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Risk Topic: Fire Safety in Commercial Kitchens



Fires within commercial kitchens happen for many reasons and can cause a significant amount of damage and disruption to your business. Whilst the common reasons for fire include failure of thermostats and electrical faults, the fire will be worse if your extraction ductwork and filters are not being cleaned regularly enough. Fire events spreading into ductwork that have excessive grease build-up is especially hazardous and can reach out-of-control levels far more quickly.

Key Considerations

To maximise risk prevention in a commercial kitchen we have produced a checklist at the end of this Risk Topic. The top 5 most common issues relating to kitchen fires are:

1. Is your ductwork being cleaned in accordance with the TR19 industry standard issued by the Building and Engineering Services Association (BESA)?
2. Are your filters being regularly cleaned to avoid excessive grease build-up?
3. If your kitchen is carrying out deep fat frying, do you have an automatic fire suppression system installed?
4. If you have an automatic fire suppression system installed, have staff had training on the action to take in the event of a fire?
5. Is kitchen equipment being regularly inspected and subject to an annual maintenance contract?



Ductwork

The risks associated with kitchen fires in extraction ducting systems are generally well known and many businesses will already have arrangements for the cleaning of ducts by specialist contractors[1].

Specialist contractors need to be either:

- a member of the Building Engineering Services Competence Assessment (BESCA) Ltd's Vent Hygiene Elite Scheme;
- or be accredited under the Loss Prevention Certification Board's standard LPS 2084 requirements for the LPCB approval and listing of companies carrying out inspection, cleaning, and maintenance of ductwork systems.

When conducting internal cleans of the ductwork system, contractors should take account of the following guidance:

- TR19 Guide to Good Practice: Internal Cleanliness of Ventilation Systems
- TR19 Grease: Fire Risk Management of Grease Accumulation within Kitchen Extraction Systems
- DW172: Specification for Kitchen Ventilation Systems

Access for Cleaning

Access hatches must be provided at intervals of no more than 2 metres and at key points, for example both sides of the extract fans, direction change, filter sections. Due to the high air velocity provided by the extract fan, any residual areas of contamination can help fire spread through the system.

Where the extraction ducting is designed to a specific level of fire resistance (fire-rated), it is essential that access hatches are designed to match the level of fire resistance. Guidance on the position and design of access hatches should be sought from a professional duct cleaning contractor. Any encasing of ductwork throughout the building should also be appropriately fire rated and ensure access to cleaning hatches are maintained.



[1] General guidance in the design, maintenance, cleaning, and assessment of kitchen extraction ducting systems is available in the FPA document RC44: Recommendations for fire risk assessment of catering extract ventilation.

Duct Cleaning Frequencies

Frequency of cleaning decisions should be made via a risk assessment to determine the quantities of grease production and deposits through the system as shown in the table below. This can be backed up via a formal test of the grease build-up via your specialist contractor[2]. These formal tests (known as the wet film thickness test and deposit thickness test) will accurately measure the level of grease build-up and hard carbonised deposits in your ductwork.

Kitchen Extract Systems TR19 Cleaning Frequency				
Grease Production	**Cleaning Intervals (months) Daily Usage**			
	Up to 6 hours	6-12 hours	12-16 hours	16+ hours
Low No use of deep fat frying or cooking processes that generate low grease build-up	12	12	6	6
Medium Moderate use of deep fat fryers or cooking processes that generate moderate grease build-up	12	6	4	3
High Heavy use of deep fat fryers or cooking processes that generate significant grease build-up	6	3	3	2

It is also important to be aware of any provisions within your insurance policy that relate to ductwork cleaning.

[2] Document TR19 provides for the use of a Wet Film Thickness Test and provides thresholds as to when cleaning is required and guidance on cleaning frequencies.

Filter Cleaning Frequencies

The frequency may vary depending upon the level of grease contamination. Grease-laden filters, as well as greasy extraction hoods, are a high fire risk given how close they are to cooking appliances. Where exceptionally heavy accumulations of grease are emitted from cooking, cleaning may need to be completed daily. More typically, filters will need to be cleaned at least once every 7 days.

It may be that lower levels of frying or grilling warrant longer intervals, in most cases cleaning intervals should not be longer than monthly.

Where appropriate, a spare set of filters should be kept allowing filters to be rotated for cleaning.



Certification of Duct Cleaning

It is essential that documentation is provided to you by your duct cleaning contractor that confirms all parts of the kitchen extraction system have been cleaned to the required standard. TR19 requires that a report containing the following should be provided by the cleaning contractor:

1. A statement indicating whether the whole system was cleaned in its entirety
2. If not, confirmation of what wasn't cleaned and why together with recommendations to resolve any such issues
3. A recommendation of cleaning frequency
4. Pre-clean micron readings for stipulated test locations, and the mean average micron reading across all the locations
5. Other hazards identified
6. Any pre-agreement with the client as to any area not to be cleaned
7. Before and after cleaning photos representative of the system condition
8. A schematic diagram of the system layout showing the system in its entirety to include known components, changes in direction, access hatches, areas that have been cleaned and any areas that could not be cleaned.

If you would like specialist advice about your extraction cleaning regime, please contact Ventilate Consultancy & Control. Ventilate are a leading independent kitchen extract consultancy practice in the UK and provide a range of compliance services, monitoring and ensuring operators arrange effective cleaning and maintenance of their extract ventilation.

For more details on any of Ventilate's solutions, please email zrsuk.ventilate@uk.zurich.com. By emailing, you consent to us sharing your personal data such as your contact details with Ventilate so that they can contact you with further information about their services. You may withdraw consent at any time by emailing us at zrsuk.ventilate@uk.zurich.com.

Cooking Appliances

Cooking appliances are the main sources of fire risk in a kitchen and should not be left unattended when in use. In particular, kitchen ranges must never be used when the filters above the cooking range are not in place as this is the first defence against fires spreading into the ductwork.

As well as formal annual maintenance contracts for kitchen equipment, it is good practice to have more regular, recorded, visual inspections to ensure equipment is free from damage. For example:

- Cables to equipment are free from damage and have not been trapped especially if equipment has been moved. Trapped cables can damage the insulation leading to an increased risk of fire and electric shock
- Sockets and plugs have no signs of damage
- Electrical/gas isolation points remain accessible
- Any electrical boards are clear of combustible materials
- Fire doors are not being wedged open.



Deep Fat Frying

Deep fat fryers will have a thermostat with a normal maximum operating temperature of 190C and this is the main control against the oil overheating. To further reduce the fire risk, the fryer will need to have a second high-level thermostat set at 230C which will turn off the fryer if activated. This switch will require the user to manually switch the fryer back on. This device is critical in preventing the oil reaching temperatures where it may spontaneously combust.

If the high-level thermostat has operated this may be an indication of a problem with either the fryer's thermostat or another problem such as blocked ventilation. Staff should be instructed to call in a maintenance company to inspect the fryer in these circumstances.

Be aware!

Older oil that continues to be reused, which is typically darker brown in colour, will have undergone chemical changes that increase the risk that the oil will ignite. The tell-tale signs of this are a darkening in the colour of the oil. There are colour charts or test methods available to check your oil but regularly changing the oil will prevent this happening.

Another cause of fire is accidentally switching on the heat source after the oil has been drained down during changes or cleaning. Procedures should be put in place to ensure the power and gas supply to the fryer is isolated during oil changes and cleaning.



Automatic Fire Suppression Systems

Where the cooking range is equipped with deep fat fryers, the best method of protection is to install an automatic fire suppression system that is approved to UL 300 or EN 17446 standards. This type of system is not dependent upon any power supply and provides 24/7 protection of your entire cooking range against unexpected fires.

Following an activation of the fire suppression system, the wet chemical (foam) discharge can be simply cleaned away and cooking processes restarted once the suppression system has been re-filled.

If you do not have a fire suppression system, even if you manage to contain the deep fat fryer fire, it is likely that significant amounts of smoke contamination will be produced that will require a deep clean of your kitchen. In the worst-case scenario, there are many examples of commercial kitchen fires spreading to the remainder of the building.

For these reasons many insurers insist on automatic fire suppression systems where there is a high risk that a kitchen fire will result in significant fire and smoke damage.



Conclusion

While there is no doubt that the process of cooking, especially deep fat frying, presents fire risks, these can be controlled by a combination of correct siting, installation and use of the equipment and the correct training, housekeeping and maintenance procedures being put in place.

Fires in kitchen extraction ducting systems are not uncommon and may result in devastating damage to your premises and business. Implementing the guidance, which is based upon a risk-based approach to the cleaning of ducting and filters, will help to reduce the chance of a fire starting.



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Zurich Resilience Solutions UK
Risk Support Services
6th Floor, The Colmore Building
20 Colmore Circus, Queensway
Birmingham
B4 6AT

For further information about any of the topics mentioned in this document please speak to your local Zurich contact, or email Zurich Resilience Solutions at zrs.enquiries@uk.zurich.com or alternatively call this number +44 (0) 121 697 9131

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Registered Office: The Zurich Centre, 3000 Parkway, Whiteley, Fareham, Hampshire PO15 7JZ

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- RC68 Recommendations for Fire Safety in Catering Establishments. The Fire Protection Association.
- LPS 2084 Requirements for the LPCB approval and listing of companies carrying out inspection, cleaning, and maintenance of ductwork systems. BRE Global Ltd.
- TR19 Guide to Good Practice – Internal Cleanliness of Ventilation Systems. Building and Engineering Services Association.
- TR19 Grease Specification for Fire Risk Management of Grease Accumulation within Kitchen Extraction Systems. Building Engineering Services Association (BESA).
- DW172 Specification for Kitchen Ventilation Systems. Building Engineering Services Association (BESA).
- NFPA 17A: Standard for Wet Chemical Extinguishing Systems. National Fire Protection Association.
- Zurich Recognised Technology for Property Risks. This paper outlines the approach taken by Zurich Risk Engineering to determine whether and how to account for these solutions when assessing risks.
- NFPA 96: Standard for Ventilation Control and Fire Protection of Commercial Cooking Appliances.

Appendix 1 – Kitchen Fire Safety Checklist

	Question	Answer	Comment
1	Do the filters above the cooking range ever show signs of excessive grease build-up?	☐ Yes ☐ No	
2	Does your ductwork have access hatches at 2-metre intervals?	☐ Yes ☐ No	
3	Does your ductwork pass through combustible construction, combustible insulation or compartment floors?	☐ Yes ☐ No	
4	Do you have pre and post photographic evidence when your contractor completes ductwork cleaning?	☐ Yes ☐ No	
5	Is your ductwork cleaning programme in accordance with the frequency intervals provided in TR19 by BESA?	☐ Yes ☐ No	
6	Are your appliances subject to an annual maintenance programme?	☐ Yes ☐ No	
7	Have staff received training regarding the appropriate action to take in the event of a fire?	☐ Yes ☐ No	
8	Do you have appropriate fire extinguishers that are located in the correct position and subject to a maintenance contract?	☐ Yes ☐ No	
9	Do you have an automatic fire suppression system above the cooking range?	☐ Yes ☐ No	
10	If an automatic fire suppression system is installed have staff received training on its manual and automatic activation?	☐ Yes ☐ No	
11	When cleaning the fryer do you turn off the power supply and isolate it from the gas supply?	☐ Yes ☐ No	
12	Are fire doors and any automatic fire shutters in good working order and maintained?	☐ Yes ☐ No	
13	Do you complete regular, recorded, visual inspections?	☐ Yes ☐ No	
14	Are rags contaminated with cooking oils and fats disposed of in metal lidded bins or washed on high temperature cycles with a full cooling cycle?	☐ Yes ☐ No	