Newcastle City Council

Healthier Food Environments

Supplementary Planning Document
June 2024

Appendix 3
Guidance on Extraction Systems

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When a planning application in relation to food or drink premises is received by the Council, an environmental assessment of the application is undertaken by the Council's Environmental Health team, Public Safety and Regulation.

The aim of the assessment is to ensure that the proposed development has an adequate ventilation and extraction system that will not lead to complaints from neighbouring properties about cooking smells or noise from equipment such as fan motors. Other environmental issues are also considered, such as the likelihood of disturbance to neighbours by customers late at night.

The Council has powers under the Environmental Protection Act 1990 to take action against takeaways and other food and drink premises if they cause a nuisance. However, it is much better for the relevant details to be incorporated into planning applications to ensure that such problems are unlikely to occur.

In most cases a high level of protection is to be incorporated into an extraction/ventilation system where hot food is cooked, so this includes restaurants and hot food takeaways, regardless of the type of food to be cooked. This is because, once planning permission is granted for this, the premises can be used for any range of food preparation, including those which have the potential to cause odours.

Adequate ventilation/extraction must be provided in hot food takeaway and other types of hot food preparation premises to remove steam, cooking odours and grease-laden air. Natural ventilation is insufficient and an extract duct with a fan and filters is required to ventilate cooking fumes and remove odours without causing a nuisance to neighbouring properties.

Getting the right ventilation/extraction system can be complex; it is recommended that the applicant contact a specialist contractor who can carry out a ventilation survey and advise on accordingly.

Minimum ventilation rates

- An internal ambient air temperature of 28°C maximum
- Maximum humidity levels of 70%
- Internal noise level should be between NR40 – NR50
- Dedicated make up air system to be approximately 85% of the extract flow rate
- Minimum air change rate of 40 per hour (bases on canopy and general room extraction)

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

Ducting

Ducting should be as straight and short as possible, to ensure that fumes are discharged as effectively as possible. Care should be taken when designing the route of ducting to avoid proximity to residential or office windows on neighbouring properties which could give rise to complaints.

Ducting systems should extend to at least one metre higher than the eaves of the property or 1 metre above the nearest openable window on the property. In some cases ducting may need to extend to the roof ridge where there are openable rooflights. Ducting should not be routed through residential rooms. Ductwork should be fitted with anti-vibration mountings to minimize the vibration caused by air passing through.

Even if you are applying for planning permission only for external ducting, it is important to remember that vibration from the ductwork inside the building could also cause a nuisance to adjacent domestic or residential properties, particularly if ducting is fixed to a ceiling or party wall. Anti-vibration mountings should be used for all ductwork fixings.

Minimum requirements for ductwork

- 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 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 Odour Control
Discharge Stack

- The discharge stack should:
  1. Discharge the extracted air not less than 1m above the roof ridge of any building within 20m 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 1m 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

- **Low level discharge is not acceptable.**
- **Use of cowls is not recommended.**

Various types of filters will usually be required in order to eliminate grease and odours from the cooking fumes.

Grease filters

Grease filters ensure that grease is removed from the cooking fumes. This helps prevent it from building up inside the ducting, which can cause hygiene and odour problems, cause the grease to leak through joints in the ductwork, and pose a fire risk.

Grease filters should be incorporated into the cooker hood and should be easily removable for cleaning before they become clogged. Proper maintenance of grease filters is essential, as grease accumulation further up the ventilation ducting can be very difficult to remove. When fitting grease filters, mesh type filters are preferable to baffle type filters as they are considered to be more effective.

Carbon and Pre-filters

Carbon filters are also required and are essential when preparing fried foods and/or foods with strong odours in a food premises close to residential or office properties. Properly maintained carbon filters can eliminate the majority of odours created when food is cooked. Carbon filters should be fitted internally to the ductwork, after the grease filters and electrostatic precipitator unit and should be positioned so that they can easily be accessed for cleaning.

The carbon filter unit selected should include pre-filters, as these help ensure that no grease enters the carbon filters themselves. Carbon filters can be ruined by operating the extraction system without effective removal of grease. This can be very expensive and it is therefore essential to ensure grease and pre-filters are installed and that they are kept in good working order and used at all times when cooking.

Achieving suitable dwell time is essential to ensure cooking odours are correctly managed. It is important that the air being filtered through the carbon filter system remains in contact with the carbon filter for sufficient time. It should have a low pressure drop (80-100pa) and a high surface area to improve efficiency. The final choice of fan size will depend on the required dwell time of a particular carbon filter system. The table entitled Minimum Requirements for Odour Control set out the required dwell times.

Electrostatic precipitation

Electrostatic separators (ESP) are used to separate solid or liquid particles from ventilation air. The particles distributed in the gas are electrostatically charged so that they stick to collection plates. The Main components of an ESP are the filter housing, discharge and

collecting electrodes, power supply, gas guides or baffles and a rapping system for cleaning the collecting plates. ESPs can be designed to eliminate extensive quantities of smoke however the effectiveness of an ESP is limited to removing the grease that adheres to smoke and should not be considered to be a primary source of odour control. Where installed, pre-filters should be fitted upstream of the ESP to provide some protection from large contaminants that may pass through the grease filters. Where an ESP is used to treat oily fumes the collecting plates can become fouled, rendering them less effective. Weekly servicing should be the minimum requirement and they should be cleaned immediately as soon as there is any sign of deterioration in fume control.

In-line oxidation systems

Oxidation using ozone and/or activated oxygen ions has been used to treat odour emissions from commercial and industrial kitchen processes. Due consideration needs to be given to the residual ozone that may arise from these systems. Complete degradation of ozone is unlikely to take place within the duct work and therefore extraction system must discharge at high level. There will need to be restricted application of these systems in areas housing multiple commercial kitchens. Such systems are not considered to be a primary source of odour control.

Odour neutralizing and counteracting agents

There are a number of products on the market claiming that odour emissions can be 'neutralised' by the addition of certain components into the air stream. Counteracting agents are added to the air stream and result in a reduced response to the odour by the human nose by reducing the perceived intensity. As this type of system does not remove odour the level of odour removal is likely to be negligible. Again, such systems do not provide a primary source of odour control and are therefore not accepted as such.

Minimum Requirements for Odour Control

A suitable vapour barrier must be installed to prevent fugitive odours permeating the Building.

Minimum requirements for Odour Control
Odour arrestment plant performance

Low to medium level control may include:

- Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.1 second residence time)

High level odour control may include:

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

Very high level odour control may include:

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

- Fine filtration or ESP followed by carbon filtration and by counteractant/neutralizing system to achieve the same level of control as 1.
- Double pass ESP followed by carbon filtration (carbon filters rated with a 0.6 – 0.8 second residence time)
- Fine filtration or ESP followed by carbon filtration and by counteractant/neutralizing system (carbon filters rated with a 0.8 – 1 second residence time)

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

Charcoal grills and log burning ovens

The City of Newcastle upon Tyne is a smoke control area, meaning it is an offence to emit smoke from a chimney, including a high level extraction system unless 'authorised fuels' are used. Cooking using solid fuel therefore requires an authorised fuel to be used. Suitable fuels can be found on the Authorised Fuels page of the DEFRA website. Charcoal for use inside a food premises must be sourced from this website to ensure it is compliant with the smoke control area requirements.

Health and Safety

Preventing exposure to carbon monoxide from use of solid fuel appliances in commercial kitchens.

The Health & Safety Executive has produced guidance for food business operators who choose to cook using solid fuels. The guidance is aimed specifically at employers who use solid fuel appliances such as tandoori ovens, charcoal grills and wood-fired pizza ovens in commercial kitchens. It is concerned with the risks of exposure to carbon monoxide gas for workers as well as members of the public and outlines how they can be protected and what the law says.

Information for food business operators on how to comply with health and safety legislation can be found in the HSE Information Sheet, CAIS26. Carbon monoxide is known as 'the silent killer' because it is odourless and colourless. A well-maintained extraction system and carbon monoxide alarm, preferably interlocked with the extraction system is required. As well as regular servicing and maintenance, the extraction system will also require inspection.

Sold fuel burns at higher temperatures than gas. Therefore any system will require consideration of this at design stage. It is strongly recommended that the services of a suitably competent contractor are sought at the design stage.

Fans

A fan will be required to pull cooking fumes from the cooker hood to the point of discharge at roof height. The size of the fan motor must be adequate to ensure proper ventilation, taking into account the length and design of the ductwork and the filters used. A ventilation contractor will be able to advise on the appropriate size of fan motor for the ducting and on the adequacy of air changes.

Fans should be located within the building wherever possible, in order to minimise the likelihood of fan noise and vibration causing nuisance. If the fan cannot be located internally, details of the noise levels the fan makes are required. Even with fans located inside the building, consideration should be given to making sure that any vibration and noise from the fan will not cause a nuisance to adjacent properties.

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
- 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 noise control

- For new premises or premises covered by planning conditions restricting the impact of noise the system should 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 should be designed to avoid statutory nuisance and should comply with the principles of Best Practicable Means.
- To achieve these objectives the noise control system should include:
    - Control of noise at source to the greatest extent possible
    - Control of noise to the environment by taking acoustic considerations into account within the duct, grille and termination design
- The control system should meet the requirements laid down in BS4142: 2014 Methods for Rating and Assessing Industrial and Commercial Sound and should not exceed the existing background noise level as measured or calculated at the nearest residential property.

Sound insulation

In order to prevent the structural transmission of vibration and regenerated noise within adjacent or adjoining premises the following is required:

- All ductwork must be fitted with anti-vibration couplings or mountings to minimise the vibration caused by air passing through.
- A suitable scheme of insulation is required where residential use and commercial use will share a separating floor or wall. It is expected the scheme will deliver NR20 within habitable rooms.

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 regulations. Good maintenance is required by the food hygiene regulations and will also minimise the risk of fire.

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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 filters every two weeks
    - Change carbon filters every 4 to 6 months

- System using ESP and other in line abatement
    - Clean every 2-6 months

Further Information

Consideration must also be given to the visual impact of flues with all planning applications and care should be taken to locate them where they will not appear prominent. The council will take into account issues of visual amenity in deciding whether or not a proposed extraction system is acceptable.

Where practicable, but especially in conservation areas or within the setting of a listed building, equipment should be installed predominately within the building. Where external flues are proposed colour-coated flues that complement the existing building materials, should normally be used.

Where it is intended to reline internal flues or erect an external flue on a property in joint ownership or involving a party wall, all interested planning notes for guidance and legal consent obtained from all of those parties prior to any development work starting on site.

Submission of Planning Application

Details of design, size, siting, acoustic treatment, finish, odour abatement techniques of the flue extraction system to be installed must be submitted with all applications for hot food takeaways. Where such details are not submitted the application may be refused on the grounds of insufficient information.