SPECIFICATION OF KITCHEN EXTRACTION SYSTEM

SITE ADDRESS: 157 Whitby Road, Ruislip, HA4 9EB

PROPOSAL: Change of use from Office (Use Class E) to Restaurant (Use Class E) and Hot Food Takeaway (Sui Generis) with installation of rear flue system

GUIDANCE:

- **DEFRA GUIDE 2005 Control of odour and noise from commercial kitchen exhaust systems**
- **HVCA DW 172 Standard for kitchen ventilation systems**
- **HVCA DW 144 Standard for ductwork**

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Minimum Ventilation Rates

- An internal ambient air temperature of 28 degrees MAX.
- Max. Humidity Levels of 70%.
- Dedicated make up air system to be approx. 85% of the extract flow rate.
- Min. Air Change rate of 40 per hour.

Minimum Requirements for Canopy

Velocity requirements

- Light loading – 0.25 m/s (applies to steaming ovens, boiling pans, bains marie and stock-pot stoves).
- Medium loading – 0.35 m/s (applies to deep fat fryers, bratt pans solid and open top ranges and griddles).
- Heavy loading – 0.5 m/s (applies to chargrills, mesquite and specialist broiler units).

Material of construction

- A material that would comply with the food hygiene requirement is stainless steel.

Grease filtration

Have a minimum performance the same as a baffle filter.

Be easy to clean

Minimum Requirements for Duct Work

- All ductwork should be Low Pressure Class ‘A’ and constructed in accordance with HVCA Specification DW 144 with a minimum thickness of 0.8mm.
- Duct velocities should be as follows:

	Supply (m/s)	Extract (m/s)
Mains run	6-8	6-9
Branch runs	4-6	5-7
Spigots	3-5	5-7

- All internal surfaces of the ductwork should be accessible for cleaning and inspection. Access panels should be installed at 3.0m centres and should be grease tight using a heat proof gasket or sealant.
- Duct work should not pass through fire barriers.
- Where it is not possible to immediately discharge the captured air, fire rated ductwork may be required.

Minimum Requirements for Fans

- Fans must be capable of dealing with the operating static pressure within the duct work and should be designed with a minimum 10% pressure margin [note operating static pressure will increase throughout a maintenance cycle].
- Backward curved centrifugal, mixed flow or axial flow impellers are preferred as they are less prone to imbalance and are more easily maintained/ cleaned due to their open construction. Fixed or adjustable metal impellers with a robust and open construction should be used.
- Fan motors should be rated to IP55 with no need to mount the motor outside of the air stream. For fans that have motors within the air stream and are ventilating cooking equipment that produce high levels of temperature and humidity the specification for the motor should be upgraded to withstand more onerous conditions.

Minimum Requirements for Odour Control

Objectives

- For new premises or premises covered by planning conditions restricting the impact of odour the system shall be designed to prevent harm to the amenity.
- For existing premises not covered by planning conditions restricting the impact of odour, the system shall be designed to avoid statutory nuisance and shall comply with the principles of Best Practical Means.

To achieve these objectives the odour control system shall include an adequate level of:

1. Odour control; and

2. Stack dispersion.

The overall performance of the odour abatement system will represent a balance of 1 and 2.

Discharge Stack

The discharge stack shall:

1. Discharge the extracted air not less than 1 m above the roof ridge of any building within 20 m of the building housing the commercial kitchen.

2. If 1 cannot be complied with for planning reasons, then the extracted air shall be discharged not less than 1 m above the roof eaves or dormer window of the building housing the commercial kitchen. Additional odour control measures may be required.

3. If 1 or 2 cannot be complied with for planning reasons, then an exceptionally high level of odour control will be required.

Odour arrestment plant performance

Low to medium level control may include:

1. Fine filtration or ESP following by carbon filtration (carbon filters rated with a 0.1 second residence time).

2. Fine filtration followed by counteractant/neutralising system to achieve the same level of control as 1.

High level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.2-0.4 second residence time).

2. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

Very high level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.4 – 0.8 second residence time).

2. Fine filtration or ESP followed by carbon filtration and by counteractant/neutralising system to achieve the same level of control as 1.

3. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

4. Fine filtration or ESP followed by wet scrubbing to achieve the same level of control as 1.

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

Minimum Requirements for Noise Control

For new premises or premises covered by planning conditions restricting the impact of noise the system shall be designed to prevent an acoustic impact on the external environment and therefore harm to the amenity, as well as ensuring that noise exposure of kitchen staff does not constitute a hearing hazard.

For existing premises not covered by planning conditions restricting the impact of noise, the system shall be designed to avoid statutory nuisance and shall comply with the principles of Best Practicable Means.

To achieve these objectives the noise control system shall include:

• Control of noise at source to the greatest extent possible (with the added benefit of hearing protection); and

• Control of noise to the environment by taking acoustic considerations into account within duct, grille and termination design.

The control system should meet the requirements laid down in BS4142: 1997 “Method for Rating industrial noise affecting mixed residential and industrial areas”.

Maintenance

Proprietors of commercial kitchens have a duty to ensure that the ventilation system serving the respective premises 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. The recommended cleaning period for extract ductwork is:

Heavy Use	12-16 Hours Per Day	3 Monthly
Moderate Use	6-12 Hours Per Day	6 Monthly
Light Use	2-6 Hours Per Day	Annually

Recommendations for maintenance of odour control system include:

- System employing fine filtration and carbon filtration.

➢ Change fine filters every two weeks.
➢ Change carbon filters every 4 to 6 months.

- Use a system employing ESP and other in line abatement.

➢ Clean every 2-6 months.

Risk Assessment for Odour

Defra, 2005 contains an assessment procedure for identifying the potential risk of odour impacts from commercial kitchen operations. The results of this risk assessment can 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 parts:

· dispersion;

· proximity to receptors;

· size of kitchen; and

· cooking type and grease loading.

Each part is given a risk rating score and the total risk rating denotes the level of odour abatement which is likely to be required to prevent the kitchen from causing odour nuisance impacts. The following sections of this report outline each part of the risk assessment in relation to the proposed restaurant.

Dispersion

The risk rating for dispersion relates to the conditions under which kitchen extraction emissions are discharged. The relevant risk ratings described in the guidance are shown below. The risk score is shown in parentheses.

· VERY POOR (20) – Low level discharge, discharge into courtyard, or restriction on stack;

· POOR (15) – Discharge not low level, but below eaves, or discharge rate below 10 m/s;

· MODERATE (10) – Discharging 1 m above eaves at a rate of 10-15 m/s;

· GOOD (5) – Discharging 1 m above ridge at a rate of 15 m/s or more.

The risk rating for dispersion is judged to be VERY POOR. Emissions will be emitted to atmosphere via the low-level flue pipe. The exit of the flue pipe is 1m above the roof eaves of the single-storey rear extension.

Proximity to Receptors

The risk rating for proximity to receptors relates to the distance between the point of discharge of kitchen emissions and the nearest sensitive receptor locations. Sensitive receptor locations may be residential properties, commercial premises or frequently used public open spaces. The relevant risk ratings described in the guidance are shown below. The risk score is shown in parentheses. For the purpose of this assessment, it is assumed that the proposed development has been built and is operational.

· CLOSE (10) – Closest sensitive receptor is less than 20 m from kitchen discharge;

· MEDIUM (5) – Closest sensitive receptor is between 20 and 100 m from kitchen discharge;

· FAR (1) – Closest sensitive receptor is more than 100 m from kitchen discharge.

The risk rating for the proximity to residential properties is judged to be CLOSE; there are residential properties situated within 20m of the proposed extract flue pipe.

Size of Kitchen

The risk rating for size of kitchen relates to the volume of food prepared by the kitchen and is described in terms of the capacity of the restaurant or takeaway. The relevant risk ratings described in the guidance are shown below. The risk score is shown in parentheses.

· LARGE (5) – More than 100 covers or a large-sized takeaway restaurant;

· MEDIUM (3) – Between 30 and 100 covers or a medium-sized takeaway restaurant;

· SMALL (1) – Less than 30 covers or a small takeaway restaurant.

The proposed development is a small takeaway; it is expected to serve 4-5 customers at any one time. It is thus judged to be SMALL in terms of the size of the kitchen.

Cooking Type and Grease Loading

The risk rating for cooking type and grease loading relates to the type of cooking methods employed in the kitchen and the type of food prepared. The relevant risk ratings described in the guidance are shown below. The risk score is shown in parentheses.

· VERY HIGH (10) – Pubs (those serving a high level of fried food), fried chicken, burgers or fish and chips;

· HIGH (7) – Kebab, Vietnamese, Thai or Indian;

· MEDIUM (4) – Cantonese, Japanese or Chinese;

· LOW (1) – Most pubs, Italian, French, Pizza or Steakhouse.

The proposed takeaway will provide fried chicken and thus is judged to be VERY HIGH in terms of grease loading in the cooking emissions.

Risk assessment summary

The odour risk assessment summary is shown in Table 1 for the proposed takeaway.

Table 1: Restaurant Kitchen Odour Risk Assessment Summary

Criteria	Risk Rating	Risk Score[1]	Description	Comments
Dispersion	Very poor	20	Low level discharge	Flue pipe exit is low-level, and above the roof eaves of the extension.
Proximity to Receptors	Close	10	Closest sensitive receptor less than 20 m from kitchen discharge.	There are residential properties adjacent and around the proposed development.
Size of Kitchen	Small	1	Less than 30 covers or a small takeaway restaurant.	The proposed development will be a small takeaway serving 4-5 customers at a time
Cooking Type and Grease Loading	Very high	10	Mixed of fried food and pizza	Fried chicken and chips, and pizza
TOTAL RATING	Very high	41	A very high level of odour abatement required.	

[1] Total Risk Score of <20 = Low to Medium Risk, 20 to 35 = High Risk; and >35 = Very High Risk.

The overall odour risk rating is ‘very high’. This denotes that a very high level of odour control is necessary to adequately minimise the potential for odour impacts on nearby residential receptors.

Kitchen Extract Specification

Component	Specification	Purpose / Notes	Maintenance
Extract Canopy	5900 mm × 1400 mm × 500 mm, stainless steel, 0.5 m/s face velocity	Captures cooking fumes efficiently; suitable for heavy loading (grills, broilers)	Clean grease filters weekly; inspect canopy monthly
ESP Unit	1 No. ESP5000E, Airflow max 2.5 m³/s, 220/240 V 50 Hz, IP65, welded sump, temp 4–60 °C, humidity ≤75 %	First-stage filtration removing smoke, oil, and grease; protects carbon filters	Clean every 2–3 months depending on cooking load
Carbon Filters	16 site-safe units, dwell time 0.5–0.6 s, casing 2 No. 1500 L × 1210 H × 1210 W	Second-stage odour control; absorbs cooking gases and VOCs to reduce odour to non-nuisance level	Replace every 4–6 months
Mechanical Extraction Fan	Helios GigaBox GBD650, anti-vibration mountings, flexible connections	Provides required airflow; supports ESP and carbon stages; fan noise controlled with in-line attenuator	Annual inspection; check vibration mounts
In-line Attenuator	Installed downstream of fan	Reduces noise emissions to acceptable levels	Inspect annually
Ductwork & Flue	Low Pressure Class 'A', DW172 standard, velocities: Mains 6–9 m/s, Branch 4–7 m/s, Spigots 3–7 m/s; anti-vibration mounting pads; flue exit 1 m above roof eaves	Transfers extracted air efficiently; allows cleaning; ensures dispersion to minimise odour impact	Clean every 3 months (heavy use)
Make-up Air System	≈85% of extract airflow	Maintains internal temperature ≤28 °C, humidity ≤70%, minimum 40 air changes/hour	Inspect and maintain quarterly

Component	Specification	Purpose / Notes	Maintenance
Odour Control Level	Very high	Designed for kitchens near sensitive receptors (residential within 20 m); ESP + carbon filtration with 0.5–0.6 s dwell time ensures effective odour mitigation	Maintain ESP and carbon as per schedule to retain odour control efficiency