



City of Westminster

Prevention of odour and fume nuisance from commercial kitchen exhaust systems

- Westminster City Council Environmental Health Department's recommendations for premises running a commercial hot food use operation

March 2021

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1.0 Methodical approach to preventing odour nuisance / loss of amenity from a commercial premises running a hot food business

Introduction – the recommendations in this guidance is for use by existing operators of hot food use premises and for those intending to provide a new hot food operation. This includes whether the hot food provision is by reheating only and/or by ‘Primary Cooking’.

The following are the common situations when operators must carefully consider how fumes produced in the kitchen are treated and handled:

- **To alleviate odour nuisance resulting from the existing hot food operation** *eg following an abatement notice served under Section 80 of the Environmental Protection Act 1990*
- **Substantial changes proposed to type and/or intensity of hot food operation such that existing low-level discharging odour mitigation scheme is no longer compatible** *eg café now wanting to operate as an Indian restaurant*
- **New commercial hot food operation** *eg as permitted under planning Use Class E, new proposals under Sui Generis etc*

NOTE:

- *prior to September 2020 Westminster Environmental Health (and Planning Department) only approved ‘full-height’ externally discharging schemes for new hot food use premises (or in limited situations an acceptable recirculation system). Where such schemes were not feasible applications for such new uses were recommended for refusal as Westminster already contains, for historical reasons, numerous existing low-level discharging premises that have required interventions by Council Officers on grounds of causing odour nuisance*
- *‘low-level’ means discharging externally below level of roof eaves (and/or below level of dormer windows) of the building housing the commercial kitchen and/or below the height of any building that is within about 20m of the discharge point*
- *this revised guidance is as a result of the changes that came into effect in September 2020 by The Town and Country Planning (Use Classes) (Amendment) (England) Regulations 2020 (SI 2020 No.757) whereby retail, restaurant etc uses are permitted developments under use Class E - thus many existing retail premises which may now propose to operate as hot food premises are likely to be at locations where a full height discharge route is impossible – a planning application will now only be required for any external plant/ducting if installed and not for a change of use.*

The following odour mitigation hierarchical approach is recommended for determining the appropriate method to prevent nuisance from a hot food producing commercial premises:

1.10 First option - install the primary universal scheme of full-height discharge for preventing odour nuisance as such a scheme offers the following main benefits:

- *permits all food types, intensity of operation and methods of cooking without requiring further adaptation to the odour mitigation system even if there are changes to the food operation in the future*

The standard for a full height scheme is described in more detail in Section 2.1

Any proposal either for an existing or a new hot food premises that does not intend to install a full-height scheme should justify why this option has not been put forward.

1.20 Second option - install the secondary universal scheme of an acceptable 'recirculation' system as such a scheme offers the following main benefit:

- *ideal for particularly sensitive locations where even a low-level externally discharging system cannot be implemented. Although limited to cooking by electricity only (i.e. no gas or solid fuel can be used) nevertheless permits all food types to be produced.*

Section 2.2 of this guidance provides more details on an acceptable recirculation system.

1.30 Third option – only where the full-height or recirculation options cannot be implemented then a '**bespoke**' externally discharging at low-level system should be considered. It must be designed to at least '**Best Practicable Means**' (**BPM**) standards (i.e. to current optimum industry standards). This will usually be sufficient to prevent nuisance for the food type and intensity of operation intended at the time of the proposal.

However as no low-level externally discharging system can eliminate all odour, even if designed to enhanced BPM standards, Environmental Health advice on whether such a scheme will definitely prevent nuisance shall always be:

'a desk-top assessment by Environmental Health shows the proposed 'low-level' externally discharging scheme meets 'Best Practicable Means' standards for the food operation proposed and is therefore unlikely to result in odour nuisance. However final assessment as to whether the

system will prevent odour or fume nuisance will only be able to be made after the system has been installed and started operations under its most intense use conditions - should nuisance still occur post installation and after operations have started then further adaptations will be required.'

NOTE:

- *Final acceptance of any low-level externally discharging installation shall usually require applicants to submit a post-installation report showing it has been installed in accordance with the design submitted and demonstrate that no nuisance is being caused after the hot food use commences operations*

For particularly sensitive locations a proposed scheme's effectiveness could be supported by submitting an assessment of odour nuisance based on FIDOL factors (i.e. Frequency, Intensity, Duration, Odour unpleasantness and Location) – the methodology is described in more detail in the 'Guidance on the assessment of odour for planning' from the Institute of Air Quality Management.

- *Clearly any future significant changes to the food operation will require operators to re-assess the low-level scheme for its effectiveness in continuing to prevent odour nuisance.*

1.31 Designing a bespoke low-level externally discharging scheme:

The bespoke scheme appropriate for a particular food operation is recommended to be determined by using the risk assessment method provided in Annex C of the Government's 'Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems, 2005, DEFRA.' For information, Annex C is reproduced on the following page.

Although DEFRA withdrew this guidance in 2017 it can still be used as a source of information and advice on many of the various systems available – ***this guidance can be 'googled' (recommend EMAQ guidance is used -see below)***

NOTE: *it is unclear if the government will be replacing the DEFRA guidance. In the meantime in 2018 Ricardo-AEA Limited, who were involved in producing the original DEFRA document, have produced under the brand name EMAQ an updated guidance 'Control of Odour and Noise from Commercial Kitchen Exhaust Systems' – this can be purchased at the following website;*

- <https://ee.ricardo.com/downloads/air-quality/control-of-odour-and-noise-from-commercial-kitchen-exhaust-systems>

Annex C: Risk Assessment for Odour - Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems, 2005, DEFRA:

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.

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

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

Criteria	Score	Score	Details
<i>Dispersion</i>	<i>Very poor</i>	<i>20</i>	<i>Low level discharge, discharge into courtyard or restriction on stack.</i>
	<i>Poor</i>	<i>15</i>	<i>Not low level but below eaves, or discharge at below 10m/s</i>
	<i>Moderate</i>	<i>10</i>	<i>Discharging 1m above eaves at 10-15m/s</i>
	<i>Good</i>	<i>5</i>	<i>Discharging 1m above ridge at 15 m/s</i>
<i>Proximity of receptors</i>	<i>Close</i>	<i>10</i>	<i>Closest sensitive receptor less than 20m from kitchen discharge.</i>
	<i>Medium</i>	<i>5</i>	<i>Closest sensitive receptor between 20 and 100m from kitchen discharge.</i>
	<i>Far</i>	<i>1</i>	<i>Closest sensitive receptor more than 100m from kitchen discharge.</i>
<i>Size of kitchen</i>	<i>Large</i>	<i>5</i>	<i>More than 100 covers or large sized take away.</i>
	<i>Medium</i>	<i>3</i>	<i>Between 30 and 100 covers or medium sized take away.</i>
	<i>Small</i>	<i>1</i>	<i>Less than 30 covers or small take away</i>
<i>Cooking type (odour and grease loading)</i>	<i>Very high</i>	<i>10</i>	<i>Pub (high level of fried food), fried chicken, burgers or fish & chips.</i>
	<i>High</i>	<i>7</i>	<i>Kebab, Vietnamese, Thai or Indian.</i>
	<i>Medium</i>	<i>4</i>	<i>Cantonese, Japanese or Chinese.</i>
	<i>Low</i>	<i>1</i>	<i>Most pubs, Italian, French, Pizza or steakhouse.</i>

Example application of scoring procedure for four different cooking situations:

Example	Dispersion	Proximity of receptors	Size of Kitchen	Cooking Type	Total Score
1. Small Indian restaurant	20	10	1	7	38
2. Pub	5	5	5	1	16
3. Medium sized French restaurant	15	10	3	1	29
4. Large burger restaurant	10	10	5	10	35

Example 1

- Represents a small Indian restaurant with the kitchen ventilation extract discharging into a small courtyard.

Example 2

- Represents a traditional pub cooking a range of food types with the kitchen ventilation extract discharging at roof ridge. The pub is located in a rural location with the closest receptors 25 m away.

Example 3

- Represents a medium sized French restaurant. The restaurant occupies the ground floor of two story building (adjacent buildings are taller). The kitchen extract discharges at roof eaves.

Example 4

- Represents a large burger restaurant. The restaurant occupies a building within 20m of residential properties. The kitchen extract discharges at roof eaves.

Examples 1 and 4 are locations where the risk of problems arising due to these types of cooking activity are very high. In both instances, improving dispersion (e.g. to 1 m above roof ridge) will reduce the risk ranking. Based on this assessment approach the emissions from these restaurants will need a very high level of odour control to prevent nuisance. The level of odour control requirement is reduced with improvement in stack dispersion.

Example 2 is a location where the risk of problem occurring due to this type of cooking activity is low to medium. Based on this assessment approach the emissions from these restaurants will need a low to medium level of odour control to prevent nuisance.

Example 3 is a location where the risk of problems occurring due to this type of cooking activity is high. Based on this assessment approach the emissions from the restaurant will need a high level of odour control to prevent nuisance. The level of odour control requirement is reduced with improvement in stack dispersion.

2.0 Odour prevention schemes that provide a 'Universal' solution to prevent nuisance for any food operation

i. Introduction - precautionary approach – desk-top evaluation

When carrying out a 'desk-top' evaluation Environmental Health can only recommend for approval, without qualification, schemes that offer a 'universal' solution to prevent nuisance as these can usually cope with any food type and/or intensity of operation.

ii. 'Universal' schemes that prevent odour nuisance

The only universal schemes currently acceptable to Westminster Environmental Health are the following:

a) **A scheme of 'full-height' discharge of the kitchen fumes** (*this will permit a full range of cooking styles including utilising any fuel types - gas, solid fuel and/or electricity*) - see Section 2.1

OR

b) **An acceptable 'recirculation' system where there is no direct external discharge of the kitchen fumes and where all food operations utilise cookline equipment operated by electricity only** - see Section 2.2

2.1 Standards for 'Full Height' Kitchen Extract Discharge

Full height is where dispersion enables adequate dilution to occur before the plume interacts with a receptor. This thus provides a universal and permanent solution in preventing nuisance no matter what the mix of food styles, equipment, fuel utilised and/or intensity of operation.

To achieve optimum dispersion the effective stack height is achieved by the discharge point being designed to be at 'full-height' where

- i. Full height means;
 - discharge point must be at least 1m above roof eaves (or 1m above flat roof) including 1m above any dormer windows of the building housing the commercial kitchen and/or any other openings (*ideally, discharge point should be at chimney height or 1m above roof ridge*) and
 - be above the height of any building within about 20m of the discharge point and
 - at sufficient discharge velocity to limit the potential entrainment of exhaust air (*i.e. efflux velocity usually at least 8m/s*)

In addition, if above complied with, the following also applies;

- if there are surrounding receptors at a distance of between approximately 20m - 50m away that are higher than the discharge point then a scheme providing a high level of odour reduction must also be incorporated

NOTE: Buildings that are more than about 50m distance away (even if these are higher than the discharge point) are normally considered to be far enough for adequate natural dilution to have occurred.

- ii. The design of the final discharge point must be vertically upwards and unhindered *i.e. use of plate, cowl or cap methods for the prevention of rainwater penetration should not be employed;*
- iii. All kitchen extract ducting should comply with Building Engineering Services Association (BESA) document TR19 to enable adequate cleaning and maintenance. This normally means fitting access panels/hatches at approximately 2-3 metre intervals (*see figure 1*).



Figure 1 - Access panel for duct cleaning

- iv. Within the kitchen the following should also be achieved:
 - Humidity - target 40-70%
 - Temperature – ambient target approx. 25°C
 - Make up air supply in accordance with BESA document DW172 – 2018
 - Internal noise level should be maximum between NR40-NR50
- v. Any external installation shall also require the approval of the Planning Department for noise/vibration, visual impact and conservation area considerations *e.g. see figure 2. (Note also - any cladding must be made of non-flammable materials approved by Building Control and/or Fire*

Brigade and still allow access to the cleaning and maintenance doors/hatches)



Figure 2 Good aesthetic design of extract duct with matching pseudo brick effect (note includes access panels)

2.2 Standards for an acceptable 'Recirculation' System

As an alternative to a full height discharging system a 'recirculation' scheme could be appropriate if all cookline equipment **operates by electricity only**. Westminster Environmental Health accept such schemes as they too can permit a wide range of food types without requiring further adaptations.

The acceptability of a recirculation scheme shall require the system demonstrating compliance with the following standards as a minimum:

- a) No direct external discharge to atmosphere of the cooking fumes
- b) All cookline equipment to operate by **ELECTRICITY** only
 - **i.e. no gas and/or solid fuel cooking permitted** – *note when gaseous or solid fuel is burned the products of combustion, such as carbon monoxide gas, are released which are difficult to eliminate. In any case, the Gas Safety Regulations would require external discharge if such fuel was utilised.*
- c) The recirculated air must comply with The Workplace (Health, Safety and Welfare) Regulations 1992 - *these Regulations require that employers provide effective and suitable ventilation in every enclosed workplace. This includes kitchens that need ventilation to create a safe and comfortable working environment.*

Any proposal submitted must therefore show that the design of the supplier's system **has been tested** to achieve the following standard for the quality of the recirculated air:

- i. Comply with Occupational exposure limits as set out in HSE publication 'EH40 Workplace Exposure' particularly for;
 - Airborne Dusts (Aerosol)
 - Gases (CO, CO₂, Ozone, NO_x)
 - Hydrocarbons

The testing must be carried out by an independent ISO 17025 UKAS accredited laboratory.

d) Within the kitchen the following should also be achieved:

- Humidity - target 40-70%
- Temperature – ambient target approx. 25°C
- Make up air supply in accordance with BESA document DW172 – 2018
- Internal noise level should be maximum between NR40-NR50

e) An acceptable recirculation system will also have the following design features:

- The Recirculation system **must not** incorporate elements that generate or add chemicals e.g. Ultraviolet (UV), Ozone, Electrostatic Precipitators (ESPs) etc.
- The Recirculation system must be interlocked with the Electric Cooking Equipment, such that cooking is only enabled when airflow is established and proved.
- The status of filters within the Recirculation unit must be monitored – preferably, via remote 'dial up / internet' access – to maintain system performance, recirculating air quality & Kitchen Staff well-being.
- The removal of any filters from the system must render the system inoperable by default.
- System must have clear signage on it stating that no gas or solid fuel equipment can be employed at the premises.

Also the design of the system must utilise such components that enables operators, if they so wish, to engage third parties to carry out maintenance of the system particularly after any guarantee period has ended. Information provided to the operator must include the operational standards for the component parts that must be adhered to for optimal operation.

As of March 2021, the following suppliers have provided test results from accredited independent laboratories showing the recirculated air from their Recirculation System's complies with The Workplace (Health, Safety and Welfare) Regulations 1992 (i.e. in compliance with the workplace exposure limits set out in HSE document EH40):

- ***Reco-Air, 14 Heritage Park, Hayes Way, Cannock, Staffordshire, WS11 7LT***
- ***CK Direct Duct & Maintenance Ltd, Unit 15 Tresham Road, Orton Southgate, Peterborough, PE2 6SG***
- ***Purified Air Limited, Lyon House, Lyon Road, Romford, Essex RM1 2BG***

Note: If appropriate, suppliers could still be asked for post-installation testing of the re-circulated air.

To enquire if other suppliers have been added to the list or if suppliers wish to be added to the list of acceptable suppliers then please e-mail Westminster Environmental Health Consultation Team at the following address:

- ehconsultationteam@westminster.gov.uk

3.0 Reasons for requiring ‘full-height’ discharge (or an acceptable ‘recirculation’) for kitchen extract ventilation systems

Westminster Environmental Health recommends commercial premises with a hot food operation to incorporate a ‘full-height’ discharge scheme (or an acceptable ‘recirculation’ system). All other schemes discharging externally at low-level, even if to BPM standards, can only finally be determined as being suitable once in operation and will likely require further adaptations should the hot food operation change in the future.

i. The reasons for recommending the ‘Universal’ schemes are summarised below:

- a) Westminster already has numerous existing commercial hot food premises that discharge externally at low level – most of these are present for historical reasons.

These low-level discharging premises generate significant number of nuisance complaints requiring the Environmental Health Department (and often Planning Enforcement) to take remedial action. Nuisance usually results if the food operation changes or intensifies and/or from lack of maintenance of each of the many elements that comprise a bespoke low-level discharging system.

Resolving odour nuisance under Statutory Nuisance legislation from these existing low discharging premises is also time consuming for all concerned (persons affected, the businesses themselves and Officers of the Council) as the investigation and potential mitigation measures are rarely straightforward.

- b) Westminster, apart from in the Royal Parks, is a densely populated and built up area where any new use can have significant impact on other users if the new operation consists of low-level external discharge that has not been carefully designed and/or installed poorly
- c) Premises with suitably maintained and cleaned full-height discharge systems (or acceptable recirculation schemes) rarely have generated odour or fume nuisance even if a food operation has been changed or intensified – problems usually only arise if the ducting has not been regularly cleaned internally or has been allowed to corrode
- d) Westminster Environmental Health therefore considers that new operations or those that are causing nuisance should install systems that are ‘future proofed’ so as not to add to the burden caused by existing

operations. The following aspects of a 'full-height' scheme confer future proofing of such uses:

- Kitchen extract ventilation systems discharging at full-height are more likely to achieve the planning standard of 'no loss of amenity' as no odour reduction system discharging externally at low level can completely eliminate all odours.
- Discharging to the 'full height' standard gives complete flexibility for a full range of food types and cooking methods to be provided without necessarily having to further adapt the extract ventilation system - this includes enabling cooking by gas, electricity, solid fuels or any combinations of fuel types.
- Full height systems normally require relatively little maintenance whereas low externally discharging bespoke systems consist of numerous elements needing constant monitoring and maintenance of their component parts.

e) Low-level externally discharging systems have to be **bespoke** designed for the particular food operation. *Eg one designed for a fish and chip operation is unlikely to be effective for a Chinese restaurant or other high impact operations.*

Additionally, assessment of whether the low level externally discharging bespoke system will achieve its aim can only finally be undertaken after it comes into operation whereas full height or acceptable recirculation schemes can provide that assurance at the design stage.

f) Amongst the advantages of an acceptable recirculation systems are the following:

- recirculation systems are 'self-policing' as a failure to maintain it will result in the premises own staff and customers being the first to be affected
- external ducting/plant usually not required – less planning impact especially in conservation areas
- internal ductwork through the building block also usually not required thus saving space within a building that has other users

ii. **Westminster is an Air Quality Management Area (AQMA)** under the Clean Air Acts and our Action Plan requires controls that offer the best mitigation and pollution reduction not only from vehicles but including that from commercial premises:

- *Thus, premises intending to use solid fuels e.g. charcoal, wood etc must comply with AQMA requirements where only 'Authorised Fuels' and /or 'Exempt Appliances' can be employed. Further information can be found on the DEFRA website at the following link:*

- <https://www.gov.uk/smoke-control-area-rules>

In addition, whilst strictly not forming part of the AQMA Action Plan, the following local impact from hot food producing commercial premises should also be considered when deciding upon the most appropriate kitchen extract ventilation scheme:

- *All full range cooking produces vitiated air (including any that have the most up to date odour reduction systems). Dispersal of effluent at full height provides complete atmospheric dispersion whereas low externally discharging systems are likely to detract from the amenity of users of the adjoining footway or of nearby buildings*

4.0 REFERENCES:

- i. *'A planning guide for Food and Drink Premises, 1999 – Supplementary Planning Guidance, Westminster Planning Department. (note this is pending revision by Westminster City Council)*
- ii. *Guidance on the control of odour and noise from commercial kitchen exhaust systems - Defra 2005. (note this was withdrawn by the Government in 2017)*
- iii. *'Control of Odour and Noise from Commercial Kitchen Exhaust Systems 2018' - EMAQ*
- iv. *The Town and Country Planning (Use Classes) (Amendment) (England) Regulations 2020 (SI 2020 No.757) – Use Class E*
- v. *HSE EH40 Workplace Exposure Limits - for use with the Control of Substances Hazardous to Health Regulations (as amended), Health and Safety Executive*
- vi. *Kitchen Ventilation Systems, DW 172 - Second Edition 2018 – Building Engineering Services Association*
- vii. *Internal cleanliness of ventilation systems, TR19 - Building Engineering Services Association*
- viii. *Guidance on the assessment of odour for planning - the Institute of Air Quality Management.*