



Restaurant Projects Ltd Ventilation Strategy

Reference	Eccleston Street
Stage	Pre Construction Advisory
By	Chris Hamblin
Date	25/07/2025

EMAQ+ Odour and Noise Risk Assessment – Points Matrix

Premises: Small Commercial Kitchen

Cuisine: English / Mediterranean

Covers: 50

Filtration: Grease baffle, carbon filter, HEPA filter

Duct Design Resistance: Extract = 243.87 Pa @ 1.5 m³/s (500mm)

Supply Air: 1.1 m³/s @ 400 mm duct, Resistance = 185.71 Pa

Discharge: >1 metre above eaves with cowl and louvre (RAL 7016)

1.1 Risk Assessment

EMAQ+ Odour and Noise Risk Assessment Summary

Category	Details	Score
1. Cooking Type	English / Mediterranean cuisine (includes grilling, frying, oven use) – <i>Medium odour</i>	7
2. Kitchen Size	Small kitchen (approx. 50 covers, limited prep space)	3
3. Proximity to Receptors	Located in close proximity to residential premises (urban/semi-urban)	10
4. Discharge Height	Vertical discharge point >1 metre above eaves – good dispersion	0
5. Odour Mitigation Measures	Grease baffle, Carbon filter, and HEPA filter (Clean condition)	0
6. Maintenance / Management	Regular ductwork cleaning, access panels, and filter maintenance procedures in place	0
7. Noise Control	Supply & extract fans fitted with attenuators, anti-vibration mounts, and isolation	0
Total Score		20
Risk Level		Low–Medium
Recommended Actions	No additional odour abatement required. High-level discharge with carbon & HEPA filtration meets EMAQ+ expectations. ESP not required.	

Notes for Submission

- The **system is compliant** with EMAQ+ guidance for low-to-medium risk sites due to:
 - High-level discharge (>1m above eaves),
 - Effective filtration system (carbon + HEPA),
 - Proper duct sizing, velocity and static pressure,
 - Fully sealed DW/144 ductwork with maintenance access,
 - Noise mitigation through attenuators and isolation.
- No additional odour abatement** (e.g., ozone, ESP) is required unless site-specific planning conditions are introduced.

Information

Criteria	Score	Score	Details
Dispersion	Very Poor	20	Low level 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
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 sizes take away
Cooking type (odour and grease loading)	Very High	10	Pub (high level of fried food), fried chicken, burgers or fish and chips. Turkish, Middle Eastern, or any premises cooking with solid fuel.
	High	7	Vietnamese, Thai or Indian, Japanese, Chinese or Steakhouse
	Medium	4	Cantonese, Italian, French, Pizza (gas fired)
	Low	1	Most pubs, (no fried food, mainly reheating and sandwiches etc..) , Tea rooms..

1.3 The Odour Control System

Particulate and Odour Control Strategy – Airclean Kitchavent 4000 System

Due to height constraints between the canopy and the finished floor level (FFL), the use of traditional ESP systems is not viable within this installation. Instead, the kitchen extract system has been designed around the Airclean Kitchavent 4000, a high-efficiency four-stage grease, smoke, and odour control solution, compliant with DW/172 and EMAQ+ guidance. This system provides filtration through a sequential arrangement of washable grease filters, M5 bag filters, HEPA E10 smoke filters, and activated carbon. This configuration directly supports the filtration strategy outlined in Section 1 – Carbon & HEPA Fine Filtration, offering robust capture of particulate and odour emissions from charcoal-based Mediterranean and English cooking methods.

The Kitchavent 4000 is purpose-designed for commercial kitchen extract and supports airflow rates up to 2.12 m³/s, aligning well with the current canopy extract volume of 2.1 m³/s. The system ensures no bypass leakage, as the modular housing forces all exhaust air through each filter stage. The HEPA filters effectively remove smoke particulates at an efficiency of up to 99%, while the carbon filter captures and neutralises odours with up to 90% efficiency. The system's internal contact time and pressure drop meet EMAQ+ requirements without the need for ionisation or ozone, thereby offering a safe, passive and low-maintenance solution suitable for kitchens with limited installation height.

A contact time of 0.2 to 0.3 seconds has been used for this application based on cuisine type and discharge sensitivity, referencing Airclean's technical data and EMAQ+ guidance. Ductwork is sized accordingly to maintain velocity and provide the required dwell time for effective odour neutralisation. The Kitchavent system is mounted inline within the extract route prior to the fan, and maintenance access is provided on both sides of the unit. This solution ensures full compliance with local authority environmental requirements while maintaining a discreet profile for sensitive installations.

1.4 The Attenuation Strategy – Splitter Silencer

To ensure compliance with environmental noise limits and workplace acoustic comfort, a **baffle-type splitter silencer** has been integrated into the kitchen extract system. The selected model is the **Elta 068-0500-MFB**, appropriate for a 500 mm diameter duct serving an airflow of **2.1 m³/s**. This unit provides substantial insertion loss across all octave bands, particularly in the most sensitive ranges for human hearing and environmental assessment.

Insertion loss performance includes:

- **-24 dB at 500 Hz,**
- **-30 dB at 1 kHz,**
- **-30 dB at 2 kHz,**
- With typical attenuation of **-14 to -23 dB** across lower and higher frequencies.

The silencer is constructed with a **galvanised steel casing, perforated steel internal baffles**, and **glass tissue-faced high-density mineral wool infill** for sound absorption. Its internal geometry and 1200 mm length allow for high attenuation without introducing excessive static resistance, preserving airflow efficiency. The pressure loss is minimal and

compatible with the fan duty curve specified in Section 8, ensuring no performance compromise.

This splitter silencer is positioned directly downstream of the extract fan and before the final vertical discharge, significantly reducing breakout and airborne noise. The system complies with **BS EN ISO 3744** noise emission standards and is in line with planning requirements for commercial kitchens near noise-sensitive receptors.

1.5 Fresh (replacement) Air Ventilation System

The mechanical supply air fan (MUB series) is selected to deliver **80% of the extract volume**, in line with best practice for commercial kitchen ventilation to ensure adequate replacement air without over-pressurisation. Based on the extract flow rate of **1.5 m³/s**, the supply airflow rate is therefore set at **1.1 m³/s**.

Using a **400 mm duct diameter**, this results in an internal air velocity of **8.75 m/s**, and the system's total static resistance has been calculated at **185.71 Pascals**, factoring in:

- 3 metres of spiral ducting (**5.6 Pa**),
- 1 x 90° segmented bend (**16.5 Pa**),
- 1 x reducer (**8.0 Pa**),
- 1 x clean filter cassette (**122.5 Pa**),
- 1 x weather louvre (**33.0 Pa**).

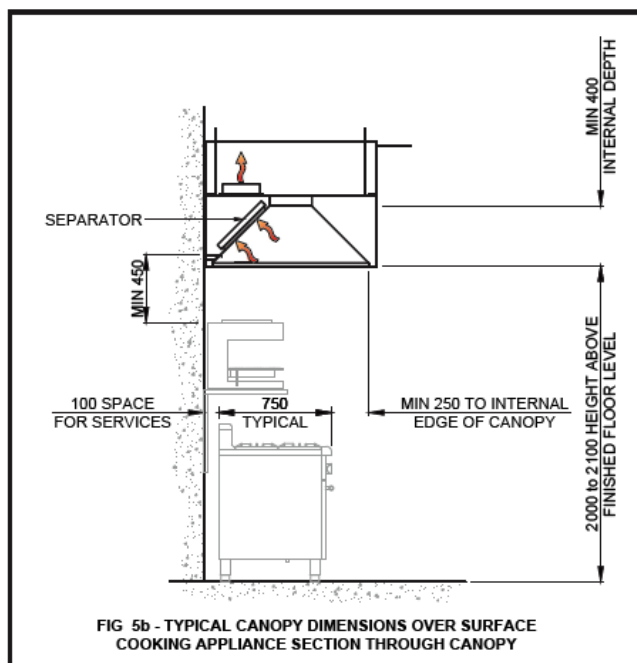
1.5 Canopy

The overall size of the canopy is the canopy will be manufactured from 20swg 304 food grade stainless steel with a full perimeter condense drain channel. There will be an extract plenum to the rear and will be fitted with standard stainless steel baffle type grease filters. Filter stage 1.

An insulated fresh air plenum to the front of the canopy with perforated stainless steel diffusers to distribute the fresh air into the kitchen. Further information found in section 2. Fresh Air Intake.

The fresh air plenum would also have integral high temp rated LED lighting modules.

The underside of the canopy should be located between 2m and 2.1m above finished floor level.



The canopy is to be installed wall mounted, closed both sides.

There will be a minimum of 1 no spigot connection for every 3m of the canopy.

1.6 Ductwork

All duct work will be manufactured in accordance with DW/144

Extract Ductwork:

The main extract ductwork is sized to handle an airflow of **1.5 m³/s**, with a nominal duct diameter of **500 mm**, resulting in an in-duct velocity of approximately **7.64 m/s**. In other sections, the duct transitions to a **550 mm diameter**, which increases the velocity to approximately **6.31 m/s**. Where square ducting is used, an equivalent cross-sectional area—such as **450 mm x 450 mm**—is applied to maintain consistent velocity and static pressure within design limits. Additionally, some parts of the system expand to **800 mm x 800 mm** to reduce velocity and manage static pressure in accordance with layout and acoustic considerations. Refer to the mechanical drawings for full duct sizing and routing.

Supply (Replacement Air) Ductwork:

The supply air system is designed for an airflow of **1.1 m³/s**, using **400 mm diameter ductwork**, achieving an in-duct velocity of approximately **8.75 m/s**. Where square ducting is preferred, an equivalent dimension of **450 mm x 450 mm** provides sufficient cross-sectional area while aligning with installation constraints. This duct sizing ensures adequate delivery of make-up air to offset extract volume and maintain balanced kitchen pressurisation. Ductwork is fabricated and installed in accordance with **DW/144** and includes suitable access panels for maintenance and inspection.

At this stage we have not assess the requirements for fire rated duct. However all fire rated ductwork will be fire rated to 2 hours, by the application of FireMac FM120, in accordance with the FireMac specifications.

2. Interlock System

- 2.1 All connections to gas services must be performed by a Gas Safe Engineer. In order to comply with BS6173 all new commercial kitchens with one or more items of gas-fired cooking equipment, built or fitted-out since September 2001, must have a gas interlocking system on the ventilation system. The interlock system is designed to disable the flow of gas to appliances if there is a failure in the ventilation system.

3. Carbon Monoxide Safety System

This ventilation system has been designed on the basis that solid fuel cooking appliances are not in use. The current design does not account for the additional fire safety, ventilation, and gas monitoring requirements associated with solid fuel equipment. Should the client wish to introduce solid fuel appliances, such as charcoal grills or wood-burning ovens, a separate ventilation design will be required to ensure full compliance with DEFRA, EMAQ+, and BS6173 standards, along with relevant guidance on carbon monoxide (CO) mitigation.

In the event that solid fuel cooking is to be incorporated, the system must include a dedicated Carbon Monoxide (CO) safety solution, in addition to the standard fresh air and extract provisions. This would typically involve installing a Merlin CT1750 control panel, together with CO₂ and temperature sensors supplied by S&S Northern. These devices provide continuous real-time monitoring, with a wall-mounted control unit that delivers both audible and visual alarms in the event of elevated CO levels.

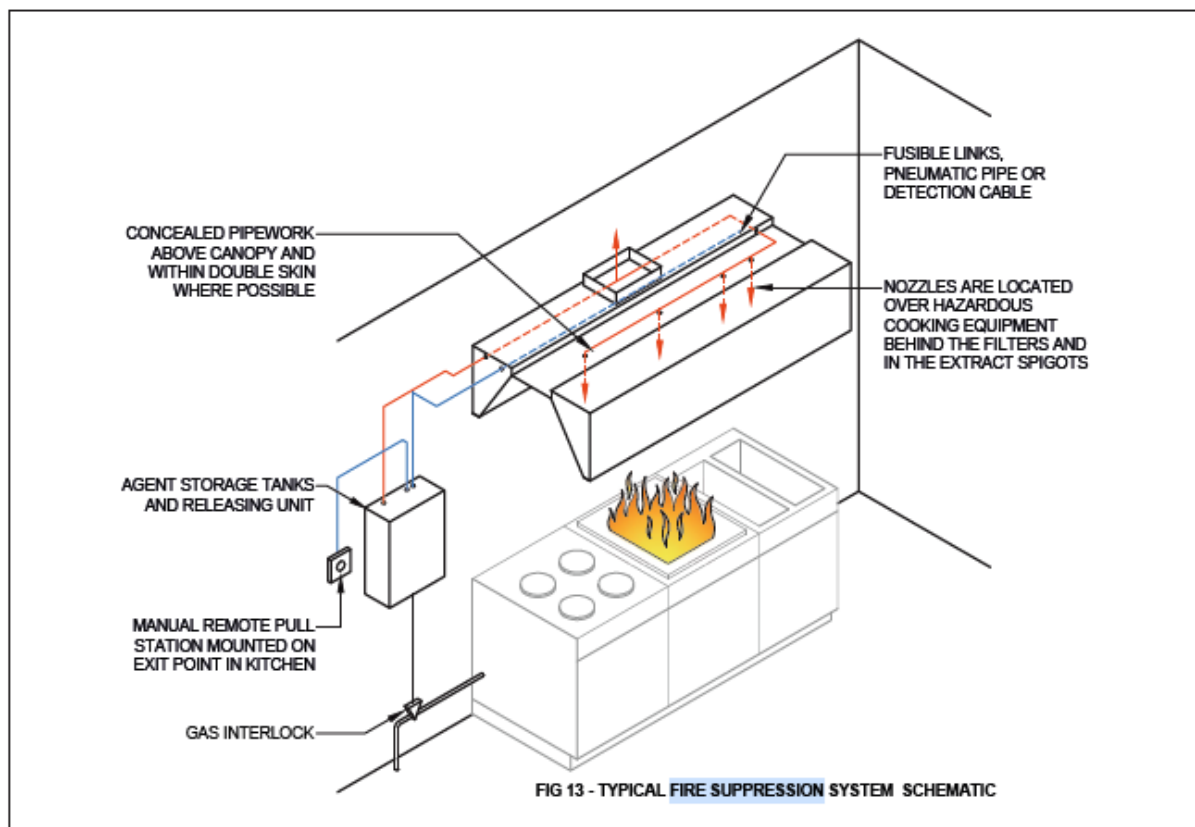
The control panel would actively monitor the kitchen environment during service. If CO levels exceed safe thresholds—despite the ventilation system running—alarms would be triggered, and an immediate check of the extract fan integrity would be required. In such cases, all solid fuel cooking must cease until the ventilation system is fully restored. Additionally, if the kitchen is closed but residual combustion continues (e.g., solid fuel smouldering after hours), the system will automatically activate the extract fan to purge CO until levels return to within safe parameters.

To reiterate: solid fuel cooking is not permitted under this current system design. A revised design including enhanced ductwork protection, spark arrestors, heat-resistant components, and continuous gas monitoring—must be commissioned if solid fuel appliances are to be installed.

4. Fire Suppression

The Regulatory Reform Act loosely referred to as the Fire Reform Order is a statutory (Legally binding) regulation.

This is intended to move the point of responsibility from the Local Fire Brigade to the operator (not necessarily the owner) of the restaurant, shop etc. requiring hi/her to produce a Fire Risk Assessment (FRA) for the premises. This FRA will invariably require a fire suppression system if, for example, there is a deep fat fryer involved. There is also thought to the location of the fryers at Stamford QTR as the user needs to pass the fryer for safe exit.



4.1 We have included the optional but recommended Fire Suppression system.

The system will be designed as an **overlapping system**. This will invariably result in there being additional liquid suppressant tanks / cylinders in the system. The future benefits to the operator will potentially offset this. The capacity of the overlapping nozzles are designed for any type and size of cooking appliance thereby facilitating trouble free future alterations to the type and layout of the cooking appliances.

5 Cleaning & Maintenance

- 5.1** Cleaning and maintenance schedule to be supplied to client to TR/19 guidelines
This must be carried out by a competent registered BESA Ductwork cleaner no longer than 12 month intervals or earlier

Table 12 Kitchen grease extract systems

Perceived level of grease production	Typical example	Cleaning intervals (months) Daily usage			
		up to 6 hours	6-12 hours	12-16 hours	16+ hours
Low	No significant production of grease laden aerosols during normal daily food production operations	12	12	6	6
Medium	Moderate production of grease laden aerosols during normal daily food production operations	12	6	4	3
High	Heavy, significant or continual production of grease laden aerosols during normal daily food production operations	6	3	3	2

Notes to Table 12

1. Commercial liability/property insurance policies invariably contain conditions and warranties that stipulate a minimum cleaning frequency for grease extract ductwork systems under the insurance contract which can be a higher frequency of cleaning than TR/19 recommendations. Failure to comply with such requirements will invalidate the property insurance policy.
2. The canopy and canopy/extract plenum is an area of higher fire risk and consideration should be given to more frequent cleaning in accordance with insurers' requirements.
3. Periodic specialist cleaning should be accompanied by daily or weekly cleaning of canopies, filters and associated drains and traps in accordance with manufacturers' recommendations, typically carried out by the kitchen operator, in compliance with the property insurers' requirements.

5.2 Fire Suppression

The operator will require an ongoing maintenance and service plan with the retrospective manufacture of the Fire Suppression. If Ansul you will require 2 service visits per year. If K-Series system it will be 1 service visit per year.

Appendices

KITCHAVENT 2000 / 3000 / 4000

Complete Grease, Smoke and Odour Control Solution

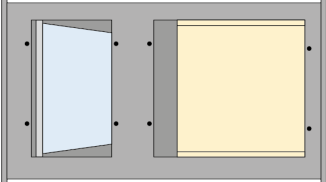
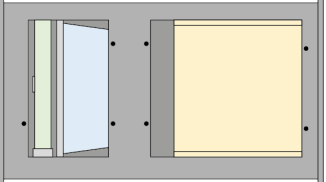
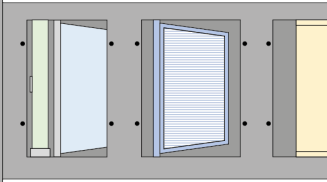
Applications

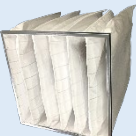
The Airclean Kitchavent System is designed to control nuisance grease, smoke and odour discharge from commercial kitchens in line with DW 172 and the EMAQ+ guidance for nuisance control from kitchen extract systems.

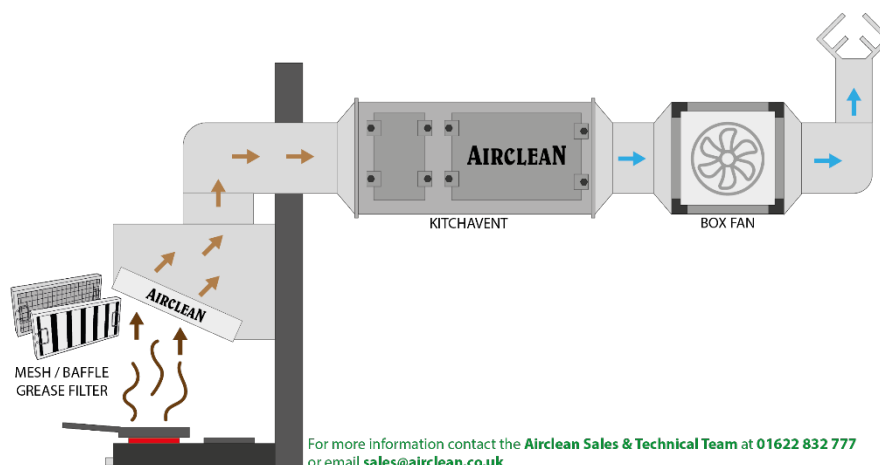
The Kitchavent system can be installed in any convenient position within the kitchen extract duct run from the canopy to the extract fan.

Various versions of the Kitchavent are available offering up to four stages of kitchen extract filtration using Grease, Bag, HEPA, and Activated Carbon to clean the air before being discharged.

Kitchavent 2000, 3000 and 4000 are distinguished between by the following:

2 Stage - Kitchavent 2000	3 Stage - Kitchavent 3000	4 Stage - Kitchavent 4000
		
M5 Bag + Carbon	Grease Filter + M5 Bag + Carbon	Grease Filter + M5 Bag + HEPA + Carbon

			
Washable Grease Filter Reduce excess grease	M5 Bag Filter Reduce fine particulates	E10 HEPA Filter Reduce smoke	Activated Carbon Reduce odour



The unique design of the Kitchavent housing ensures that all air is treated for grease, smoke and odour prior to discharge, ensuring that there is no air leakage past the filters within the unit.

The modular system allows for airflows ranging from 0.2m³/s in the smallest module and up to 2.12m³/s in the largest unit. Multiple units can be utilised to cater for any larger airflows or greater contact times.

The Kitchavent System can be used to design systems that will meet any contact time required for odour control. Typically this is defined by local authority guidance, or advised by a systems designer. (Typically 0.1 seconds to 0.8 seconds depending on cuisine and discharge point.)

The Kitchavent grease, odour and smoke control unit is suitable for internal and external mounting, and is also available in a flat pack version for those tricky to reach situations.

Description

The Kitchavent housing is manufactured from pre-coated steel, having plain external flanges of 40mm, access doors on both sides, and a painted finish. The grease filter is located in a grease trough to facilitate regular cleaning of the unit.

Air filter sealing faces and clips ensure that all air passes through the carbon and HEPA filters capturing 90% of odours, and up to 99% of smoke generated from modern commercial kitchens.

The simple design, along with a painted finish, ensures that the unit is not obtrusive, and is discrete for installations where the unit is on show, or where sensitive planning issues exist.

Technical

Contact Times

To ensure effective odour control, a suitable contact time must be maintained with the activated carbon. Contact times will vary depending upon cuisine styles and the sensitivity of the discharge point. Examples of typical contact times are as follows, or where it is required, the EMAQ+ guidance "Control of Odour and Noise from Commercial Kitchen Exhaust Systems" can be consulted.

Contact Times (Seconds)	Typical Cuisines / Applications	EMAQ+ Guidance
0.1	Café / Tea Rooms / Most Pubs Low Odour Cuisine / High level Discharge	Low to Medium Level Odour Control
0.2 - 0.3	Take Away / Pizza / Burger Bars Medium Odour Cuisine	High Level Odour Control
0.4 - 0.8	Indian / Thai Restaurants / High level of fried food Low Level Discharge / Sensitive Discharge	Very High Level Odour Control

Positioning and Mounting

Where airflows greater than stated in the data sheets are required, multiple modules can be mounted in "parallel".

Units are generally mounted horizontally, although where grease filters are not used (Kitchavent 2000) units can be modified to suit a vertical airflow.

Filter change and maintenance can be carried out from both sides of the unit. Consideration must be made for manual handling and mounting as the weights of the Activated Carbon Filters and the actual units are high. (See Catalogue AC6.2 Section 6).

Where installation access is difficult, **flat pack AHU style Kitchavents** are available for engineers to simply put together on site.

Operating Conditions

Max allowable air on conditions to the unit are 40 degrees centigrade and 80% relative humidity, if these conditions are exceeded then the activated carbon filter will be ineffective.



Flat Pack Kitchavent
Available on request

Kitchavent Selection Tables

The following tables offer selections for Kitchavents of all styles.

0.1 second contact time is suitable for Low to Medium Level Odour Control

0.2 second contact time is suitable for High Level Odour Control

0.4 second contact time is suitable for Very High Level Odour Control

KITCHAVENT 2000 - 2 Stage Odour Control													
Airflow Rating @ 0.1 Second Contact Time			Airflow Rating @ 0.2 Second Contact Time			Airflow Rating @ 0.4 Second Contact Time			Overall Casing Size (mm) *			Cell Qty.	Part Number
m3/s	P.D. (Pa)		m3/s	P.D. (Pa)		m3/s	P.D. (Pa)		Height	Width	Depth		
	Clean	Dirty		Clean	Dirty		Clean	Dirty					
0.27	322	400	0.14	161	380	0.07	81	340	383	383	1182	1	1815211
0.54	322	400	0.27	161	380	0.14	81	340	383	681	1182	2	1815212
0.81	322	400	0.41	161	380	0.20	81	340	383	979	1182	3	1815213
1.08	322	400	0.54	161	380	0.27	81	340	383	1277	1182	4	1815214
0.53	296	367	0.27	296	367	0.13	74	307	688	383	1182	1	1815251
1.06	296	367	0.53	296	367	0.27	74	307	688	681	1182	2	1815252
1.59	296	367	0.80	296	367	0.40	74	307	688	979	1182	3	1815253
2.12	296	367	1.06	296	367	0.53	74	307	688	1277	1182	4	1815254

KITCHAVENT 3000 - 3 Stage Odour Control													
Airflow Rating @ 0.1 Second Contact Time			Airflow Rating @ 0.2 Second Contact Time			Airflow Rating @ 0.4 Second Contact Time			Overall Casing Size (mm) *			Cell Qty.	Part Number
m3/s	P.D. (Pa)		m3/s	P.D. (Pa)		m3/s	P.D. (Pa)		Height	Width	Depth		
	Clean	Dirty		Clean	Dirty		Clean	Dirty					
0.27	354	464	0.14	177	434	0.07	89	374	383	383	1182	1	1815311
0.54	354	464	0.27	177	434	0.14	89	374	383	681	1182	2	1815312
0.81	354	464	0.41	177	434	0.20	89	374	383	979	1182	3	1815313
1.08	354	464	0.54	177	434	0.27	89	374	383	1277	1182	4	1815314
0.53	331	437	0.27	166	407	0.13	83	347	688	383	1182	1	1815351
1.06	331	437	0.53	166	407	0.27	83	347	688	681	1182	2	1815352
1.59	331	437	0.80	166	407	0.40	83	347	688	979	1182	3	1815353
2.12	331	437	1.06	166	407	0.53	83	347	688	1277	1182	4	1815354

KITCHAVENT 4000 - 4 Stage Odour Control													
Airflow Rating @ 0.1 Second Contact Time			Airflow Rating @ 0.2 Second Contact Time			Airflow Rating @ 0.4 Second Contact Time			Overall Casing Size (mm) *			Cell Qty.	Part Number
m3/s	P.D. (Pa)		m3/s	P.D. (Pa)		m3/s	P.D. (Pa)		Height	Width	Depth		
	Clean	Dirty		Clean	Dirty		Clean	Dirty					
0.20	418	651	0.07	138	400	0.03	69	350	383	383	1824	1	1815401
0.40	418	651	0.13	138	400	0.07	69	350	383	681	1824	2	1815402
0.60	418	651	0.20	138	400	0.10	69	350	383	979	1824	3	1815403
0.80	418	651	0.26	138	400	0.13	69	350	383	1277	1824	4	1815404
0.40	401	632	0.20	201	607	0.10	100	557	688	383	1824	1	1815451
0.80	401	632	0.40	201	607	0.20	100	557	688	681	1824	2	1815452
1.20	401	632	0.60	201	607	0.30	100	557	688	979	1824	3	1815453
1.60	401	632	0.80	201	607	0.40	100	557	688	1277	1824	4	1815454

* Duct size is overall less 80mm



SPLITTER SILENCER

SPLITTER SILENCER

Overview

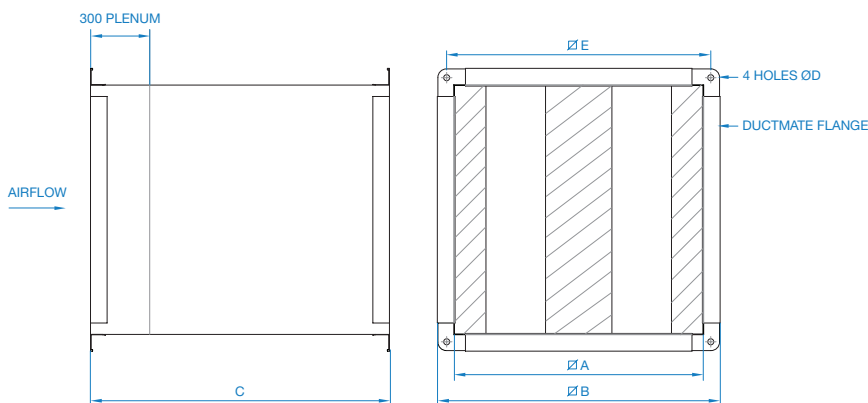


- Baffle type silencers
- Galvanised steel casing with perforated steel lining and baffles
- Infill is glass tissue faced high density mineral wool

Product Code	Insertion Loss @ Octave band							
	63	125	250	500	1K	2K	4K	8K
068-0350-MFB	-4	-6	-14	-23	-30	-29	-20	-14
068-0400-MFB	-4	-6	-14	-23	-30	-29	-20	-14
068-0450-MFB	-4	-9	-13	-25	-31	-30	-22	-15
068-0500-MFB	-4	-9	-14	-24	-30	-30	-23	-16
068-0550-MFB	-4	-6	-11	-22	-28	-27	-18	-14
068-0650-MFB	-4	-7	-13	-24	-26	-25	-17	-12
068-0700-MFB	-4	-7	-13	-24	-26	-25	-17	-12
068-0800-MFB	-5	-8	-16	-27	-30	-30	-21	-16
068-1000-MFB	-5	-9	-12	-22	-26	-23	-16	-12

Dimensional Data

Product Code	A	B	C	D	E	Ductmate Flange	Weight kg
068-0350-MFB	350	400	1200	9	375	25	24
068-0400-MFB	400	450	1200	9	425	25	31
068-0450-MFB	450	500	1200	9	475	25	38
068-0500-MFB	500	550	1200	9	525	25	42
068-0550-MFB	550	620	1200	11	585	35	49
068-0650-MFB	650	720	1500	11	685	35	74
068-0700-MFB	700	770	1500	11	735	35	81
068-0800-MFB	800	870	1800	11	835	35	117
068-1000-MFB	1000	1070	1800	11	1035	35	164



Dimensions are in mm.

SPLITTER SILENCER

Notes

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