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Odour Assessment

5 Tavistock Road, UB7 7QT

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Contents

Author	Date	Description
Anthony Jennings OCDEA	16/04/2024	EMAQ (2018) Control of Odour and Noise from Commercial Kitchen Exhaust Systems Study

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1. Introduction and Site Details

1.1 Introduction

NML Ltd have been commissioned by the Applicant to provide an Odour Assessment to support a Planning Application for the Installation of a kitchen extraction system. The planning application proposes a new extraction flue system and seeks to identify a scheme for the extraction and treatment of fumes and odours at the site.

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1.2 Site Details

The site is located on the end of a parade of shops . The area is a mix of commercial and residential buildings. The site is typical of an urban cityscape environment. (See Figure 1.1)

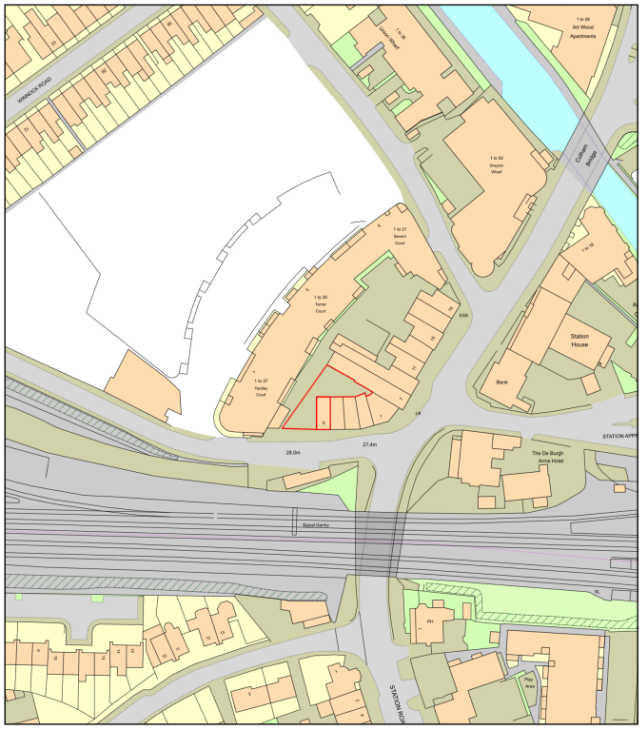

Figure 1.1 – Site Location

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2. Guidance and policy

The following legislation and guidance have been used in this assessment:

• Guidance on the Assessment of Odour for Planning, Version 1.1 Institute of Air Quality Management (IAQM), 2018. The IAQM published the 'Guidance on the Assessment of Odour for Planning' document in July 2018. This guidance specifically deals with assessing odour impacts for planning purposes, namely potential effects on amenity. Which refers to the DEFRA report on odours and noise from commercial kitchens now superseded by
EMAQ, (2018) Control of Odour and Noise from Commercial Kitchen Exhaust Systems, an amendment of the original DEFRA document published in 2005, deals specifically with the control of kitchen odours.

The magnitude of odour impact depends on a number of factors and the potential for adverse impacts varies due to the subjective nature of odour perception. The FIDOL acronym is a useful reminder of the factors that can be used to help determine the degree of odour pollution:
• Frequency of detection - frequent odour incidents are more likely to result in adverse impacts;
• Intensity as perceived - intense odour incidents are more likely to result in adverse impacts;
• Duration of exposure - prolonged exposure is more likely to result in adverse impacts;
• Offensiveness - more offensive odours have a higher risk of resulting in adverse impacts; and,
• Receptor sensitivity - (The type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor.)
It is important to note that even infrequent emissions of odours may cause loss of amenity if odours are perceived to be particularly intense or offensive.

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3. Assessment Methodology

The assessment of odour takes on the following aspects:

• A qualitative assessment of proposed odour emissions from the change of use development;

• An assessment taking into account the nature of the premises;

• The height and position of any proposed flue;

• The recommended exit velocity from the flue; and

• The distance between the proposed flue and the potential odorous emissions and the distance to the sensitive receptor.

3.1. Baseline Survey

A desktop survey has been undertaken to review the plans, including the proposed ventilation system and the potential impact on the surrounding properties. This assessment has been carried out using EMAQ (2018) Control of Odour and Noise from Commercial Kitchen Exhaust Systems.

1. 5 Tavistock Road, UB7 7QT is proposing a kitchen extraction system.

2. Surrounding properties are commercial and residential.

3. Plans include keeping the existing of a kitchen extract system comprising of a wall type canopy extracting through a site safe carbon block before the extract fan discharging at 1m above the roof ridge at the “Proposed Kitchen Extraction Exhaust” shown in figure 2.

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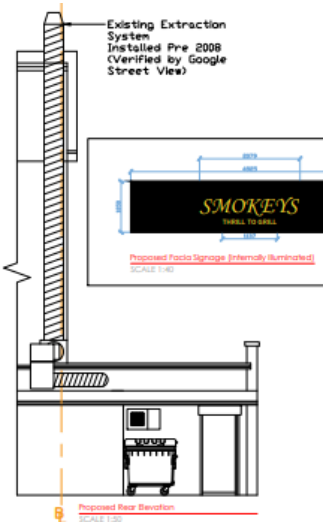

Figure 2: Proposed rear elevation showing ductwork

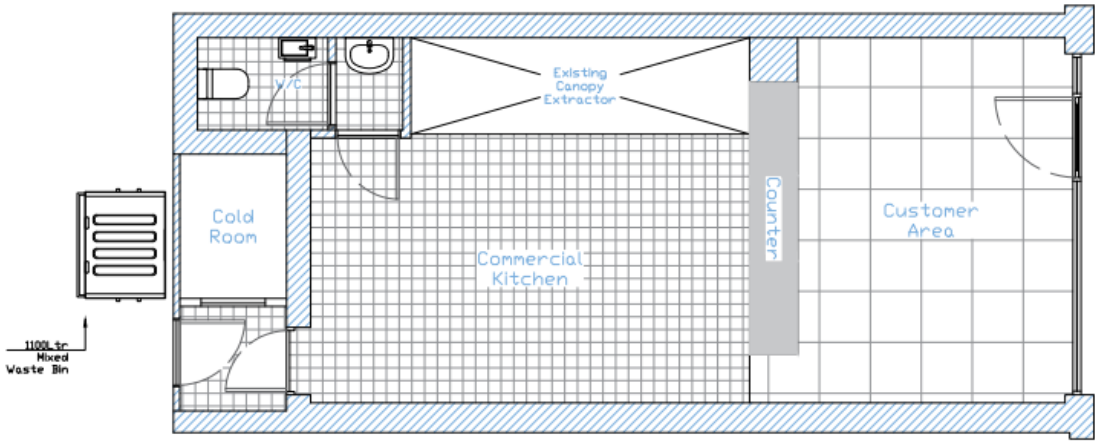

Figure 2.1 – Proposed Kitchen Layout

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3.2. Assessment Criteria of Planned Kitchen Extract Vent.

From the available information contained in the plans the risk of odour impact on nearby receptors has been assessed using the guidance in the EMAQ, (2018) Control of Odour and Noise from Commercial Kitchen Exhaust Systems as referred to in the IAQM.

Impact Risk	Odour Control Requirement	Significance Score*
Low/Medium	Low Level Odour Control	Less than 20
High	High Level Odour Control	20-35
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:

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Criteria	Rating	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 1 m above eaves at 10-15m/s
	Good	5	Discharging 1m above ridge at 15m/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 take away.
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers, or fish & chips. Turkish, middle eastern or any premises cooking with solid fuel
	High	7	Vietnamese, Thai or Indian, Japanese, Chinese, Steakhouse
	Medium	4	Cantonese, Italian, French, Pizza (gas fired)
	Low	1	Most pubs (no fried food, reheating, sandwiches), Coffee shop.

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Below is an evaluation for the site based on the above criteria:

Criteria	Rating	Score	Details/ Comments
Dispersion	Good	5	Discharging 1m above the ridge
Proximity of Receptors	Close	10	NSR is 2m away from discharge
Size of Kitchen	Small	1	Small Takeaway
Cooking Type	High	7	Steakhouse Grill

Impact Risk	Odour Control Requirement	Significance Score
High	High Level odour requirement	23

A High Level of odour control is required.

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3.3. Odour Control Recommendations

The risk assessment suggests that a High level of odour control is needed in order to reduce the risk of odour impact on the nearby receptors.

Based on the technical specifications from the suppliers of the fan and carbon filter the following is recommended on each kitchen extraction system:

- Canopy with grease filters
- Fine filtration – such as a panel filter, this will remove grease particles not removed by the canopy filter and protect the carbon.
- Actuated Heavy Duty Carbon Filter with V Pleat pre -Filter

Installation of this equipment constitutes as a high level of odour control.

Maintenance must be carried out to ensure these performance levels are always achieved.

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4. Maintenance

Proprietors of commercial kitchens have a duty to ensure that the ventilation system serving their kitchen are maintained and operated effectively. Good maintenance is a prerequisite for ensuring that a system complies with Best Practicable Means under statutory nuisance provision and will form a key element of any scheme designed to minimise harm to the amenity under planning regulation. Good maintenance is required by the food hygiene regulations and will also minimise the risk of fire and minimise noise. The recommended cleaning period for grease extract system ductwork is:

Grease Loading		Daily Uses	Cleaning Interval (months)
Heavy Use	Heavy/continuous Grease Production	6 – 12 hours	3-6 months
		12-16 hours	2-3 months
Moderate Use	Moderate Grease Production	6 – 12 hours	6-12 months
		12-16 hours	3-4 months
Light Use	No significant Grease Production	6 – 12 hours	12 months
		12-16 hours	6 months

Recommendations for maintenance of odour control system include:

- Change fine filters every two weeks
- A visual inspection of the ventilation system be carried out at least once a week. All metal surfaces should be checked to ensure that there is no accumulation of grease or dirt and that there is no surface damage;
- Cooker hoods and grease filters should be cleaned on a daily basis;
- Change carbon filters every 4 to 6 months
- Carbon filters with ESP pre-treatment change carbon filter every 6 to 12 months.

Daily cleaning keeps the filters working at their optimum efficiency and will greatly reduce the number of service visits required throughout the year. It will be important that the odour control methods are fully implemented and additionally, that the proposed management measures and frequency of servicing is complied with.

With respect to the servicing and maintenance regime, audit and service records should be maintained and made available to the Local Authority on demand. These time frames may increase or reduce for extreme or very light applications.

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5. Conclusions

This odour impact assessment has carried out to support a planning application for the installation of kitchen extract system.

The risk of odour impact on nearby receptors has been assessed using the guidance in the EMAQ (2018) Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems.

Considering the dispersion, proximity of receptors, food type and kitchen size, without the installation of odour abatement equipment, the risk assessment score is 23. This suggests that a high level of odour control is needed in the proposed kitchen in order to reduce the risk of odour impact on the nearby receptors.

The planned kitchen ventilation system – existing extraction fan , with a with fine filtration and carbon filters and discharging 1m over the roof ridge would provide a high level of odour control. This complies with the EMAQ Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems best practice.

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Appendix 1

Risk assessment for odour from EMAQ, (2018) Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems.

Impact Risk	Odour Control Requirement	Significance Score*
Low/Medium	Low Level Odour Control	Less than 20
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*Based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

Criteria	Rating	Score	Details
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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.

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Appendix 2

Filter Examples

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PLEATED PANEL AIR FILTER
G4 to EN779:2012

Applications

The Pleated Panel Air Filter is a medium efficiency disposable air filter, suitable for ventilation and air conditioning systems which require a higher efficiency and greater dust holding capacity than can be achieved with glass or synthetic panels.

The G4 filter can be used where glass panels are undesirable, such as in the food industry and hospitals.

Typically, G4 panel filters are used as pre filters on supply air systems to High Performance Bag Filters, or to protect heating or cooling coils from dust build up which leads to system inefficiency. Another common place to see G4 Pleated Panel Air Filters is to protect fans in extract systems for office blocks or kitchen extract systems.

Description

Pleated Panel Filters consist of a dry non-woven fabric media which is pleated to give an extended surface area, producing a low initial resistance for the same air volume, making this an energy efficient filter. The pleat is supported by an expanded galvanised steel mesh.

The pleated air filter media is contained within the air filter by a rigid all-cardboard casing. The filter is sealed together using hot melt adhesive glues to ensure a highly rigid and quality disposable panel air filter.

Three frame options are available; Standard, Airclean Moisture Resistant (AMR) and Metal. Each offering an increased strength and resilience against moisture and humidity experienced in supply air from atmosphere.

Technical

The pleated air filter media is Flame Retardant to UL Class II
Max Operating Temp 80 Deg C
Dust Holding Capacity for 50mm Filter = 840 g/m2 Dust Holding Capacity for 100mm Filter = 1260 g/m2
Nominal to Actual Size: less 6mm on H & W, 3mm on Depth
Filter Grade to ISO 16890: Coarse 75%

PLEATED PANEL FILTER STANDARD SIZES

Size		Flow Rate			Part Numbers					
OT Inches	Actual mm	22mm m^3/s	47mm m^3/s	97mm m^3/s	1" (22mm)		2"(47mm)		4"(97mm)	
					STD	AMR	STD	AMR	STD	AMR
10 x 10	242 x 242	0.12	0.15	0.18	1130101	1134121	1130201	1134221	1130401	1134421
12 x 12	289 x 289	0.17	0.21	0.25	1130102	1134122	1130202	1134222	1130402	1134422
15 x 15	369 x 369	0.27	0.34	0.41	1130103	1134123	1130203	1134223	1130403	1134423
18 x 18	445 x 445	0.40	0.50	0.59	1130104	1134124	1130204	1134224	1130404	1134424
20 x 10	495 x 242	0.24	0.30	0.36	1130106	1134125	1130206	1134225	1130406	1134425
20 x 16	495 x 394	0.39	0.49	0.59	1130108	1134126	1130208	1134226	1130408	1134426
20 x 20	495 x 495	0.49	0.61	0.74	1130110	1134127	1130210	1134227	1130410	1134427
25 x 16	620 x 394	0.49	0.61	0.73	1130111	1134128	1130211	1134228	1130411	1134428
25 x 20	620 x 495	0.61	0.77	0.92	1130112	1134129	1130212	1134229	1130412	1134429
24 x 12	594 x 289	0.34	0.43	0.51	1130113	1134130	1130213	1134230	1130413	1134430
24 x 20	594 x 495	0.59	0.74	0.88	1130114	1134131	1130214	1134231	1130414	1134431
24 x 24	594 x 594	0.71	0.88	1.06	1130115	1134132	1130215	1134232	1130415	1134432

STD: Standard Cardboard Frame *AMR: Airclean Moisture Resistant Cardboard Frame*

FOR NON-STANDARD SIZES CONTACT THE SALES TEAM

Airclean Ltd reserve the right to amend or delete the product as they decide, without prior notification. E&OE.
Code AC1.3 Ref 10/19 Page 1 of 2

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Notes
* Actual sized filters will be manufactured as ordered +/- 3mm
* Rated Airflows based on Face Velocities : 22mm = 2.0m/s, 47mm = 2.5m/s, 97mm = 3.0m/s
* Clean Pressure Drops at Rated Airflows : 22mm = 75Pa, 47mm = 75Pa, 97mm = 75Pa
* Max Size: 625Hx900W

Airclean Moisture Resistant Panel (AMR) Filters

Airclean Moisture Resistant Panel Filters are for use in high humidity or moist environments. These premium filters still have a cardboard frame, but have a higher moisture resistance than our standard range, which help the filter maintain rigidity and functionality without structural failure.

Airclean Moisture Resistant Panels are available in G2/3 Glass Fibre, G3 Synthetic and G4 Pleated Panel Filters. "AMR Panel Filters" are manufactured in the same way as our standard panel filters but utilise "Carrier / Beverage Board" which has an increased wet-strength.

Metal Framed Pleated Panel Filters

Metal Framed Pleated Panels offer an increased level of fire retardancy and rigidity by removing and replacing the cardboard frame with a galvanised or stainless steel frame. A small amount of hot melt or polyurethane adhesive is used to fix and seal the pleated elements into the frame.

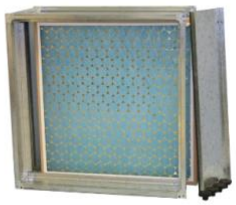
PLEASE NOTE: This is not a "wrap around" metal frame, but a complete replacement for the cardboard frame removing any chance the filter collapsing in humid environments.

Holding Frames and Cases

Holding frames and casings for Disposable Pleated Panel Filters are available singularly or in multiples, and can be manufactured to suit non-standard sizes and special applications.

See Catalogue Section 8 (code AC8) for full information.

Front Withdrawal Frame (1810)



MEZ Flanged Side Access Housing (1820)

Duct Mounted Filter Housing (1825)

Fully Welded Side Withdrawal Filter Housing (1840)

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Standard Mesh Type Grease Filters

Stainless Steel & Galvanised Steel for Kitchen Extracts and Canopies

Applications

Mesh Grease Filters are generally installed in the kitchen canopy above cooking ranges, fryers, and gas hobs in commercial restaurant kitchens. These air filters effectively eliminate or greatly reduce grease build up in duct work and on fans in the kitchen extract system.

Mesh Canopy Filters significantly reduce the frequency of expensive duct cleaning, and offer some protection against grease-fire hazards. Airclean now have many thousands of mesh grease filters operating satisfactorily in leading restaurants, hotel kitchens and ship's galleys.

Description

The grease filtration media is a crimped galvanised or stainless steel knitted wire mesh, that is enclosed in either an aluminium or galvanised channel frame. Galvanised steel or stainless-steel retaining meshes are fitted to both faces of the grease filter, and corner plates provide rigidity.

Handles are normally desirable on grease filters for ease of removal and cleaning, but these are optional. Drain holes also provide an outlet for grease to drain away from the filter into drain trays and grease traps.

For Heavy Duty Stainless Steel Mesh Type Grease Filters are available, and these can be found as our Gridmesh Style Grease Filter. See AC3.4 Stainless Steel Gridmesh Grease Filters for further information.

Technical

Filter Classification : Grade G2/G3 to EN779, Coarse 20% to ISO 16890
Maximum Operating Temperature : 100°C (212°F)
Maximum Recommended Face Velocity 2.5 m/s
Standard Filter Depths/Thickness: 47mm, 22mm, 12mm

Size		Flow Rate	Filter Depth			
			Galvanised Steel		Stainless Steel	
OT Inches	Actual mm	m^3/s	1" (22mm)	2"(47mm)	1" (22mm)	2"(47mm)
			Part No	Part No	Part No	Part No
10 x 10	242 x 242	0.15	1310101	1310201	1316101	1316201
12 x 12	292 x 292	0.21	1310102	1310202	1316102	1316202
15 x 15	369 x 369	0.34	1310103	1310203	1316103	1316203
16 x 16	394 x 394	0.39	1310104	1310204	1316104	1316204
18 x 9	445 x 216	0.24	1310105	1310205	1316105	1316205
18 x 18	445 x 445	0.50	1310106	1310206	1316106	1316206
20 x 10	495 x 242	0.30	1310107	1310207	1316107	1316207
20 x 16	495 x 394	0.49	1310108	1310208	1316108	1316208
20 x 20	495 x 495	0.61	1310109	1310209	1316109	1316209
25 x 16	623 x 394	0.61	1310110	1310210	1316110	1316210
25 x 20	620 x 495	0.77	1310111	1310211	1316111	1316211
24 x 24	597 x 597	0.89	1310112	1310212	1316112	1316212

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Notes

* Actual sized filters will be manufactured as ordered +/- 3mm
* Clean Pressure Drops 1" -25Pa, 2" – 30Pa, based on FV= 2.5m/s
* Handles and Drain Holes come as standard and are only removed upon request.
* Handles are located on the shortest side of the grease filter as standard.
* Alternative Frame Materials available : Aluminium (1315990), Stainless Steel 430 (1315991), Stainless Steel 304 (1315992)
* Heavy Duty Grease Filters with 25% extra filter media are available on request (Increased Pressure Drop).

Grease Filter Cleaning Tanks and Agents

To ensure the prolonged efficiency and life of a kitchen mesh grease filter they must be cleaned regularly (according to use).

Airclean offer a range of suitable Grease Filter Cleaning Tanks (Heated and Non Heated), and Non Caustic Cleaning Agents (See Catalogue Section 8, Page AC3.8).

Alternative cleaning solutions for grease filters include steam cleaning or an automatic dishwasher.

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Activated Carbon Filters
Metal Cased Discarb Cells

Applications

Activated Carbon Discarb Cells can be used for the reduction of odour or for gas control. Activated Carbon Discarb Cells offer a compact and convenient method to housing bonded carbon panels ready for mounting in a range of filter housings.

Typical applications for Airclean Activated Carbon Cells include Kitchen Extract Odour Control, Commercial Food Manufacture, Laboratory supply and extract systems, Office Air Supply, and VOC control.

Activated Carbon Discarbs offer a practical solution for controlling gases and odours in airflows from 0.1m3/s up to 10m3/s +.

Description

The metal cased 'Discarb' cells have the highest carbon loading in our range, and have standard or heavy-duty carbon panels permanently sealed into a galvanised sheet steel casing.

This construction gives a very strong unit capable of handling large air volumes or where conditions dictate, increased contact time. The advantage of this unit is that with panels sealed in, there is no possibility of air leakage.

Activated Carbon Discarb Filter Units can be manufactured to almost any reasonable size, the limiting factors being the overall weight for handling purposes and the size of individual panels. When the unit has finished its useful life it is discarded and replaced with a complete new cell.

Technical

Carbon Filters must be selected based on system duty airflows, and required contact times (dwell / residence). Contact times must be selected based on concentration and specific gases / odours that need to be removed.

The following tables on the next page offer selections for Activated Carbon Discarbs of all styles based on 0.1 second contact times.

For 0.2 second contact times reduce the airflows in the 0.1 second tables by 50%, pressure drops will reduce to 50%.

For 0.3 second contact times reduce the airflows in the 0.1 second tables to 33.3%, pressure drops will reduce to 33.3%.

For 0.4 second contact times reduce the airflows in the 0.1 second tables to 25%, pressure drops will reduce to 25%.

Pre filtration of grade M5 to EN779 is recommended prior to Activated Carbon Filters to aid effective gas removal.

Max allowable air on conditions to the unit are 40 Degree Centigrade and 80% Relative Humidity, if these conditions are exceeded then the activated carbon filter will be ineffective.

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ACTIVATED CARBON DISCARB FILTERS - STANDARD FLOW						
Dimensions (Actual, mm)			m^3/s	Pa	Grade 20 – Std. Flow	Grade 50 – Std. Flow
H	W	D			Part No.	Part No.
293	293	293	0.10	75	1620101	1620121
293	293	445	0.15	95	1620102	1620122
293	293	597	0.22	140	1620103	1620123
445	445	293	0.21	55	1620104	1620124
445	445	445	0.31	70	1620105	1620125
445	445	597	0.41	105	1620106	1620126
597	597	293	0.41	70	1620107	1620127
597	597	445	0.61	90	1620108	1620128
597	597	597	0.81	130	1620109	1620129
597	293	597	0.40	130	1620110	1620130
597	196	597	0.27	130	1620111	1620131

ACTIVATED CARBON DISCARB FILTERS - EXTRA DUTY						
Dimensions (Actual, mm)			m^3/s	Pa	Grade 20 – Extra Duty	Grade 50 – Extra Duty
H	W	D			Part No.	Part No.
293	293	293	0.13	125	1620201	1620221
293	293	445	0.20	175	1620202	1620222
293	293	597	0.27	250	1620203	1620223
445	445	293	0.30	95	1620204	1620224
445	445	445	0.41	125	1620205	1620225
445	445	597	0.54	185	1620206	1620226
597	597	293	0.54	125	1620207	1620227
597	597	445	0.80	150	1620208	1620228
597	597	597	1.06	225	1620209	1620229
597	293	597	0.53	225	1620210	1620230
597	196	597	0.35	225	1620211	1620231

Notes

* Airflow rates are based on a 0.1 second contact time. (Indian & Thai Cuisine require minimum of 0.3s)
* **Grade 20** 20 - 30% retention CTC. **Grade 50** 50 - 60% retention CTC.

Holding Frames and Cases

Holding frames and casings for Activated Carbon Filters are available singularly or in multiples, and can be manufactured to suit non-standard sizes and special applications.

See Catalogue Section 8 (AC8) and Section 11 (AC11) for full information.

Fully Welded Side Withdrawal Filter Housing (1840)

Kitchavent – Grease, Smoke and Odour Control for Kitchen Extract (1815)

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FAX:01622 832507

sales@airclean.co.uk www.airclean.co.uk

Metal Cased Discarbs

The metal cased 'Discarb' cells have the highest carbon loading in our range, and have standard or heavy-duty carbon panels permanently sealed into a galvanised sheet steel casing. This construction gives a very strong unit capable of handling large air volumes or where conditions dictate, increased contact time. The advantage of this unit is that with panels sealed in, there is no possibility of air leakage. Also, these units can be manufactured to almost any reasonable size, the limiting factors being the overall weight for handling purposes and the size of individual panels. When the unit has finished its useful life it is discarded and replaced with a complete new cell.

Standard Duty Cells

Nominal Size W x H x L	Actual Size mm W x H x L	Number of Panels	Carb. Weight	Discarb Weight	Airflow m^3/s	Airflow cfm	Pressure Pa
12"x 12" x 12"	292 x 292 x 292	6	5 kg	9 kg	0.10	212	75
12" x 12" x 18"	292 x 292 x 445	6	8 kg	14 kg	0.15	318	95
12" x 12" x 24"	292 x 292 x 597	6	10 kg	19 kg	0.22	466	140
18" x 18" x 12"	445 x 445 x 292	8	10 kg	17 kg	0.21	445	55
18" x 18" x 18"	445 x 445 x 445	8	15 kg	25 kg	0.31	657	70
18" x 18" x 24"	445 x 445 x 597	8	21 kg	33 kg	0.41	868	105
24" x 24" x 12"	597 x 597 x 292	12	20 kg	31 kg	0.41	868	70
24" x 24" x 18"	597 x 597 x 445	12	31 kg	45 kg	0.61	1292	90
24" x 24" x 24"	597 x 597 x 597	12	42 kg	59 kg	0.81	1716	130
12" x 24" x 24"	298 x 597 x 597	6	21 kg	35 kg	0.40	847	130

Extra Duty Cells

Nominal Size W x H x L	Actual Size W x H x L	No. of Panels	Carb. weight	Discarb weight	Airflow m^3/s	Airflow cfm	Pressure Pa
12"x 12" x 12"	292 x 292 x 292	6	6 kg	10 kg	0.13	275	125
12" x 12" x 18"	292 x 292 x 445	6	9 kg	15 kg	0.20	424	175
12" x 12" x 24"	292 x 292 x 597	6	12 kg	20 kg	0.27	572	250
18" x 18" x 12"	445 x 445 x 292	8	12 kg	19 kg	0.30	635	95
18" x 18" x 18"	445 x 445 x 445	8	19 kg	28 kg	0.41	868	125
18" x 18" x 24"	445 x 445 x 597	8	25 kg	37 kg	0.54	1144	185
24" x 24" x 12"	597 x 597 x 292	12	25 kg	35 kg	0.54	1144	125
24" x 24" x 18"	597 x 597 x 445	12	38 kg	52 kg	0.80	1694	150
24" x 24" x 24"	597 x 597 x 597	12	51 kg	68 kg	1.06	2245	225
12" x 24" x 24"	298 x 597 x 597	6	26 kg	46 kg	0.53	1122	225

The company reserves the right to change the specifications without notice. E & OE.

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