

FIRE SUPPRESSION SYSTEMS

UL 300

Every commercial kitchen hood requires a UL 300 listed commercial fire system. In summary, UL 300 involves heating vegetable shortening or oil to an auto ignition temperature of 685° F or higher. After the oil has auto-ignited, it must remain in a pre-burn state for 2 minutes with the exception of griddles, which remain in a pre-burn state for 1 minute. The extinguishing agent is then applied to suppress the fire. If after 20 minutes no fire has returned, the fire suppression system successfully passes certification.

Wet Chemical

Wet chemical fire suppression systems use a potassium based chemical extinguishing agent. The agent is discharged over the entire cooking battery and reacts with hot grease to form a blanket of foam in a process called saponification that seals the hazard depriving the fire of oxygen. The wet chemical system is available in two types:

Appliance Specific

These systems are designed specifically for appliances and require knowledge of the cooking battery under the hood. Specific nozzles and fusible links are chosen based on the type of appliance. The systems use a temperature rated fusible link to hold a scissors link together (*Figure 40*). When the fusible link melts, the scissors opens activating the system. This is a dedicated detection system that requires permanent equipment placement – if the equipment is moved or changed, re-piping is necessary.

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Full Flood

Full flood systems require no prior knowledge of the cooking battery with the exception of shelves, salamanders, and upright broilers. Full flood systems have drops evenly spaced across the length, the spacing is dependent on the manufacturer's UL listing. The detection system is either a pneumatic tube (*Figure 41*) that runs the full length of the hood, or fusible link detection with the links evenly spaced along the length of the hood. The advantage of the full flood system is that cooking equipment can be moved and changed without having to alter the fire suppression piping. See *Figure 39* for an example of full flood coverage.

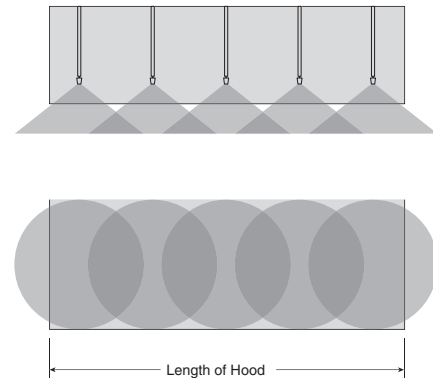


Figure 39

Dual Agent

Dual agent fire suppression systems uses both wet chemical and water to suppress the fire. Similar to the other systems, a wet chemical agent is used to blanket the fire with foam followed by water to cool the hazard. By cooling the area the chance of a flare-up is reduced. Dual agent fire suppression systems are available both as appliance specific and full flood, and utilize a fusible link detection system.

Before choosing a type of dual agent fire suppression it is imperative that the water pressure at the job site be verified. The dual agent system requires 33 psi for large systems and continuous piping systems. For branch piping and average size systems, 22 psi of water pressure will be sufficient. Check with the fire system supplier to determine the required water pressure for the application.

Water Spray

The Water Spray fire suppression system is an automatic system, designed to protect the cooking equipment, hoods, ducts, plenums, and filters in facilities designed with wet-pipe sprinkler systems. Once activated, the system provides a focused continuous water mist until it is manually turned off. Water spray fire suppression only discharges onto the fire area, not over the entire cooking battery. In 1997 UL removed the listing from the EA-1 fryer nozzles. Greenheck, with several other manufacturers, has developed the Dual Tech nozzle for use over fryers. The nozzle has self-contained chemical canisters that discharge on the fryer first, followed by water.

Due to the operation and effectiveness of water spray fire protection, many local and state codes prohibit the use of these types of systems. Thus, check with the local code authority on the job to get approval in writing before specifying and purchasing a water spray fire suppression system.

DECISIONS TO BE MADE WHEN CHOOSING A FIRE SUPPRESSION SYSTEM

Appliance Specific or Full Flood

Choose whether the system is to be designed using a full flood system without knowledge of the cooking battery (with the exception of shelves, salamanders, or upright broilers) or an appliance specific system.

If appliance specific, standard wet chemical or dual agent

Choose between wet chemical only or a dual agent with wet chemical and water. Be aware that dual agent is considerably more expensive and requires a water connection.

Complete System or Pre-Pipe Only

Decide whether the hood should include the entire system or only piping drops and nozzles while remaining components are left for field installation. Some manufacturers and systems may only offer the product as a complete system. The pre-pipe option allows for concealed, pre-piping of the hood, and the flexibility of choosing your local fire system distributor to complete your system.

Hood Mounted or Remote

Choose to have the system mounted in a cabinet at the end of the hood or remotely mounted at another location in the kitchen or utility room. If remote mounted, be advised that there are limitations on the distance the cabinet can be mounted from the hood.

Other considerations that may or may not apply:

Gas Valve – If all electric appliances, a valve is not needed. If using gas appliances, a mechanical or electric shut-off valve must be selected to stop the flow of fuel to the cooking appliances in the event of a fire.

K-Class Fire Extinguisher – Most codes require a separate fire extinguisher mounted on the wall of the kitchen.

Permits – License fee required by the local authority – sometimes multiple permits are required – municipality as well as state. Check with the local authority having jurisdiction for local requirements.

Testing – The authority having jurisdiction observes a system performance test. Usually only a “puff” or air test is required. Air is blown through the system to ensure there are no obstructions in the piping.

Sometimes a bag or a dump test is required. Chemical is released through the system as would be in an actual fire situation and caught in a bag or bucket at each nozzle. The chemical is weighed to make sure the proper amount has been released. Many times dump tests require additional cost to flush the pipes and nozzles. Check with the local authority having jurisdiction for local requirements.

Fire System Detectors

Most fire systems use a fusible link (**Figure 40**) installed in the exhaust plenum above each piece of cooking equipment. In the event of a fire, the heat will melt the metal link which has a specific melting point ranging from 165° F - 500° F, thus triggering the fire system.

Pneumatic tubing (**Figure 41**) is another detection device that can be used in both appliance specific and full flood systems. The tubing runs the entire length of the hood and in the event of a fire, the tube will melt at 435° F releasing the pressure in the line triggering the fire system.

Fusible Link

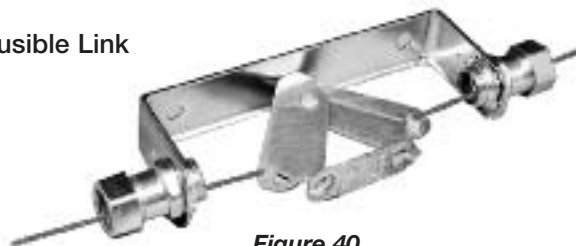


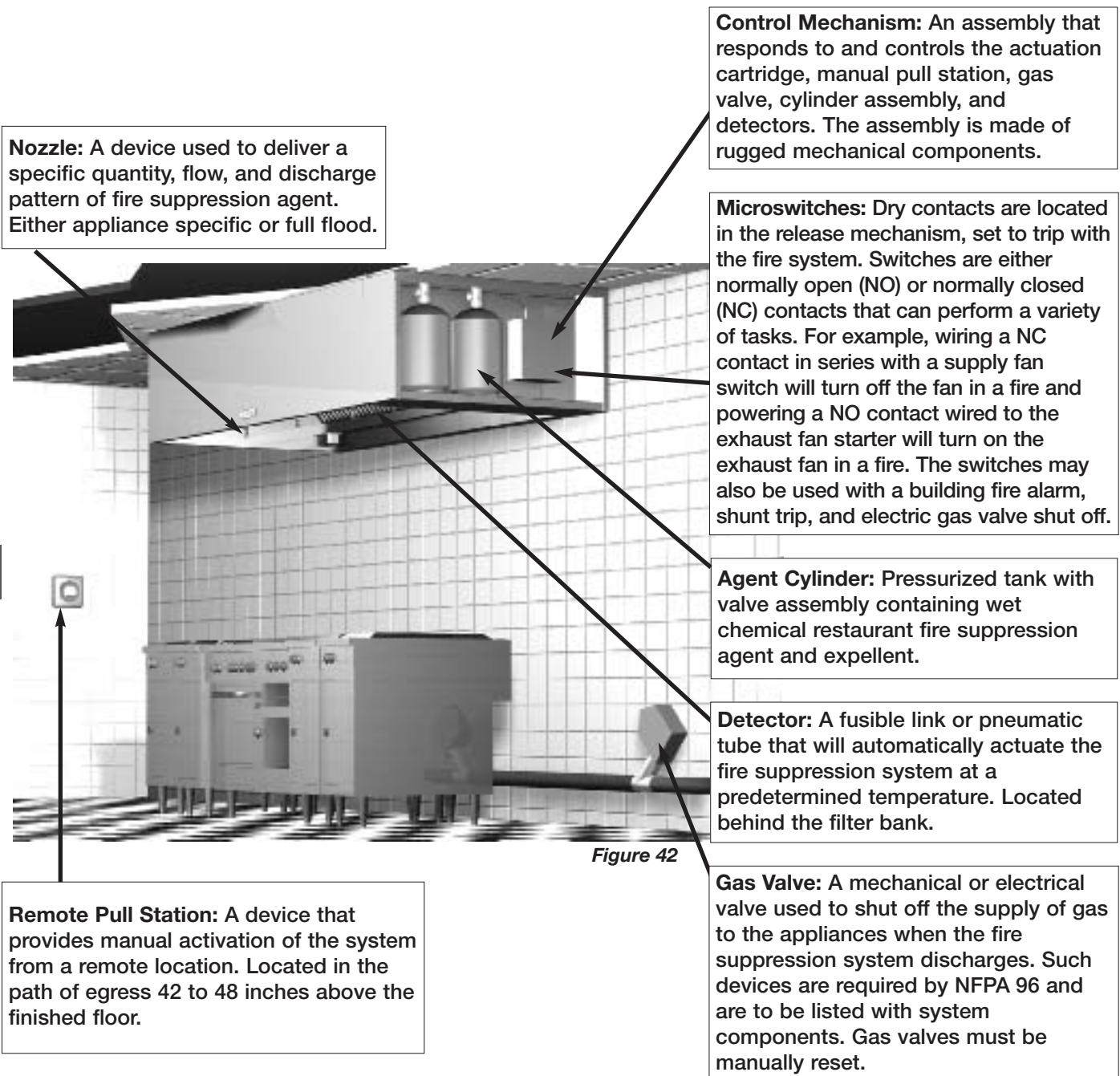
Figure 40

Pneumatic Tubing



Figure 41

Below is an example of a typical fire suppression system in a hood



Exhaust Duct Fire Dampers

The primary purpose of the damper is a secondary back-up to the fire suppression system. If that system fails and allows enough heat to escape into the exhaust duct, the fire damper will close and in some cases shut down the exhaust fan. The most common fire damper has a fusible link actuator.

Fire dampers in the exhaust duct are not required in most areas. However, a few local code authorities may require them, so be sure to look into the requirements in the area of construction.

Supply Duct Fire Damper

Like the exhaust damper, the supply dampers offer protection from a spreading fire. Many times, when the fire suppression system is activated, power is cut to the supply fan to prevent feeding the fire with forced oxygen. Using a fusible link fire damper to close off the supply duct can reduce the threat of greater fire damage. Again, few code authorities require fire dampers and in many cases they may not be permitted.