

Restaurant Fire Suppression Systems

Stuart Dale Restaurant Fire Suppression Systems Ltd

Tel: 01423 226322 Mobile: 07720 312570 Email: stuart@sdrfss.com

DW172 Specification for Kitchen Ventilation Systems **SECTION 21 Fire Suppression**

The Regulatory Reform Act loosely referred to as the Fire Reform Order is a statutory (Legally binding) regulation. Scotland and Northern Ireland have their own fire safety legislation.

This is intended to move the point of responsibility from the Local Fire Brigade to the operator (not necessarily the owner) of the restaurant, shop, etc., requiring him / her to produce a Fire Risk Assessment (FRA) for the premises.

This FRA will invariably require a fire suppression system if, for example, there is a deep fat fryer involved.

Heavy fines and, in some extreme cases, custodial sentences have already been served on operators who fail to observe and comply with this requirement.

21.1 The significant presence of flammable grease and related particles contained within kitchen extract systems, combined with the possibility of fire ignition caused by the cooking equipment, creates a hazard level above that which is normally encountered in other ventilation systems.

21.2 Where ventilation systems exhaust grease laden air and vapour mixtures from a kitchen, the design must provide a level of protection to ensure the well-being of occupants and firefighting personnel and limit the damage to the property and cooking equipment.

21.3 Whilst the correct maintenance and use of cooking appliances and ventilation systems will help prevent potential fires, it is equally important that in the event of a fire it is immediately detected and extinguished and prevented from spreading to other areas of the building.

21.4 Where a surface fire suppression system is specified, selected manufacturer's instructions shall be followed. See Fig 13 for a typical system layout.

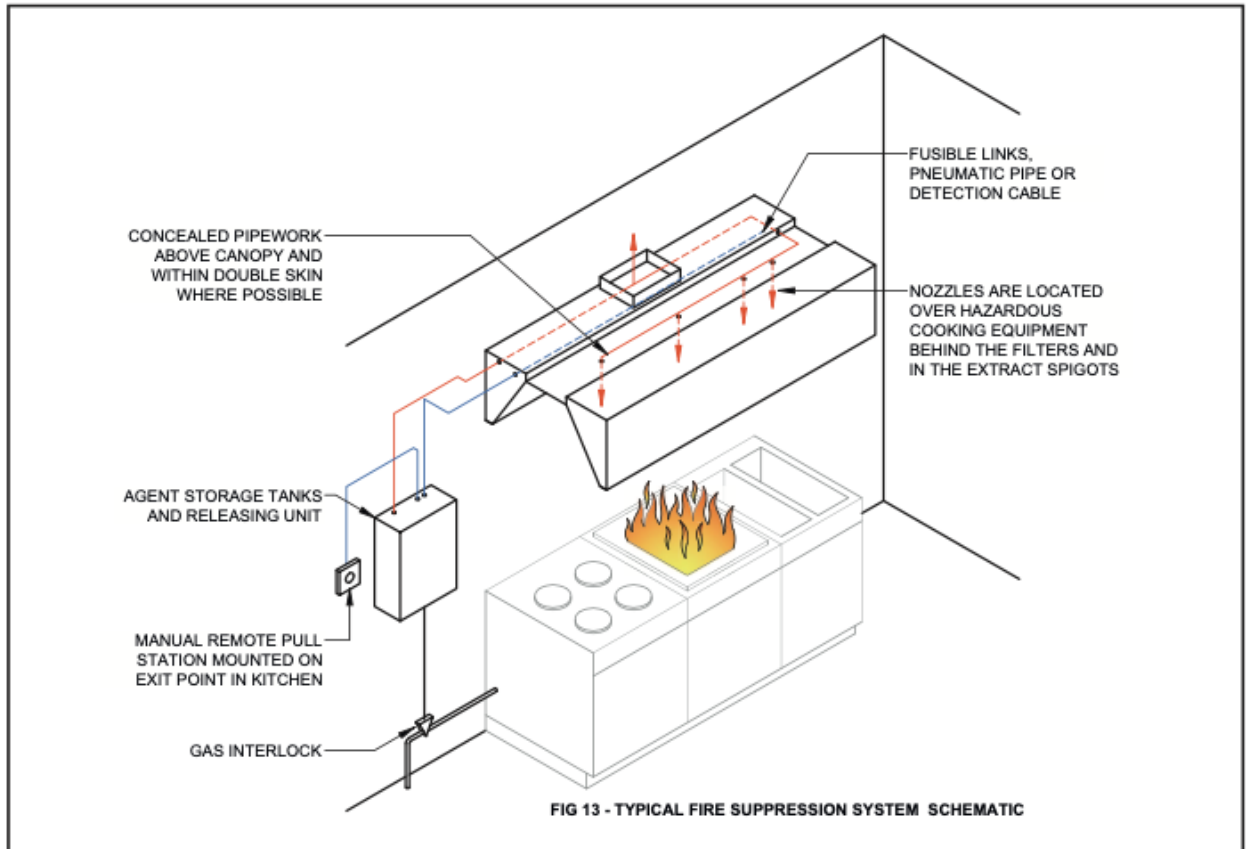
21.5 Carbon dioxide CO₂ is not recommended due to its lack of cooling and high volumes needed to be successful. It can present a danger to people in the area and the fire may re-ignite. The correct term for Chemicals is Wet Chemical.

21.6 Chemical Systems

21.6.1 Almost all fire suppression or extinguishing systems use special chemical agents which provide protection to the kitchen canopy and cooking appliances using grease and fats or producing residual grease and fats from the cooking process. Chemically based systems are in liquid form.

21.6.2 These systems are activated either manually or automatically in the event of a fire. Thermal fusible links having different fuse temperatures are available and are chosen on a number of variables such as canopy height and cooking appliance layout.

21.6.3 When the fire suppression system is activated, mains energy supplies such as gas or electricity serving the appliances, must immediately be automatically shut off and isolated.



21.6.4 The chemical agent stored within the system is released along the distribution pipework. A gentle misting application is made at a rate that penetrates the heat pressure and gets to the seat of the fire. Wet Chemical systems use a chemical interaction to extinguish the flames. This is the primary function and that is the reaction termed saponification. As a result of the saponification a secondary foamy layer is produced, and this creates a barrier to air enhancing the primary chemical reaction. It is not the element that prevents re-ignition. That is prevented with three elements

- 1) Saponification.
- 2) Cooling as a result of the fine mist dropping the oil to below auto ignition temperature.
- 3) Foam layer to cut off air from the surface of the oil and fats.

21.6.5 All systems must have a manual actuation capability normally positioned adjacent to exit doors along escape routes.

21.7 Water Systems

21.7.1 The principle of this system has the same design philosophy, installation characteristics, mains shut off action and alarm status. A dedicated water supply can be used independent of a sprinkler system.

21.7.2 The water mist systems have pressure sensitive glass bulbs and as a fire is sensed the pumps are brought online and all the pipework is pressurised. ALL heads in the system operate together not just the head affected by the heat. Water mist is sprayed throughout the canopy and over the appliances.

21.7.3 The water spray performs a dual function when fighting a fire. The sprayed mist first absorbs the heat generated and becomes steam. This in turn displaces the air locally and hence starves the fire of the oxygen necessary for combustion.

21.8 Overlapping Systems

Appliance nozzles can be configured in an Overlapping pattern. This will invariably result in there being additional liquid suppressant tanks / cylinders in the system. The future benefits to the operator will potentially offset this. The capacity of the Overlapping nozzles are designed for any type and size of cooking appliance thereby facilitating trouble free future alterations to the type and layout of the cooking appliances.

System Design

21.8.1 The size and extent of a fire suppression system will depend on the type of kitchen in question, the type of equipment requiring protection and whether extraction is by means of a canopy or ventilated ceiling. In all cases, the relevant manufacturer's recommendations shall be strictly followed as they will advise on nozzle requirements and if single or multiple systems are needed.

21.8.2 The following are typical grease producing appliances requiring protection, but it is good practice to seek the advice of the fire suppression system manufacturer or installer:

- Fat fryer, fat cooker
- Griddle
- Salamander and chargrill
- Oven ranges
- Bratt pans
- Pizza ovens
- Char broiler
- Chinese wok ranges
- Solid fuel
- Rotisserie
- Open Tandoori

21.9 Installation Considerations

21.9.1 Canopies and ventilated ceilings are required to have, by design, no snags, dirt traps and visible fixings so as to provide hygienic and cleanable surfaces as well as pleasing aesthetics. For this reason, the use of visible fixings and surface-run pipework should be avoided.

21.9.2 Only vertical pipe droppers and nozzles should be used wherever possible within the canopy and under the ventilated ceiling.

21.9.3 Fire suppression pipework and detection runs should be installed such that they do not interfere with the operation and maintenance of grease separators, access doors, luminaires, UV-C cassettes, etc. To achieve this, it is essential that the fire suppression designer coordinates his work with the canopy or ventilated ceiling manufacturer.

21.9.4 The fire suppression pipework droppers and nozzles should not interfere with the operation of the cooking equipment. This is particularly important with the protection of salamander grills and equipment with opening lids such as bratt pans and boiling kettles.

21.9.5 Wherever possible, appliance nozzles (i.e. those serving cooking appliances under the canopy or ceiling) should be configured in an "overlapping/flood" type pattern. This may result in there being additional liquid suppressant tanks in the system, but the future benefits to the operator will, potentially, offset this. The use of the "overlapping" type nozzles is particularly important where mobile cooking equipment is installed under the canopy/ceiling as the mobile equipment may not always be located correctly under "equipment specific" nozzle type installations. In addition, the "overlapping/flood" type installation will make it easier to accommodate any future alterations or additions to the cooking equipment installed under the canopy/ceiling.

21.9.6 "Overlapping" systems lend themselves to being factory fitted and thereby minimising costly site time.

21.9.7 A layout drawing of the proposed system shall be provided for co-ordination purposes and used during the installation works.

21.9.8 An approved fire suppression contractor, who is also capable of preparing the design and obtaining his equipment from a single source shall be appointed. All work shall be carried out in accordance with the technical manuals of the equipment manufacturer/supplier to ensure that warranties are not invalidated.

21.9.9 For successful and correct operation, the liquid temperature in the containers shall not fall below 0oC or rise above 54oC.

21.9.10 Chemical fire suppressant is an alkaline solution, all due care and attention must be taken when handling such a substance. Contact with eyes and skin must be avoided and COSHH Regulations complied with.

21.10 Testing and Commissioning

21.10.1 Once the system has been completely installed it shall be commissioned and tested in accordance with the manufacturer's recommendations.

21.10.2 There is normally a requirement to test the release assembly mechanism before the gas cartridges are installed. Also, individual components like pull stations, mechanically or electrically activated valves, electrical switches, pressure switches and the detection system shall be fault tested in-situ.

21.10.3 Once the system testing and commissioning process is complete, acceptance certificates for the installation shall be completed for approval and signature. The customer or end user is then in a position to arrange financial cover with a recognised insurance company against loss or serious damage to the kitchen or the building as a whole.

21.11 Maintenance

21.11.1 Following handover of the system, it is recommended that a 12-month maintenance contract with the fire suppression installation contractor is entered into. The agreement should normally include 12 month guarantee for provision of spare parts required and labour against any installation or manufacturing fault. Subsequent maintenance should be required at regular six-monthly intervals with major system overhaul every 3 years maximum. Maintenance should be carried out in line with the cleaning frequency and responsibility should be established for cleaning the external surface of the pipework and nozzles.

21.11.2 Good housekeeping shall be practised and the following check list is suggested as a general guide:

- Keep the hazard area clean.
- Flammable and corrosive cleaners must be avoided.
- The kitchen exhaust ventilation system should always be running when the kitchen is in use.
- Grease separators should always be in place when the ventilation systems are running to minimise grease build up in the ductwork and restrict the spread of flame into the ductwork.
- System efficiency should always be maintained by regular monitoring and servicing.
- System tampering should be avoided.
- Regular visual checks on the whole system undertaken by the owner/kitchen head.
- For further information refer to the ABI/BSRIA document, "Fire Risk Assessment for Catering Extract".

Company Number 9488366



Stuart Dale Restaurant Fire Suppression Systems Ltd
Oak Tree Cottage, Carrside Road, Great Ouseburn, York. Y026 9RW