



Mr A Younis
Ground Floor
460 Cheetham Hill Road
Manchester
M8 9JW

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Odour Control

Odour Risk Assessment

EMAQ guidance on the Control of Odour and Noise from Commercial Kitchen

Exhaust Systems includes a risk assessment methodology for identifying the potential risk of odour impacts from commercial kitchen operations. The results of the risk assessment may then be used to determine a suitable level of odour abatement to be installed into a commercial kitchen.

The risk assessment for odours is split into the following four categories.

- dispersion.
- proximity of receptors.
- size of kitchen; and
- cooking type (odour and grease loading).

A risk rating is scored for each category and the total risk rating, i.e. the sum of the risk rating for each category, is compared with the significance score in Table 1.

Table 1: Significance Score and Odour Control Requirement

Impact Risk	Odour Control Requirement	Significance Score
Low to Medium	Low level of odour control	<20
High	High level of odour control	20 - 35
Very High	Very high level of odour control	>35

The level of odour control which is likely to be required to prevent the kitchen from causing odour nuisance impacts can then be determined.



The risk ratings for each category are shown in Table 2.

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 10-15 m/s.
	Good	5	Discharging 1 m above ridge at 15 m/s.
Proximity of receptors	Close	10	Closest sensitive receptor less than 20 m from kitchen discharge.
	Medium	5	Closest sensitive receptor between 20 and 100 m 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 takeaway.
	Medium	3	Between 30 and 100 covers or medium sized takeaway.
	Small	1	Less than 30 covers or small takeaway.
Cooking Type (odour & grease Load)	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	Kebab, Vietnamese, Thai, Indian, Japanese, Chinese or Steakhouse.
	Medium	4	Cantonese, Italian, French or Pizza (gas fired).
	Low	1	Most pubs (no fried food, mainly reheating and sandwiches etc.), or Tea Rooms. a



Risk Assessment

Dispersion

The risk rating for dispersion relates to the location of the discharge flue of the kitchen extraction system, and the flow rate of the exhaust air at the point of discharge.

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The kitchen extract system will terminate through a high velocity cowl (jet Cowl) above the roof of the rear of the building at a height above the roof eaves by 1metre. Therefore, based on the information in Table 2, the risk rating for dispersion would be described as moderate.

Proximity to Receptors

The risk rating for proximity to receptors relates to the distance from the point of discharge of the kitchen extraction system to the nearest sensitive receptor. Examples of high sensitivity receptors, as set out in the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Odour for Planning (IAQM, 2018), include residential dwellings.

Residential properties rear to the commercial unit the application site will be less than 20m from the flue; therefore, based on the information in Table 2, the risk rating for dispersion would be described as close.

Size of Kitchen

The risk rating for the size of kitchen relates to the volume of food prepared by the kitchen, as described by the number of covers of a restaurant, or the size of a takeaway.

The unit in question will operate as a 40-seater café/takeaway only; therefore, based on the information in Table 2, the risk rating for the size of kitchen would be described as medium.

Cooking Type

The risk rating for cooking type relates to the type of food prepared in the kitchen, and the cooking methods used.

The venue will serve kebabs and hot foods; therefore, based on the information in Table 2, the risk rating for cooking type would be described as high.

Summary

A summary of the risk assessment and the total risk rating for the Takeaway is shown in Table 3.

With regard to the significance scores set out in Table 1, the overall risk rating for the restaurant is Low to medium; therefore, the extraction system would require a medium level of odour control to mitigate the potential odour impacts at local sensitive receptors.

**Table 3 Odour Risk Assessment Summary**

Criteria	Rating	Significance Score	Comments
Dispersion	Moderate	10	Discharging 1 m above eaves at 10-15 m/s.
Proximity of Receptors	Close	10	Closest sensitive receptor less than 20 m from kitchen discharge.
Kitchen Size	Medium	3	Between 30 and 100 covers or medium sized takeaway.
Cooking Type	High	7	Cantonese, Italian, French or Pizza
Overall Risk Rating	High	30	Moderate level of odour control required

Odour Mitigation

The odour risk assessment has identified that the proposed venue would require a High level of odour control (see Table 3). The EMAQ guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems outlines that abatement systems offering a High level of odour control may include:

1. Fine filtration or electrostatic precipitator (ESP) followed by carbon filtration (carbon filters rated with a 0.1-0.2 second residence time); or
2. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

In addition to the recommended mitigation measures above, canopy hoods should also be installed above all cooking areas. The canopy hoods should be fitted with washable grease baffle filters. Grease laden air passing through the filter is forced through direction and velocity changes, depositing grease on the vanes, which is then drained from the filter. The use of baffle filters, which typically have a grease removal efficiency of 65-80%, will help prevent contamination of the fine filters of ESP. Mesh filters are not recommended as they do not provide a flame barrier.

The extract flow rate of the system should be sufficient to ensure a capture velocity at the extract canopy appropriate to the type of cooking to be undertaken. An adequate capture velocity will also help prevent untreated odour emissions due to leakage from the building, i.e. through doors and windows. Any adjustments to the flow rate of the ventilation air will need to take account of the residence time requirements of the carbon filtration system (if fitted).



Conclusions

The odour risk assessment has identified that the take away would have a High-risk rating with regard to odour effects.

An odour abatement system consisting of fine filtration or an ESP followed by carbon filtration (with a 0.1-0.2 second residence time) or a UV ozone system is recommended.

It is judged that there will not be a significant risk of odour impacts from the proposal, provided that the extract system is installed, as specified, to provide a High level of odour control. There should be no constraints to the development of the site as a hot food venue with regard to odour.

References

Defra (2005) Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems.

EMAQ (2018) Control of Odour and Noise from Commercial Kitchen Exhaust Systems. IAQM (2018) Guidance on the Assessment of Odour for Planning (v1.1).