RISK CONTROL BULLETIN

Protecting Commercial Cooking Equipment

This Risk Control Bulletin addresses the installation, inspection, and maintenance of commercial cooking equipment and fire extinguishing equipment in accordance with the standards and requirements of NFPA 96 "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations," and FCCI Insurance Group's underwriting standards. Commercial cooking equipment covered includes: exhaust hoods, exhaust ductwork, exhaust fans, grease removal devices, dampers, fire extinguishing equipment, and other ancillary components or systems that are involved in the capture, containment, and control of grease-laden cooking effluent. Commercial cooking appliances covered includes: ranges, deep fat fryers, pressurized fryers, potato chip fryers, doughnut fryers, griddles, grills, woks, broilers, barbecue-smokers, ovens, steam kettles, microwave ovens, etc.

Commercial Cooking Equipment Protection

NFPA 96 Requirements for Installation of Commercial Cooking Equipment

Commercial cooking equipment in restaurants and other occupancies insured by FCCI Insurance Group companies must meet the following requirements and otherwise be installed in accord with the National Fire Protection Association standard NFPA 96 "The Standard For Ventilation, Control, and Protection of Commercial Cooking Equipment:

General Requirements

- Cooking equipment that produces grease laden vapors is equipped with hoods, ducts (if applicable), fans, automatic fire extinguishing systems and special effluent or energy control equipment.
- All automatic fire extinguishing systems comply with standard UL 300, Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas, and are installed in accordance with their listing.
- All automatic fire extinguishing systems, with the exception of sprinklers, must have an accessible, clearly marked, manual pull control arranged to activate the system mechanically and located in the path of exit travel.
- All kitchen staff should be familiar with the location of the manual pull box control and know how to activate it.
- Upon activation of any fire extinguishing system, all sources of fuel and power connected to any protected equipment must be automatically shutoff.
- Any modification to cooking equipment requires reevaluation of the protection systems.
- Fire extinguishers provided for the protection of cooking appliances that use combustible cooking media such as vegetable or animal oils and fats are UL listed and labeled for Class K fires.
- A placard is conspicuously placed near the extinguisher that states that the fire protection system shall be activated prior to using the fire extinguisher.
- Protection for equipment, exhaust hoods and ducts should be arranged in accordance with Figure 1 below.

Fixed Automatic Extinguishing Protection For Commercial Cooking Operation

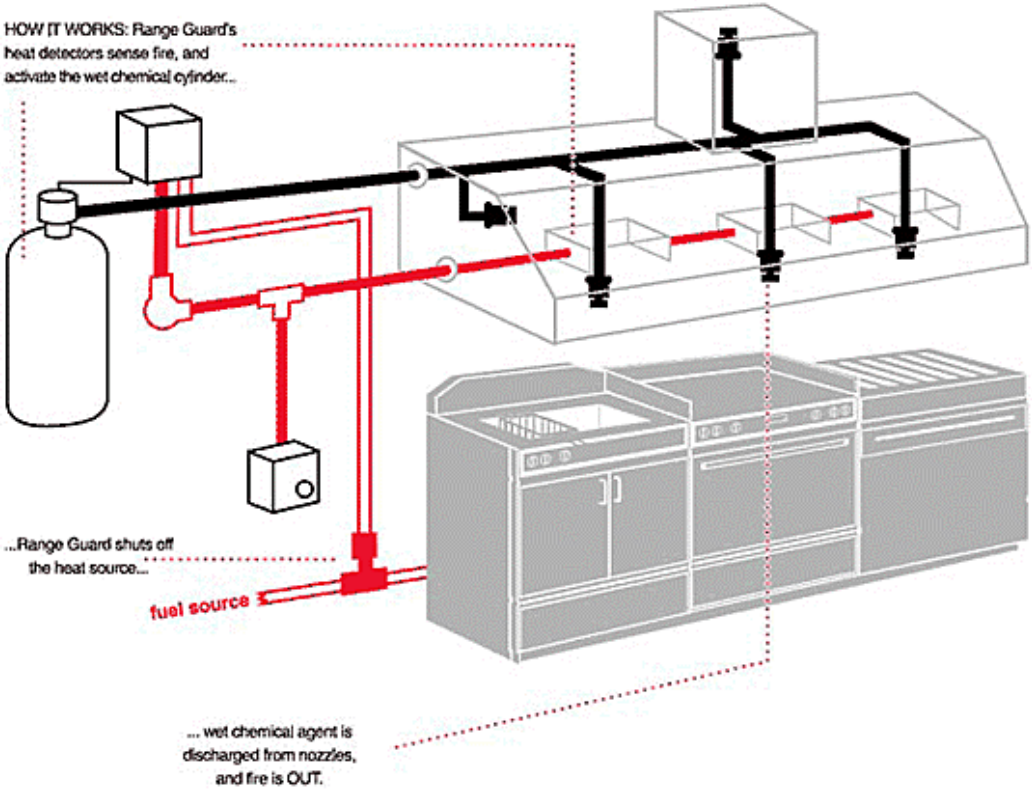


Figure 1
Range Guard graphic reproduced with permission of Badger Fire Protection

Commercial Cooking Hood And Duct Installation

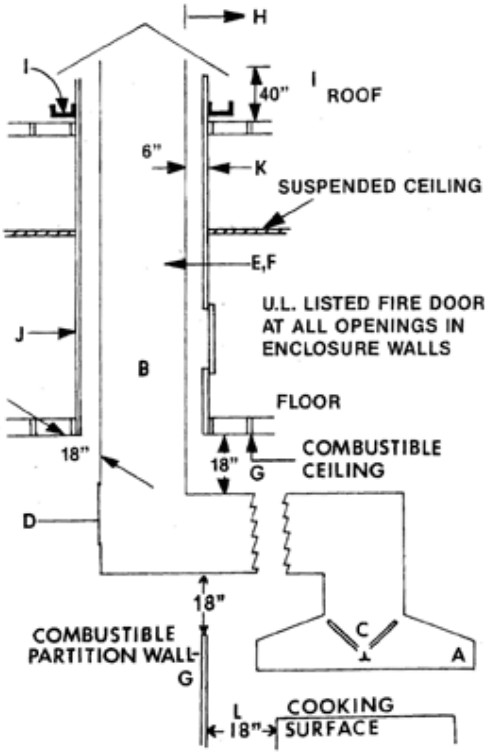


Figure 2
Construction and clearances should be in accord with NFPA 96, however Figure 2 provides some examples as per the following references:

A. Exhaust hoods and canopies are constructed of 18-gauge carbon steel or 20-gauge stainless steel and of such size and configuration as to capture and remove grease-laden vapor.
B. Ducts are constructed of a minimum of 16 gauge carbon steel or 18-gauge stainless steel.
C. UL listed grease filters are installed and removable for cleaning.
D. Clean-out openings are provided at each change of duct direction.
E. Joints and seams for hoods and ducts have liquid tight continuous welds.
F. Ducts lead as directly as possible to the building exterior, without passing through firewalls or being interconnected with any other building ventilation or exhaust system.
G. There is at least 18 inches clearance where horizontal ducts pass beneath combustible ceilings and where ducts pass through combustible floors or walls.
H. Ducts terminate at least 10 feet from adjacent buildings, wall openings, or air intake ducts.
I. Exhaust ducts discharge away from the roof surface, and has at least 40 inches clearance to the roof surface. If this clearance is not feasible the surface must be protected with a sand filled metal pan to collect the residue.
J. Duct enclosures constructed as follows are necessary when an interior duct passes through a floor or floors in multi story buildings or through a combustible roof in a single story building:
    - Enclosure is continuous, extending from the ceiling above the duct and through the roof.
    - For interior vertical ducts, in buildings less than four stories in height, the enclosure wall has a fire resistance rating of not less than 1 hour.
    - For interior vertical ducts, in buildings 4 stories or more in height, the enclosure wall has a fire resistance rating of not less than 2 hours.
K. Clearance from the duct the interior surface of enclosures of noncombustible or limited-combustible construction is not less than 6 in (increase to 18 inches for combustible construction).
L. All cooking appliances, hoods, ducts and grease extractors have no less than 18 inches to any unprotected combustible materials.

Additional NFPA 96 Installation Requirements

- Approved exhaust fans are installed and provide a minimum air velocity of 1500 ft./minute, and continuously operate during cooking.
- Exhaust systems, where fan operation is not audible or visible during cooking, have a pilot light to indicate operation.
- Exhaust fans and electrical attachments are UL listed and installed in accordance with manufacturers' specifications and the National Electrical Code (NFPA #70).
- Filters have a minimum of 18 inches of clearance from the cooking surface.
- Filters are protected from flame flare-up impingement, when such flame conditions can occur, with a steel baffle plate to cause the flames to travel a minimum of 18 inches to reach the filters. Baffles are installed at least 6 inches from the filters.
- Filters serving charcoal-type broilers, including gas or electric char broilers, have at least 4-foot vertical clearance to the cooking surface.
- Deep fat fryers are installed at least 16 inches from open flames of adjacent cooking equipment.
- Deep fat fryers are equipped with a high temperature limit control switch, located 1 inch below the surface, that will cut-off the fuel or energy supply when the operating temperature exceeds 475º F.
- Electrical equipment located in the path of grease-laden vapor is UL listed* for Class I, Division I, Group D locations explosion proof).

Commercial Cooking Equipment Maintenance and Inspection

Automatic fire extinguishing systems must be operational at all time. The probability of a kitchen fire increases with grease build up. Grease build-up depends on the nature and frequency of cooking and the frequency of equipment cleaning. To minimize the likelihood and severity of kitchen fires, we require the following maintenance and inspection practices as minimums.

- Daily cleaning of all exposed cooking surfaces, preparation surfaces, the surrounding areas and the underside of hoods.
- Weekly inspection of the interior of all hoods and filters for accumulation of grease. Clean areas as necessary.
- Clean and operate all UL listed grease extractors, (collectors) in accordance with manufacturer's instructions.
- Have a qualified outside service contractor inspect, test and service the automatic extinguishing system at least every six (6) months, under a service contract agreement.

- Hood and duct systems professionally cleaned (from the hood, through all duct work to and including the outside discharge fan) to the bare metal, under a service contract agreement, by a qualified outside contractor, according to the schedule below.
- The cleaning service must provide a certificate of performance, stating the last date of service, any inaccessible areas not cleaned, and the date of next service due. The certificate should be posted near the hood.

Hood and Duct Cleaning Schedule

- **Semi-annual** (every six months) for cooking operations with lighter production of grease laden vapors such as family-style coffee shops, restaurants at golf courses and clubs serving breakfast and lunch only.
- **Quarterly** for cooking operations with moderate production of grease laden vapors such as family-style restaurants with table service, cafeteria, fast food restaurants, char-broiling, steak house, fish fry, and Oriental wok-style cooking, typically serving breakfast, lunch, and dinner.
- **Every 2 months** for cooking operations with heavy production of grease laden vapors such as cooking operations that do indoor cooking using solid fuel (i.e. charcoal, wood grilling or smoking).

Meeting the Requirements of UL 300

Beginning January 1, 1995, Underwriters Laboratories (UL) has required that automatic fire protection systems protecting commercial cooking appliances meet the requirements of UL 300 " Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas". This standard was developed because of changes in commercial cooking equipment fire hazards resulting from a combination of: a) the use of new high efficiency, better insulated deep fat fryers, that heat faster and cool slower, combined with b) the use of higher temperature vegetable oils in lieu of animal fats.

There is a danger that older UL listed extinguishing systems, such as limited-agent dry chemical, may not prevent reignition of fires, after initial extinguishment, because of the relatively long cool-down of higher temperature vegetable oils, particularly in well-insulated fryers. In addition, the process of saponification (creating a soap foam layer to seal the top surface of the grease) by which the traditional dry chemical agents extinguish cooking oil fires, occurs to a lesser degree in vegetable oils.

FCCI's underwriting position on fixed pipe automatic extinguishing systems protecting commercial cooking equipment is that they must meet UL 300 requirements. If they do not, they must be upgraded to meet the UL 300 requirements. This applies even if the restaurant or cooking establishment is using animal fat and/or older uninsulated equipment. The concern is that the restaurant or cooking establishment will eventually switch to vegetable oil and acquire a new deep fat fryer without installing a UL 300 compliant automatic extinguishing system. If a restaurant is discovered to not be in compliance, we will develop a recommendation requiring compliance within 90 days. Exceptions to the number of days to compliance exceeding 90 days should be referred to a Director for approval.

Identifying UL 300 Compliant Systems

For existing installations, installed from November 1994 to the present, most manufacturers prominently display a permanent marking on all UL 300 compliant equipment. If in doubt, the installation manual, which should be in the possession of the purchaser, is the most complete source of information. Another option is to contact the installer and ask for the original installation guidelines.

For new installations, the contractor should be asked to include with his submittal package a copy of the manufacturer's installation and maintenance manual that would specifically indicate it is in compliance with the UL 300 standard.

*** The term "UL Listed" also includes listing UL of Canada and approval by Factory Mutual (FM).**

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