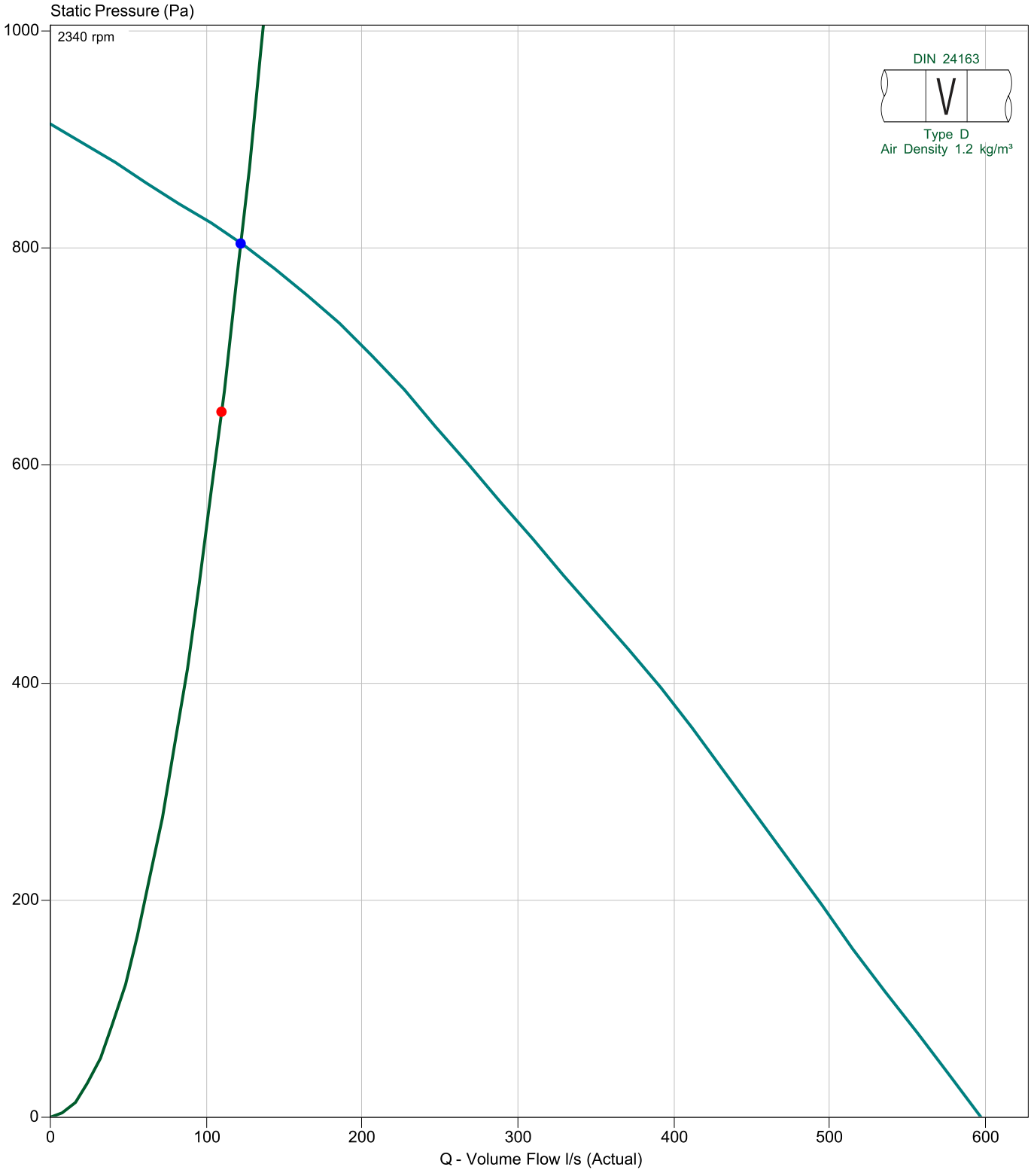
Performance and Sound Data are to BS 848 parts 1 & 2.
This offer is made subject to the terms and conditions detailed on the accompanying letter.

Fläkt Woods Limited

Performance Chart

SuperLite - Tube Fans Metal

Project Name	: British Museum	Date:	: Thursday, July 5, 2012
Quotation Number	: 59999E12	Fan Code	: ILC - MS355L
Customer	: Michael J Lonsdale Limited	Item Reference:	: ES/6A/03



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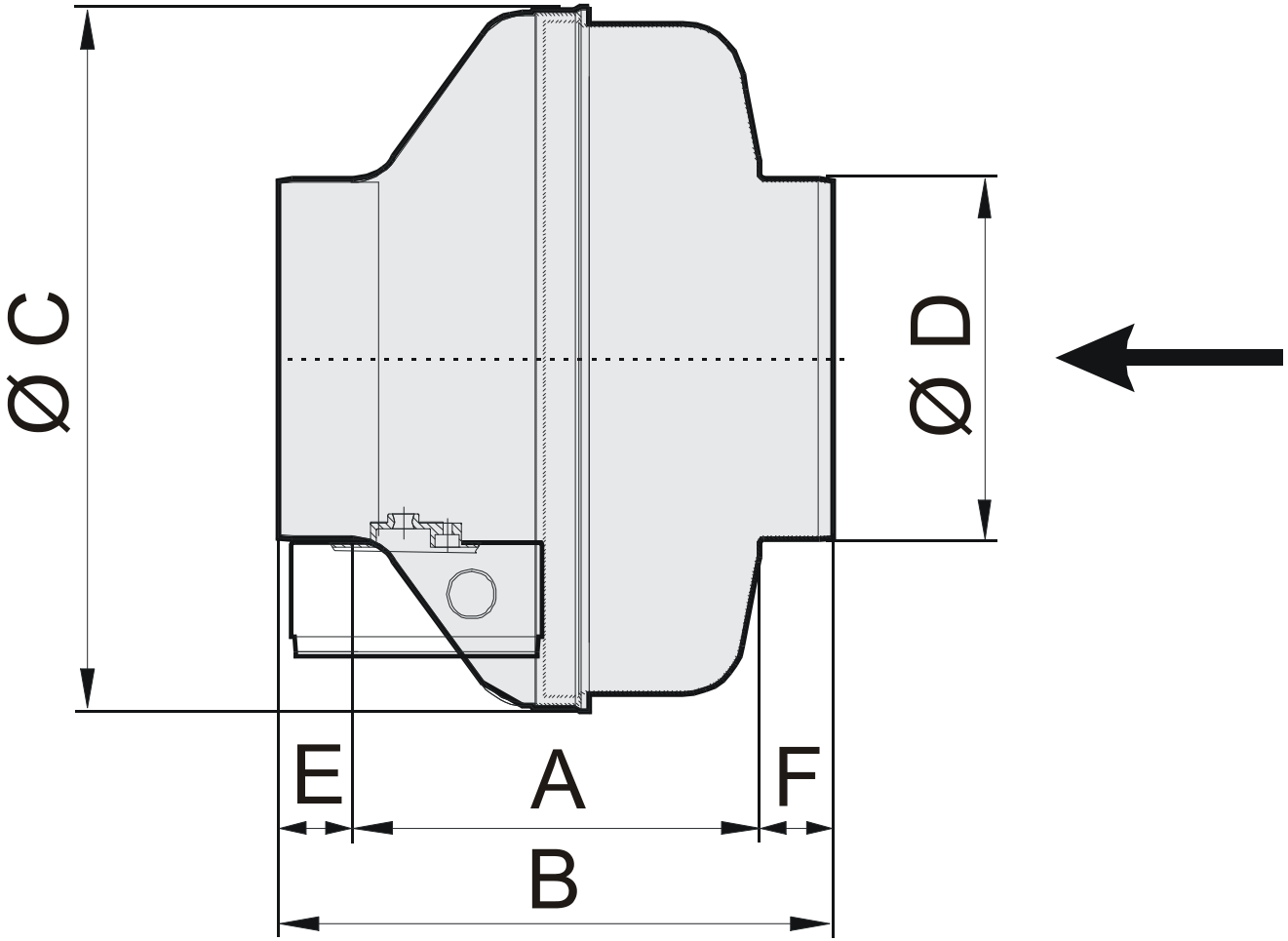
Fläkt Woods Limited

Drawing and Dimensions

SuperLite - Tube Fans Metal

Date: : Thursday, July 5, 2012
Fan Code : ILC - MS355L
Item Reference: : ES/6A/03

Project Name : British Museum
Quotation Number : 59999E12
Customer : Michael J Lonsdale Limited



A	320
B	395
C	490
D	355
E	40
F	35
Weight	14

Notes : Dimensions shown in mm / Weight in kg

Reference :Catalogue drawing

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AMR/Q005/59999E13 - ES/6A/04

British Museum - Smoke Extract
JM Aerofoil
35JM/16/2/5/8

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Product Specification

Requested Duty: 215l/s @ 400Pa (static)
Actual Duty: 222l/s @ 425Pa (static)
Obtained Duty: 103%

Fan Code:	35JM/16/2/5/8	Electrical Supply:	220-240volts 50Hz 1phase
Fan Diameter:	355 mm	Rated Motor Power:	0.215 kW
Fan Hub Diameter:	160 mm	Full Load Current:	1.420 A
Fan Speed:	2 Pole, 2840 rpm	Starting Current:	3.300 A
		Start Type:	Direct on Line
No. of Blades:	5		
Pitch Angle:	8°		
Form of Running:	B	Absorbed Power:	0.208 kW
Fan Casing:	Long Cased	Peak Power:	0.216 kW
Motor Frame Size:	(P) BT5	Fan Total Efficiency:	46%

	Sound Power Level Spectrum (Lw)								Lw	LpA @ 3.00m
	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz		
Inlet	81dB	85dB	87dB	89dB	88dB	81dB	73dB	66dB	94dB	71dB
Outlet	84dB	86dB	89dB	90dB	89dB	82dB	73dB	67dB	95dB	72dB
Breakout	74dB	71dB	69dB	69dB	63dB	53dB	48dB	44dB	77dB	48dB

Special Features

Ancillaries & Price	Qty	Price	Total
JM Aerofoil: 35JM/16/2/5/8	1.0		
Set of Mounting Feet (2)	1.0		
Rubber Anti Vibration Mounts (set of 4)	1.0		
Matching Flange	2.0		
Flex connector c/w 2 clips	2.0		
Commissioning Damper	1.0		
Key Information White/black/white Traffolyte Labels - Fitted	1.0		

Despatch: 9.0 working weeks

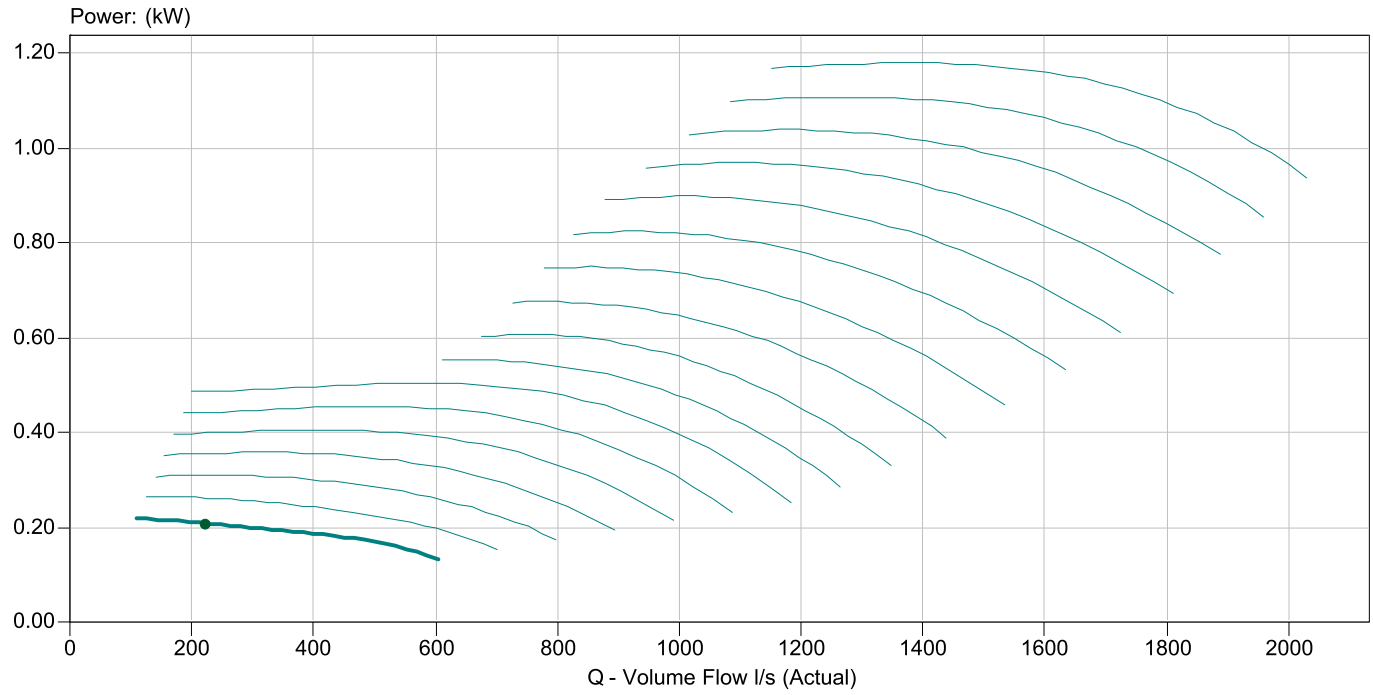
Performance and Sound Data are to BS 848 parts 1 & 2.
This offer is made subject to the terms and conditions detailed on the accompanying letter.

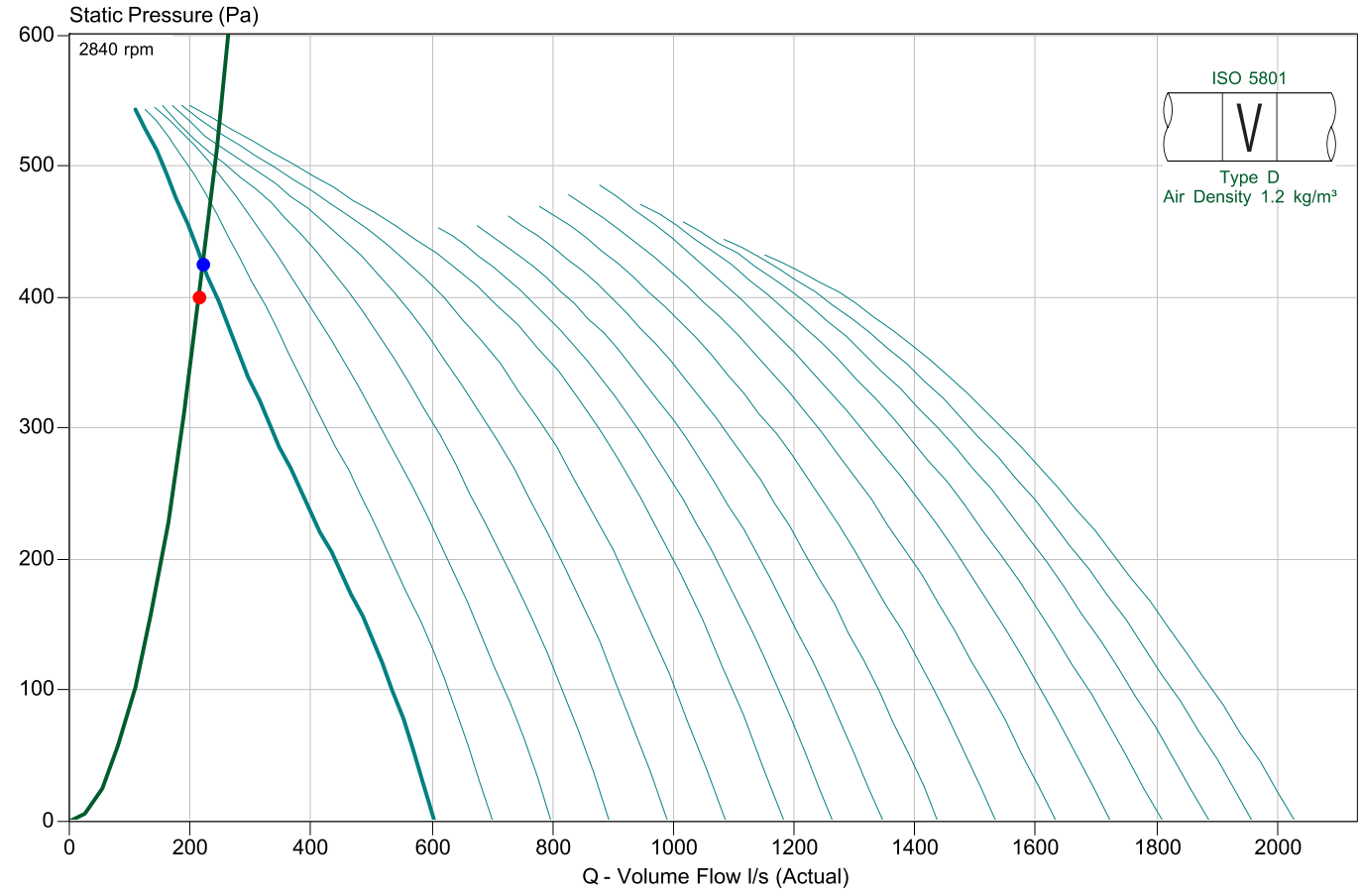
Fläkt Woods Limited

Performance Chart

JM Aerofoil

Project Name	: British Museum	Date:	: Thursday, July 5, 2012
Quotation Number	: 59999E12	Fan Code	: 35JM/16/2/5/8
Customer	: Michael J Lonsdale Limited	Item Reference:	: ES/6A/04





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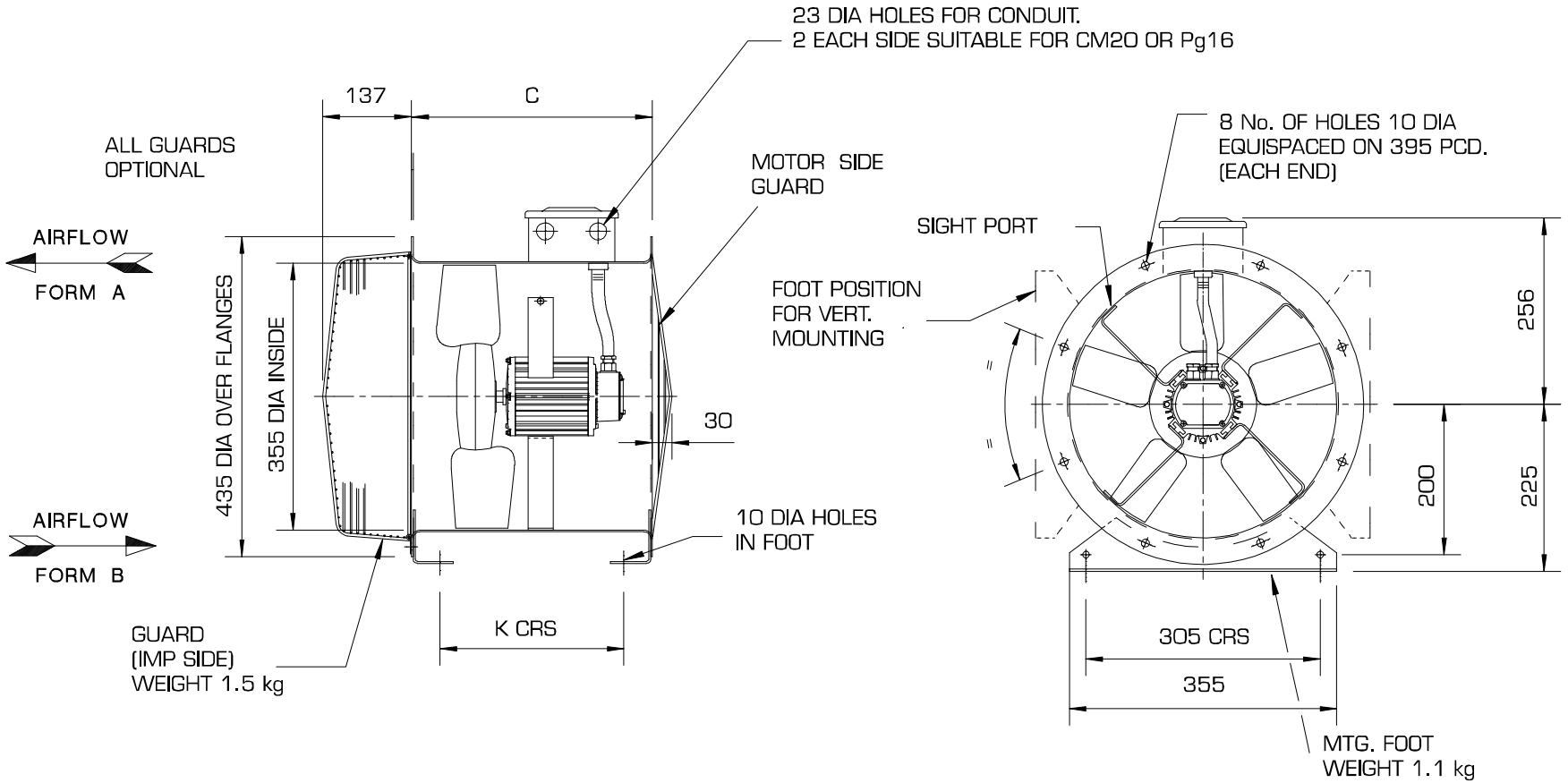
Fläkt Woods Limited

Drawing and Dimensions

JM Aerofoil

Date:	: Thursday, July 5, 2012	Project Name	: British Museum
Fan Code	: 35JM/16/2/5/8	Quotation Number	: 59999E12
Item Reference:	: ES/6A/04	Customer	: Michael J Lonsdale Limited

C	330
K	245
Weight	22



Notes : Dimensions shown in mm / Weight in kg

Reference :Catalogue drawing

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AMR/Q005/59999E13 - ES/02/01

British Museum - Smoke Extract
JM Aerofoil
40JM/16/2/5/8

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Product Specification

Requested Duty: 410l/s @ 400Pa (static)
Actual Duty: 431l/s @ 443Pa (static)
Obtained Duty: 105%

Fan Code:	40JM/16/2/5/8	Electrical Supply:	220-240volts 50Hz 1phase
Fan Diameter:	400 mm	Rated Motor Power:	0.480 kW
Fan Hub Diameter:	160 mm	Full Load Current:	3.100 A
Fan Speed:	2 Pole, 2840 rpm	Starting Current:	6.700 A
		Start Type:	Direct on Line
No. of Blades:	5		
Pitch Angle:	8°		
Form of Running:	B	Absorbed Power:	0.355 kW
Fan Casing:	Long Cased	Peak Power:	0.363 kW
Motor Frame Size:	(P) BT9	Fan Total Efficiency:	55%

	Sound Power Level Spectrum (Lw)								Lw	LpA @ 3.00m
	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz		
Inlet	80dB	84dB	86dB	87dB	89dB	82dB	75dB	68dB	94dB	71dB
Outlet	83dB	85dB	89dB	89dB	89dB	84dB	75dB	69dB	95dB	72dB
Breakout	73dB	70dB	69dB	68dB	63dB	55dB	50dB	46dB	77dB	48dB

Special Features

Ancillaries & Price

	Qty	Price	Total
JM Aerofoil: 40JM/16/2/5/8	1.0		
Set of Mounting Feet (2)	1.0		
Rubber Anti Vibration Mounts (set of 4)	1.0		
Matching Flange	2.0		
Flex connector c/w 2 clips	2.0		
Key Information White/black/white Traffolyte Labels - Fitted	1.0		

Despatch: 3.0 working weeks

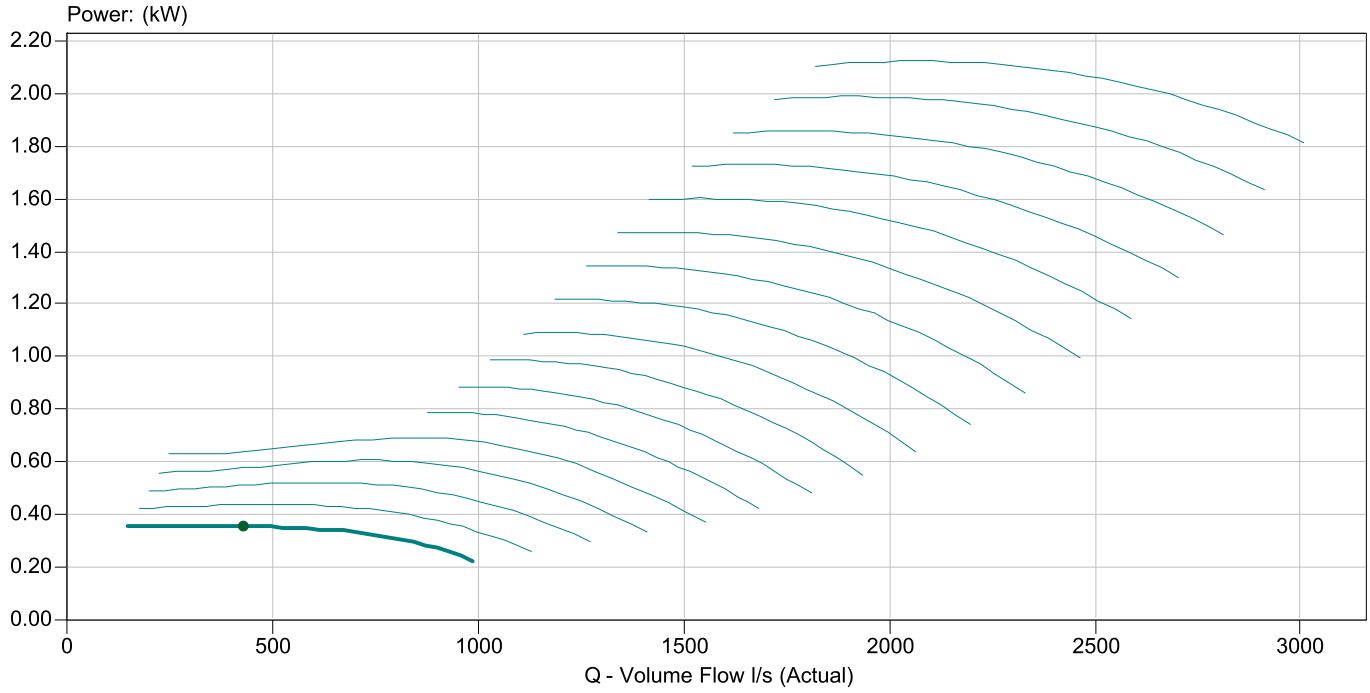
Performance and Sound Data are to BS 848 parts 1 & 2.
This offer is made subject to the terms and conditions detailed on the accompanying letter.

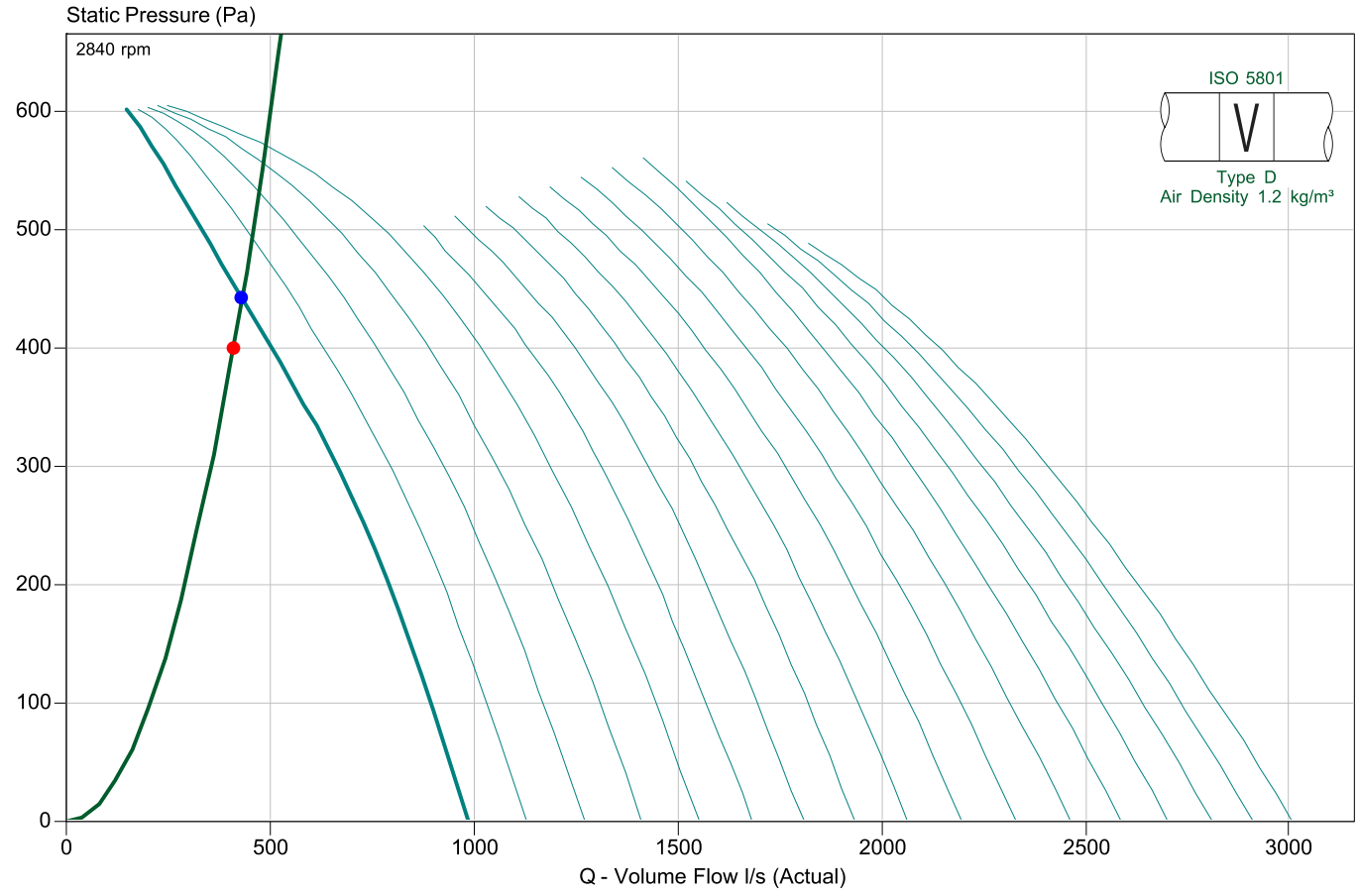
Fläkt Woods Limited

Performance Chart

JM Aerofoil

Project Name	: British Museum	Date:	: Thursday, July 5, 2012
Quotation Number	: 59999E12	Fan Code	: 40JM/16/2/5/8
Customer	: Michael J Lonsdale Limited	Item Reference:	: ES/02/01





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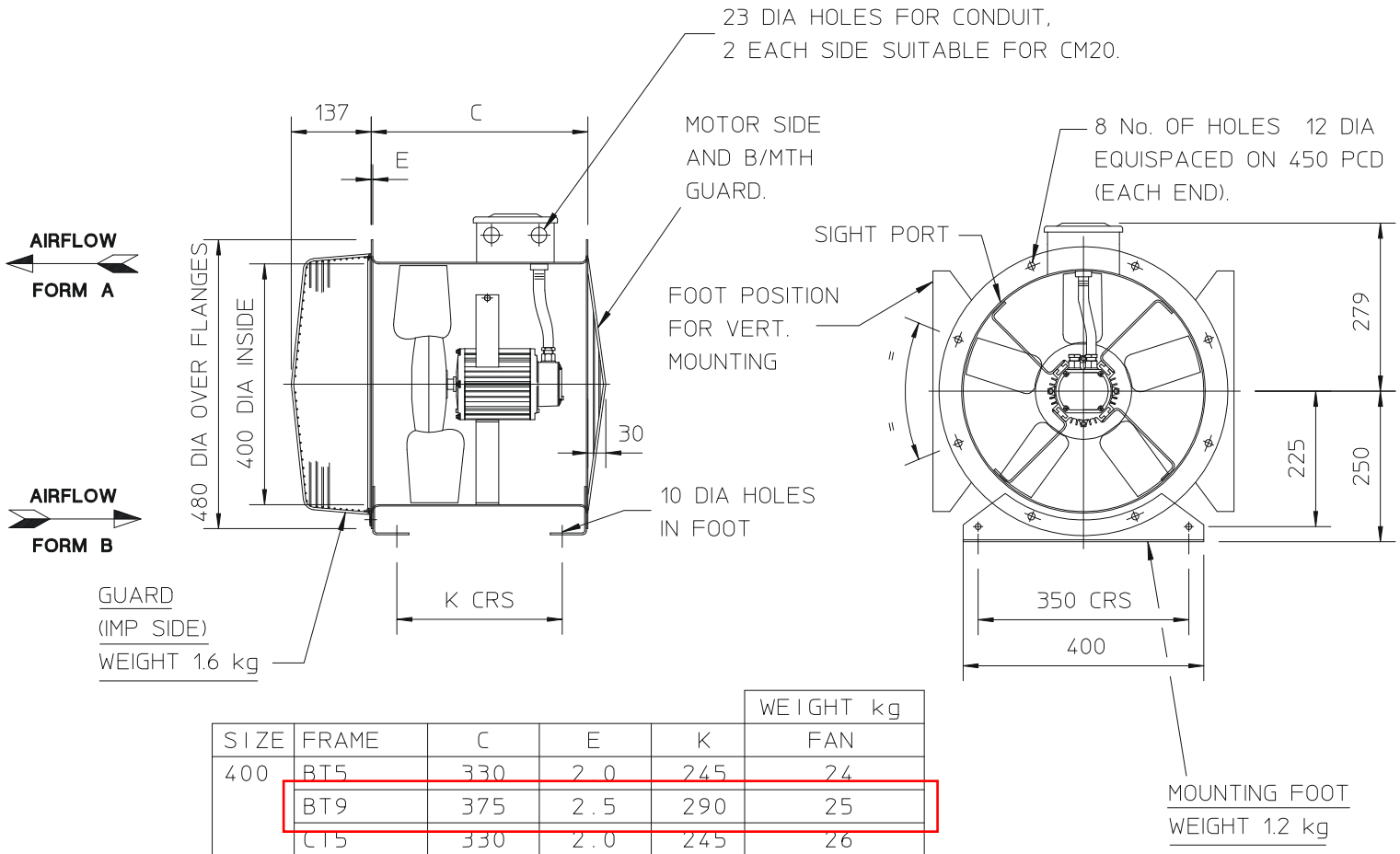
Fläkt Woods Limited

Drawing and Dimensions

JM Aerofoil

Date:	: Thursday, July 5, 2012	Project Name	: British Museum
Fan Code	: 40JM/16/2/5/8	Quotation Number	: 59999E12
Item Reference:	: ES/02/01	Customer	: Michael J Lonsdale Limited



SIZE	FRAME	C	E	K	WEIGHT kg FAN
400	BT5	330	2.0	245	24
	BT9	375	2.5	290	25
	CT5	330	2.0	245	26
	CT9	375	2.5	290	30

Notes : Dimensions shown in mm / Weight in kg

Reference :D269016

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AMR/Q005/59999E13 - ES/02/02

British Museum - Smoke Extract
SuperLite - Tube Fans Metal
ILC - MS355L

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Product Specification

Requested Duty: 165l/s @ 650Pa (static)
Actual Duty: 176l/s @ 742Pa (static)
Obtained Duty: 107%

Fan Code: ILC - MS355L
Fan Diameter: 355 mm

Fan Speed: 2 Pole, 2340 rpm

Electrical Supply: 220-240volts 50Hz 1phase
Rated Motor Power: 0.610 kW
Full Load Current: 2.600 A

Start Type: Direct on Line

Form of Running: B
Fan Casing: Long Cased
Motor Frame Size: Integral

Peak Power: 0.610 kW

	Sound Power Level Spectrum (Lw)								Lw	LpA @ 3.00m
	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz		
Inlet	0dB	72dB	78dB	72dB	70dB	64dB	62dB	56dB	80dB	54dB
Outlet	0dB	73dB	69dB	72dB	72dB	69dB	65dB	61dB	79dB	55dB
Breakout	0dB	62dB	65dB	60dB	61dB	57dB	54dB	41dB	69dB	44dB

Special Features

Ancillaries & Price

	Qty	Price	Total
TF355012: SuperLite - Tube Fans Metal: ILC - MS355L	1.0		
Duct mounting clamps	2.0		
Key Information White/black/white Traffolyte Labels - Loose	1.0		

Despatch: 2.0 working weeks

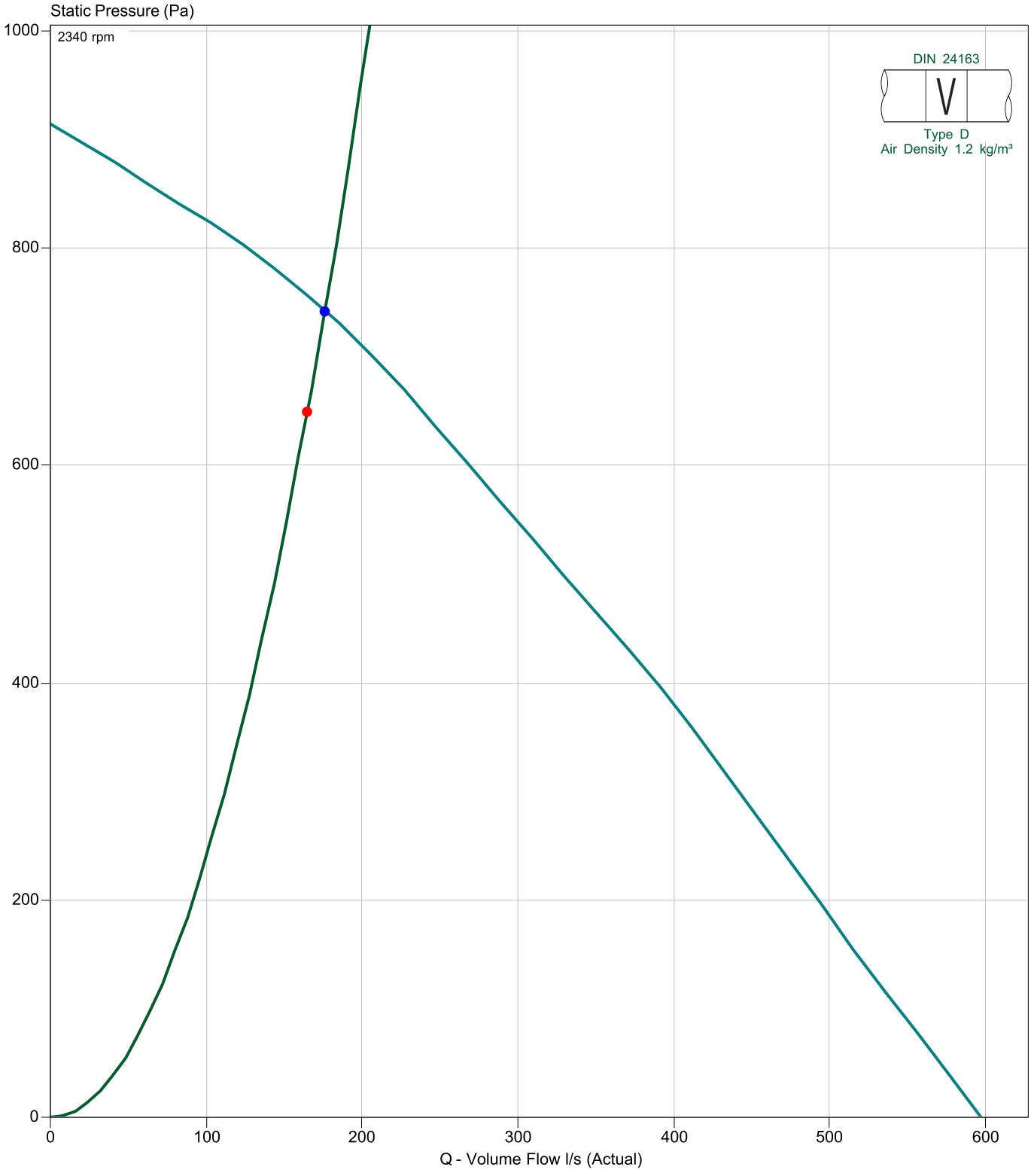
Performance and Sound Data are to BS 848 parts 1 & 2.
This offer is made subject to the terms and conditions detailed on the accompanying letter.

Fläkt Woods Limited

Performance Chart

SuperLite - Tube Fans Metal

Project Name	: British Museum	Date:	: Thursday, July 5, 2012
Quotation Number	: 59999E12	Fan Code	: ILC - MS355L
Customer	: Michael J Lonsdale Limited	Item Reference:	: ES/02/02



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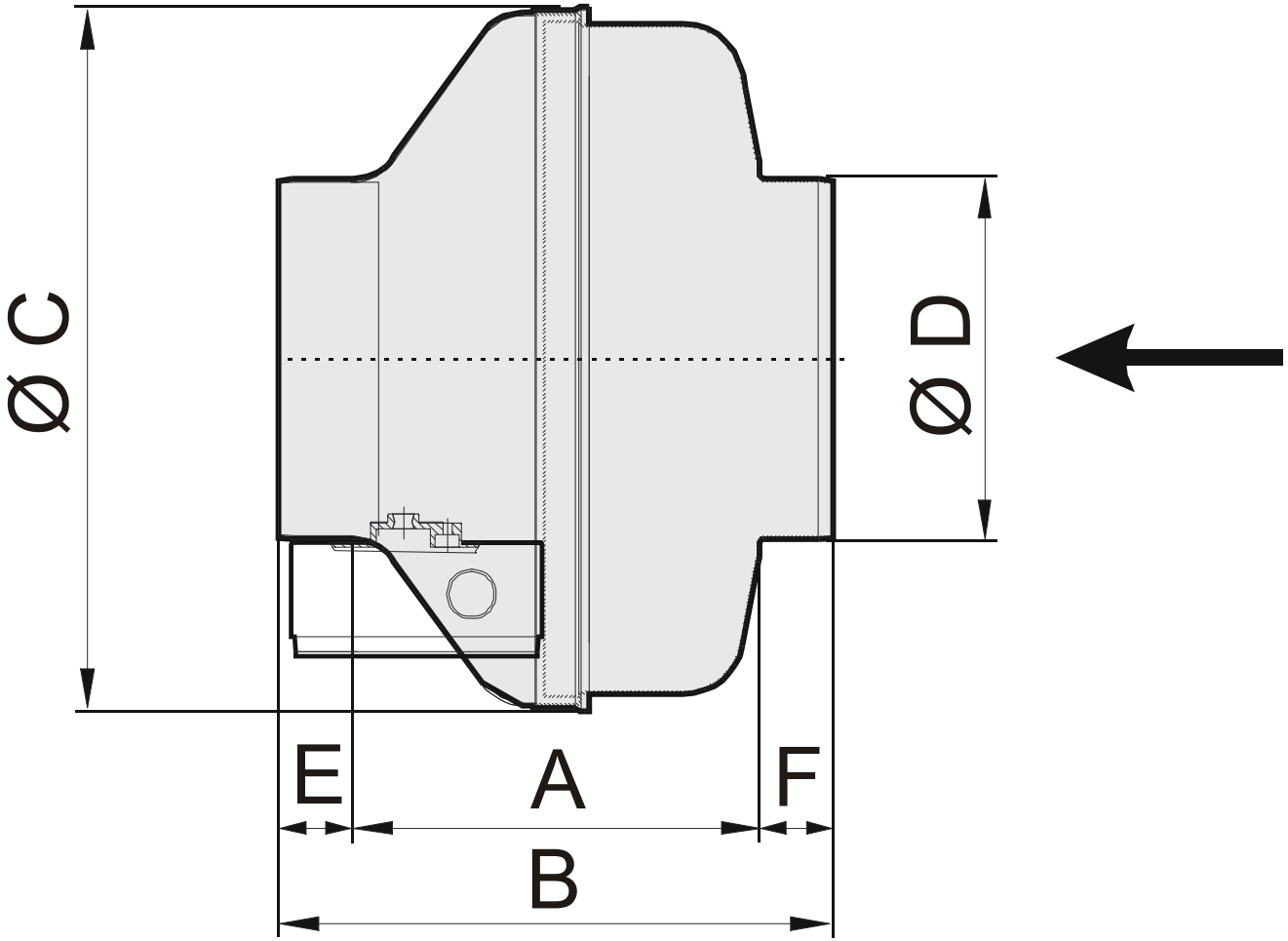
Fläkt Woods Limited

Drawing and Dimensions

SuperLite - Tube Fans Metal

Date: : Thursday, July 5, 2012
Fan Code : ILC - MS355L
Item Reference: : ES/02/02

Project Name : British Museum
Quotation Number : 59999E12
Customer : Michael J Lonsdale Limited



A	320
B	395
C	490
D	355
E	40
F	35
Weight	14

Notes : Dimensions shown in mm / Weight in kg

Reference :Catalogue drawing

This drawing shows dimensions that should be used as a guide only and are subject to change. Certified drawings are available on request.

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