Commercial Kitchen Operations & Exhaust Systems
Risk Management Note

Kitchen exhaust/fume extract systems and cooking appliances are commonly found in restaurants, fast food outlets and within the commercial kitchens of establishments such as food courts, hospitals, schools, hotels, large factories and catering facilities.

Fires are very common in such areas and are usually triggered or exacerbated in one of four ways:

1. A flame flares up on the cooking appliance or oil is overheated in a deep fryer. Flames reach the filters above the cooking surface and is then drawn up into the duct beyond the filters. If significant grease residue exists either on the filters or within the duct, it acts as a fuel and fire can easily spread through the duct and break out into the roof space.
2. An extract fan fails or a restriction occurs in the duct, causing a drop-in airflow. Significant drop-in/reduced airflow will contribute to a build-up of grease residue in the filters/duct, as it is not being picked up and vented into the atmosphere. Again, if significant grease residue exists in the hood plenum or duct interior, this can act as a fuel and fire spreads through the duct.
3. When the deep fryers are poorly maintained such as build-up of grease residue around the control panel/mechanical parts, or lack of servicing, it can become a potential fire risk. As with any cooking appliances, deep fryers require regular maintenance to ensure they operate safely and reliably.
4. Spontaneous combustion of oil-impregnated material has also been a cause of several major fires, commonly tea towels, serviettes, tablecloths, and the like. Tea towels and other laundry used in restaurants and other workplaces can contain higher volumes of fat and oil, even after washing, there will be some oil residue left as detergent does not get rid of this completely. The mix of high temperatures and fats can cause an exothermic reaction, which can cause a fire to start spontaneously.

General risk management controls associated with commercial kitchen operations and exhaust systems are outlined below; Fire Prevention and Fire Control.

Fire prevention

1. Grease filter and hood cleaning

- Regular cleaning of the grease filters and hood will reduce the build-up of fat and grease (which are a fire risk) and will also help with the removal of cooking smells.
- Grease filters in ducts over cooking appliances need to be removed and cleaned thoroughly on a weekly basis.

Grease build-up in the filters and hood

Clean grease filters

2. Cooking waste management

- Regular changing of cooking oil (particularly in deep fryers) in accordance with the manufacturer's recommendation is important, especially if crumbed food is often cooked, as residue will build up in the base of a fryer (which burns readily). Used cooking liquid needs to be regularly removed from each deep fryer, and stored in a closed metal container outside of the building.
- All fried scrapings or crumbs skimmed during the service time must be held in metal bowls or containers, and removed out of the building at the end of the day.

3. Extraction system flue cleaning

- Even with regular grease filter cleaning, grease residue (oily or fatty deposits) will build up in the ducting system over a period of time and, if a fire occurs in the cooking range or deep fryer, it could spread into the flue (and possibly into the roof space) and cause major damage. Extraction system flues and associated fans must be cleaned thoroughly on a scheduled basis (at least annually), but more frequently with heavy use of cooking appliances.

Usage	Running hours	Cleaning frequency
Heavy	Over 12 hours per day	3 monthly
Moderate	6 – 12 hours per day	6 monthly
Light	Up to 6 hours per day	12 monthly

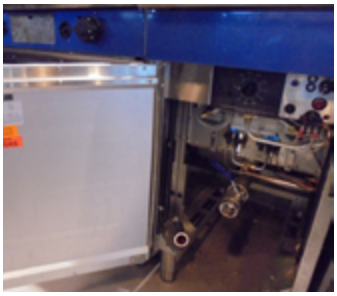
Both photos showing significant build-up of grease residue inside the flues and associated wiring.

- There are several commercial kitchen extraction cleaning companies throughout New Zealand that specialise in extraction system cleaning (it is recommended that you search your local 'Yellow Pages' to find a local company). The following are known to QBE Insurance:
  - Filter Cleaning Contractors Limited, 09 376 6004 – www.filtercleaning.co.nz
  - Commercial Ducting and Hood Service Ltd (Comduc), 0800 266 382 – www.comduc.co.nz

4. Kitchen equipment preventative maintenance

- All cut-outs, thermostats, heating elements and associated controls or cooking appliances need to comply with the relevant New Zealand Standard, Code of Practice and/or International Standard. The cooking appliances need to be maintained in a safe and efficient working condition at all times with a recommended 12-monthly scheduled maintenance.
- All electric and gas cooking appliances need to comply with the latest electrical/gas regulations including checks on all the gas hoses, electrical wiring and [ball] valves for the gas appliances.
- Gas hoses, connectors and [ball] valves should be checked for signs of failure on a regular basis, and any issue needs to be repaired or replaced immediately.

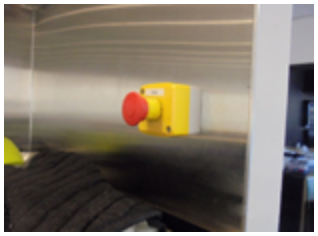
Well-maintained hoses and connectors



Clean control panel and mechanical parts

5. Energy isolation

- Isolation valves should be in a readily accessible location.
- When cooking has finished for the day, all cooking appliances (including the wok burners) are to be turned off, and wherever possible, the energy source isolated (electricity at the wall and gas by the shut-off/[ball] valve).



Switches and emergency gas shut-off button on the walls

Emergency gas shut-off button and [ball] valve at the cooking appliance

6. High temperature cut-outs (deep fryers only)

- A separate external, non-adjustable and manually reset cut-out mechanism needs to be fitted to each deep fryer to isolate the heating elements when the cooking oil temperature exceeds a preset maximum temperature which can be up to two hundred and thirty degrees Celsius (230°C).
- This will provide protection in the event of a thermostat failure by preventing the over-heating of oil, which may otherwise reach its auto-ignition temperature and ignite. It is important to note that different oils have different temperature ignition points and these deteriorate the more the oil is contaminated.

Over-temperature safety cut-out switches

Fire control

7. Fire extinguishers

- Most commercial kitchens utilise some form of deep frying. This is an area where many fires occur. If kitchens have the appropriate fire protection, a small fire can easily be controlled by staff who have basic fire prevention training.
- As a minimum standard, the kitchen needs to have a fire blanket and a wet chemical fire extinguisher for use on an oil fire. We strongly recommend that all kitchens have at least an additional dry powder fire extinguisher for use on general and electrical fires where liquid might not be suitable to use in emergency.
- The wet chemical fire extinguisher should be located in an easily accessible position near the deep fryer, and staff need to be trained in the correct use of both fire extinguisher types.
- Fire equipment needs to be inspected, maintained and serviced every twelve (12) months in accordance with the NZS 4503:2005 (Hand Operated Fire Fighting Equipment) standard.

8. Fire blanket & close-fitting steel lids

- These are useful as a back-up to a fire extinguisher or if the kitchen only has a small bench-top fryer (domestic style). However, staff need to be trained in how to use the fire blankets safely.
- Close-fitting steel lids are to be placed over deep fryers or oil pots/woks in a fire situation, thereby allowing the fire to extinguish. It also assists in preventing a potential fire ignition event through oxygen starvation.

9. Automatic fire suppression

- For larger fryer installations it is worthwhile considering installing an automatic fire suppression system in the extract hood above the deep fryers. These can be either automatically and/or manually triggered.

Automatic fire suppression above the deep fryers

- There are several systems that are available utilising agents such as CO_2, wet chemical and special powders.
- A certified fire sprinkler company, such as Wormald or Chubb, should be consulted for further advice. Additional information on certified fire sprinkler companies can be found at Fire Protection Association of NZ (FPANZ) website: www.fireprotection.org.nz.

10. Staff training

- Overall, this is one of the most important areas of fire prevention and fire control. Fires can easily occur, and spread quickly, if staff are not reliably trained in fire prevention and control measures.
- Every new staff member should be given adequate training in fire prevention and control measures, including the safe and reliable use of fire extinguishers and blankets.
- Training programmes in the use of fire extinguishers and fire blankets are run by fire protection companies (more information can be found at Fire Protection Association New Zealand Inc (FPANZ): www.fireprotection.org.nz). Refresher training should be provided regularly (recommended on an annual basis).
- No deep frying or wok cooking is to be left unattended.
- In some cases, if you have a laundry facility on the premises, it is important to prevent the self-heating and spontaneous ignition combustion after hot washing and drying of the kitchen tea towels and cloths, by allowing all the cycles to run to the end, including the cool-down cycle. It is critical that the towels and cloths are removed immediately and left to air rather than being folded or placed in a bag or laundry basket.
- A close-fitting steel lid is to be put in place when each deep fryer or oil pot/wok is not in use.
- Staff should know where all gas shut-off/ball valves are located so that, in case of a fire, they can immediately isolate the gas supply and prevent any further fuel being added to the fire.
- Oil levels keep within manufacturer's specifications.


Close fitting metal lids are usually provided for the deep fryers regardless of the sizes, makes and models.

Disclaimer

The purpose of this Risk Management Note is to assist you to minimise potential loss from exposures which need prompt consideration. The Note does not imply that all other exposures were under control at the time of inspection.

The options contained in this Note are not intended to be a substitute for appropriate professional advice in relation to any matter. In achieving compliance with these items, fire protection equipment and systems should be installed to comply with the requirements of the relevant local, and/or Government authority. Any equipment installed should also comply with the requirements of the relevant New Zealand Standards and Codes.

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