Building Engineering Services Association

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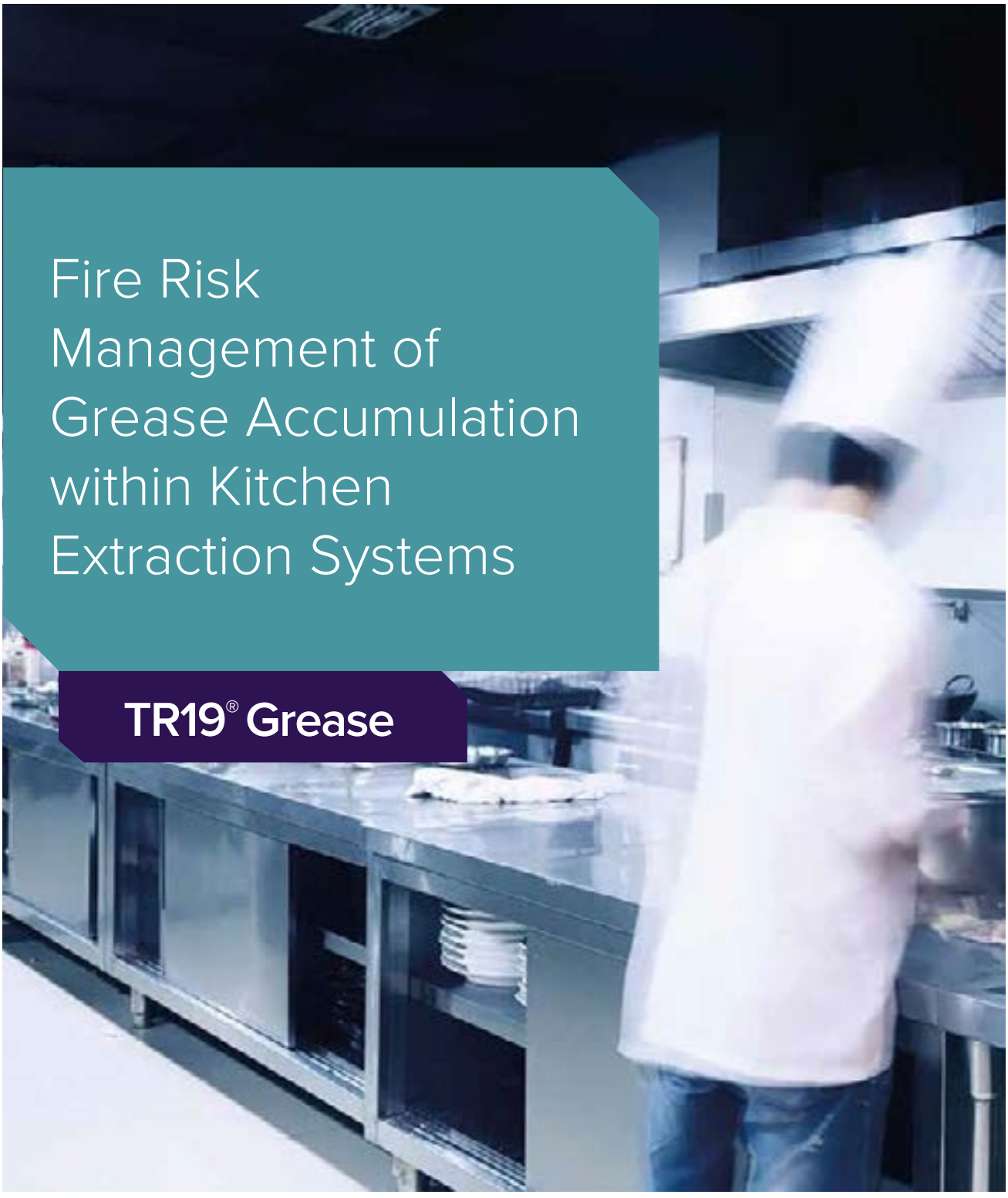

Fire Risk Management of Grease Accumulation within Kitchen Extraction Systems

TR19® Grease

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RISCAuthority - the annually funded research scheme supported by a significant group of UK insurers

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The BESA Academy - the training arm of the Building Engineering Services Association that facilitiates apprenticeships, certification, accredited training for the UK's building engineering services sector

Notes

1. TR19® Grease, is a new, stand-alone specification for Fire Risk Management of Grease Accumulation within Kitchen Extraction Systems. For any works that require compliance with the TR19® Grease specification, it must be expressly stated in any tender documents/ contracts that TR19® Grease applies, in addition to TR19®, to ensure the correct services can be applied to projects where required. Stating TR19® only will not encompass the TR19® Grease specification.

2. Manufacturing techniques are continually subject to change and improvements and in respect of proprietary methods and devices this specication does not preclude their use if they can be demonstrated to the system designer to be equally satisfactory. Where there is divergence between the requirements of and the manufacturer's recommendations for proprietary methods and devices, the latter shall take precedence.

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FOREWORD

Previously TR/19 - Internal Cleanliness of Ventilation Systems, covered all aspects of ventilation cleanliness within the one document. For this revision the decision was taken to produce a specific document focused on fire risk management of grease accumulation within kitchen extraction systems.

Commercial kitchens have grown in number over recent years and fires within premises involving commercial kitchen extract systems as either a source or contributory factor to the fire has focused the attention of insurers, property owners and landlords to ensuring that kitchen extraction systems are correctly cleaned and maintained. With this in mind TR19® Grease - Fire Risk Management of Grease Accumulation within Kitchen Extraction Systems, has been produced as a specification document in its own right for the first time in 2019.

The risk of fire from the build up of grease deposits in kitchen extract systems and the expectations of building occupiers and legislators, has resulted in an ever more stringent level of ventilation system cleanliness being required.

This Association first published TR/17 in 1998 in order to give guidance to good practice and to establish standards for testing, cleaning and verification of the internal cleanliness of ventilation systems. The guide was republished as TR/17 2nd Edition in 2002 and included further improvements to best practice. In 2005 it was republished again and incorporated the former publication DW TM2 – Internal Cleanliness of New Ductwork Installations. To differentiate this expanded edition from its predecessor, it was renumbered TR/19. In 2013 TR/19 second edition was published to incorporate reference to BSEN15780 Cleanliness of Ventilation Systems the 2011 British and European Standard.

The opportunity has been taken in this 5th revision to incorporate changes to highlight the current best practice for ensuring that kitchen extract systems are maintained to minimise the risk of fire associated with grease accumulation. Kitchen extract systems are not currently covered by BS EN 15780 - Ventilation for Buildings Cleanliness of Ventilation Systems.

This specification can be used for new build, upgrade and maintenance of ventilation systems and will directly benefit users of the indoor environment as well as specifiers and consultants. Since its inception in 1998, TR19 and its predecessors have been widely accepted within the building servicers sector and by the UK insurance industry as the standard to which ventilation systems should be cleaned.

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5. BESA may in its absolute discretion withdraw the right or authorisation to use the TR19® trademark and/or claim that services are certified to meet the TR19® specification and are TR19® compliant.

Definitions

For the purpose of this document, the following definitions apply:

Air flow
Movement of air usually within boundaries (such as ducts).

Air supply plenum
Either an integral chamber or a chamber connected to the canopy to feed air into the kitchen corresponding with supply air outlets.

Building Management System (BMS)
A control system that can be used to monitor and manage the mechanical, electrical and electromechanical services in a facility.

Canopy
A capture or receiving hood, three or four sided, that receives a rising gas from a process. They are located above a process designed to provide a suitable capture velocity to ensure the safe removal of the contaminant.

Ceiling panel
Fixed or removable elements of a ceiling installed horizontally, vertically or at any angle on a sub-construction.

Ductwork
Pipe or closed conduit, round, oval square rectangular, constructed from sheet metal or other suitable material used for conveying air.

Exhaust air flow rate
Volume of air leaving an exhaust air terminal device in unit time.

Extract air
Treated or untreated air that is removed from a space and discharged to outdoors.

Fire risk assessment
A process involving the systematic evaluation of the factors that determine the hazard from fire, the likelihood that there will be a fire and the consequences if one were to occur.

Fire rated ductwork
Fire resistant ductwork that could be required or have special use under fire conditions.

Fryers Warranty
A warranty on an Insurance policy which requires strict fire protections in relation to use of a Deep Fat Fryer, including fixed upper-limit thermostatic cut-offs, regular servicing and maintenance of fryers and extraction ducts and appropriate fire-fighting equipment.

Grease Extract System
A system that is designed to collect smoke, steam, grease, cooking odours and fumes from combustion appliances into a canopy, through filters, ductwork, and then discharged to atmosphere.

IP Rating
Ingress Protection (IP) ratings, as defined in international standard BS EN 60529, are used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt etc.) and moisture.

Kitchen extract system
A system that collects and removes contaminants, heat and moisture from cooking appliances.

Kitchen ventilated ceiling
A ventilation system that may incorporate the air inlets, air outlets, separators, light fittings and additional hoods which can be integrated.

Kitchen ventilation canopy
Air terminal device which provides the facility to capture, contain and remove process pollutant. It may also provide a point of supply air back into the room space.

Local Exhaust Ventilation (LEV)
A system that uses extract ventilation to prevent or reduce the level of airborne hazardous substances from being breathed by people in the workplace as governed by the COSHH regulations.

Make-up air
Air introduced into a space to replace air that is being extracted. Replacement of air lost due to exhaust air requirements.

Plenum
Air compartment connected to a duct or ducts. The portions of the air distribution system that makes use of the building structure, and the sheet metal that connects distribution ductwork to an air-handling unit. Many buildings use the space above a dropped or suspended ceiling as a plenum.

Separator
Device for the efficient separation of airborne solid or liquid particles, based on the effect of mechanical forces that deflect the particles out of the airflow.

Sound attenuator
An assembly installed in a duct system to absorb sound made by fans in heating, ventilation, and air conditioning systems.

Symbols
The symbols used in this specification are In line with National and European standards covering Ventilation for Buildings by CEN/TC15

Objective

To provide a management process for controlling the risk of grease related fires associated with operating commercial kitchen extract systems. The purpose of maintaining the kitchen ventilation system is to remove contamination from the cooking processes to reduce the fire risk presented, maintain system performance, ensure continued ventilation of the surrounding ancillary areas and provide safe and comfortable conditions for the occupants.

This publication is primarily intended to:

- Provide information for commercial caterers who are appointing (by competition or negotiation) a contractor.
- Provide a specification for the correct hygienic and fire safety maintenance of kitchen ventilation systems.
- Specify levels of compliance and competence for those undertaking cleaning of grease extraction systems that can be verified by independent assessment.
- Specify the scope of works necessary to maintain systems that deliver a safe working environment whilst reducing the risks associated with fire spread.
- Provide information to assist with compliance to health, hygiene and fire safety regulations and building insurance conditions.

Quality Assurance

This specification should be used by all individuals who have duties, as set out in the various regulatory instruments, to ensure the safety of those using a building or premises and to enable those duty holders to determine their compliance with health and fire safety regulations.

This specification sets out the standard for those undertaking independent compliance assessments. It forms the basis of the BESCA Ven Hygiene Register (VHR) which monitors contractor performance in meeting kitchen ventilation system fire safety maintenance.

Scope
This specification covers the type of kitchen grease extract ventilation systems usually found in commercial catering outlets, non-domestic premises and facilities where employees and the public are potentially at risk. The specification is not intended for residential premises, although some of its provisions will apply. This specification makes use of terms “should”, “shall” and “must” when prescribing procedures:

- The term “must” identifies a requirement by law at the time of publication.
- The term “shall” prescribes a procedure, which it is intended to be complied with, in full and without deviation.
- The term “should” prescribes a procedure, which it is intended to be complied with unless, after prior consideration, deviation is considered equivalent or better.

Publication and review
User feedback on the content or the requirements of the specification will be welcomed to assist in the ongoing development of this document.

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SECTION 1

Introduction

Kitchen extract (exhaust) systems are particularly affected by the deposition of grease and oil on internal surfaces. No separator or filter device can be 100% effective and, consequently, varying efficiencies of separation or filtration affect the rate of fouling. Likewise, other (non-catering) industrial cooking processes can result in accumulation of grease and oil that becomes hidden inside ventilation systems.

1.1 To comply with the Regulatory Reform (Fire Safety) Order 2005, or equivalent national legislation, grease extract systems must be inspected, tested and cleaned regularly to ensure the mitigation of fire hazards. In addition, advice and guidance provided by the Health & Safety Executive (HSE), BSRIA and RISCAuthority, stipulate that kitchen extract systems should be kept clean to minimise fire and health and safety risks.

1.2 Spontaneous ignition of residual grease or oil deposits occurs at 310-360°C. Deposits of some mixtures, such as chicken fat or vegetable oil, ignite more readily. Therefore, under certain circumstances flames and/or high temperatures can ignite grease, causing fire to spread rapidly through a system in situations where grease levels have not been adequately controlled in accordance with TR 19® Grease. In addition to this, the ductwork can be heated to such a degree that ignition of the surrounding materials, in contact with or in close proximity to the duct, can occur. Fire Services and forensic fire investigators report many cases where, a small kitchen fire has been spread well beyond the original seat of fire by grease laden extract systems, causing major property damage well beyond the confines of the kitchen leading to significant business interruption.

1.3 For this reason insurers have increased their attention on the ‘fryers’ warranty’ as well as requiring specific cleaning frequencies and detailed proof of compliant cleaning maintenance regimes. Claims may be refused by insurers where compliance with the terms of the insurance policy cannot be demonstrated.

1.4 Accumulated grease also creates a hygiene hazard that can lead to foul odours, pest infestation and, in some cases, unhygienic ‘backwash’ of air into the cooking area. Leakage of oil from damaged or poorly-installed ductwork can also spread these hazards to food preparation areas or other areas of the building such as ceiling voids and service shafts.

1.5 The introduction of the Regulatory Reform (Fire Safety) Order 2005 in October 2006, followed by similar regulation for Scotland and Northern Ireland, implemented a legal requirement for employers or those who may have some control of any part of the premises, such as occupier or owner, to have a suitable and sufficient Fire Risk Assessment undertaken and maintained. The Fire Risk Assessment should be conducted by a nominated competent person who shall identify potential hazards associated with kitchen extract ventilation, principally those associated with inadequate cleaning regimes, evaluate the hazard, record the findings and keep the assessment under review, particularly if there are any changes in the system, cooking practices or frequency of use.

1.6 EC852-2004 states that 'Ventilation systems are to be so constructed as to enable filters and other parts requiring cleaning or replacement to be readily accessible.’

SECTION 2

System components

A kitchen extract system would typically consist of the following components:

2.1 **Canopy**
Also referred to as hood, canopy hood, extraction hood, cooking hood, cooker hood, cooking canopy or extraction canopy. This would most likely include a vertical canopy skirt running around the perimeter of the canopy. A 'u' channel on the bottom edge of the skirt; a canopy roof sitting horizontally on the top of and joining the skirts; a grease filter housing assembly (with grease filters and traps) hanging within the boundary of the skirts. The canopy houses the filtration systems, extract plenum, potentially the fire suppression system and Ultraviolet (UV) filtration systems. (See DW172 for further information)

2.2 **Canopy grease filters (Separators)**
All types of filter/separator are designed to be fitted usually to the extract canopy as the primary or secondary point of grease capture. Refer to DW172 and LPS 1263 for specific details on canopy grease separation. Grease filters/separators should be regularly cleaned to remove grease deposits as they are the closest point of the systems to the primary source of ignition from the cooking appliances.

2.3 **Canopy extract plenum**
This is typically the area immediately behind the grease filter housing and below where the ducting commences. This area can rapidly accumulate high levels of grease and may have removable traps or drainage points.

2.4 **Fire dampers**
These must not be present within a kitchen extract system but are occasionally found in old or non-compliant systems.

2.5 **Flexible ductwork**
DW172 states that this type of ducting must not be used for kitchen extract systems. Where found it should be recommended for immediate replacement by the client.

2.6 **Sound attenuators**
The internal make up contains a sound deadening material held in place with metal panels that have circular holes cut into them to allow the fan noise to be absorbed. Excessive amounts of water or chemical should not be used for cleaning attenuators. If the internal lining becomes saturated with grease any remedial work would not form part of a typical cleaning contract. DW172 states that 'Where in-line attenuators are used for kitchen extract, they shall be constructed so that there is no grease impregnation into the acoustic media. A protective membrane shall be specified for this purpose.'

2.7 **Turning vanes (change of direction)**
These may be found at changes of direction within the ducting and assist in smoothing / directing the flow of exhaust gases. Turning vanes should be avoided wherever possible as the air disturbance forms a grease accumulation point. Radius bends for changes in direction are preferable. (See DW172, Section 18 Clause 18.11)

2.8 **Volume Control Dampers (VCD's)**
In line components used to regulate and control airflow volumes to the system. Careful noting of set position and resetting of volume control dampers should be made before and after maintenance.

2.9 **Extract fans**
Required to create extraction from the canopy an extract fan would be connected to the ductwork. Some extract fans (roof mounted) discharge directly to atmosphere via a cowl. Kitchen extract fans operate under increased strain and are particularly prone to burnout due to the heat, grease-laden and oily environment in which they operate. The likelihood of this occurrence increases with age. This is particularly so where there is a significant build-up of heat modified oil due to a lack of regular cleaning. A clean motor will dissipate heat more effectively than a dirty motor, therefore lasting longer. Regular cleaning also prevents imbalance, which leads to increased vibration.

2.10 **Bifurcated, Swing Out Door and Box fans**
These are more suitable for kitchen extract because they can withstand high temperatures ie up to 200°C. These fans, having motors out of the airstream, prevent grease build-up and provide easier access for cleaning and maintenance. It is essential to ensure fans are electrically isolated and locked off before carrying out inspection or cleaning works.

2.11 **Ratings for kitchen extract fans**
Electrical equipment such as motors in fans often have an Ingress Protection (IP) rating which tells you how resistant it is to foreign bodies such as dust, fluid, moisture. The IP Rating is a simple encoding that covers a range of international standards. A rating of IP55 (Protected from limited dust ingress and low pressure water jets from any direction), limited ingress protection) or greater will ensure the fan is suitable for the cleaning process using spray applications. Care should be taken not to flood the fan as the ingress of excessive water can cause malfunction.

Centrifugal Fan

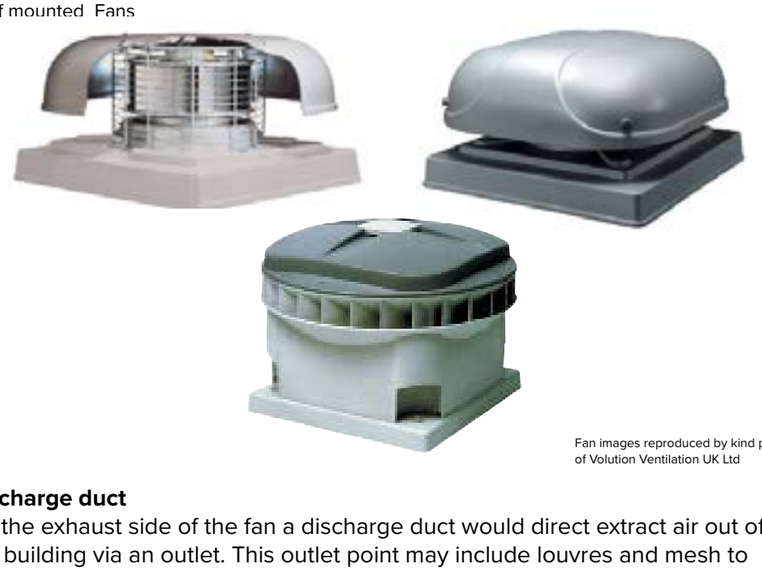
Axial Fan

Bifurcated Fan

Box Fan

Propellor/Plate Axial Fan

Roof mounted Fans



Fan images reproduced by kind permission of Volution Ventilation UK Ltd

2.11 **Discharge duct**
On the exhaust side of the fan a discharge duct would direct extract air out of the building via an outlet. This outlet point may include louvres and mesh to prevent the ingress of windblown waste, leaf litter, precipitation and vermin.

2.12 **Ultraviolet (UV) systems**
Whereas UV or similar systems within the grease extract canopy and ductwork system may reduce the accumulation of grease, nonetheless a full system inspection will still be required to determine the appropriate cleaning frequency. Interlock systems should be identified to ensure the safe isolation of the UV systems before maintenance or inspection. Exposure to elevated Ozone levels can occur if the system is not correctly isolated and purged before maintenance. UV systems are commonly mounted within the canopy plenum or further upstream to the ducted system as separately manufactured units. These require specialist competencies for maintenance and cleaning.

2.13 **Water Wash canopies and Continuous Cold Water Mist systems**
Water based systems can be used to wash down canopy voids internally. Misting systems can be used where solid fuel cooking is prevalent.

2.14 **Fryer ranges**
Commonly found in fish and chip premises, these ranges often have internal ducting that links to a section of extract ductwork and a sump beneath the floor.

Access to the internal surfaces of these systems for maintenance requires particular attention.

2.15 **Carbon filtration/separation**
Typically installed prior to discharge to minimise odour release in compliance with local planning requirements.

2.16 **Electrostatic precipitation separators (ESP)**
Separators in electrically charged separator banks, fitted to minimise system atmospheric discharge, require regular laundering to maintain efficiency.

2.17 **Gas interlock systems**
BS 6173 - The ventilation system interlock to the gas supply serving the cooking equipment. Typically installed so that in the event of airflow failure, the gas supply is switched off. Small sensitive components within gas interlock systems should be noted during maintenance. These components include the pitot airflow tubes.

2.18 **Pitot Airflow Tubes**
These small tubes penetrate the ductwork and are linked to pressure switches or the Building Management System (BMS) or safety system.Critical to the kitchen range function, they can be easily damaged or blocked during maintenance. The presence and location of pitot tubes should be identified by the installer and clearly marked on the as-installed drawings.

2.19 **Recirculatory systems**
Utilised in environments where cooking is undertaken using electric powered equipment, regular inspection and maintenance of the separation fitted to the system is required to control contaminants being re-circulated into the internal environment. These require specialist competencies for maintenance and cleaning.

2.20 **High temperature flues / ducts**
Many solid fuel and or gas applications for high temperature cooking process applications, such as pizza ovens, utilize high temperature insulated or twin wall ducts / flues.

2.21 **Ventilated ceilings (Fig.2)**
Maintenance of full-ventilated ceiling systems will require extract cassette removal and cleaning of the non-drip integral or perimeter troughs and relevant void areas above them. Systems where ventilated ceilings are installed with ceiling plenum void extract or direct-ducted extraction, such as those connected to pizza ovens and fish frying ranges, are subject to the same cleaning considerations.

2.22 **Solid fuel**
Ventilation systems serving Solid Fuel Appliances may be considered as Local Exhaust Ventilation (LEV) in so far as statutory thorough examination is required every 14 months.

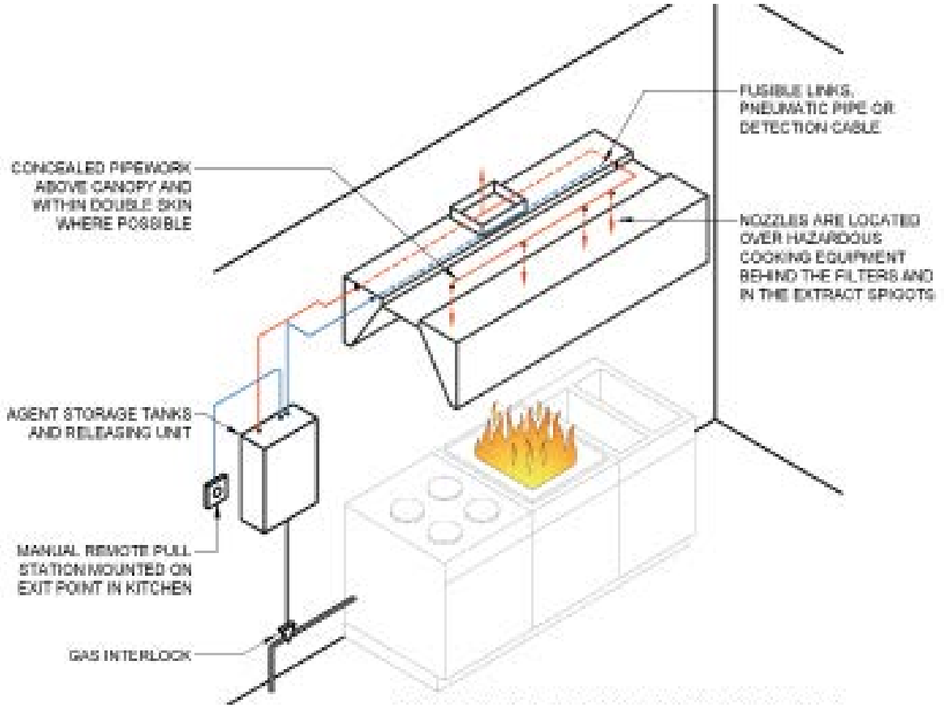
2.23 **Fire suppression systems (Fig. 1)**
Components include fusible link actuation mechanism, nozzles, pipework, and control cabinets with wet chemical agent and agent tank.

2.23.1 In most cases the fire suppression systems should be excluded from the remit of the kitchen extraction system cleaning. This should be noted in the post clean report. Fire suppression systems must be designed and installed by trained engineers who are certified, approved and audited by the system equipment manufacturer.

2.23.2 It is important that the client's nominated responsible person for implementing cleaning regimes, clearly understands the system's component parts so that the cleaning regime is compliant with the terms of property insurance conditions or warranties relevant to the kitchen extract maintenance.

2.23.3 The client should arrange for safe isolation and subsequent reinstatement of the fire suppression system before and after cleaning/maintenance has taken place.

Fig. 1 - Typical fire suppression system schematic



2.24 Correct installation and maintenance is essential to ensure compliance with third party approved installer or maintainer requirements and regulations. Any company engaged in the cleaning of the fire suppression components should have appropriately trained and authorised personnel. The installed system should not compromise access for the maintenance of the extraction system.

2.24.1 Care needs to be taken in the cleaning of kitchen appliances, canopies, plenums and an extinguishing system. Kitchen fire suppression products comprise stand-alone automatic detection and extinguishing systems.

2.24.2 The system's distribution pipework and particularly the nozzles fitted to them may be designed to be aimed at specific points or form an overlapping pattern. If they are moved during cleaning the fire protection of the kitchen appliances will be compromised.

2.25 Detector mechanisms and those fitted with fusible links and connecting wires, are prone to the accumulation of surface grease deposits. Disturbance of these areas may cause the suppression systems to activate and discharge.

2.26 **Other extraction systems**
Other extraction systems serving the cooking area, such as pot wash/dish wash systems and general extraction, may also be affected by grease deposits. Therefore, similar considerations will apply.

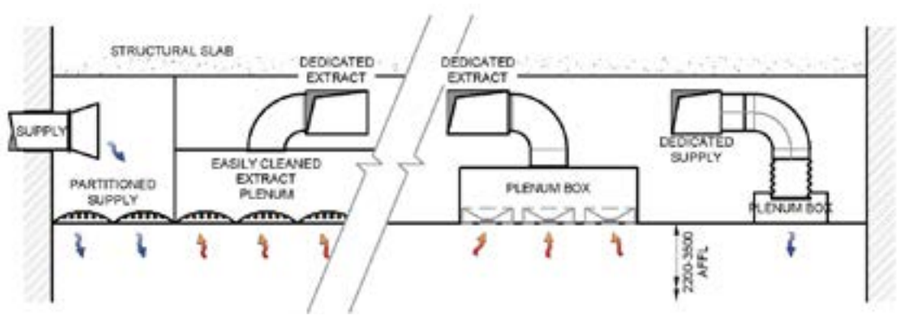
2.27 Supply or make-up ventilation systems should be maintained in an hygienic condition, as detailed in TR19 (Second Edition). In many instances correct control and function of the kitchen extraction system is linked to the correct function of the mechanical supply air systems.

2.28 It is the responsibility of the maintenance contractor, as part of the initial system survey, to provide the client with a detailed schematic or system description highlighting any known areas that are inaccessible and, therefore, will remain un-cleaned. Any specified actions, agreed between the contractor and the client, to enable inaccessible areas to be cleaned, should also be stated.

2.29 It is also the duty of the client's nominated responsible person to highlight any inaccessible/un-cleaned areas to their insurer or other relevant third party, such as a landlord or managing agent.

Note: The initial system inspection, prior to the first clean taking place, may not identify all inaccessible areas. It is the client's responsibility to facilitate access to any third party premises in which any part of the ductwork system may be located.

Fig. 2 - Cassette type ceiling systems



SECTION 3

Design and access to the internal surfaces of the kitchen extract system

All kitchen extract systems should be designed and installed according to BESA DW172. Reference should also be made to DW144, Part Six - Hangers and Supports.

3.1 **Internal surfaces of kitchen extract systems**
These should be free of irregularities which make grease accumulation more likely and cleaning more difficult.

3.2 **Access panels**
It is essential that a kitchen extract ductwork system, canopy and extract plenum, are fitted with access panels of sufficient number, quality and size to enable unrestricted access for regular cleaning and inspection of the internal surfaces and in-line components. All panels shall be in accordance with the requirements of DW144 and DW172.

3.3 The number of access panels removed at any one time should be kept to a minimum. It is the cleaning contractor's responsibility to ensure that all access panels are properly replaced after cleaning.

3.4 The location of access panels is dependent on a number of design and operational considerations:

- design and location of ductwork
- building design and construction materials
- location of kitchen within a building
- location of extract fan and accessibility for maintenance
- accessibility to physically reach the ductwork
- any building modifications and current uses that may restrict access
- location and number of system components requiring access
- method of cleaning employed

3.5 Access panels should be suitable for the purpose for which they are intended and should be constructed of a similar performing material as the ductwork. As a minimum, they should incorporate quick release mechanisims, sealing gaskets and, where appropriate, thermal and acoustic properties equal to that of the duct. (See DW144 Sections 33 and 34)

3.6 **Fire-rated ductwork**
Particular consideration must be given to maintaining the fire integrity of fire-rated ductwork. The recommendations of the manufacturer or specialist fire protection adviser should be sought which shall be followed where appropriate. The client's nominated competent person shall be responsible for any re-certification of fire resistance (integrity/insulation) that shall be required following the installation of additional access panels.

3.7 DW172, Appendix D, outlines the requirements placed upon the client with regard to fire rated systems. When access panels are fitted retrospectively to a system by the maintenance contractor or others, the client's nominated responsible person must review the building's fire risk assessment immediately. (See DW172 for further information on the requirements of fire rated systems and the client's responsibilities.)

3.8 **Additional access panels**
These should be as large as the duct size permits without weakening the structure of the system.

3.9 Openings must not be obstructed by other building services, stored equipment or by the fabric of the building. The panel and aperture must be free of any sharp edges.

3.10 Ideally, access panels should be fitted to the side of the duct at a minimum of 10mm above the base to reduce the risk of grease leakage. In exceptional circumstances, they can be fitted on the top or underside of the duct to enable access. In either case, due consideration must be given to the accessibility of the panel.

3.11 Where access panels are fitted to the underside of a duct, particular care must be taken to ensure there is a leak-free fit and a sign affixed warning of the risk of oil being released on opening of the panel.

3.12 In designing systems, due consideration should be given to providing physically unobstructed access to all access panels. This may include the specifying of working platforms to enable safe working access during each cleaning operation.

3.13 Access panels should be fitted on either side of in-line components, as detailed in **Table 1**, to allow for safe access to clean these often intricate surfaces. It also set out the requirements for access to components, such as fire dampers and attenuators, which are not normally recommended to be installed, but are often found in practice.

3.14 **It should be noted that** DW144 **ductwork or supports do not take into account either man-loading or the support of other building services.** Therefore system designers must take this into account when considering new designs along with BS EN 12236, 'Ventilation for buildings – Ductwork hangers and supports – Requirements for strength, which states: '*The horizontal components shall be capable of supporting the total calculated load imposed by the duct and any other loads (e.g. man loading) on the duct. The appropriate strength should therefore be specified by the designer. This paragraph should also be taken into account when conducting risk assessments.*'

Table 1 - Location of access panels for cleaning and inspection purposes

TYPE	POSITION
Volume control dampers	Both sides
Fire dampers	Both sides
Attenuators	Both sides
Changes in direction	Both sides
Filter sections	Both sides
Horizontal ducts	Generally 2m centres (See note 2)
Risers	Maximum 2m centres (see note3)
Extract fans	Both sides (see note 4)
Discharge grille/mesh	one side (see note 5)

Notes to Table 1:

1. Additional builders work hatches may need to be fitted in the ceilings and/or walls of existing installations, or provided for in new constructions. These would not be provided by the cleaning contractor unless separately specified and priced.

2. Access openings for cleaning purposes are generally required at a maximum of 2 metre centres and/or at each change of direction to enable head and shoulder access. This distance should be reduced where the size of the duct prevents adequate cleaning by hand, where there are several changes in direction or where other external features restrict the positioning of panels.

3. Internal kitchen extract risers often require access panels fitted at maximum 2 metre centres on each floor level so that all internal surfaces can be reached and fire dampers, where fitted, can be cleaned. In some buildings this may require additional builders works (e.g. hatches through masonry/stone/concrete) to reach the riser ducts (see note 1). The exception to this may be if mechanized remote cleaning or abseil cleaning is practicable, where specialist advice should be sought. In such cases it may be possible to reduce the required quantity of access panels, subject to ensuring that greases levels pre and post cleaning can be adequately monitored.

4. Extract fan design should allow thorough cleaning of impeller blades and internal surfaces without the need for dismantling, i.e. ductwork with access panels should be provided immediately upstream and downstream of the fan. Larger fans should be designed with panels in the casing. Similarly, attenuators or other in-line fittings likely to obstruct cleaning activity must be provided with adequately sized access panels on both sides.

5. At the design stage, consideration should be given to the provision of safe access to the downstream side of discharge grilles, bird guard mesh and louvres. Attenuators should also be given special consideration for access.

6. At the design and installation stage, it is the responsibility of the designer or system owner/operator to specify the locations for, and sizes of, access door installation to ensure that, at the point of handover, full safe access for cleaning inspection and maintenance is achieved in line with the requirements of the Construction Design and Management (CDM) Regulations. Full ‘as installed’ drawings should be produced and be available via the client to cleaning/maintenance contractors.

7. Fire dampers must not be fitted in new installations. Where fire dampers are still found in older installations, these systems should be tested annually, as a minimum, as required by BS 9999 - Fire safety in the design, management and use of buildings Code of practice, or removed from the system entirely. Removal will require a review of the fire risk assesment.

8. Other services which may be installed after the original installation of the extract ductwork, such as architectural features and building fabric should not obstruct any access panels provided to allow for regular cleaning and maintenance. Equally any kitchen equipment installed below any duct access panels shall not restrict access for cleaning purposes and where necessary shall be of an easily movable nature on flexible services connections.

9. Bespoke permanently fixed access gantries or platforms may be required above ceilings to enable safe access to cleaning access doors for high-level working. These must be specified by the designer under the CDM Regulations in consultation with the owner/operator prior to site handover.

3.15 During cleaning, it is essential to ensure that mechanical and fire integrity of access provision is maintained. In the absence of as-installed drawings, access panels should be identified and marked on a schematic sketch.

3.16 After cleaning, it shall be the cleaning contractor’s responsibility to ensure that all access panels are properly replaced. Fire protection measures removed for cleaning such as cladding board and insulation must be re-fitted. The repair and replacement of any previously broken, worn or damaged fire cladding shall not be the responsibility of the cleaning contractor unless specifically agreed with the client.

3.17 Prior to cleaning work, the client must thoroughly inspect all elements of the system and confirm the extent of existing damage with the contractor. It is the responsibility of the client to ensure certification of fire resistance (integrity/insulation) following cleaning.

SECTION 4

Cleaning Methods

This section provides specific advice on how to clean and maintain kitchen extract systems. Similar consideration will also apply to non-kitchen areas that might be affected by grease and/or oil deposits.

4.1 The guidance in this publication on cleaning methods is not intended to be definitive as there are many methods both existing and new technologies, that can be applied in tandem. Table 2 gives examples of cleaning methodologies.

4.2 The cleaning methods implemented must be capable of achieving the required standard for post-clean verification, as set out in this publication, on both the internal surfaces of the extract duct and the system components.

4.3 When choosing the cleaning method, consideration should be given to operative safety. There should also be particular focus on the surrounding environment when using wet cleaning methods as grease and moisture could leak from the ductwork components and damage the surrounding fabric.

Table 2 Examples of cleaning methodology

GENERIC NAME	ENERGY SOURCE	REMOVAL METHOD
Hand wipe	Manual	Wiping the surface of the ductwork with a cloth
Hand Scrape	Manual	Removing heavy deposits by hand scraping
Chemical	Manual	Softens or dissolves deposits making them suitable for hand scraping or wiping
Steam cleaning	Electrical	Hot water vapour expelled at high pressure from lance to dislodge/dissolve deposits
Rotary/Mechanised Brushing systems	Electrical/ Compressed Air	Scarifying of the surfaces of the ductwork with rotating brush heads driven by a shaft
Hot chemical foam application	Electrical/ Compressed Air	Application of degreasing solution by pressurized vessels to deliver chemical laden foam to surfaces
High pressure water washing	Electrical	Water expelled at high pressure from lance or nozzle to dislodge deposits

Notes to Table 2

1. The cleaning methods listed are considered as best practice. The list is not exhaustive and new technology is being introduced regularly. Therefore, it is critical that the cleanliness result of any method used shall meet the requirements of the post-clean verification.

2. Remote chemical brushing, steam cleaning and high pressure water washing should be carefully assessed for ductwork that is situated above false ceilings or in vulnerable areas. Unless the system is specifically designed and sealed for wet cleaning, the possible leakage of contaminants from the duct, which may damage ceiling panels or electrical services, may occur. Ducted systems should be installed to comply with access door frequencies as set out in **Table 1** and BESA DW172. This will reduce the need for mechanised cleaning and brushing of areas without access for cleaning or fluid removal to sections of ductwork.

3. 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 system.

4. The use of chemical cleaning agents should only be considered where a risk/ COSHH assessment has been carried out to assess the effects of the applied chemicals on the material construction, environment and cleaning personnel. These can then be mitigated and the details recorded.

5. Some chemicals may adversely affect the seals or gaskets applied to ductwork and fire rated systems through both single application and repeated exposure over time. The landlord or client should advise in accordance with manufacturers installers recommendations as to the chemicals to be utilised by the cleaning contractor. In the absence of such advice contractors shall assume that commonly used industry approved chemicals are suitable to use.

   Note (i): It is not normally economically practicable to clean kitchen extract systems and fans to a ‘like new’ bright metal condition due to substrate staining. Care should be taken when cleaning to avoid damage or removal of protective coating on fan casings, impellers and motor housings.

   Note (ii): Fat, Oil & Grease (FOG) are able to penetrate porous seals or gaskets (DW172 specifies non-porous) and it is known that ageing grease can reduce pH levels to significantly below 4, at which point acid corrosion to metal can occur. Many de-greasing chemicals are alkaline based with pH between 12-14 and can have a neutralsing effect on acidic grease.

Important Note: Loss Prevention Standard 2084: Clause 3.5 - Catering premises shall have procedures for the containment and removal of all waste in line with all appropriate Local Authority guidance for waste management and the disposal of Fats, Oils and Grease (FOG) and cleaning products.

SECTION 5

Frequency of cleaning - control of grease and fire risk

5.1 Unless recommended otherwise in a fire risk assessment undertaken by the client's responsible person, all operational grease extract ductwork systems will usually require cleaning annually as a minimum.

5.2 Specific cleaning intervals stated by landlords, system designers or insurers should be identified by the owner/operator and notified to the cleaning and maintenance contractor.

5.3 Conditions and warranties within commercial liability/property insurance policies, should stipulate minimum cleaning frequencies for grease extract ductwork systems. However, some insurance contracts may require a higher frequency of cleaning than recommended in TR19®. Failure to comply with such requirements may invalidate the property insurance policy.

5.4 The frequency of cleaning should be sufficient to ensure that grease deposit limits of 200µm, as a mean across the system, are not exceeded.

Table 3 Grease Deposit Thickness Limits

GREASE THICKNESS TEST	RECOMMENDED ACTION
200 µm as a mean across the system	Complete cleaning required
Any single measurement above 500 µm	Urgent localised cleaning required to area

5.5 All cleaning frequencies should be based upon accurate historical levels of grease accumulation to maintain grease deposit levels below 200 microns as a mean across the system.

5.6 In certain cases sections of ducting may accumulate grease levels over 500 microns, often referred to as 'hot spots' or 'high points'. Such areas should be cleaned urgently with the caveat that the extent of fouling at 500 microns and the level of risk posed should be considered. For example 500 microns within the canopy plenum, immediately above the heat source would be a far higher risk than a small high point on a turning vane many meters away from the heat source. Interim cleaning of such high point areas should be introduced to the full system cleaning schedule where it is agreed that this is required to control the risk of high point grease level accumulation.

5.7 In the absence of data for historic grease deposit levels, such as a newly installed systems, time-and-usage-based methods can be used to estimate required initial cleaning frequency (see Table 4). Pre-cleaning micron readings and time periods between cleaning should be taken to accurately determine ongoing cleaning frequency so that grease levels are maintained below 200 microns as a mean across the system.

5.8 **Table 4** will assist in establishing the initial cleaning frequency for the system in the absence of data on the historical pre-clean grease thickness levels and duration of days between each set of grease thickness readings.

Table 4 Initial Clean Frequency Calculator

PERCEIVED LEVEL OF GREASE PRODUCTION	TYPICAL EXAMPLE	CLEANING INTERVALS (MONTHS) DAILY USAGE			
		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

Notes to Table 4

1. The canopy and extract plenum are areas with a high risk of fire. Consideration should be given to more frequent cleaning in accordance with insurers' requirements.

2. In addition to the scheduled specialist cleaning, a daily or weekly cleaning regime should be implemented on canopies, separators and associated drains and traps in accordance with manufacturers' recommendations. Typically, these are be carried out by the kitchen operator to comply with the property insurers' requirements.

5.9 **Predictive Accumulation Assessment Table**:
In order to quickly assist in selection of the correct cleaning intervals **Table 5** assesses the required cleaning intervals against average grease accumulation that has built up over a number of days.

Table 5 - Frequency of grease risk control clean vs average daily grease accumulation

FREQUENCY OF CONTROL CLEAN	DAILY MICRON AVERAGE ACCUMULATION RANGE
Twice weekly	28.7 upwards
Weekly cleaning	14.4 to 28.6
Every 2 weeks	9.6 to 14.3
Every 3 weeks	6.7 to 9.5
Monthly	4.8 to 6.6
Every 6 weeks	3.3 to 4.7
Every 2 months	2.2 to 3.2
Quarterly	1.7 to 2.1
Every 4 months	1.1 to 1.6
Every 6 months	0.6 to 1.0
Annually	0.5 or LESS

Notes to Table 5

1. The frequency guidance table requires a simple calculation to define daily rate of accumulation in microns.

2. To calculate daily rate take mean pre-clean system micron levels and divide by number of days since previous clean or opening of site and grease production.

3. Select appropriate range to define the frequency of the risk control clean required to ensure micron levels do not exceed 200 as a mean between each cleaning visit.

4. It should be noted that cleaning frequencies shown in **Table 5** are indicative only and are based on historic usage of the system. They should not be seen as substitues to an actual cleanliness risk assessment undertaken by a competent person. When calculating the cleaning frequency seasonal variations and changes in the type and frequency of cooking should be taken into consideration. An additional risk assesment may be required as a result.

5.10 **Review of Fire Safety Arrangements**
Article 11 of The Regulatory Reform (Fire Safety) Order (RRFSO) (England and Wales) , the Fire (Scotland) Act 2005 and Fire Safety (Scotland) Regulations 2006, and the Fire and Rescue Services (Northern Ireland) Order 2006 and Fire Safety Regulations (Northern Ireland) 2010 require monitoring and review of fire safety arrangements, the management teams of client and contractor shall therefore conduct regular review meetings to ensure that the cleaning frequencies are sufficient to adequately control the grease levels in line with this specification and to adjust frequencies as and when required, thus maintaining suitable fire safety.

SECTION 6

Post-clean verification of cleanliness

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

6.2 Verification of cleanliness should be by means of the Grease Thickness Test, as detailed in Section 8 - System Testing, Inspection and Monitoring.

6.3 Following cleaning all post clean wet film thickness tests shall not exceed 50µm and shall be representative of the system.

6.4 Pre and post clean grease measurements (Grease Thickness Test) should be taken from the following representative locations, where practicable and detailed in the post clean report:

- Canopy(s) extract plenum(s) behind separators
- Duct 1 m from each canopy
- Duct 3 m from each canopy
- Duct midway between canopy(s) and fan
- Duct upstream of fan
- Fan
- Discharge duct downstream of fan

6.5 In addition any other location(s) noted with significant grease accumulation should be representative of the system and its pre clean condition.

SECTION 7

Post-clean reporting requirements

7.1 The maintenance contractor has a duty of care and responsibility to inform the client of fire risks under Article 11 of the Regulatory Reform (Fire Safety) Order (RRFSO). The maintenance contractor should clearly state whether the system is cleaned in its entirety, and if it is not, give clear information as to what specific sections have not been cleaned. They should state the reason(s) why they have not been cleaned and recommendations which will facilitate full cleaning to be achieved. This report should be submitted to the client within 30 days of the date of final cleaning attendance.

7.2 Each post clean report will be registered on the BESCA Vent Hygiene Register (VHR), or equivalent
recognised scheme, to be compliant with TR19®.

7.3 The maintenance contractor's nominated responsible person on site shall be deemed to be the 'signing off' engineer and therefore holds the responsibility for clarifying the extent of the clean carried out. These individuals shall be qualified to a minimum of BESA GHT standard or equivalent.

7.4 A Post Clean Report shall include the following:

- An executive summary page that highlights the following key risks:
  - A clear statement (yes or no) indicating whether or not the system was cleaned in its entirety.
  - If no to the above question, state precisely what wasn't cleaned and why not together with suggested solutions and recommendations.
  - A recommendation of a new cleaning frequency based on the pre-clean Grease Thickness Test readings. In order 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 and therefore the recommended new frequency can be calculated using Table 5 and the guidance in the notes to the predictive accumulation assessment table.

    Table 5 *clearly sets out the required frequency of the cleaning based on various daily micron average accumulation ranges. During any review meetings a management decision will need to be made by the client, based on the rate of grease accumulation data provided and the business turnover trends that have impacted the grease accumulation levels, as to whether they wish the cleaning frequency increased or decreased or retained. The client shall instruct the contractor on the requirement for any future cleaning frequencies that they deem appropriate after having considered the data available to them.*

- Micron readings for the stipulated test locations. The mean (average) micron reading across all micron readings taken.
- Other hazards that have been identified.
- Pre agreement with a client of a specific section or area that is not to 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.*

- A sufficient number of photographs of the system taken before and after cleaning that are representative of the system condition. These should be as per system testing and more if the duct length exceeds 10m. (See Clause 6.4)
- 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.

7.5 For multi-site clients the maintenance contractor shall amalgamate all executive summary pages for each site into a review meeting summary schedule, which should in particular serve to identify any access issues reported as an urgent risk based upon assessed grease deposit levels. This master summary to identify issues across the portfolio should be assessed and presented to the client as a minimum annually after completion of all initial cleans..

To comply with the BESCA Vent Hygiene Register (VHR) a post clean report must fully comply with Section 7 and the required site details shall be uploaded to the BESCA portal by the cleaning contractor.

SECTION 8

System testing, inspection and monitoring

8.1 As described in Appendix A, it is recommended that the Grease Thickness Test measurement, be used for testing the internal surfaces of a ductwork system to measure grease deposits.

8.2 The Grease Thickness Test methodology provides an objective, repeatable and verifiable measurement of grease deposits and overcomes the subjectivity of a visual inspection alone.

8.3 For new systems or, in the absence of data for historic grease deposit levels, **Table 4** will assist in assessing the required frequency of initial inspection.

8.4 Following each inspection and/or clean, a decision on the frequency for future cleaning shall be made using the recommendations set out in **Table 5**.

8.5 Grease Thickness Test measurements should be taken at the following representative locations where practicable for each system:

- Canopy(s) extract plenum(s) behind separators
- Duct 1 m from each canopy
- Duct 3 m from each canopy
- Duct midway between canopy(s) and fan
- Duct upstream of fan
- Fan
- Discharge duct downstream of fan
- other location(s) noted with significant grease accumulations

Table 6 - Grease thickness readings

GREASE THICKNESS TEST	RECOMMENDED ACTION
200 µm as a mean across the system	Complete cleaning required
Any single measurement above 500 µm	Urgent localised cleaning required (notes 4 & 5)

Notes to Table 6

1. The deposit limits refer to the degree of grease deposition within the ductwork consistent with good practice. Other factors such as cooking methods, cuisine, potential ignition sources, and other combustible debris will affect the risk of fire.

2. The mean measurement is calculated by dividing the total of the test results by the number of testing locations.

3. The second category of any single measurement above 500 µm is provided to cater for local “hot spots” which should be cleaned even where the whole system does not require complete cleaning. Examples might be immediately local to a canopy or at a fan.

4. The extent of urgent local cleaning required by the presence of grease deposits above 500 µm shall be subject to reasonable appreciation of the extent of fouling and risk posed.

5. The surface grease deposits limit should not be confused with the level set for post-clean verification which is far more stringent. (See section 6).

6. Where remote cleaning methods have been used in areas where WFTT measurements would not be possible, then visual assessment shall be used and that this would be achieved by remote camera or video support.

SECTION 9

System performance testing

9.1 Owners/operators who have concluded in their risk assessment that there is exposure to substances hazardous to health, particularly where surplus ozone is produced by UV-C lamps incorporated in the system, or where cooking uses solid fuel, then engineering control is needed to adequately control the hazardous substances. Performance testing at least within every 14-month period shall be carried out.

9.2 Where Local Exhaust Ventilation (LEV) is deemed to be required reference should be made to DW172 and HSG258, Controlling Airborne Contaminants at Work. A Guide to Local Exhaust Ventilation (LEV) is published by the HSE as well as the Catering Information Sheet No.26 - Preventing exposure to carbon monoxide from use of solid fuel appliances in commercial kitchens.

9.3 When designing kitchen supply and extract systems the duct velocities shown in **Table 7** BESA DW172 - Duct Velocities, shall be followed.

9.4 It may be beneficial to the client to recommend measurement of airflow across the filters and/or duct transport velocities to systems that are experiencing heavy grease loadings to ensure that the system extraction levels are as per the recommendations. Lower extraction velocities may result in higher grease particulate drop out from the extracted air-stream.

Table 7 - BESA DW/172 - Duct Velocities

	SUPPLY	EXTRACT
MAIN RUNS	6-8 ms^{-1}	6-9 ms^{-1}
BRANCH RUNS	4-6 ms^{-1}	5-7 ms^{-1}
SPIGOTS	3-5 ms^{-1}	5-7 ms^{-1}

SECTION 10

Compliance and training

10.1 To ensure the requirements of the BESA TR19® Grease specification are carried out safely, it is the responsibility of both employers and clients to ensure that staff are adequately trained and compliant.

10.2 The minimum level of course achieved to undertake works on grease extraction systems are as follows:

10.3 **BESA GHT-Grease Hygiene Technician (GHT3) or equivalent**
Team leaders/supervisors/technicians with responsibility for installing access panels, signing off the work, carrying out pre and post clean testing, creating Risk Assessments and Method Statements (RAMS), clarifying the post clean information and, supervising the clean on site, should be qualified to BESA GHT3 - Grease Hygiene Technician or equivalent. Every site should have a BESA GHT present for the duration of the clean.

10.4 **BESA GHO – Grease Hygiene Operative (GHO) or equivalent**
Any team member - excluding trainees with less than 6 months experience - should be qualified to **BESA GHO3 - Grease Hygiene Operative** or equivalent to undertake general duties of cleaning on site.

10.5 **Building Services Engineering Ventilation Hygiene Technician (NVQ level 3)**
Industry accredited apprentice scheme with 12 months to 24 months training and end-point assessment process in Grease Extraction cleaning and maintenance. When fully qualified these staff can act as per the BESA GHT.

Competencies

10.6 Although not exclusive, recommended industry related competencies and training include:

- Confined spaces - for full entry into a ventilation system or duct
- Working at Height- to work at height due to the nature of ventilation components being at high level or within ceiling voids.
- Asbestos Awareness - to protect from exposure to hazardous asbestos materials during normal duties and of the risks from airbourne contaminants.
- COSHH Awareness - for the safe use of any chemicals supplied to them to undertake duties.
- Manual Handling - good practice and techniques for manual handling of materials and equipment.
- Working from mobile access towers - for the safe erection and use of mobile scaffold towers.
- Mobile elevating work platforms - for the safe use and operation of high-level

APPENDIX A

Grease Thickness Test Methodologies

A1 Grease deposits can be either dry, hardened deposits, liquid or viscous fluids.

A2 Whatever form, the levels of deposits should be measured against the parameters of tables 3 and 6.

A3 BESA TR19® Grease suggests 4 methods for assessment of grease:

METHOD 1

Wet Film Thickness Test

This method is useful on liquid or softened grease deposits. It may not achieve the required results on dried or hardened/carbonsied grease deposits.

A4 **Equipment**
A precision gauge capable of measuring wet film thickness from 50 to 3000 microns (µm) at suitable increments (including 50, 200 and 500µm). Toothed combs typically used to measure wet paint film thickness are suitable for this task.

A5 The accuracy of the Grease Thickness test (GTT) gauge will be defined by a repu table manufacturer and will typically be better than ± 5µm.

A6 It is important to ensure that the gauge is held perpendicular to the substrate, as holding the gauge at an angle greater than 90° will exaggerate the measured result.

A7 Gauges subject to regular or hard use should be of sufficient durability to withstand wear and be regularly replaced.

A8 Using the outer side or tooth of the comb, slide it along the surface to reveal a clean start point of clean duct.

A9 Starting with the comb side with the highest tooth measurement (3000 µm) held upright and the outer posts in contact with the revealed clean duct surface, slide it through the deposit for 100 mm. For circular ductwork, similarly slide around the circumference of the duct.

A10 Initially examine the grease deposits for any tracks left by the teeth that are slightly graduated in height to the outer posts. If tracks or collected grease on the comb teeth are not present, continue the process until a result is found. To verify the actual measurement, note the highest (“dirty”) tooth on the comb, this indicates the maximum deposit thickness of grease. The result should be given as “more than” the highest tooth measurement e.g. >500. The measurement should be uniform along the length of the 100 mm long test area. If it is not, re-measure to establish a reliable representative result.

A11 For very viscose grease/oil deposits, where it is not possible to clear away deposits to expose the duct surface, then the comb should be dipped into the viscose deposits, noting soiling on the highest reading tooth.

A12 It is important to clean the gauge before carrying out further measurements.

METHOD 2

Depth probe method

A13 Before each test, the probe should be calibrated and zeroed on the supplied test surface.

A14 An area approximately 10mm wide (about the width of a slotted screwdriver blade) is cleaned for a distance of approximately 100mm. Scrape a cleaning implement through the deposited grease to expose a clean bare metal for a length of approximately 100mm.

A15 Take 4 or 5 tests with the depth gauge along the length of the cleaned strip – by adding the combined depth readings and then dividing by the number of readings taken you will find an average reading for this test point. This should be applied to this test point only.

A16 When required on spiral ductwork results can be taken by holding the gauge perpendicular to the curved surface that has had the 100mm slot applied to it.

METHOD 3

Electro-magnetic induction gauge

This method may be used on hardened grease deposits only.

A17 Instrument to be used is an electromagnetic induction type thickness gauge with statistics and a non-contact measuring tip. Before use correct calibration to be undertaken as per manufacturers guidance using calibration foils of thicknesses 250µm, 50µm and 75µm.

A18 The accuracy of the machine should be within +/-5µm.

A19 Place a measuring template (250 x 160 mm or equivalent surface area) over the surface to be tested, marking the four corners with a marker pen. Take a minimum of 20 readings across the supplied test template within the test area, recording the highest, lowest and mean values obtained.

A20 Thoroughly remove the grease deposits, replace the grid into the same position as previously, lining up the pre-marked corners.

A21 Take a further 20 readings as previously, again recording the highest, lowest and mean values obtained.

METHOD 4

Visual assessment

This method can only be used as an assessment method where gross fouling is present with deposits in excess of 3000 microns (3mm) on the duct surface. These will be easily recognised as in excess of 15 times over the required level of 200 microns (0.02mm), or where the duct is clearly free from all internal grease deposits.

A22 A visual inspection of grease extract system components must be used to assess that the grease extract system is visibly clean or dirty. An interior surface is considered visibly clean when it is free from substances and grease and hence the base surface is clearly visible. If a component is visibly clean then no further cleanliness verification methods are required.

A23 If an internal surface is visibly grossly contaminated, for example 5mm (0.5cm) then no physical measurement would be required.

A24 Some areas may have been cleaned by remote mechanical methods and may not be capable of having measurements taken, then a visual assessment shall be undertaken using long reach devices and a digital camera. The camera images shall then be compared to a section of similar ductwork that has been cleaned and the cleanliness validated as less than 50µm. The comparison site shall be recorded and included within the post clean report to support the visual assessment.

APPENDIX B

BESCA Ventilation Hygiene Elite Scheme
An example of a full clean certificate.

BESCA APPROVED
VENTILATION HYGIENE ELITE

NOTIFICATION OF VENTILATION SYSTEM CLEANING
FULL CLEAN UNDERTAKEN

Certificate Number: BES/1000001684

Site Cleaned:
Old Mansion House
Old Mansion House
Eamont Bridge
Penrith
Cumbria
CA10 2BX

Date Clean Undertaken:
20 March 2019

Post Clean Verification Report Date:
20 March 2019

Post Clean Verification Report Reference:
PCOMH003VR

Recommended Date of Next Clean:
20 September 2019

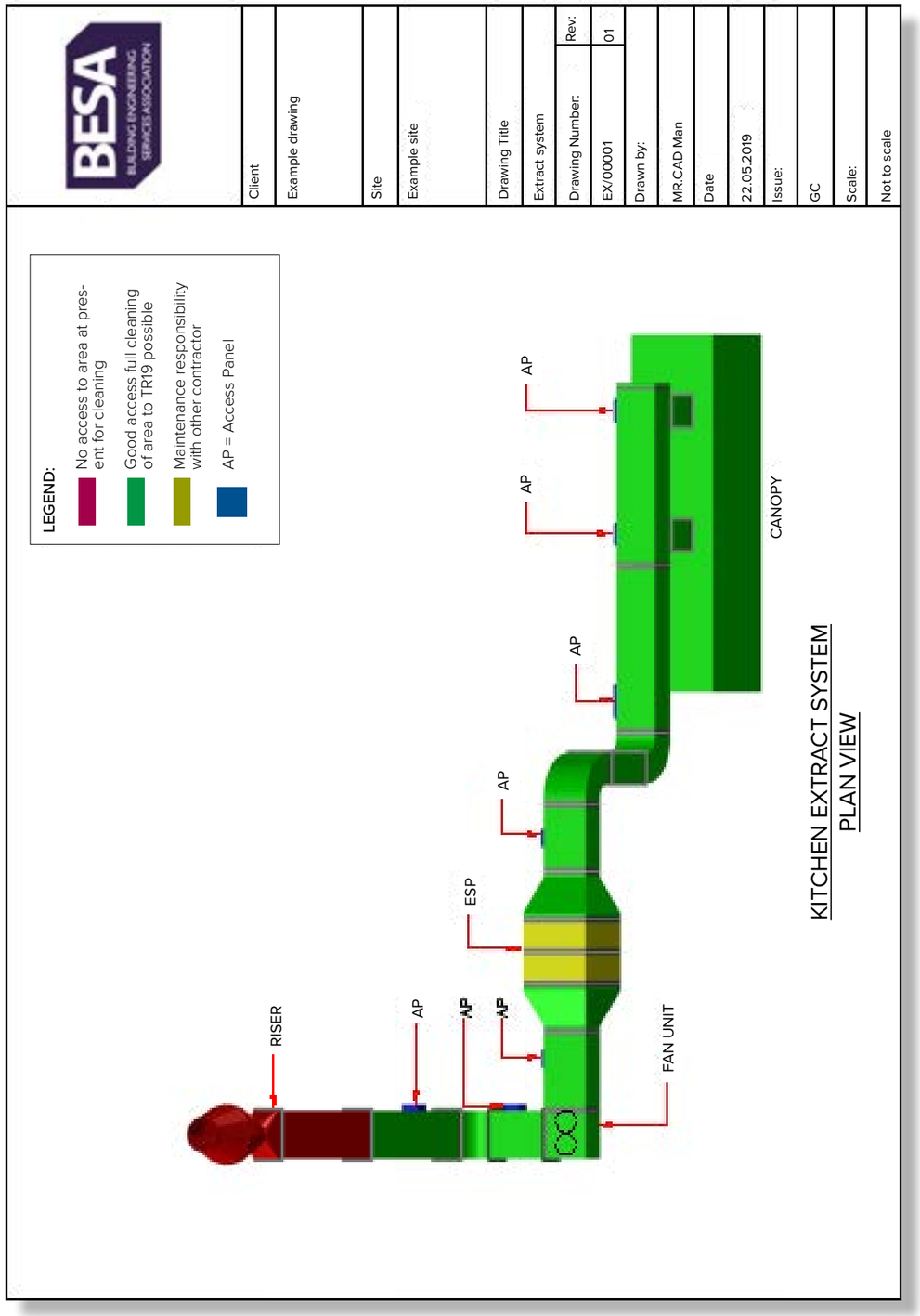
BESCA Ventilation Hygiene Elite Member
BESCA VH Elite ()

This notification of works shall be read in conjunction with the referenced Post Clean Verification Report (PCVR) and retained as evidence of completed works carried out by the BESCA Ventilation Hygiene Elite Member, compliant to BESA TR19 Cleanliness of Ventilation Systems

BESCA take no responsibility for standard of works undertaken by any third party.
Works undertaken are between the BESCA VHE member and the client as named above.

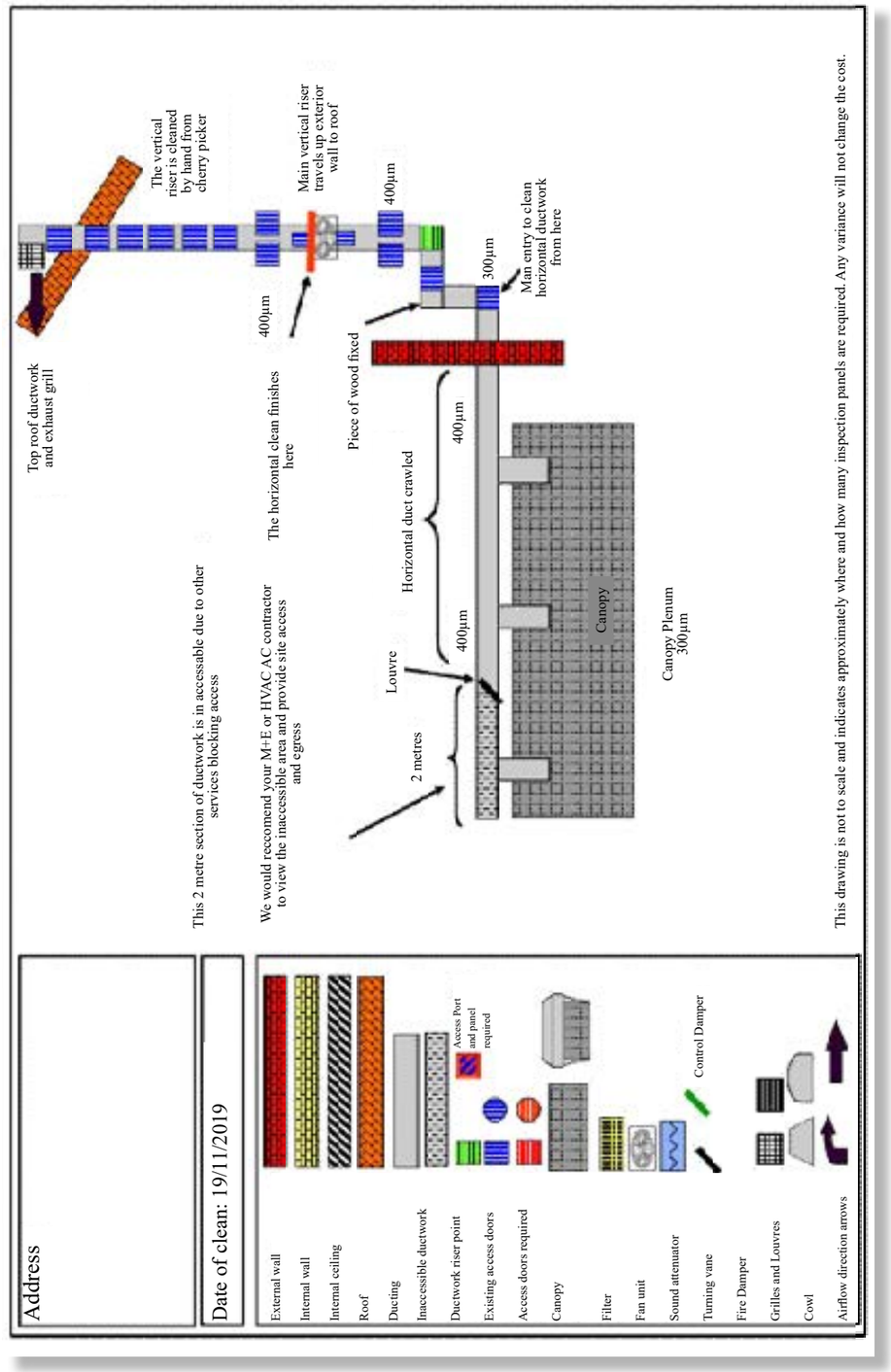
APPENDIX C

Example 1 - A System Drawing highlighting the location of Access Panels



APPENDIX D

Example 2 - Another type of drawing in a Post Clean Report



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Regulatory Reform (Fire Safety) Order 2005
Fire Safety (Scotland) Regulations 2006
Fire Safety Regulations (Northern Ireland) 2010

IEC 60509:1989
EN 60529
BS EN 60529
Degrees of protection provided by enclosures British Standards Institution

BS 6173 Specification for installations and maintenance of gas-fired catering appliances for use in all types of catering establishments (2nd and 3rd family gases) British Standards Institution

BS 9999 Fire safety in the design, management and use of buildings. Code of practice. British Standards Institution

BS EN 15780 Ventilation for buildings. Ductwork. Cleanliness of ventilation systems

LPS 1263 Loss Prevention Standard Requirements for the LPCB approval and listing of the fire performance of grease filters used in commercial kitchen extract systems - BRE Global Ltd

HSG 254 Developing process safety indicators HSE

HSG 258 Controlling airborne contaminants at work - A guide to Local Exhaust Ventilation (LEV)

HSE CAIS 10 Ventilation in Catering Kitchens

HSE CAIS 26 Preventing exposure to carbon monoxide from use of solid fuel appliances in commercial kitchens

RC44 Recommendations for fire risk assessments of catering extract ventilation

RC16a Recommendations for fish and chip frying ranges

RC16b Recommendations for cooking equipment (other than fish and chip frying ranges)

No 9:2012 CFPA-E European Guideline Fire safety in restaurants

BESA Publications

DW143 A Practical Guide to Ductwork Leakage Testing

DW144 Specification for Sheet Metal Ductwork - Low, Medium & High Pressure/Velocity Air Systems

DW145 Guide to installation of Fire and Smoke Dampers (Under review)

DW154 Specification for Plastic Ductwork (Under review)

DW172 Specification for Kitchen Ventilation

TR40 Guide to Good Practice Local Exhaust Ventilation

Email: knowledge@theBESA.com
Web: BESA Publications and Guidance