



# LOSS CONTROL TECHNICAL BULLETIN

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## Commercial Cooking & UL 300 Recommendations

This Loss Control Technical Bulletin addresses the installation, inspection, and maintenance of commercial cooking 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 the Philadelphia Insurance Companies underwriting standards. The following commercial cooking equipment, appliances and restaurants are covered in this Bulletin:

**Cooking Equipment:** Exhaust hoods, grease removal devices, exhaust ductwork, exhaust fans, dampers, fire extinguishing equipment, and other ancillary components or systems that are involved in the capture, containment, and control of grease-laden cooking effluent.

**Cooking Appliances:** Ranges, deep fat fryers, microwave ovens, griddles, grills, pressurized fryers, potato chip fryers, woks, broilers, doughnut fryers, barbecue/smokers, ovens, steam kettles, etc.

**Types of Restaurants/ Food Preparation Facilities:** Buffet restaurants, cafeterias, coffee shops, entertainment facilities (nightclubs, dinner theaters, cabarets), & ethnic, fast food, specialty and traditional restaurants.

### Restaurant Cooking Equipment Protection

#### ***Automatic Fire Extinguishing Systems:***

Since January 1, 1995, Underwriters Laboratories (UL) has incorporated a more stringent and conservative method of testing automatic fire protection systems protecting commercial cooking appliances. This new method is called "UL 300 Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas". This new standard is the result of changes in fire hazards involving commercial cooking equipment, such as the use of high efficiency fryers that heat faster and cool slower, and the use of vegetable oils in lieu of animal fats which have a higher auto-ignition temperature. Due to these changes, all fire protection systems for commercial cooking equipment must pass this new fire test procedure to obtain a UL listing. The following automatic fire protection methods shall be adhered to:

- 1) An automatic fixed extinguishing system must be installed to protect all cooking equipment producing grease laden vapors, cooking surfaces, (deep fat fryers, broilers, grills, stovetops), hoods and exhaust ducts. Ductwork on the discharge side of listed automatic grease extractors do not require fire suppression, but the hood and cooking surfaces below the extractor would require a fire protection system. All fire protection systems and components shall be installed in accordance with National Fire Protection Association Standards. Cooking equipment protection shall be in accordance with **Figure #1**.
  - Existing cooking equipment **installed prior to November 1, 1994** can be protected with any one of the following systems:
    - a) Dry chemical extinguishing system.
    - b) Wet chemical extinguishing system.
    - c) Automatic water spray.

***NOTE: (Existing systems remain acceptable only if the following exist):***

- I. The fire extinguishing system remained in its original location.
  - II. The fire extinguishing system protects the original equipment (without changes).
  - III. The fire extinguishing system is in compliance with its original listing.
  - IV. Only UL 300 listed Wet Chemical Type K rated fire extinguishers are permissible in cooking areas.
- Fryers, griddles, ranges, charbroilers (gas radiant, electric, lava rock), and woks **installed after November 1, 1994** shall be protected with the UL 300 fire test procedure (chain broilers, upright broilers, charcoal or mesquite cooking methods are not required to meet UL 300 protocol changes). **This equipment shall only be protected with a wet chemical system, as a dry chemical system has not been capable of meeting UL 300 standards due to re-ignition.** Most manufacturers of such systems have discontinued their restaurant dry

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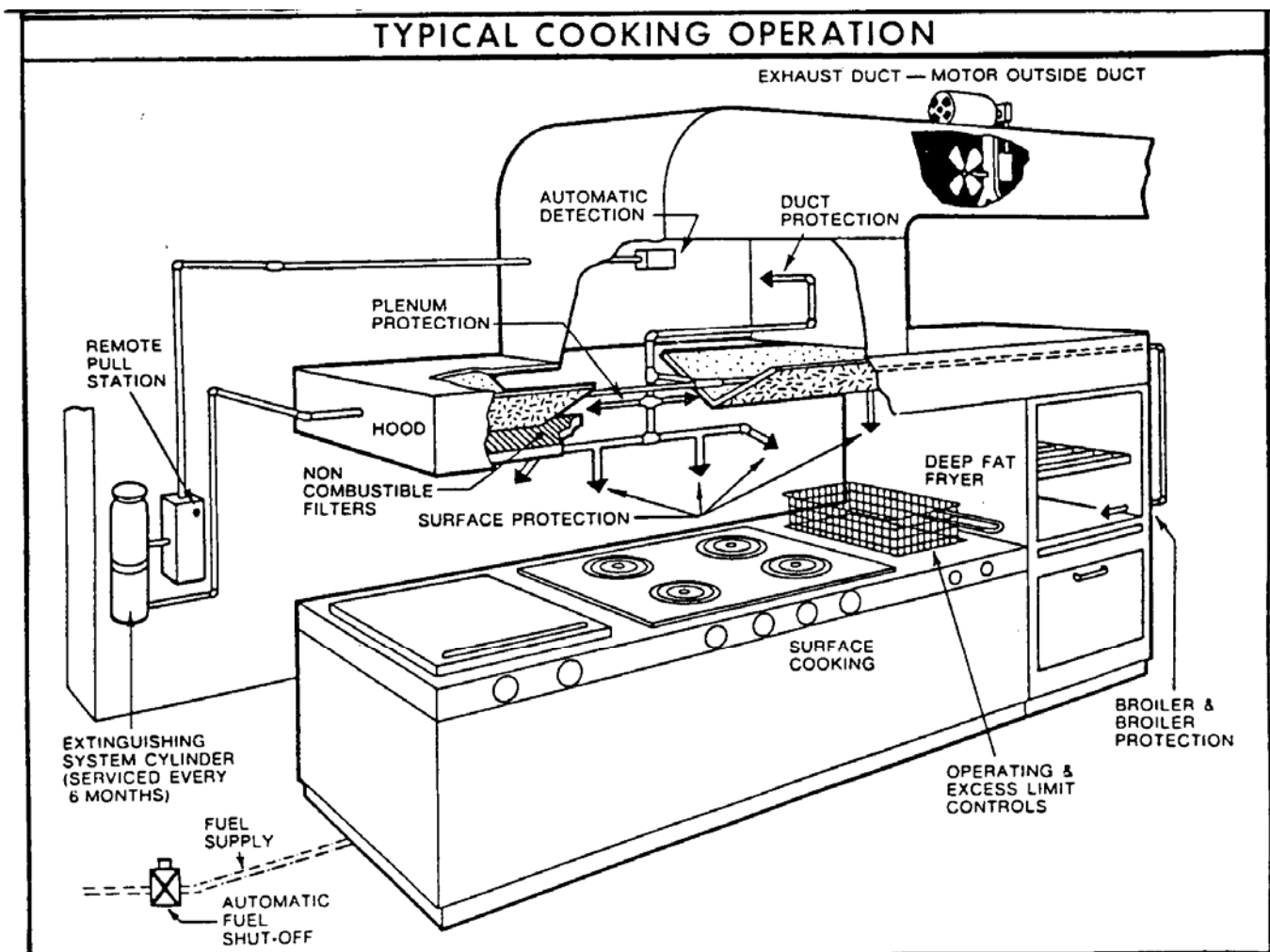
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chemical lines.

**NOTE: How can a business owner determine if a new installation system complies with the new UL 300 standard?** For existing installations from November 1994 to the present, the owner can contact the installer and ask for the original installation guidelines. For new installations, it is suggested that the contractor be required 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 new standard and dated November 1994 or later.

- Ductwork and plenums **installed prior to or after November 1, 1994** can be protected with any Pre-UL 300 fixed fire protection system as indicated in #1 above, as long as the upgraded UL 300 appliance system and duct system discharge simultaneously. The new UL 300 standard assures fire protection for a hazard that has gone through many changes. It presents the most significant advancements in testing of pre-engineered restaurant fire suppression systems in the past 20 years. Without careful scrutiny by local authorities such changes would have little effect if fire suppression systems are allowed to be installed under the old listings and manuals.

**FIGURE #1**



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- 2) All automatic fire extinguishing systems, with the exception of sprinklers, must have an accessible manual pull box control arranged to activate the system mechanically.
- 3) All automatic fire extinguishing systems must be interlocked with the fuel/energy supply to the cooking equipment. The interlocked system shall automatically shut-off the fuel supply when the extinguishing system is activated.
- 4) All portable hand-held fire extinguishers shall be UL 300 listed and shall have the capacity for an extra hazard location: 40 B rating for a travel distance of 30 feet and 80-B rating for a travel distance of 50 feet.

### **Exhaust Hoods:**

- 1) Protect and arrange exhaust hoods in accordance with Figure 2.
- 2) Hoods and canopies shall be constructed of 18-gauge steel or 20-gauge stainless steel with joints and seams liquid tight, and of such size and configuration as to capture and remove grease laden vapor.
- 3) Except where enclosures are provided, hoods, grease-removal devices, exhaust fans, and ducts shall have at least 18 inches to combustible materials (wall assemblies), 3 inches to limited combustible materials, and 0 inches to noncombustible materials (see NFPA #96 Appendix A for reference).
- 4) All cooking appliances shall be safely arranged. All appliances shall be securely mounted or fastened to counter tops or other appliances. Gas appliances shall be supplied with rigid gas piping, not subject to physical damage. Where required, good clearances from combustibles must be maintained.

### **Exhaust Duct System:**

- 1) Hoods with integrated make-up air penetrating the hood require a fire actuated damper in the supply plenum.
- 2) Electrical equipment located in the path of grease laden vapor shall be NRTL<sup>‡</sup> listed for Class I, Division I, Group D locations (explosion proof). Electric appliances shall be plugged directly into a NRTL listed electric outlet.
- 3) Ducts shall have 18 inch clearance from combustibles (less clearance is allowed with proper protection).
- 4) Ducts shall be constructed of a minimum of 16 gauge steel or 18 gauge stainless steel with joints continuously welded forming liquid tight joints or be NRTL listed grease ducts installed in accordance with its listing.
- 5) Residue traps shall be provided at the base of vertical ducts and clean-out openings at each change of duct direction. Interior vertical ducts, in buildings two to four stories in height, shall be enclosed with one-hour fire rated materials.
- 6) Interior vertical ducts, in buildings greater than 4 stories, shall be enclosed with two hour fire rated materials.
- 7) Ducts shall terminate at least 10 feet (305 m) from adjacent buildings, wall openings, or air intake ducts.
- 8) Ducts shall discharge away from the roof surface, unless the surface is protected with a metal pan to collect the residue.

### **Exhaust Fan/ Vapor Removal:**

- 1) Approved exhaust fans shall be installed. Fans shall provide a minimum air velocity of 1500 ft./minute, and continuously operate during cooking.
- 2) Exhaust systems, where fan operation is not audible or visible during cooking, shall have a pilot light to indicate operation.
- 3) Exhaust fans and electrical attachments shall be NRTL listed and installed in accordance with manufacturers' specifications and the National Electrical Code (NFPA #70).
- 4) NRTL listed grease removal devices, extractors or filters must be installed.
- 5) Baffles must be installed 6 in. from filters when the distance from the cooking surface to the filter is less than 18 in.
- 6) Deep fat fryers must be equipped with an independent high temperature control switch to cut-off the fuel supply when the operating temperature exceeds 475° F.

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### ***Grease Removal System/ Extraction Devices:***

- Deep fat fryers must be equipped with an independent high temperature control switch to cut-off the fuel supply when the operating temperature exceeds 475° F.
- Automatic grease extractors shall meet be listed by a NRTL and installed in accordance with manufacturers' specifications.
- Grease filters shall be protected from 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.
- Filters shall be installed at an angle of no less than 45° from the horizontal.

Filter enclosures shall be equipped with a drip tray pitched to drip to a metal container no larger than one gallon & empty daily.

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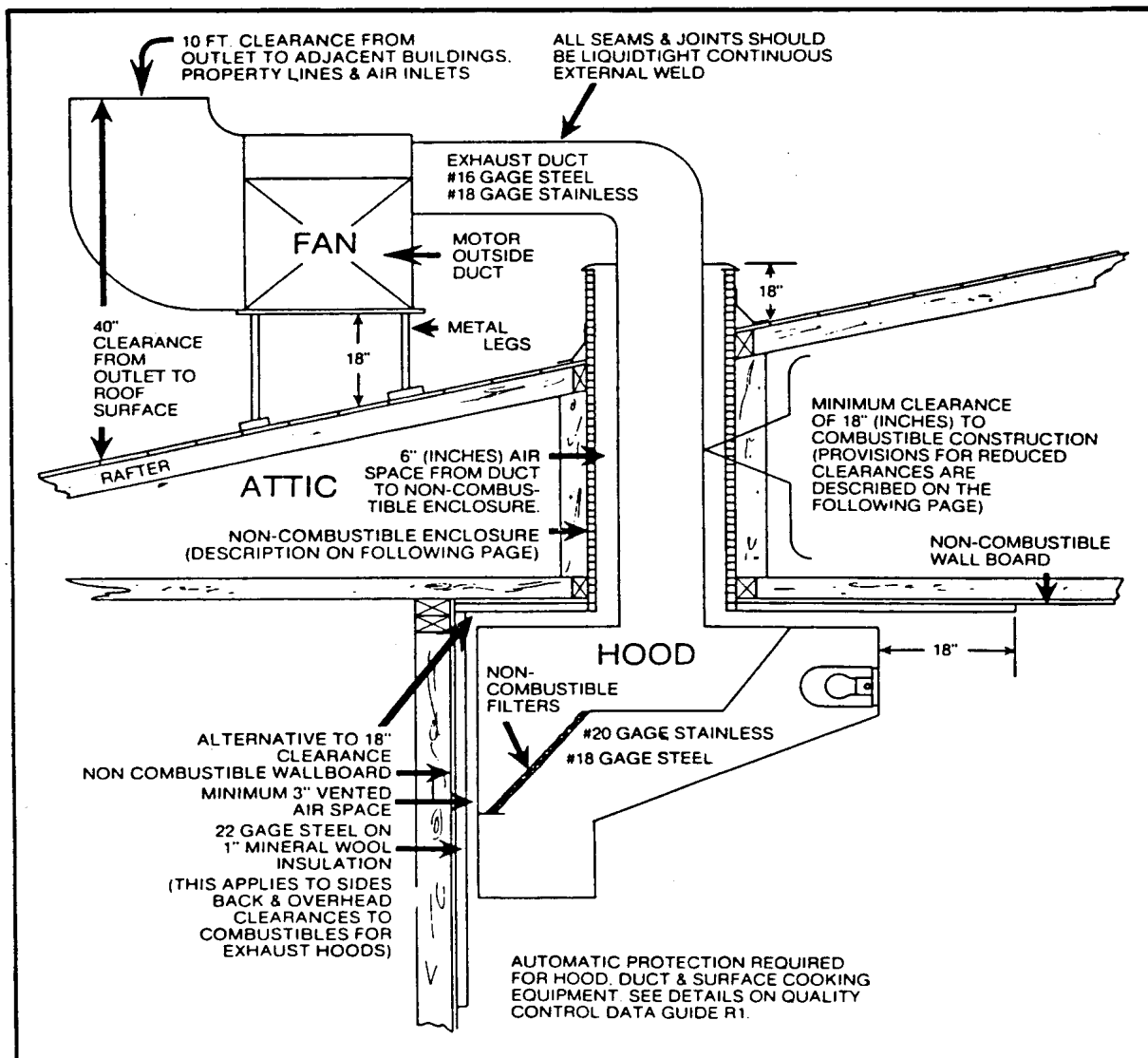


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### EQUIPMENT CLEARANCES

- Provide clearance for hoods and exhaust ducts in accordance with **Figure #2**.
- All hoods, ducts and grease extractors must be no less than 18 inches to any unprotected combustible materials or as otherwise indicated in NFPA 96.
- Cooking equipment must be installed with clearances in accordance with any NRTL listing and manufacturers' instructions. Deep fat fryers must be installed at least 16 inches from adjacent cooking equipment that produces an open flame.

**FIGURE #2**



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### RESTAURANT COOKING EQUIPMENT MAINTENANCE AND HOUSEKEEPING

Automatic fire extinguishing systems must be operational at all time. A kitchen fire is highly dependent on 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 housekeeping practices as minimums.

- Daily cleaning of all cooking surfaces, preparation surfaces, the surrounding areas and the underside of hoods.
- Daily visual inspections for fire extinguishers. Replace or recharge fire extinguishers as soon as possible.
- Weekly inspection of the interior of all hoods and filters for accumulation of grease. Clean areas as necessary.
- All NRTL listed grease extractors (collectors), operated and cleaned in accordance with manufacturer's instructions.
- The automatic extinguishing system inspected and tested at least every six (6) months by a qualified outside service contractor.
- Hood and duct systems inspected and professionally cleaned (from the hood, through all duct work to and including the outside discharge fan) by qualified outside service contractor on a schedule which prevents heavy contamination with grease or oily sludge (according the following schedule below).

The cleaning service must provide a certificate of performance, stating the last date of service, any inaccessible areas not cleaned, expiration date of the certificate, and date of next service due. The certificate should be posted near the hood.

**These are general cleaning frequency guidelines. Actual cooking exposure will determine the appropriateness of this schedule**

OCCUPANCY (Type of Restaurant)	EXAMPLES	CLEANING FREQUENCY GUIDELINE
LIGHT EXPOSURE FAMILY STYLE (Coffee Shop)  OR SEASONAL	breakfast and lunch, or lunch and dinner only.  golf course or other seasonal business; Occasional use – fraternal or social clubs, institutional  <b>(lighter production of grease laden vapors)</b>	2 / Year (More/less often at discretion of loss control)
ORDINARY FAMILY STYLE (Traditional, Table Service, Cafeteria)	extended operations (breakfast, lunch and dinner), full menu.  <b>(moderate production of grease laden vapors)</b>	3 / Year (More/less often at discretion of loss control)
FAST FOOD, CHAR-BROILING and ORIENTAL (Fast Food, Ethnic, Specialty, Entertainment)	burger & fries, steakhouses, fish fries, wok cooking  <b>(moderate production of grease laden vapors)</b>	4 / Year (More often at discretion of loss control)
INDOOR SOLID FUEL (Haute Cuisine)  <b><u>Excluding:</u></b> Pizza Ovens	indoor charcoal or wood grilling or smoking  <b>(heavy production of grease laden vapors)</b>	6 / Year (More often at discretion of loss control)

<sup>†</sup> NFPA 96 – Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations Copyright© 1994 National Fire Protection Association  
<sup>‡</sup> Nationally Recognized Testing Laboratory

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