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environmental consultants

Kitchen Odour Risk Assessment

113 High Holborn, London

Mr Osama Qashoo

MAN.986.001.AQ.R.001

'Experience and expertise working in union'

enzygo.com

Mr Osama Qashoo
113 High Holborn, London

Contact Details:

Enzygo Ltd. (Manchester Office)
Ducie House
Ducie Street
Manchester
M1 2JW

tel: 0161 240 3347
email: conal.kearney@enzygo.com
www: enzygo.com

Kitchen Odour Risk Assessment
MAN.XXX.001.AQ.R.001

Project:	113 High Holborn, London
For:	Mr Osama Qashoo
Status:	Draft
Date:	October 2024
Author:	Conal Kearney, Director of Air Quality
Reviewer:	Josh Davies, Senior Air Quality Consultant

Enzygo Limited Registered in England No. 6525159
Registered Office: Gresham House, 5-7 St. Pauls Street, Leeds, England, LS1 2JG

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Tables and Figures

Non-Technical Summary

i. Enzygo Limited was commissioned by Mr Osama Qashoo to undertake a kitchen Odour Risk Assessment in support of a planning application for a revised kitchen flue at the restaurant at 113 High Holborn, London.

ii. Retrospective planning permission is sought for a new kitchen flue.

iii. An Odour Risk and Controls Assessment was therefore carried out in order to assess the effect of the new exhaust, the potential risk of adverse odour impacts and the suitability of the odours controls in the kitchen exhaust system.

iv. The assessment indicated that the risk of adverse odour impacts has been improved by the new kitchen exhaust and that the risk has been lowered from very high to high. Guidance recommends that a high level of odour controls would be required to ensure impacts are acceptable.

v. The required controls consist of primary grease filtration, fine filtration followed by carbon filters. The system is designed to ensure sufficient air flows throughout and allow maintenance where required.

vi. The reduced odour impact risk provided by the revised kitchen exhaust flue indicates that planning permission should not be refused from an odour perspective.

vii. The installed odour controls are suitable and would ensure that odour emissions from the proposed facility would not cause disamenity at nearby sensitive locations.

1.0 Introduction

1.1 Background

1.1.1 Enzygo Limited Ltd was commissioned by Aldyar Limited to undertake kitchen odour impact risk assessment to support a planning application for a public house redevelopment at 113 High Holborn, London.

1.1.2 The development provides for a new kitchen exhaust flue and therefore an odour risk assessment has been requested to consider the risk of adverse odour impacts at existing sensitive locations.

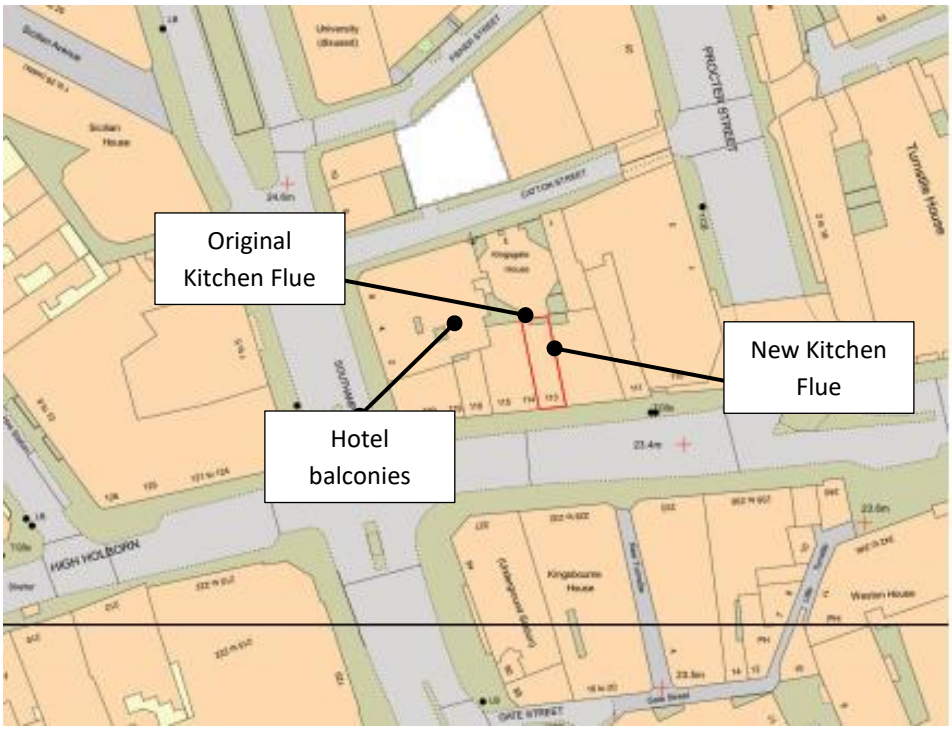
1.2 Site Location and Context

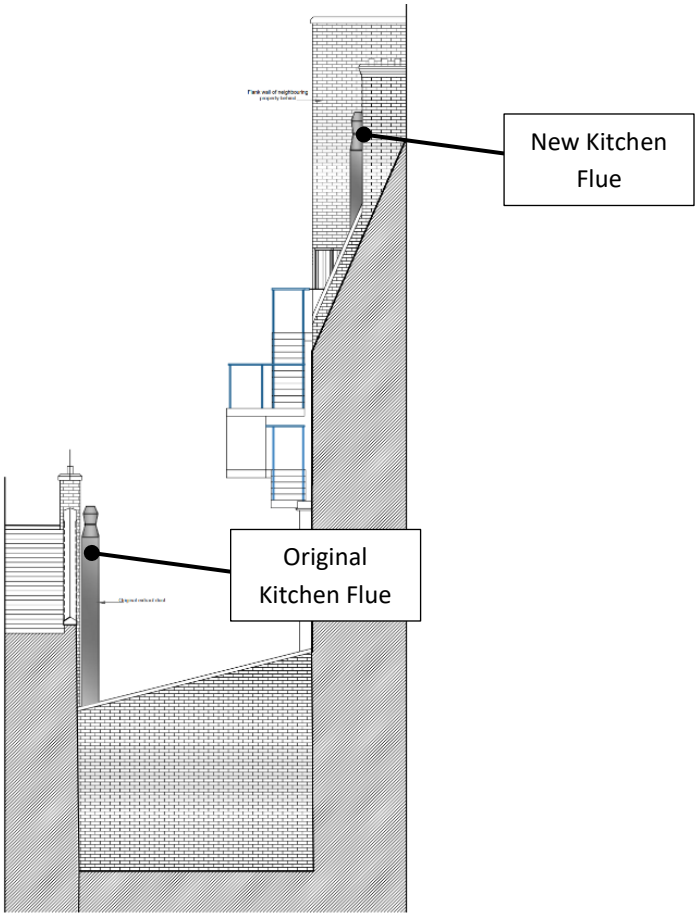
1.2.1 The kitchen is located on the ground floor of the premises at 113 High Holborn, London, WC1V 6JQ. The original kitchen flue was located at the north of the site boundary at the fourth floor height of the premises and ridge height of adjacent building to the rear. The revised kitchen extract is located at the rear facade of the premises at a much higher location at ridge height of the premises.

1.2.2 To the north west of the premises are open balconies of hotel apartments at a similar height to the premises roof, which are the nearest sensitive receptors.

1.2.3 Reference should be made to Figure 1 for a location and proposed layout plan.

Figure 1 Site and Flue Locations





02 - REAR SIDE ELEVATION

1.2.4 The exhaust outlets that serves the kitchen area has the potential to cause odour impacts at residential locations. The proposed site is located in the vicinity of existing residential properties. No amendments have been made to the kitchen or exhaust gas controls.

1.2.5 An Odour Risk Assessment was therefore required in order to assess the risk of the original and revised exhausts and assess odour controls.

2.0 Legislation Guidance and Policy

2.1 Odour Definition

2.1.1 The DEFRA guidance defines odour as:

> "*An odour is the organoleptic attribute perceptible by the olfactory organ on sniffing certain volatile substances. It is a property of odorous substances that make them perceptible to our sense of smell. The term odour refers to the stimuli from a chemical compound that is volatilised in air. Odour is our perception of that sensation and we interpret what the odour means. Odours may be perceived as pleasant or unpleasant. The main concern with odour is its ability to cause a response in individuals that is considered to be objectionable or offensive.*
>
> *Odours have the potential to trigger strong reactions for good reason. Pleasant odours can provide enjoyment and prompt responses such as those associated with appetite. Equally, unpleasant odours can be useful indicators to protect us from harm such as the ingestion of rotten food. These protective mechanisms are learnt throughout our lives. Whilst there is often agreement about what constitutes pleasant and unpleasant odours, there is a wide variation between individuals as to what is deemed unacceptable and what affects our quality of life. "The individual perception of the odour (i.e. whether the odour is regarded as unpleasant). This is greatly subjective and may vary significantly from individual to individual. For example, some individuals may consider some odours as pleasant, such as petrol, paint and creosote*."

2.2 Odour Measurement

2.2.1 The National Planning Policy Framework (NPPF) was published on 24th July 2018 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

> "*Planning policies and decisions should contribute to and enhance the natural and local environment by*:
>
> […]
>
> *Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality*.
>
> *Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan*."

2.2.2 The implications of the NPPF have been considered during the production of this report.

2.3 EMAQ Guidance

2.3.1 The EMAQ guidance document 'Control of Odour and Noise from Commercial Kitchen Exhaust Systems'[1] prepared for DEFRA provides up to date technical guidance on the recommended methods for reducing odour impacts from kitchen exhaust systems.

2.3.2 It also provides a risk assessment method for determining the likelihood of odour risk and the resulting level of odour controls.

2.3.3 This document has bene the main guide to the method and controls recommended in this report.

[1] Control of Odour and Noise from Commercial Kitchen Exhaust Systems, EMAQ, 2018.

3.0 Methodology

3.1 Kitchen Odour Risk Assessment

3.1.1 The exhaust outlet that serves the kitchen area has the potential to cause odour emissions. An odour risk assessment was undertaken based on Annex C of the 2018 EMAQ document[1].

3.1.2 This utilises the criteria shown in Table 1 to assess the potential for adverse odour impacts at sensitive receptors in the vicinity of the site.

Table 1 Odour Risk Significance Score

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 100 m 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, Indian, Japanese, Chinese, steakhouse
	Medium	4	Cantonese, Italian, French, Pizza (gas fired)
	Low	1	Most pubs (no fried food, mainly reheating and sandwiches etc), Tea rooms

3.1.3 The score calculated in Table 1 can then be used to inform the indicative level of odour or grease control required as shown in Table 2.

Table 2 Odour Control Requirement

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

3.1.4 Low to medium level control may include:

- (1) Fine filtration or electro static precipitation (ESP) followed by carbon filtration (carbon filters with a 0.1 second residence time); or
- (2) Fine filtration or ESP followed by counteractant/neutralising system to achieve the same level of control as 1.

3.1.5 High level control may include:

- (1) Fine filtration or ESP followed by carbon filtration (carbon filters with a 0.2 to 0.4 second residence time); or
- (2) Fine filtration or ESP followed by UV ozone system to achieve the same level of control as above.

3.1.6 Very high level control may include:

- (1) Fine filtration or ESP followed by carbon filtration (carbon filters with a 0.4 to 0.8 second residence time); or
- (2) Fine filtration or ESP followed by counteractant/neutralising system to achieve the same level of control as 1; or
- (3) Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

4.0 Assessment

4.1 Scope

4.1.1 The odour risk and resulting required level of odour controls was assessed according to the EMAQ guidance. To assess the net impact of the revised flue a score was provided for the original and new kitchen flue.

4.1.2 The assessment has been carried out by Conal Kearney (MIAQM, MIEnvSc, MSc, BEng) the Director of Air Quality at Enzygo who has over 25 years' experience in local government and private consultancy in assessing and advising on kitchen odour emissions.

4.2 EMAQ Kitchen Odour Risk Assessment

Dispersion

4.2.1 The new kitchen exhaust rises along the rear façade and discharges at a height approximately 1.5 metres above the premises rooftop and shown in Figure 1 and Figure 2. This is at a height 12 metres above the original flue discharge.

Figure 2 Elevation Showing Location of Kitchen Exhaust

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4.2.2 The kitchen ventilation system flow is aided by a 2-speed fan (GBD630 4/4) providing a flow of 12954 m^3/h and 14430 m3/h. The installed flue with a discharge flue diameter of 0.55 m provides a flue gas discharge velocity of at least 15 m/s.

4.2.3 The original flue discharged at a low level as shown in Figure 1 and Figure 3 below.

Figure 3 Photograph of Original Flue

Proximity of receptors

4.2.4 As indicated in Figure 1 the nearest existing residential properties are the elevated hotel apartments located to the rear of 2-6 Southampton Row, London, WC1B 4AA. The closest apartments are approximately 15 m from the proposed kitchen exhaust.

4.2.5 The revised exhaust is further from these receptors than the original location.

Size of Kitchen

4.2.6 The proposed kitchen is of a moderate size. The number of covers is likely to be less than 100 covers per day.

Type of Cooking

4.2.7 It is understood that the kitchen would provide Palestinian cuisine (approximated to 'middle eastern' in EMAQ guidance) with a relatively high proportion of fried foods. However the kitchen no longer uses charcoal cooking techniques and as such the risk of smoke nuisance is not high. However to consider a worst case scenario and to allow for flexibility in the kitchen menu, the potential for cooking odours and grease emissions is considered highly likely.

Odour Risk Score

4.2.8 The score for the kitchen system using the EMAQ Guidance[1] Criteria given in Table 2 is calculated in Table 3.

Table 3 Odour Risk Assessment Score Original Flue

Criteria	Score	Notes
Dispersion	20	Very poor. Discharging at low level.
Proximity of Receptors	10	Close. Closest sensitive receptor less than 20 m from kitchen discharge.
Size of Kitchen	3	Medium. Between 30 and 100 covers per day
Cooking Type	10	Worst case: very high. mediterranean, pizza. However fried food and charcoal cooking proposed
Total Score	**43**	**>35. Very High Impact Risk – Very High Level Odour Control Required**

4.2.9 The EMAQ risk assessment indicated that the risk of adverse odour impacts from the replaced kitchen stack was very high.

Table 4 Odour Risk Assessment Score New Flue

Criteria	Score	Notes
Dispersion	5	Discharging at least 1 m above roof height and at velocity greater than 15 m/s.
Proximity of Receptors	10	Close. Closest sensitive receptor less than 20 m from kitchen discharge.
Size of Kitchen	3	Medium. Between 30 and 100 covers per day
Cooking Type	10	Worst case: very high. mediterranean, pizza. However fried food and charcoal cooking proposed
Total Score	**28**	**>20 but <35. High Impact Risk – High Level Odour Control Required**

4.2.10 The EMAQ risk assessment indicated that the risk of adverse odour impacts from the revised kitchen stack is high.

4.2.11 Therefore the revised kitchen stack is considered as a significant betterment than the original kitchen stack and, as such, planning permission should not be refused for this development.

4.2.12 according to EMAQ guidance a 'very high level' odour control is required to make the emissions acceptable and not cause loss of amenity at nearby residential receptors.

5.0 Odour Controls

5.1.1 As stated in Section 3.1, a high level control may include:

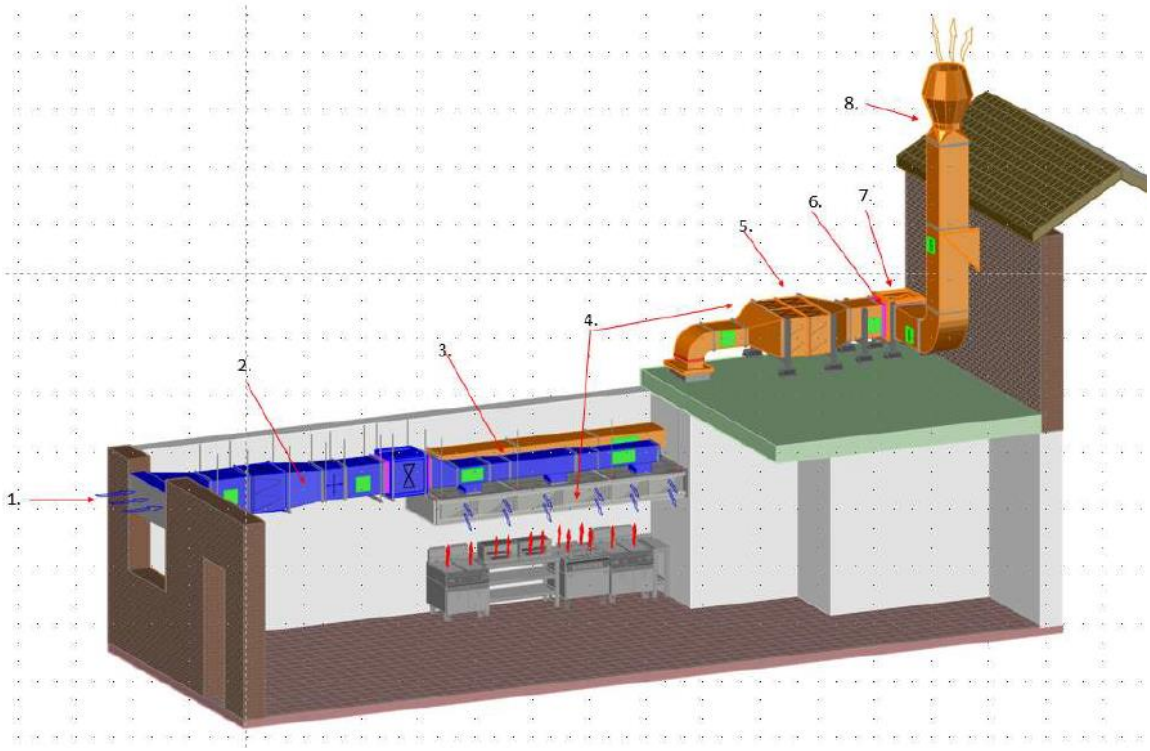
- (1) Fine filtration or ESP followed by carbon filtration (carbon filters with a 0.2 to 0.4 second residence time); or
- (2) Fine filtration or ESP followed by counteractant/neutralising system to achieve the same level of control as 1; or
- (3) Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

5.1.2 The kitchen exhaust ventilation system currently provides the following to achieve the required high level of odour control:

- Primary grease filters at the kitchen canopy extract;
- Secondary grease fine filtration;
- Odour control provided by carbon filters unit;
- Fans to provide required pressures, and exhaust exit; and
- Access within the system to allow maintenance and cleaning of filters and fans.

5.1.3A good example of the required ventilation set up is shown in Figure 4. Note that this is not a scaled or detailed design for the proposed development.

Figure 4 Example of Required Design Set up



Source: EMAQ[1]

Key: 1 – air intake; 2 – supply side fans, filters etc; 3 – canopy ductwork; 4 –grease filters (2 stages); 5 – carbon filter (under negative pressure) or UV ozone system; 6 – flexible connectors; 7 – extract fan; 8 – high velocity discharge cowl at 1 metre above the eaves.

5.1.4 The current kitchen system is in accordance with the recommended set-up and is described in the following sections.

5.2 Primary Grease Filters

5.2.1 The primary or coarse grease filters are typically positioned at the extraction point of the main cooking area(s) and are usually baffle or washable filters. These are standard in commercial kitchens and are located above the cooking areas of the kitchen.

5.3 Secondary Grease Controls

5.3.1 This stage provides the required higher level of filtration following the canopy filters to remove a high proportion of grease particles and also protect the following odour control system from grease accumulations.

5.4 Odour Control – Carbon Filters

5.4.1 The current kitchen exhaust includes an activated carbon system. This adsorption type process involves the capture of airborne components on to a fine particulate active surface. It is considered as a suitably effective method of removing odourous compounds from the kitchen exhaust gases.

5.4.2 Sitesafe carbon filters have been installed in the flue duct work. Technical data for the carbon filters is provided in Appendix A.

5.5 Filter Maintenance

5.5.1 The filters will be maintained in line with recommended guidance:

- Change fine filters every 2 weeks; and
- Change carbon filters every 4 to 6 months.

5.6 Exhaust Stack

5.6.1 The exhaust has been increased by 12 metres to be above the roof level of the premises and a high exit velocity provided by the duct work fan as described in section 4.2.2 and shown in Appendix B.

5.6.2 The exhaust has also been located further away from the nearest sensitive properties. A ‘Chinaman’s hat’ type cowl has not been used to ensure that dispersion is not hindered.

5.7 Summary

5.7.1 A risk assessment in line with EMAQ guidance[1] has shown that the revised kitchen exhaust has materially reduced the risk of odour impacts at sensitive locations and planning permission for this development should not be refused on odour grounds.

5.7.2 A high level of odour control is required from the kitchen exhaust system and this is provided by:

- High level discharge at velocity;

- Fine filtration, followed by; and
- Carbon filters

5.7.3 It is therefore considered that suitable odour and grease controls have been implemented and there the risk of odour impacts from the kitchen exhaust is not significant.

6.0 Conclusions

6.1.1 Enzygo Limited Ltd was commissioned by Mr Osama Qashoo to undertake kitchen odour impact risk assessment to support a planning application for a revised exhaust flue for the kitchen at 113 High Holborn, London.

6.1.2 The development provides for a new kitchen exhaust flue and is located in the vicinity of existing sensitive properties. An Odour Risk and Controls Assessment was therefore carried out in order to assess the effect of the new exhaust, the potential risk of adverse odour impacts and the suitability of the odours controls in the kitchen exhaust system.

6.1.3 The EMAQ risk assessment indicated that the risk of adverse odour impacts has been improved by the new kitchen exhaust and that the risk has been lowered from very high to high. EMAQ recommends a high level of odour controls would be required to ensure impacts are acceptable.

6.1.4 The 'high' level controls for the kitchen consists of primary grease filtration, fine filtration followed by carbon filters. The system is designed to ensure sufficient air flows throughout and allow maintenance where required.

6.1.5 The reduced odour impact risk provided by the revised kitchen exhaust flue indicates that planning permission should not be refused from an odour perspective.

6.1.6 The installed odour controls are suitable and would ensure that odour emissions from the proposed facility would not cause disamenity at nearby sensitive locations.

7.0 Abbreviations

DEFRA	Department for Environment, Food and Rural Affairs
ESP	Electrostatic Precipitation
NPPF	National Planning Policy Framework

Sitesafe Carbon Filters

We manufacture Sitesafe carbon filters, these innovative carbon units measure 594x196x597mm, three combining to 594x594x597mm, directly replacing our original carbon blocks whilst providing exactly the same filter performance as an existing full size cell.

Their advantage is that they only weigh 18kg each against the 68kg of our original blocks. This takes the strain out of fitting and servicing, allowing only one engineer to complete the task where two had been previously required.

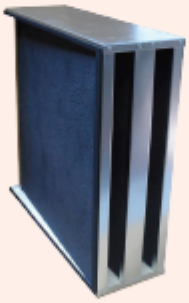
Our Sitesafe carbon filters use panels of activated carbon to remove the malodourous gases within the commercial kitchen extract duct through the process of chemical adsorption. By installing our ESP units before our Sitesafe filters, the carbon life span is greatly increased, allowing it to nullify malodours at optimum efficiency for much longer.

Will require two people plus lifting gear to carry and install.

Carbon PA242424

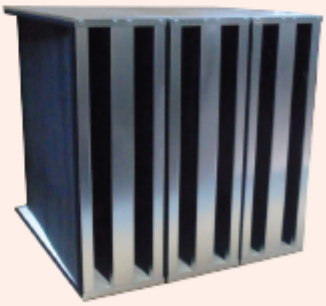
Size	594x594x597
Gross Weight	68.20kg
Carbon Weight	50.00kg
Rated Airflow	3600m³/hr*
Pressure Drop	120Pa

Safe for one person to carry. No special lifting gear required.



Sitesafe PA240824

Size	594x196x597
Gross Weight	17.95kg
Carbon Weight	16.6kg
Rated Airflow	1200m³/hr*
Pressure Drop	120Pa



Sitesafe 3 x PA240824

Size	594x594x597
Gross Weight	53.85kg
Carbon Weight	50.00kg
Rated Airflow	3600m³/hr*
Pressure Drop	120Pa

Purified Air Limited Lyon House, Lyon Road, Romford, Essex, RM1 2BG.

Please see below for the recommended minimum dwell times required for different applications and scale up accordingly.

It should be noted that filtration performance will be improved by increasing the dwell times applied.

Application	Recommended Dwell Time	Grade
Cooking - Low Odour, Tea Shop, Canteens	0.1 to 0.2 Seconds	Carbon grade Enhanced for improved performance for light catering odours
Cooking - Moderate Odour. Pizza, Steak House, French, Italian, Pubs, Chinese, Japanese, Cantonese	0.2 to 0.4 Seconds	Enhanced Carbon grade suitable for many applications 65% Minimum CTC
Cooking High Odour, Indian, Thai, Vietnamese, Kebab	0.4-0.6 Seconds	Enhanced Carbon grade suitable for many applications 65% Minimum CTC
Cooking Very High Odour. Fried Chicken, Pubs with large fried food turnover, Fish and Chip Shops, Fast Food / Burgers	0.4-0.8 Seconds	Enhanced Carbon grade suitable for many applications 65% Minimum CTC
Reduction of Kerosene Exhaust fumes	0.1 to 0.2 Seconds	General Purpose Activated Carbon
Reduction of Ozone	0.1 to 0.2 Seconds	General Purpose Activated Carbon
Reduction of Diesel Fumes, including H_2S, SO_2, NOX, HCl	0.2 Seconds	Carbon Museum,Archive, Café Directive: SO2 SOX NO2 NOX Removal
Museum and Archives	0.2 Seconds	Carbon Museum,Archive, Café Directive: SO2 SOX NO2 NOX Removal

The cooking odour classes above are as classified by DEFRA in **Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems, PB10527**

Appendix B Duct Fan Technical Data

Type	Ref. no.	Air flow volume (FID)	R.P.M.	Sound press. case breakout	Motor power (nominal)	Current full load	Current speed controlled	Wiring diagram	Maximum air flow temperature Full load	Maximum air flow temperature controlled	Weight (net) kg	5 step transformer controlier with mot. protect. unit Type	Ref. no.	5 step transformer controlier without mot. protect. unit Type	Ref. no.	Full motor protection unit using the thermal contacts Type	Ref. no.
		$\dot{V}$ m³/h	min⁻¹	dB(A) in 4 m	kW	A	A	No.	+°C	+°C	kg						
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/△ wiring, protection to IP 54																	
GBD 630/6/6	5524	8600/9990	723/893	42	0.64/0.93	1.08/1.88	2.03	867	60	60	86	**RDS 4**	1316	**TSD 5,5**	1503	**MD**	5849
GBD 630/4/4	5523	12954/14430	1128/1383	51	2.40/3.45	4.10/6.20	7.20	867	75	50	105	**RDS 11**	1332	**TSD 11,0**	1513	**MD**	5849
3 Phase motor, 3~, 400 V, 50 Hz, protection to IP 54																	
GBD 630/4 T120	5779	14200	1445	53	4.40	8.0	—	499	120	—	105	—	—	—	—	**MD**	5849

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Ducie Street
Manchester
M1 2JW
Tel: 0161 413 6444

CARDIFF
Regus House
Malthouse Avenue
Cardiff Gate Buisness Park
CF23 8RU
Tel: 02920 023 700

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