

Restaurant Cooking Equipment and Exhaust Systems

Fact Sheet

The following information provides a brief insight into commercial cooking and some of their hazards and safeguards associated. It also provides an overview of some of the standards pertaining to this subject.

Hazards associated with Commercial Cooking:

Commercial cooking equipment and extinguishing systems can be found in a number of different occupancies and consist of various types of equipment. Typical occupancies include restaurants, bars, hospitals, office buildings, recreation centres and churches to name a few.

There are two main hazards associated with Commercial Cooking:

1. Grease created by the cooking operation - When cooking most foods, including steak, hamburgers and chicken, or when boiling hot dogs or cooking meat and/or cheese on a pizza, "**Grease Laden Vapours**" are produced. These combustible vapours will condense and build up on any surface, creating a severe fire hazard. Also contributing to this grease hazard are the vapours given off by a deep fat fryer.
2. Fuel used to fire the cooking appliances - The equipment can consist of electric fired, propane fired, natural gas fired or occasionally solid fuel (wood) fired equipment including deep fat fryers, char broilers, pressure fryers, salamanders, grills, ranges, ovens and woks

Safeguards Necessary to Control the Hazards Include:

Commercial Cooking installations are subject to various codes and standards including:

- NFPA 96 (which provides minimum fire safety requirements relating to the design, installation, operation, inspection and maintenance of the equipment),
- UL 300/ULC 1254 standards which deal with extinguishing system effectiveness, and
- Local or regional Fire Codes.

These various codes and standards specify the requirements for:

1. Control of the Grease Laden Vapours - containment and extraction
2. Provision of an Adequately Designed Extinguishing System
3. Control of the Fuel Supply
4. Equipment Maintenance
5. Housekeeping

Control of the Grease Laden Vapours - containment and extraction

To control these vapours all equipment that produces them is required to be located under a standard hood, filter and duct system.

- Hoods and ducts must be constructed and supported by steel not less than 18 gauge or stainless steel not less than 20 gauge. All joints, seams and penetrations of the hood must have liquid tight continuous external welds to the lower most perimeters. All internal joints, seams and filter supports need not be welded but must be sealed and grease tight.
- Hood systems must consist of listed grease filters, baffles or other grease removal devices which are constructed of steel or a listed equivalent. The distance between these filters and the cooking equipment shall be as great as possible but not less than 18 inches.
- The hood and filter system is connected to a duct system which will carry the hot cooking gases as directly as possible to the exterior of the building. Ductwork will be constructed of listed materials and must not pass through fire walls or fire. This ductwork cannot be interconnected with any other ventilation system or exhaust systems and must be installed without dips or traps that might collect residues. Access panels for service and cleaning shall be installed on the sides or top of the ductwork at any changes in direction. The hood and duct system also includes an exhaust fan which, with adequate make up air, pulls the vapours up to the filters and also removes cooking odours from the building. Electric wiring of any type shall not be installed in any hood or duct work with the exception of electrical equipment specifically designed for that use.

Provision of an Adequately Designed Extinguishing System

Permanently installed fixed extinguishing systems must be installed to protect all cooking equipment, hoods and ductwork. These systems are usually pre-engineered or pre-packaged systems that have pre-determined flow rates, nozzle pressures and quantities of extinguishing agents. Usually, a qualified contractor will attend the location, assess the cooking equipment, order a pre-engineered extinguishing system which is capable of controlling the hazard and then install it according to the manufacturer's specifications. These systems are operated by heat detectors, usually fusible links, or by manual pull stations. Heat will build up and melt the fusible link. This will start the flow of extinguishing agent from the storage tank through the piping to the nozzles and onto the fire. Alternatively, staff can begin the flow of extinguishing agent by use of a manual pull station. It should be noted that in addition to the extinguishing system, the standard also requires that a "K" type portable fire extinguisher be on site as a back to the extinguishing system.

As you may already know, in July 1995 new test standards were introduced in Canada. It was made mandatory to upgrade existing installations and install all new installations to meet the requirements of the UL 300-ULC 1254 standard. This recognized document in simple terms stated that all new restaurant fire protection systems installed after this date had to meet this new stringent test standard. This basically eliminated all dry chemical extinguishing systems for commercial cooking occupancies. Submissions with a dry chemical extinguishing system should be considered non compliant and should be refused until an upgrade has been completed. Wet Chemical systems are manufactured by Ansul, Kidde-Aqua Blue, Range Guard, Amerex, Pyro Chem and Protek. Pre-July 1995 wet chemical systems seldom have to be replaced outright and can often be re-configured and up-graded to meet the current day standard.

Please note; A new Loss Control Directive regarding pre July 1995 Extinguishing Systems will be issued shortly.

Controlling the Fuel Supply:

All equipment regardless of fuel source (except wood) must be connected to an automatic fuel shut-off designed to turn off the fuel supply to all appliances once the extinguishing system has been activated.

Equipment Maintenance:

Equipment Maintenance is also a very important aspect of commercial cooking fire prevention. All equipment, hood and ductwork and extinguishing systems should be visually checked daily/weekly to observe any visual problems. Filters shall be cleaned weekly or more often depending on the type of cooking and how busy the restaurant is. More technical inspection and service is also required to keep the equipment in good working order. This type of work shall be performed by qualified contractors and includes hood and duct cleaning, extinguishing system service and testing and appliance service and testing. Hood and ductwork must be professionally cleaned a minimum of twice per year. This includes all hood and ductwork cleaned down to the metal along the entire length of the ductwork through and including the exhaust fan. This schedule can also be increased to include cleaning as often as is necessary to control the hazard depending on the type of cooking and how busy the kitchen is. The schedule can also be reduced for rarely used equipment or seasonal occupancies like golf courses or ski hills and churches. Extinguishing systems shall be serviced / tested twice a year. This can also be reduced to once a year for seasonal occupancies.

Maintenance contracts with qualified service contractors must be in place. This will help to ensure that the cleaning of the equipment and the service of the extinguishing equipment are kept current.

Housekeeping:

Housekeeping can also be an issue with commercial cooking. As most types of food give off grease laden vapours, it becomes very important to keep all areas clean. This daily cleaning is the responsibility of the business owner and staff. Grease build up on filters, hood and appliances should be cleaned as often as possible. This will reduce the fire hazard. There is one very important point to remember during cleaning and when inspecting. Most cooking appliances can be moved to allow for cleaning around, behind and under. While it is important to clean these areas properly, it is equally important to ensure the equipment has been placed back in the same position. Extinguishing system nozzles have been adjusted to shoot the extinguishing agent into the centre of the hazard it is protecting, if the equipment has been moved the extinguishing nozzle may not be properly aligned and may not function to its maximum capability.

Fact Sheet Summary:

Hazards:

- Improper Control of Grease and Grease Laden Vapours
- Improper Control of Fuel Source for Cooking Equipment
- Poor Housekeeping

Safeguards:

- Hood & Duct System must be constructed of Steel with adequate thicknesses and Access for Cleaning
- All dry chemical type extinguishing systems must be replaced with wet chemical extinguishing systems designed and installed in accordance with UL 300-ULC 1254 standards
- All pre July 1995 Wet Chemical Systems must be upgraded or replaced such that they meet the requirements of UL 300-ULC 1254 standards
- A service contract requiring that the extinguishing system be serviced every 6 months must be in place
- Hood and duct system must be professionally cleaned every 6 months depending on usage
- An automatic fuel/power shut off must be provided on the fuel line and/or power supply connected to the cooking equipment
- Good housekeeping is essential, especially grease cleanup throughout the kitchen including the cooking equipment, hood and duct work.



Typical Commercial Cooking Set Up-Cooking Appliances, Hood And Duct Work And Extinguishing System.



Extinguishing System Bottle Which Holds The Extinguishing Agent, “K” Type Extinguisher And Manual Pull Station.



Commercial Cooking Equipment With Standard Hood And Duct, Filters Are Out Of The Hood For Cleaning, Standard Listed Lights- Note The Extinguishing System Nozzles Pointing Down To Protect Equipment.