

# Fire Safety Guidance Note: Catering Kitchen Extract Systems

## GN86

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This Guidance Note provides fire safety advice in respect of Catering Kitchen Extract Systems

This Note is one of a series produced by the Fire Authority to provide advice on various aspects of fire safety. If you require any further guidance on the advice given or require advice on another topic please visit your local Fire Safety Office, telephone 020 8555 1200 and ask for the nearest Fire Safety Office, or visit the London Fire Brigade web site at <http://www.london-fire.gov.uk>

## 1 Introduction

- 1.1 The term catering has a dictionary definition of " the business of providing food service at a site such as a hotel, public house, restaurant or any other location where cooking facilities that utilise ductwork is carried out". This may include or impact on some domestic premises.
- 1.2 Catering kitchen extract systems(ducting systems) are designed to collect smoke, steam, grease, cooking odours and fumes from combustion appliances into a canopy, through filters, ductwork, and then be discharged to atmosphere. Therefore, where food is prepared for business purposes in a kitchen and that kitchen is a place of work it will be subject to the Regulatory Reform (Fire Safety) Order 2005 (the Order).
- 1.3 The London Fire Brigade Fire Investigation Team (FIT) state that "by far the most common problem and cause of ducting fires is the lack of proper cleaning and maintenance" . Therefore, any failure to observe a proper cleaning and maintenance regime could affect any subsequent insurance claim.

## 2 Matters for consideration

- 2.1 A kitchen extract system would typically consist of the following components (See Appendix 1 for an illustration) :
  - Canopy - This is also referred to as hood or cooking hood, and is where the grease filters are housed;
  - Canopy/extract plenum – This is typically the area immediately behind the grease filter housing and below where the ducting commences;
  - Ducting – This is beyond the canopy/extract plenum and is typically constructed of galvanised steel or heavy duty fire rated steel, which may have additional fire protection. Flexible ductwork is not recommended for kitchen extract systems due to difficulty of cleaning ;
  - Fire dampers - These must not be located within a kitchen extract system but are occasionally found in very old or non-compliant systems;
  - Sound attenuators – Internal sound deadening material to allow the fan noise to be absorbed;
  - Turning vanes – These may be found at changes of direction within the ducting;
  - Extract fan – To create extraction from the canopy an extract fan would be connected to the ductwork;
  - Discharge duct – On the exhaust side of the fan a discharge duct would direct extract air out of the building via an outlet.
- 2.2 The primary purpose of grease filters is to reduce the amount of grease passing through into the extraction ductwork. It is essential that all grease filters be in place whenever cooking appliances are operated. Mesh filters have no flame protection and should not be used where there is a high risk of fire i.e. open flame grilling , flame cooking and sudden emissions of hot vapour. Baffle filters comprise a number of interlocking vanes, which form a "two-pass" grease removal device and a barrier in the event of a flash fire.

- 2.3 All the internal surfaces of the kitchen extract systems are affected by grease and oil deposits. No filter is 100% effective, therefore the efficiency of the filtration will vary the rate of oil and grease deposits. These deposits can, in certain circumstances, ignite with the application of flame, heat, sparks, embers etc. This will then cause rapid fire spread through the duct, and can cause ignition of surrounding materials at various points along the ductwork path, transforming fire into the fabric/voids of the building.
- 2.4 Kitchen extract ductwork travelling outside the kitchen compartment is either constructed from fire rated materials, or a protective material is applied to suitably constructed and supported conventional ductwork. Alternatively, the ductwork runs from the kitchen directly to the outside of the building through a protected shaft containing no other services and with no fire dampers fitted. Ductwork within the kitchen compartment does not have to be fire rated. Maintaining the fire integrity of fire-rated ductwork should be a consideration when installation takes place. Relevant guidance documents provide information on this and those documents should be regularly accessed for updated data. .
- 2.5 In accordance with British Standard (BS) 476 Part 24, ductwork is tested to ensure that a fire outside the duct does not ignite flammable grease inside or, if the grease itself is already alight, that there is no spread of fire by radiant heat to any adjacent combustible material. The ductwork must also be rated for stability, integrity and insulation for the same period of time as the compartment through which it passes. The ductwork supporting hangers should be capable of supporting the ductwork for not less than the period of time as the compartment through which it passes. As part of the fire safety integrity of the premises, the building should be checked to ascertain if kitchen extract ducting systems pass through areas within the building, determining whether a ducting fire would affect the means of escape, and the ability of relevant persons to escape both safely and effectively.
- 2.6 Access is essential to all interior surfaces of the kitchen extract system and canopy/extract plenum for cleaning and inspection purposes. Access panels should be of sufficient number, quality and size to enable unrestricted access for regular cleaning and inspection of the interior surfaces and in-line components. All panels shall be in accordance with the requirements of the Building and Engineering Services Association DW/172 Specification for Kitchen Ventilation Systems, and should be installed at 3m centres, as close as practicably possible to either side of in-line components to be cleaned, and any 90° changes of direction.
- 2.7 Access panels should incorporate quick release catches, sealing gaskets and thermal, acoustic and fire rated insulation properties equal to that of the duct to which they are fitted. Access holes should not be cut into the ductwork, sheet metal should not be fitted to the ductwork with screws and gaffer tape/duct tape.
- 2.8 Access panels should ideally be fitted at the side of the ductwork, a minimum of 10mm above the base to minimise the risk of grease leakage.

### 3 Cleaning

- 3.1 There are various cleaning methods that cleaning contractors use, and any cleaning method must be demonstrably capable of meeting the standard for post-clean verification as detailed in the Building and Engineering Services Association Guide TR/19 Internal Cleanliness of Ventilation Systems. It is the responsibility of the premises owner/occupier to facilitate access to any third party buildings if any part of the kitchen extract ductwork is located in third party property.
- 3.2 The frequency of cleaning should be such that grease deposit limits are not exceeded. These limits are measured in microns by using a particular testing method (e.g. Deposit Thickness Test, Deposit Thickness Testing (DTT) is an approved technique that is used to accurately assess the level of deposit build up within ventilation ductwork. Preferred Vacuum Test, Preferred Vacuum Test – This test utilizes an air pump to suck dust from the surface of the ductwork guided by a plastic template. The collected dust is deposited on a sample media which is then sent to an independent laboratory for analysis which can take about 7 days to produce the results and the Wet Film Thickness Test).

- 3.3 Using the Wet Film Thickness Test a measurement of 200 microns as a mean across the extraction system would result in a recommended requirement of a complete clean. Any single measurement above 500 microns would result in a recommended urgent localised clean. (These "hot spots" should be cleaned even where the whole system does not require complete cleaning). Following cleaning of the extraction system, all post clean wet film thickness tests shall not exceed 50 microns and shall be representative of the system .
- 3.4 Many extraction systems will need a higher frequency of cleaning based on hours in use and the type of usage. For example, kitchens that produce high levels of fried or chargrilled food will produce much higher grease levels than those using less intensive cooking methods such as baking and boiling. The table below will assist in assessing the required frequency of cleaning.

**TABLE 1 KITCHEN GREASE EXTRACT SYSTEMS**

Perceived level of grease production	Typical example	Daily usage Cleaning intervals (months)			
		Up to 6 hours	6-12 hours	12-16 hours	16+hours
Low	No significant production of grease laden aerosols during normal daily food production operations.	12	12	6	6
Medium	Moderate production of grease laden aerosols during normal daily food production operations.	12	6	4	3
High	Heavy, significant or continual production of grease laden aerosols during normal daily food production operations.	6	3	3	2

**Note:** Commercial liability/property insurance policies invariably contain conditions and warranties that stipulate a minimum cleaning frequency for grease extract ductwork systems under the insurance contract which can be a higher frequency of cleaning than Building and Engineering Services Association guide TR/19 recommendations. Failure to comply with such requirements will invalidate the property insurance policy. TR/19 also lists the qualification criteria that the Responsible Person should consider when selected specialist contractors.

- 3.5 The canopy and canopy/extract plenum is an area of higher fire risk and consideration should be given to more frequent cleaning in accordance with insurers' requirements. Periodic specialist cleaning should be accompanied by daily or weekly cleaning of canopies and filters and are typically carried out by the kitchen operator.
- 3.6 After cleaning the extraction systems, the cleaning contractor should provide the client with a Post-Clean Verification of Cleanliness report. This report shall include the following:
- The system(s) cleaned;
  - Pre and post clean measurements;
  - Pre and post clean photographic records;
  - Additional works carried out (if any);
  - COSHH data on any chemicals used;

- Recommendations for future cleaning requirements;
- A certificate summarising the cleaning works completed;
- A sketch or schematic of the system indicating access panels and testing locations and clearly highlighting any un-cleaned/inaccessible areas with an explanation as to why the area could not be accessed/cleaned. (It is the duty of the client's responsible person to highlight any inaccessible/un-cleaned areas to their insurer or other relevant third party, such as a landlord).

## 4 Catering Kitchen Extract Systems and the Regulatory Reform (Fire Safety) Order 2005 (The Order)

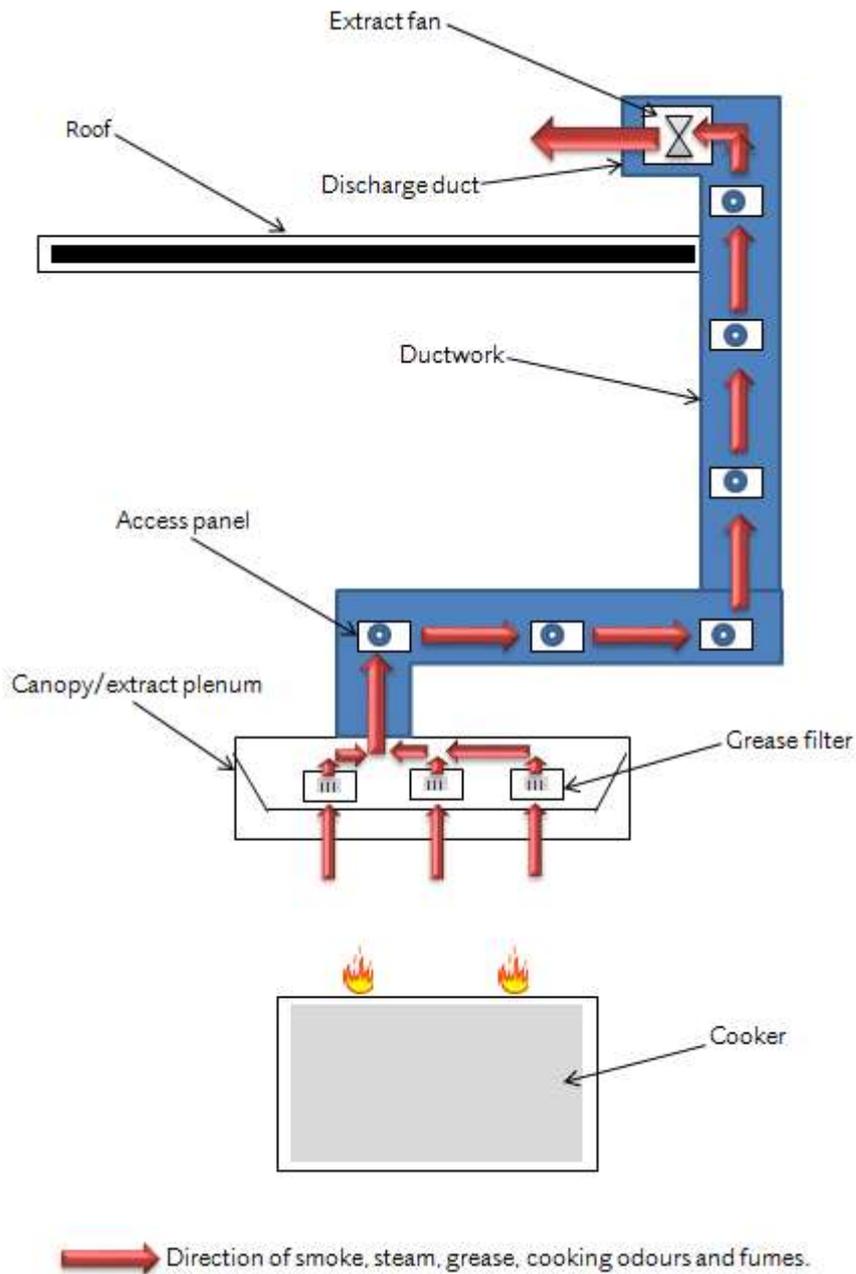
- 4.1 London Fire Brigade Fire Safety Staff will look specifically at the following areas when auditing premises that fall under the Order.
- 4.2 The General Fire Precautions (GFPs), in relation to kitchen extract systems are 'measures to reduce the risk of fire on the premises and the risk of the spread of fire on the premises, Article 4 (1) (a). Fire safety staff will follow the line of the kitchen extract ductwork through the building, ensuring that the entire ductwork has sufficient access panels (see 2.7) for cleaning and inspection purposes, and that it is a separate and independent extract system. Where ductwork passes through compartment walls and floors, there should be fire stopping that matches the fire resistance of the compartment that the ducting passes through (see 2.5 for fire rated ductwork).
- 4.3 The Insurers' Fire Research Strategy document RC44, Recommendations for Fire Risk Assessment of Catering Extract Ventilation, is aimed principally at the person responsible for ensuring that such an assessment is performed. RC44 provides for a fire risk assessment of extract systems in catering kitchens, including questions in the document's Appendix, together with supporting explanation and guidance. A detailed assessment of catering kitchen extract systems should be contained in the premises fire risk assessment, and all systems will require cleaning annually as a minimum, unless the fire risk assessment recommends otherwise. Paragraph 3.3 and Table 1 gives appropriate guidance for the frequency of maintenance. There should be an assessment of the discharge duct ensuring that it is not sited so as to jeopardize the building, i.e. away from final exits, combustible building cladding/roof coverings and openings into the building.
- 4.4 Any catering kitchen extract measures identified in the fire risk assessment, should have effective planning, organisation, control, monitoring and review. For example, a fire risk assessment may highlight that access panels are required in the kitchen extract ducting and the Responsible Person would be required to plan, organise and control the fitting of the access panels by a qualified person/s.
- 4.5 Whilst conducting an audit, the Fire Safety Officer will ask to see post-clean verification of cleanliness records (see 3.5). No cleaning, or an ineffective cleaning regime of catering kitchen extract systems, is a risk of fire, and the risk of the spread of fire on the premises, and could also invalidate commercial liability/property insurance policies. When carrying out Post Incident Audits, fire safety staff will determine if any highlighted uncleaned/inaccessible areas contained in the report were dealt with, as a failure to act on these highlighted issues could have increased the risk of fire and exacerbated the spread of fire.
- 4.6 Some kitchen extract systems will pass through areas of the building where there could be shared cleaning responsibilities e.g. in a shopping mall where the restaurant's extraction system travels into ductwork in an area that the building's landlord/owner/managing agent has responsibility for. It is important that when it comes to the cleaning of the ductwork, there is co-operation and co-ordination between the various Responsible Persons to ensure that all interior surfaces of the ductwork are cleaned at the same time, and not on different days/dates.

## 5 Bibliography

AVAILABLE FROM	TITLE
<p>The Building and Engineering Services Association</p> <p>Address: 137-143 Hammersmith Rd, London W14 0QL</p> <p>Phone: 020 7313 4900</p> <p><a href="https://www.thebesa.com/">https://www.thebesa.com/</a></p> <p>British Standards Institution (BSI)</p> <p>Address: 389 Chiswick High Rd, Chiswick, London W4 4AL</p> <p>Phone: 020 8996 9000</p> <p><a href="https://www.bsigroup.com/en-GB/">https://www.bsigroup.com/en-GB/</a></p>	<p>The Building and Engineering Services Association DW/172 Specification for Kitchen Ventilation Systems</p> <p>The Building and Engineering Services Association DW/144 Specification for Sheet Metal Ductwork</p> <p>The Building and Engineering Services Association guide to good practice TR/19 Internal Cleanliness of Ventilation Systems</p> <p>The Insurers' Fire Research Strategy document RC44 Recommendations for fire risk assessment of catering extract ventilation</p> <p>Regulation (EC) No 852/2004 of the European Parliament and of The Council on the hygiene of foodstuffs Annex II, Chapter 1, paragraph 5</p> <p>British Standard 476 Part 24</p>

Additional information is available on the Fire Gateway ([www.fire.gov.uk](http://www.fire.gov.uk)), a national website providing access to related information as well as links to all Fire & Rescue Services and the Communities and Local Government website ([www.communities.gov.uk/fire/](http://www.communities.gov.uk/fire/)).

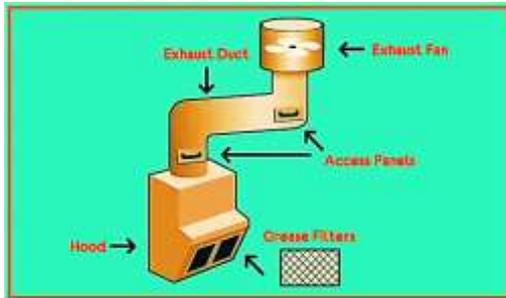
# Appendix 1 - Diagram of a catering kitchen extract system



## Appendix 2 - Catering kitchen extract system aide-memoire

Has the catering kitchen's fire risk assessment fully assessed the hazards/risks in the kitchen, and was RC44 used by the risk assessor? (See Note 1 for RC44 information)

- Are grease filters fitted and are they regularly cleaned and maintained?



Basic diagram of kitchen ducting system

Mesh filter

Baffle filter

Mesh filters have no flame protection. It is recommended that baffle filters are fitted for all cooking styles involving oils and grease (modifications to existing ducting system may be required).

- Are access panels fitted throughout the whole length of the ducting system?



- Access Panels should be fitted at a maximum of 3 metre centers throughout the whole ducting system, and/or at each change of direction, where head and shoulder access is possible for cleaning purposes.
- How often is the whole ducting cleaned? (See Note 2 for frequency of cleaning)
- After cleaning the ducting, do the cleaning contractors produce a report? (See Note 3 for report details)
- It is the duty of the responsible person to highlight any inaccessible/un-cleaned areas to their insurer or other relevant third party, such as a landlord.
- Is the discharge duct (ductwork ending) away from emergency exits, combustible building cladding/roof coverings and openings into the building? Many fires are spread beyond the discharge point of the ductwork, due to radiant heat igniting combustible materials.

**Note 1** - RC44 Recommendations for fire risk assessment of catering extract ventilation, is a document developed through the Insurers' Fire Research Strategy that contains explanation and guidance on extract ventilation in catering kitchens, and is aimed at the person responsible for ensuring that a fire risk assessment is carried out at the premises.

**Note 2.** The Building and Engineering Services Association guide TR/19 Internal Cleanliness of Ventilation Systems

## Section 7 - Table assessing the required frequency of cleaning

Perceived level of grease production	Typical example	Daily usage Cleaning intervals (months)			
		Up to 6 hours	6-12 hours	12-16 hours	16+hours
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High	Heavy, significant or continual production of grease laden aerosols during normal daily food production operations.	6	3	3	2

**Note 3.** The Building and Engineering Services Association guide TR/19 (Section 7).

Post-clean verification of cleanliness report should include the following:

- 1) The system(s) cleaned;
- 2) Pre and post clean measurements;
- 3) Pre and post clean photographic records;
- 4) Additional works carried out (if any);
- 5) COSHH data on any chemicals used;
- 6) Recommendations for future cleaning requirements;
- 7) A certificate summarising the cleaning works completed;
- 8) A sketch or schematic of the system indicating access panel and testing locations and clearly highlighting any un-cleaned/inaccessible areas with an explanation as to why the area could not be accessed/cleaned.

**NOTE:** Commercial liability/property insurance policies invariably contain conditions and warranties that stipulate a minimum cleaning frequency for grease extract ductwork systems under the insurance contract which can be a higher frequency of cleaning than TR/19 recommendations. Failure to comply with such requirements will invalidate the property insurance policy.