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Skills summary

■ What?

A guide to the cleaning protocols that should be applied to a commercial kitchen exhaust system, in a best-practice approach.

■ Who?

This Skills Workshop will be of use to all those engaged in the safety, design, construction, operation, servicing, and management of kitchen exhaust systems in commercial buildings.

CLEANING COMMERCIAL KITCHEN EXHAUSTS

Commercial kitchen exhaust systems extract the heat, smoke, particulates, grease, and water vapour generated by cooking operations in kitchens and discharge them safely outside. These systems become contaminated with grease and other cooking by-products. Over time, accumulations of these combustible contaminants create a fire safety hazard within the system.

When a system is poorly designed, installed or maintained, the accumulation of contaminants complete the fire triangle – fuel, air, and ignition – to significantly increase the fire risk within the system and escalate the potential consequences of a kitchen fire.

Accumulated grease and moisture also create a hygiene hazard within the system that can lead to issues such as unpleasant odours, mould growth, bacterial contamination, and pest infestation.

This Skills Workshop provides a methodology to determine the frequency and necessity for physically cleaning a kitchen exhaust system, through defined inspection procedures and a set of performance standards; acceptable methods for cleaning exhaust systems and components; and a set of standards used to verify acceptable post-clean cleanliness.

Section 13 of AS 1851 sets out the requirements for routine service of fire and smoke control features of mechanical services in buildings covered by AS 1668.1, AS 1668.2, AS 1682.1, AS 1682.2 and AS 2665.

The commercial kitchen exhaust system best practice approach outlined here goes beyond

the minimum inspection and routine service requirements of AS 1851 to outline a targeted evidence-based approach, as documented in overseas standards. This risk-based approach relates the requirement or minimum frequency for inspection/cleaning to the hours and style of cooking and evidence of build-up of grease in the system.

Initial cleaning frequency guide

In the absence of historic data for grease deposit levels, such as for newly installed systems, grease production load and system usage-based analysis can be used to estimate the required initial cleaning frequency. Tables 1 and 2 provide a matrix

Predicted level of grease production	Typical example	Cleaning intervals (months)			
		Where daily usage rate is:			
		≤ 6hr	>6 ≤12hr	>12 ≤16hr	> 16hr
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

Table 1: Non-solid fuel cooking applications

Predicted level of grease production	Typical example	Cleaning intervals (months)			
		Where daily usage rate is:			
		≤ 6hr	>6 ≤12hr	>12 ≤16hr	> 16hr
Medium	Moderate production of grease laden aerosols during normal daily food production operations	6	3	3	1
High	Heavy, significant, or continual production of grease laden aerosols during normal daily food production operations	3	2	2	1

Table 2: Solid fuel cooking applications

Notes to Tables 1 and 2

- The hood and extract plenum are areas with a high risk of fire. Consideration should be given to more frequent cleaning of these areas in accordance with insurers' requirements.
- In addition to the scheduled specialist cleaning, a daily or weekly cleaning regime should be implemented on hoods, separators and associated drains and traps in accordance with manufacturers' recommendations. Typically, these are carried out by the kitchen operator, to comply with insurers' requirements.
- Owing to wide variations in usage, the frequency of cleaning is often best monitored by the kitchen operator.
- The results of inspection and cleaning of the system may lead to changes to cleaning frequencies (see section 4).

relating (predicted) grease production and daily usage rates to minimum cleaning intervals for both non-solid fuel and solid fuel cooking applications.

Pre-cleaning requirements

General requirements

A competent person should perform the pre-cleaning requirements.

Prior to cleaning, the person should determine if a certificate, label, or tag has previously been posted on the exhaust hood and, if yes, then all relevant information should be recorded. If no certificate, label, or tag is posted, this should be noted in the post clean inspection report.

Personal protective equipment (PPE)

PPE must always be used during inspection, cleaning, and post-cleaning processes, in accordance with regulations. Proper inspection of all PPE must be performed prior to commencing work.

PPE required for the kitchen exhaust cleaning and inspection includes (but is not limited to) the following:

- Approved eye protection.
- Respiratory protection to prevent inhalation of harmful particulate and gases.
- Hand protection (gloves) to prevent injury from sharp objects and exposure to chemicals.
- Foot protection to prevent “slip and fall” accidents and foot injuries.
- Lock out/tag out and ground fault interruption devices.
- Fall arresting harnesses and lanyards.
- Head protection to include bump caps and/or hard hats.

Ladders

Where ladders are necessary to gain access to facility rooftops or interior portions of the kitchen exhaust system, the ladder, surface, and safety requirements must comply with relevant standards and regulations and allow adequate space for safe working.

Chemical handling and use

all chemicals used in the cleaning process should be used, handled, and disposed of in accordance with manufacturers’ instructions and applicable standards and the WHS regulations for chemical handling and hazard communication.

Pre-cleaning inspections

Basic operation test

Before cleaning it should be verified that the system is mechanically operable. If the system is powered off, system start-up should be initiated where possible, including all exhaust fans and any make-up air fans. Exhaust airflow should be verified, and the quantity should be assessed.

The owner(s) or operator(s) of the system should be interviewed, if applicable, to determine if the facility has experienced any problems with the system performance.

If system deficiencies are identified during the pre-cleaning inspection and testing operations

notification should be provided as soon as practical to the owner/operator of the system.

Grease removal devices

Hood grease filters or other listed grease removal devices used in exhaust hoods should be inspected to determine their condition.

Fan visual inspection

Where possible, the visible portion of the exhaust fan should be inspected to ensure that it is operating. Notification of recorded deficiencies should be provided as soon as practical to the owner/operator of the system.

Inspection of belts and drives

The fan must be locked out and tagged out and all fan motion confirmed to have ceased prior to inspection of the belts and drives of the fan. The motor compartment of the exhaust fan should be opened, and a visual inspection should be performed of the belts and drives. Notify the owner/operator of deficiencies such as cracked or loose belts as soon as practical.

Effluent treatment equipment

Effluent treatment equipment and systems should be maintained in accordance with the manufacturer’s instructions by persons who have received specific training to service the equipment. Where grease or oil accumulates due to these systems, this should be identified and drained or cleaned as required. Any hazards to maintenance personnel (e.g., from UV or ozone) must be identified and mitigated.

Other equipment and systems

Other equipment and systems should be maintained and inspected prior to cleaning by a competent person in accordance with the manufacturer’s instructions. Where oil accumulates due to these systems, this should be identified and drained or cleaned as required.

Water wash hoods

The cleaning person should surcharge the hood drain in a water wash hood system prior to the start of work to ensure that it is free-flowing and record any noted deficiencies. Specialised blowers should be maintained according to the manufacturer’s instructions.

Protective covering

Protection of workspace areas

To avoid the possibility of contamination, all food products should be removed from the workspace area and stored in a proper place prior to the start of the cleaning process.

Where possible, all food preparation cookware and equipment should also be removed from the workspace area and stored in a proper place prior to the start of the cleaning process to avoid any possibility of contamination.

Where that is not possible, all items that remain in the workspace area should be completely covered with protective sheets, prior to the start of the cleaning process.

When all cleaning procedures have been completed, all protective sheets should be removed from food preparation equipment.

Wet-washing process preparation

When wet-washing kitchen exhaust systems, all equipment that may be exposed to wash water and cleaning agents should be covered with protective sheeting. Protective covering used for hood wrapping and equipment protection should be of a thickness sufficient to withstand the cleaning process. Wash water should be contained for proper disposal.

No process wastewater should be disposed of through a storm-water collection system. Waste solids should be collected and disposed of in an environmentally safe and approved solid waste disposal device acceptable to the relevant authority.

Energy source protection

Pre-cleaning

Prior to the start of the cleaning process, all electrical switches, open flame gas burners, and utility distribution systems serving the cooking appliances and the exhaust fans that could be activated accidentally must be locked out and tagged out.

Where solid fuel is present, all solid fuel must be extinguished and properly removed and disposed of, prior to the start of the cleaning process.

Post-cleaning

When all cleaning procedures have been completed, all components of the system should be returned to an operable state.

Cleaning methods

This section provides specific advice on how to clean and maintain kitchen exhaust systems.

All cleaning processes must result in the removal of cooking by-product deposits, grease, and fuel from the interior surfaces of kitchen exhaust systems. The cleaning methods implemented must be capable of achieving the required standard for post-clean verification, as set out in this guide, on both the internal surfaces of the exhaust ductwork and the system components.

The guidance provided on cleaning methods is not intended to be definitive as there are many methods, both traditional and new technologies, which can be applied in tandem on a kitchen exhaust system. Table 3 provides examples of some typical cleaning methods.

When choosing the cleaning method, consideration should be given to operator safety. There should also be particular focus on the surrounding environment when using wet cleaning methods, because grease and moisture can leak from the ductwork and components causing exterior damage.

All interior surfaces of a commercial kitchen exhaust system should be accessible for inspection and cleaning purposes. Where applicable, all exhaust ducts must be provided with access openings for inspection and cleaning in accordance with AS 1668.1.

For any specialised effluent treatment equipment or energy control equipment, the relevant equipment supplier, representative or agent should provide guidance on cleaning methods and frequencies. If any cleaning process or chemical has the



Method	Removal method
Manual	Hand scraping and removal of deposits and/or wiping the surface of the ductwork with a cloth. Chemicals can be used to soften or dissolve heavy deposits making them easier to remove. Flammable solvents or other flammable cleaning aids must not be used.
Steam cleaning	The use of hot water vapour expelled at high pressure from a lance to dislodge/ dissolve deposits to clean the surfaces.
Rotary/mechanised brushing systems	Scarifying of the surfaces of the ductwork with rotating brush heads to clean the surfaces driven by a shaft.
Hot chemical foam application	Application of degreasing solution by pressurized vessels to deliver chemical laden foam to clean the surfaces.
High-pressure water washing	The use of pressurised water discharged at ambient or high temperature from a lance or nozzle to dislodge deposits and clean the surfaces.

Table 3 – Examples of cleaning methodology

potential to cause disturbance to any fire safety equipment, it is recommended that a person competent in that equipment is engaged.

Wet cleaning methods using chemical foam, steam cleaning and high-pressure water washing should be carefully assessed for use in ductwork that is situated above false ceilings or in vulnerable areas. Unless the exhaust system is specifically designed and sealed for wet cleaning, these methods should be avoided, due to the risk of possible leakage of contaminants from the duct to the surrounding area and services.

After applying wet cleaning methods, care should be taken to ensure that all condensed vapours and cleaning fluids are removed from all parts of the exhaust system.

The use of chemical cleaning agents should only be considered where a risk assessment has been carried out to assess the effects of the applied chemicals on the materials of construction, environment, and cleaning personnel.

Vertical exhaust ducts should be cleaned from top to bottom either by direct personnel entry using manual processes, or remotely using any of the described cleaning processes. The exhaust fan should be positioned to allow access to the vertical duct or access should be provided to the intake side of the fan.

Horizontal exhaust ducts should be cleaned from one end of the duct to its other end either by direct personnel entry using manual processes, or remotely using any of the described cleaning processes. These processes can be applied from outside or inside the exhaust ductwork.

It is not normally necessary or economically practicable to clean kitchen

exhaust systems and fans to a “like new” bright metal condition. This may be impossible due to substrate staining.

Excessive abrasion should be avoided, and care should be taken when cleaning to avoid damage or removal of protective coatings on fan casings, impellers, and motor housings.

Cleaning frequency

Minimum standard approach

AS 1851 provides guidance on minimum inspection and cleaning requirements. Specific cleaning intervals stated by property owners, facility managers, proprietors, system designers or insurers should be identified by the owner/operator, and the cleaning and maintenance contractor should be notified.

Best-practice approach

The best-practice approach is to determine cleaning frequency based on the recommended system inspection frequencies in Table 4.1 supported by Grease Thickness Test measurements (see Appendix A for measurement options) taken at representative locations. Following each inspection and/or clean, a decision on the frequency for future cleaning should be made so that grease levels are maintained below 0.2mm or 200µm, as a mean across the system.

Conditions and warranties within insurance policies, should stipulate minimum cleaning frequencies for kitchen exhaust systems. It should be noted that some insurance contracts may require a higher frequency of cleaning than recommended in this guide and failure to comply with such requirements may invalidate the property insurance policy.

Post-cleaning requirements

When all cleaning procedures have been completed, all protective sheets should be removed and all components of the system should be returned to an operable state.

Post-cleaning verification

Pre-clean and post-clean grease measurements (Grease Thickness Test) should be taken where practicable, and these should be clearly detailed in the post-clean report (see Appendix B).

For cleaned system verification, the surface should be visibly clean and capable of meeting the specified level of cleanliness.

For verification following cleaning, individual post-clean grease thickness tests must not exceed 50µm.

Post-clean report

A post-clean report should include the following:

An executive summary page that highlights the following key risks:

1. A clear statement indicating whether the system was cleaned in its entirety.

2. If the entire system was not cleaned, state precisely what element(s) was not cleaned and why it was not cleaned, together with suggested solutions and recommendations.
3. Grease Thickness Test measurements for the stipulated test locations. The mean (average) micron reading across all Grease Thickness Test measurements taken.
4. A recommendation of a new cleaning frequency based on the pre-clean Grease Thickness Test readings.
Note: To calculate a frequency based on keeping grease levels below 200 microns as a mean across the system, the rate of build-up of grease needs to be assumed to be linear over time. This assumption can be validated by future inspections over time.
5. Any deficiencies or other hazards that have been identified.

Post-clean reports should contain a description of the actual work performed, identification of systems that are cleaned, and the specific customer information, in addition to the following:

- Type of fan(s)
- Number of fan(s)
- Location of fan(s)
- Location of duct and access panels (accessible and non-accessible)
- Location and type of kitchen exhaust effluent and energy control equipment
- List of known leakage locations
- Fan switch location
- Enough photographs of the system taken before and after cleaning that are representative of the system condition
- A schematic diagram or as-installed drawing of the system layout, showing the system in its entirety including known components, changes of direction, access panels, areas that have been cleaned and any areas that could not be cleaned.

Note: If other factors are known to influence the speed of grease accumulation, such as peak periods of trade or where historical data infers, then interim inspections should be implemented/recommended to check grease thickness, and further frequency adjustments made as appropriate.

Verification certificate

When a commercial kitchen exhaust system is inspected or cleaned, the person performing the inspection or cleaning should attach a pre-printed label or tag containing the service provider name, telephone number, and date of inspection or cleaning.

Old certificates, labels, or tags should be removed when affixing new labels, or tags.

A service verification certificate should also be provided to the client. ■



PULLOUT



This skills workshop is taken from AIRAH's *Best Practice Guide for Commercial Kitchen Exhaust Management*, available at www.airah.org.au/resources

Next month:
Flexible ductwork