



Fan Services

*Commercial Kitchen Extraction
and Ventilation Experts*

Email: info@fanservices.co.uk |

Website: www.fanservices.co.uk |

Office: 0203 539 1475 | **After Hours:** 0759 500 3000 |

771 High Road,
London
N17 8AH

1st March 2022

KITCHEN EXTRACTION & ODOUR CONTROL SYSTEM PROPOSAL

Fan Services was asked to carry out a site survey and put together a proposal for the extraction system at the above address:

After concluding the odour risk assessment under the EMAQ and DEFRA guidance, the total score was 28 which leads to high level of odour filtration (please see attached Odour risk assessment). Our proposal as follows:

The restaurant will be serving fish and chips and from the fish and ship range the ductwork will be connected the first stage of filtration which is the Electrostatic Precipitator (ESP) Kitchen Extract Grease and Smoke filtration such as Trion Air boss T1001 (please see attached tech spec for the ESP).

The ductwork will incorporate a second stage of filtration which is ozone odour control units such as type OC2 which will inject ozone into the extract ductwork just after the canopy and before the fan.

These will treat the odour emissions, via an oxidation reaction. This location closest to the source of the odours, will allow the maximum dwell time for the ozone to react with the emissions in the extract ventilation ductwork and ensure that adequate dilution takes place before the plume interacts with a receptor.

The ozone unit will be interlocked so that it only operates when the extract fan is operating. (Please see attached tech spec for the OC2).

The odour system is then connected to Systemair KBR315DV Thermo Fan with transformer speed controller and overheat protection. (Please see attached fan technical specification).

The fan will be mounted on using anti vibration rubber mountings and connected to ducting using flexible connectors to eliminate vibration onto the floor.

The 350mm ductwork after the fan will exist the back wall and run vertically to terminate one meter over the roof level with high velocity jet accelerator. This ductwork will be replacing the existing external ductwork.

A sound attenuator would be installed after the fan (atmosphere outlet side) type Acustica R02-5-1500 to achieve the insertion loss as per the acoustic engineer report by DAA group. (Please see attached Sound attenuator details).

Attenuation has been selected so as to provide a system rating level of at least 10 dB(A) below the lowest existing background noise level for the proposed operating hours and when extrapolated to the nearest noise sensitive neighbouring residential property.

The system will be designed and installed in accordance to DW172 and Defra Guidance.

CLEANING AND MAINTAINCE SCHEDULE

- 1- TR19 extractor system, ductwork cleaning to be scheduled every 3 months.
- 2- ESP to be serviced and cleaned every 3 months.
- 3- Ozone generator to be serviced one a year by the manufacturer representative.

We hope this is of assistance and await your further instruction.

Kind regards

Jay Zen

Appendix 3: Risk Assessment for Odour

Odour control must be designed to prevent odour nuisance in a given situation. The following score methodology is suggested as a means of determining odour control requirements using a simple risk assessment approach. The odour control requirements considered here are consistent with the performance requirements listed in this report.

Impact Risk	Odour Control Requirement	Significance Score*
Low to Medium	Low level odour control	Less than 20
High	High level odour control	20 to 35
Very high	Very high level odour control	more than 35

* based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

Criteria	Score	Score	Details
Dispersion	Very poor	20	Low level discharge, discharge into courtyard or restriction on stack.
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s.
	Moderate	10	Discharging 1m above eaves at 10 -15 m/s.
	Good	5	Discharging 1m above ridge at 15 m/s.
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge.
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge.
	Far	1	Closest sensitive receptor more than 100m from kitchen discharge ¹ .
Size of kitchen	Large	5	More than 100 covers or large sized take away.
	Medium	3	Between 30 and 100 covers or medium sized take away.
	Small	1	Less than 30 covers or small take away ¹ .
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips. <i>Turkish, Middle Eastern or any premises cooking with solid fuel</i>
	High	7	Vietnamese, Thai, Indian, <i>Japanese, Chinese, steakhouse</i>
	Medium	4	<i>Cantonese, Italian, French, Pizza (gas fired),</i>
	Low	1	Most pubs (<i>no fried food, mainly reheating and sandwiches etc</i>), <i>Tea rooms</i> ¹

Note 1: A planner may take a pragmatic view when assessing whether certain low risk kitchens require any odour abatement to be fitted. In reaching this decision the Planner may consider the nature of the food being cooked and/or the size of kitchen and/or its location.

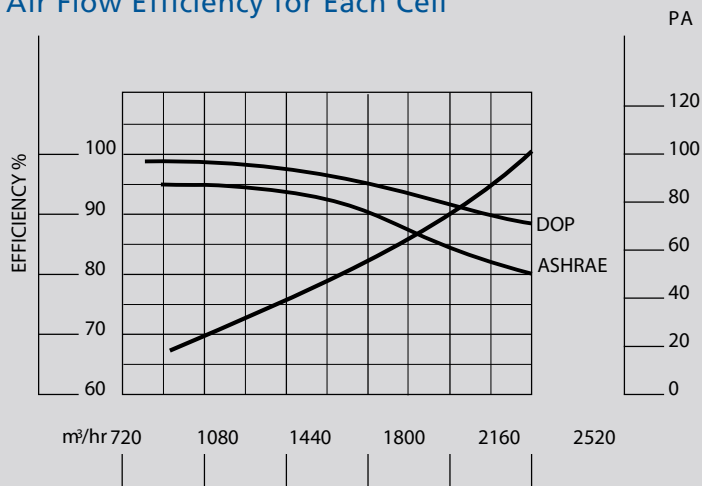
Air Boss® T1001 Specifications



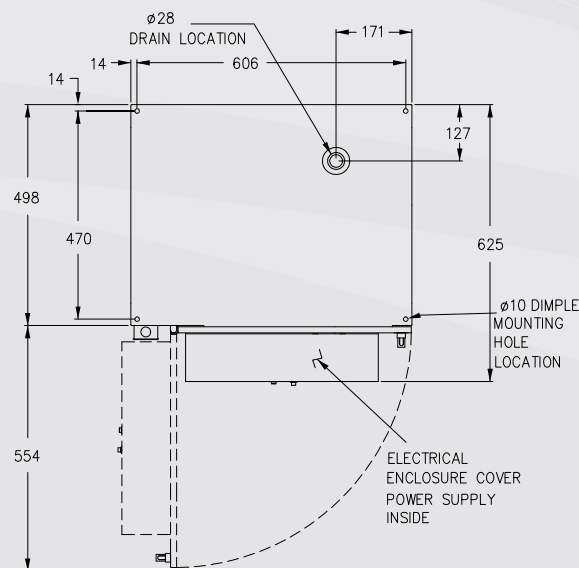
T1001

Dimensions	635L x 625W x 533H mm
Installation	Free Standing, Wall or Frame Mounted
Unit Weight	44 kg
Input Voltage	230Vac/1phase/50Hz
Cell Power	50 watts
Output Voltage	12 kV/6 kV
No of Cells	1
Cell Weight	15 kg
Air Volume	1360 - 2210 m³/hr
Controls	On/Off Switch with Indicator
Pre-Filter	Aluminum Standard Mesh (1 Req.) (Optional Impinger)
Primary Filter	Electronic Ioniser/Collector Cell
After Filter	Optional Disposable Charcoal After Filter
Power Supply	High Frequency Solid State Design
Efficiency	To 95% Based on D.O.P. Test Method To 99% for Double Pass (Calculated)
General	Multiple Units Can Be Joined Together for Increased Volume or Efficiency

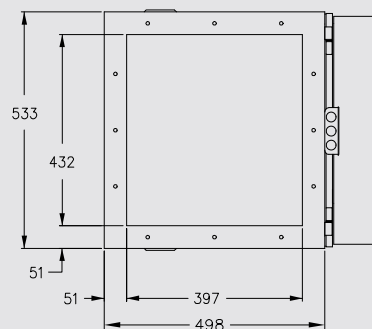
Air Flow Efficiency for Each Cell



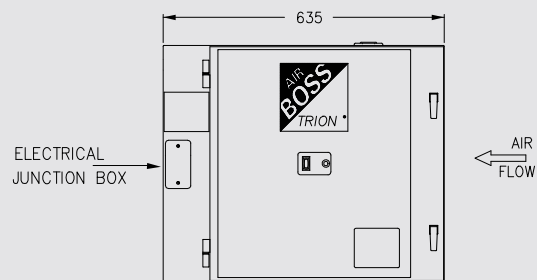
Top View



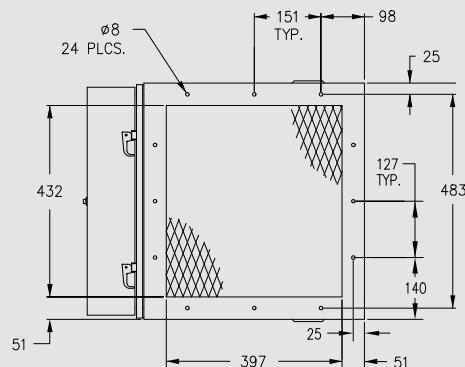
Discharge End



Front View



Intake End



OC INNOVATIONS - OC2

Process Information

Oxidation using ozone and activated oxygen ions is used to treat odour emissions from commercial and industrial kitchen processes (DEFRA, 2005: Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems).

The OC2 has been specifically designed for use in commercial kitchens. The system injects ozone into the kitchen extraction canopy or associated duct work where it reacts with odours, which are oxidized in a chemical reaction, which results in the production of carbon dioxide and water vapour. The ozone itself is consumed during the process and is converted back into oxygen.

The benefits of purchasing an OC2 unit over traditional UV/Ozone systems are as follows:

- Compact, lightweight and quiet operation so is less obtrusive
- Quick and easy low cost installation
- Low capital and running costs – up to 50% less than traditional UVC systems
- Injection into ductwork – adding negligible back pressure to the system so requiring less energy to push air through the air handling system. This means less ductwork modifications
- The OC2 maintains efficiency as they remain outside of the air stream, they also require less maintenance and require less cleaning.
- Tested to EN13725:2003, CE Approved



Spec sheet overleaf >

OC INNOVATIONS - OC2 (SPECIFICATIONS)

TECHNICAL INFORMATION

Ozone Output:	20g/hr ozone output
Housing dimensions:	290mm W 290mm L 290mm H
Housing material:	Stainless Steel powder coated black
Duct work connection:	100mm circular
Volume flow rate in ductwork:	Up to 2m ³ /s per unit, subject to cooking odours.
Air residence time inside chamber:	>0.1 seconds
Pressure drop:	N/A
Weight of unit:	10Kg approx.
Electrical requirements:	240V / 1 ph / 50/60Hz
Power requirements:	168W
Safety:	THE UNIT MUST BE INTERLOCKED IN TO FAN CONTROL SYSTEM

INSTALLATION

It is recommended to locate the units with an injection point located closest to the source of odours (i.e. Canopy plenum or nearest accessible point on ductwork, in order to maximize dwell time. In any case the dwell time must be no less than 1 second.

The system is powered via a fused spur/socket, which is interconnected to the main extraction fan control to ensure that the OC2 units only operate when the main fan is operating.

THE UNIT MUST BE INTERLOCKED INTO THE FAN CONTROL SYSTEM

MAINTENANCE

An optional service contract is available which entails a yearly inspection of the unit.
Please contact us for further information and pricing.

Item number 5833

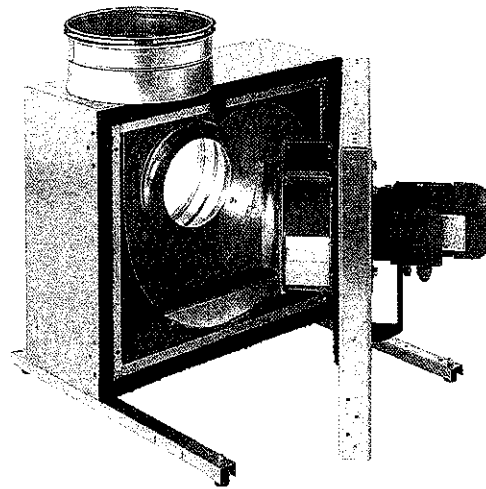
KBR 315DV THERMO FAN

- Max temperature of transported air 120°C
- Speed-controllable via frequency converter
- Integral cold conductor (PTC)
- Low sound level
- Standard motor outside the air stream
- Easy to maintain and reliable

The KBR fans have impellers manufactured from galvanised steel with backward-curved blades and external rotor motors. The KBR casing is manufactured from doubleskinned galvanised sheet steel and is insulated with 50 mm mineral wool.

The KBR fans have a swing-out door for easy inspection and service. The fan is isolated from the casing via connectors and anti-vibration dampers are incorporated into the base frame.

To protect the motors from overheating the KBR fans have Integral cold conductor (PTC) with external leads for connection to a motor protection device.



Item number 5833

KBR 315DV THERMO FAN**Input data****Required point**

Air flow

 m³/h ▼

Static pressure

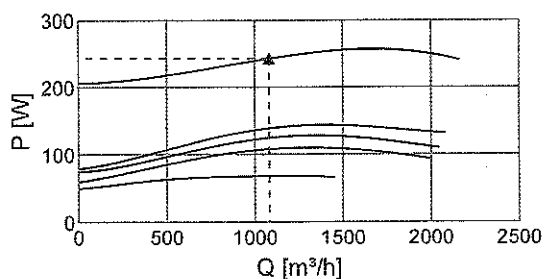
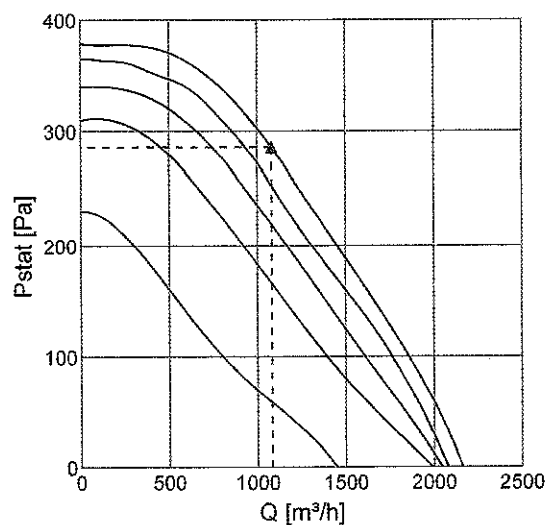
 Pa ▼**Regulation**

Selection method

System line ▼

Speed control

5-step transform ▼

Diagrams**Max efficiency**

Hydraulic data	
▲ Working air flow	1082 m ³ /h
▲ Working static pressure	286 Pa
▲ Power	243 W
Speed	1460 r.p.m.
Current	1,23 A
SFP	0,808 kW/(m ³ /s)
Voltage	400 V

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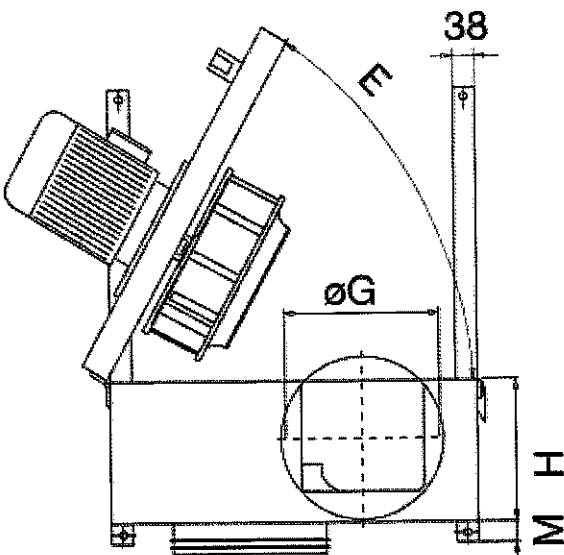
KBR 315DV THERMO FAN

Mid-frequency band, Hz

		Tot	125	250	500	1k	2k	4k	8k
LwA Inlet	dB(A)	77	75	74	69	67	63	57	54
LwA Outlet	dB(A)	79	77	76	71	68	65	59	56
LwA Surrounding	dB(A)	59	57	56	51	49	45	39	36

Measurement point: 1368 m3/h, 250Pa

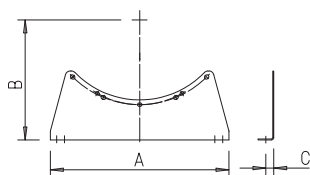
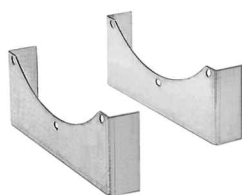
KBR 315DV THERMO FAN



KBR	A	B	C	D	E	F	øG	H	J	K	L	M
315	187,5	600	339	398	690	125	315	249	307	70	770	55

MK

Dimensions in mm



Mounting feet

To fix Axial/VAR cased fans on ceiling, wall or floor. Made from galvanised sheet steel or hot dipped galvanised steel. Fixing holes fit casing flanges. Set includes a pair of feet, nuts and bolts.

Note:

If motors of high weight are installed, an extension duct (VR...) is recommended to move the centre of gravity within the mounting feet. Mount feet on the outer flange.

Type	Ref. No.	A	B	C	Weight in kg
MK 200-225	1446	310	208/220	20	1.5
MK 250-280	1447	340	227/245	20	1.7
MK 315-355	1448	380	281/300	25	2.2
MK 400-450	1449	360	311/335	25	2.6
MK 500-560	1450	570	383/415	25	5.3
MK 630	1333	600	465	30	8.5
MK 710	1372	670	515	35	10.5
MK 800	1373	680	565	35	15.5
MK 900	1374	760	625	35	18.0
MK 1000	1375	840	690	35	19.5

SDD-U

Dimensions in mm



Anti vibration pads

The rubber mounting pads SDD-U are suitable as a base for installation of fans on flat, horizontal surfaces. They reduce the direct noise and vibration transmission to the building structure.

One set consists of 4 elements, which are positioned individually under the corners of the fan unit. Maximum compression: 40 kg/pad = total 160 kg.

SDD-U Ref. No. 5627

SDD

Dimensions in mm

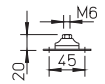
SDD
1 - 3



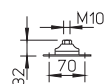
SDD 1F,
4 - 10



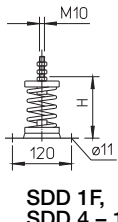
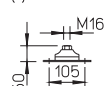
SDD 1



SDD 2



SDD 3



SDZ

Dimensions in mm

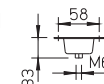
SDZ
1 - 3



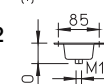
SDZ 1F,
4 - 9



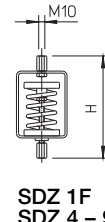
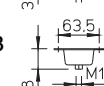
SDZ 1



SDZ 2



SDZ 3



Anti vibration mounts for compression

To reduce noise and vibration transmission of fans installed on horizontal surfaces. Simple installation in combination with feet MK (accessory). Select size according to fan weight (see table).

Rubber elements are suitable for small to middle weights and ambients up to +60 °C. Spring elements are suitable for higher temperatures above +60 °C (e.g. smoke extraction).

Anti vibration mounts for suspension

To reduce noise and vibration transmission of fans installed hanging from ceilings. Specification as model SDD.

Important note for installation!

Make sure that fan system is well balanced (centre of gravity of heavy motor may cause uneven loading of mounts).

Type	Ref. No.	Maximum fan weight in kg	H Height in mm	Spring element	Contents 1 set = 4 pieces
SDD 1	1452	80	*		
SDD 1F	1942	70	112 - 82	•	
SDD 2	1453	180	*		
SDD 3	1367	750	*		
SDD 4	1944	130	112 - 86	•	
SDD 5	1924	210	112 - 86	•	
SDD 6	1926	400	112 - 80	•	
SDD 7	1928	580	112 - 82	•	
SDD 8	1930	900	112 - 82	•	
SDD 9	1934	1300	112 - 85	•	
SDD 10	1951	1800	112 - 88	•	

* shown in dimensional drawing

Type	Ref. No.	Maximum fan weight in kg	H Height in mm	Spring element	Contents 1 set = 4 pieces
SDZ 1	1454	60	*		
SDZ 1F	1943	70	190 - 220	•	
SDZ 2	1455	160	*		
SDZ 3	1366	300	*		
SDZ 4	1945	130	190 - 216	•	
SDZ 5	1925	210	190 - 216	•	
SDZ 6	1927	400	190 - 221	•	
SDZ 7	1929	580	190 - 220	•	
SDZ 8	1931	900	190 - 220	•	
SDZ 9	1935	1300	190 - 217	•	

* shown in dimensional drawing

R02 Rectangular Silencers

R02 - 5 - Attenuator

Available in seven standard lengths R02 5 Rectangular Duct Mounted Silencers have excellent attenuation properties, achieved with sound absorbing infill splitters, retained in the attenuator casing by a perforated liner. The resistance to airflow is a function of the face velocity and length. It is not recommended to select the R02 5 Silencers with a face velocity above 3.5 metres per second without asking advice regarding re-generated self noise. We can advise on the selections and can perform system analysis to ensure the correct unit is specified.

- High performance rectangular duct silencer
- Seven standard lengths
- Many connection options
- Cross section dimensions in 1mm increments
- System pressure within ducted systems to 1500 Pa
- Special lengths on request



Insertion Loss (dB) - Centre Band Frequency

Product Code	Length (mm)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R02 - 5 - 600	600	4	6	11	19	24	23	18	12
R02 - 5 - 900	900	4	6	12	26	30	31	22	16
R02 - 5 - 1200	1200	5	9	18	32	40	39	28	19
R02 - 5 - 1500	1500	7	11	23	37	45	45	32	22
R02 - 5 - 1800	1800	8	13	25	44	50	50	37	24
R02 - 5 - 2100	2100	9	16	28	50	50	50	45	29
R02 - 5 - 2400	2400	11	19	33	50	50	50	50	32

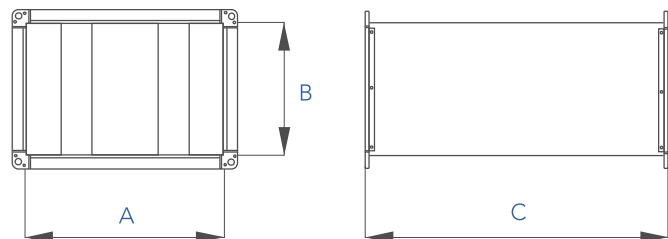
Insertion loss data is derived from continual testing to BS4718 and other standards in independent UKAS certified laboratories, which includes where appropriate, re-generated or self noise testing in both forward and reverse flow conditions. If you request system analysis from our technicians all predictions will be assessed using the relevant certified insertion loss data together with relevant dynamic corrections.

Dimensional Data

Code	A Min	A Max	B Min	B Max	C Min	C Max
R02 - 5	100	1200	100	1200	400	2400

Resistance to Airflow (Pa)

Product Code	1.0m/s	1.5m/s	2.0m/s	2.5m/s	3.0m/s
R02 - 5 - 600	10	16	22	39	60
R02 - 5 - 900	10	16	23	40	62
R02 - 5 - 1200	11	16	24	40	64
R02 - 5 - 1500	11	17	25	40	66
R02 - 5 - 1800	11	18	26	42	67
R02 - 5 - 2100	12	19	26	43	69
R02 - 5 - 2400	13	19	28	48	71



R02

Rectangular Silencers



Material & Finish

All components are manufactured from mill finish hot dip galvanised mild steel conforming to EN10327 (BS2989). To prevent erosion of absorbing materials, the R Series Silencers are fitted with perforated splitters manufactured from galvanised mild steel conforming to EN10327 (BS2989). R Series Silencers utilise acoustic grade mineral fibre absorbing infill and are manufactured to the HVCA specification DW144 class B and M&E 100 for sheet steel thickness and stiffening.

Pressure Up to 1500 Pascals positive and negative.

Temperature -12° to +100°C.

Location Internally & externally mountable.

Melinex Lining (Optional)

Where moist conditions exist (e.g. process systems) or for critically clean applications (e.g. hospitals) the sound absorbing material may be required to be fully sealed by Melinex lining to prevent fibre migration. This will however, effect the acoustic performance of the silencer. Please contact us to discuss your requirements.

Alternative Specification

The above specification refers to our standard, stock range. We can also supply custom materials such as 304 and 316 grade stainless steels, cold reduced (CR4) mild steel and aluminium.

Dimensional Data

Units smaller than the minimum and larger than the maximum with the same aero-acoustic performances are available, but may have different manufacturing methods and are therefore coded accordingly.

Connection Options	
MEX Flanges	20, 30 & 40mm
Ductmate Flanges	25 & 35mm
Circular Spigot	"SPIRAL FIT" circular spigots, can be offset.
Rectangular Spigot	Rectangular spigots, can be offset
Raw	Plan end for slip jointing etc.

Installation

For recommendations for the support of the fan the principles of Part Six (pages 43-46) of the HVCA DW144 standard should be followed. Always use the correct size bolts as specified in the dimensional data table above. The arcuate holes are sized to allow the metric thread sizes to be utilised, for example, for an M10 fixing, the slot is made 19mm long by 13mm wide. Please contact us to confirm the suitability of any fan manufacturers product.

Equipment	Location
Centrifugal Fans	Position at least one duct width from inlet or outlet.
Axial Fans	Position at least one duct width from inlet or outlet.
Mixed Flow Fans	Position at least one duct width from inlet or outlet.
Ductwork Bends	Position at least three duct widths from inlet or outlet. One duct width will increase resistance by 90%, two by 20%. Ensure splitters are in parallel plane to bend.
Ductwork Reducers	Direct couple only with reducers of maximum 15° cheek slope.
Finned Coils & Filters	Leave 500mm plenum between silencer and coil or filter, and suitable reducer as specified in HVCA DW/144 1998.

Cleaning & Maintenance

Should the product require routine cleaning we recommend low-pressure air blasting, vacuuming or wiping the exposed surfaces with a damp cloth. It is not unusual for "White Zinc Oxide" to develop on galvanised silencers when the zinc in the galvanising reacts electrolytically with moisture. Silencers are of a passive nature and as such require no routine maintenance or lubrication.