NFPA

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VAPOR REMOVAL FROM COOKING EQUIPMENT 1980

NATIONAL FIRE PROTECTION ASSOCIATION, INC.
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Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment

NFPA 96-1980

1980 Edition of NFPA 96

This 1980 edition of NFPA 96, *Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment*, was prepared by the Technical Committee on Venting Systems for Cooking Appliances and was adopted by the National Fire Protection Association, Inc. on November 18, 1980, at its Fall Meeting in San Diego, California, with amendment to Section 7-3. Pursuant to the Regulations Governing Committee Projects, the Technical Committee was balloted on the amendment and voted to approve the amendment. (The Correlating Committee on Chimneys and other Heat and Vapor Removal Equipment voted to release the action of the Technical Committee.) The Standards Council released the Committee Report with the amendment on January 8, 1981.

Changes from the 1978 edition included in this 1980 edition are the greatly expanded list of definitions, a new section dealing with "make-up air" hoods, further clarification relative to hood and duct construction, and the removal of references to asbestos in Appendix A.

In addition, as a result of a decision by the NFPA Standards Council, the entire section dealing with Operating Requirements of Fire Extinguishing Equipment has been deleted. The reader is referred to the relative NFPA standards concerned with the installation and operation of the various extinguishing systems available.

Origin and Development of NFPA 96

The subject of the ventilation of restaurant-type cooking equipment was first considered by the NFPA Committee on Blower and Exhaust Systems. That Committee developed material on ventilation of restaurant-type cooking equipment to be included in NFPA 91, *Blower and Exhaust Systems*. This was adopted by the Association in 1946. Revisions to the Section were adopted in 1947 and 1949.

When the NFPA Committee on Chimneys and Heating Equipment was organized in 1955, the material on ventilation of restaurant cooking equipment in NFPA 91 was assigned to this new Committee with the suggestion that it be revised and published as a separate standard. Thus, in recent years this standard has been published as NFPA 96. Previous editions of the standard prepared by the Committee on Chimneys and Heating Equipment were adopted by the Association in 1961, 1964, 1969, 1970, 1971, 1973, 1976, 1978, and 1980.

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NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or of any document developed by the Committee on which the member serves.

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Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment

NFPA 96-1980

Chapter 1 General

1-1 Scope. This edition of NFPA 96 covers basic requirements for the design, installation and use of exhaust system components including (1) hoods; (2) grease removal devices; (3) exhaust ducts; (4) dampers; (5) air moving devices; (6) auxiliary equipment; and (7) fire extinguishing equipment for the exhaust system and the cooking equipment used therewith in commercial, industrial, institutional and similar cooking applications. This standard does not apply to installations for normal residential family use.

1-2 Definitions.

Air Intakes. An opening in a building's envelope whose purpose is to allow outside air to be drawn into the structure to replace inside air removed by exhaust systems, or to improve the quality of the inside air by providing a source of air having a lower concentration of odors, suspended particles, or heating content.

Air Pollution Control Devices. Equipment and devices which are used for the purpose of cleaning air passing through or by it in such a manner as to reduce or remove the impurities contained therein.

Appliance Flue Outlet. That opening or openings in a cooking device where vapors and/or combustion gases are designed to leave the cooking device. There may or may not be ductwork attached to this opening.

Approved. Means "acceptable to the authority having jurisdiction."

NOTE: The National Fire Protection Association does not approve, inspect or certify any installations, procedures, equipment, or materials nor does it approve or evaluate testing laboratories. In determining the acceptability of installations or procedures, equipment or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

Appurtenance. An accessory or subordinate part that enables the primary device to perform or improve its intended function.

Authority Having Jurisdiction. The "authority having jurisdiction" is the organization, office or individual responsible for "approving" equipment, an installation or a procedure.

NOTE: The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner since jurisdictions and "approval" agencies vary as do their responsibilities. Where public safety is primary, the "authority having jurisdiction" may be a federal, state, local or other regional department or individual such as a fire chief, fire marshal, chief of a fire prevention bureau, labor department, health department, building official, electrical inspector, or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the "authority having jurisdiction." In many circumstances the property owner or his designated agent assumes the role of the "authority having jurisdiction"; at government installations, the commanding officer or departmental official may be the "authority having jurisdiction."

Automatic. Operating by its own mechanism when actuated by some impersonal influence, as for example, a change in current, strength, pressure, temperature, or mechanical configuration.

Baffle Plate. An object placed in or near an appliance to change the direction of or to retard the flow of air, air-fuel mixtures, or flue gases.

Canopy Hood. A covering fixed above and overhanging on all its unclosed sides, a cooking appliance or appliances, whose lower edge is generally at or slightly above head level, and in some cases having a roof-like appearance, the purpose of which is to contain and channel, for other purposes, the various fumes and vapors resulting from the cooking activities.

Clearly Identified. Capable of being recognized by a person of normal vision without causing uncertainty and indecisiveness as to the location or operating process of the item in question.

Combustible Material. Material made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that will ignite and burn, whether flameproofed or not, or whether plastered or unplastered.

Concealed Spaces. That portion(s) of a building behind walls, over suspended ceilings, in pipe chases, attics, and elsewhere whose size may normally range from 1¾-in. (44.45-mm) stud-spaces to 8-ft (2.44-m) interstitial truss spaces, and possibly containing combustible materials such as building structural members, thermal and/or electrical insulation and ducting. Such spaces have sometimes been used as HVAC plenum chambers.

Continuous Enclosure. A recognized architectural or mechanical component of the building having the fire resistance rating as required for the structure and whose purpose is to enclose the vapor removal duct and convey that duct to its termination point outside the structure without having any portion possessing a fire resistance rating less than the required value.

Continuous External Weld. A metal joining method without interruption as related to visibility and quality, located on the outside of the surfaces that directly contain and/or convey the grease-laden vapors of the cooking process(es). For the purpose of the definition, it specifically includes the exhaust compartment of hoods, and welded joints of exhaust ducts, yet specifically does not include filter support frames or appendages inside hoods. Welding is a fabrication technique for joining metals by heating the materials to the point that they melt and flow together forming an uninterrupted surface of no less strength than the original materials.

Dampers. A valve or plate within a duct or its terminal components for controlling draft or the flow of gases including air.

Detection Devices. Electrical, pneumatic, thermal, mechanical, or optical sensing instruments or a subcomponent of such an instrument whose purpose is to cause an automatic action to be taken, upon the occurrence of some preselected event. In the context of this document, the event in question could be excessive temperature or flame, and the action could be the operation of a fire extinguishing system.

Dips. Depression or cup-like places in horizontal duct runs in which liquids could accumulate.

Discharge. The final portion of a duct or pipe where the product being conveyed is emptied or released from confinement; the termination point of the pipe or duct.

Ducts (or Duct System). A continuous passageway for the transmission of air and vapors which, in addition to the containment components themselves, may include duct fittings, dampers, plenums, and/or other items or air handling equipment.

Easily Accessible. Within comfortable reach with limited dependence on mechanical devices, extensions or assistance.

Fire Partition. An interior wall or partition of a building that separates two areas and serves to restrict the spread of fire, yet does not qualify as a fire wall.

Fire Resistance Rating. A relative term, usually with a numerical rating or modifying adjective to indicate the extent to which a material or structure resists the effects of fire, e.g., "fire resistance of 2 hrs as measured on the Standard Time-Temperature Curve."

Fire Wall. A wall having a fire resistance rating of not less than 4 hrs, which separates buildings, restricts the spread of fire, is constructed of noncombustible or limited-combustible materials and extends continuously, from the foundation through all stories, to or above the roof.

Fume Incinerators. Devices utilizing intense heat or fire to break down and/or oxidize vapors and odors contained in gases or air being exhausted into the atmosphere.

Fusible Links. A form of fixed temperature heat detecting device sometimes employed to restrain the operation of an electrical or mechanical control until its designed temperature is reached. Such devices are to be replaced following each action.

Grease. Rendered animal fat, vegetable shortening and other such oily matter used for the purposes of and resulting in the activity of cooking and/or preparing foods. Grease may be liberated and entrained with exhaust air, or may be visible as liquid or solid.

Grease Ducts. Containment system for the transportation of air and grease vapors, so designed and installed to reduce the possibility of the accumulation of combustible condensation and the occurrence of damage should a fire be experienced within the system.

Grease Extractors. A system of components designed for and intended to process vapors, gases, and/or air as it is drawn through such devices by collecting the airborne grease particles and concentrating them for further action at some future time, leaving the exiting air with a lower amount of combustible matter.

Grease Filters. A component of the grease vapor removal system which deflects the air and vapors passing through it in such a manner as to cause the grease vapors to concentrate and/or condense for the purpose of collection and as a result leaving the exiting air with a lower amount of combustible matter.

Grease Removal Devices. Other components of the grease and vapor removal system which do not fit the definition of "grease extractors" or "grease filters" yet are designed, installed, and perform so as to take vapor suspended grease particles from the exhaust air/vapor stream, or are designed to assist other devices in the removal of such vapors or particles.

High Broiler. (See Upright Broiler.)

High Limit Control. For purposes of this document, an operating device installed in and serving as an integral component of a deep-fat fryer, having as its purpose the secondary limitation of temperature allowed to be experienced by the cooking operation, and, should that temperature be exceeded, the automatic interruption of the thermal energy input.

Hood. A device provided for a cooking appliance(s) to direct and capture grease-laden vapors and exhaust gases. It shall be constructed in a manner that will allow it to withstand adverse conditions that may be experienced. (*See canopy hoods, and noncanopy hoods.*)

Interconnected. Mutually assembled to another component in such a manner that the operation of one directly affects the other, or that the contents of one specific duct system are allowed to encounter or contact the products being moved by another duct system.

Labeled. Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Liquidtight. Constructed and performing in such a manner as not to permit the passage of any liquid at any temperature.

Listed. Equipment or materials included in a list published by an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

NOTE: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The "authority having jurisdiction" should utilize the system employed by the listing organization to identify a listed product.

Noncanopy Hood. A fixed device located in close proximity to a cooking appliance and in some cases having a shelf-like appearance, the purpose of which is to use air movement to contain and channel, either in a vertical or horizontal manner, the various fumes and vapors resulting from the cooking activities.

Pitched. To be fixed or set at a desired angle or inclination.

Removable. Capable of being transferred to another location although a limited application of effort and tools may be required to accomplish the process.

Replacement Air. Air deliberately brought into the structure, then specifically to the vicinity of either a combustion process or a mechanically or thermally forced exhausting device for the purpose of compensating for the vapor and/or gases being consumed or expelled.

Salamander Broiler. (See Upright Broiler.)

Shall. Indicates a mandatory requirement.

Solvent. A substance (usually liquid) capable of or used in dissolving something. A chemical compound designed and used for the purpose of converting solidified grease into a liquid or semi-liquid state to facilitate a cleaning operation.

Termination. The concluding or intentional ending portion of a duct system that is designed and functions to fulfill the obligations of the system in a satisfactory manner.

Thermal Recovery Unit. A device or series of devices whose purpose is to reclaim only the heat content of air, vapors, gases, and/or fluids that were being expelled through the exhaust system, and transferring the thermal energy so reclaimed to a location whereby a useful purpose may be served.

Trap. A cup-like or U-shaped configuration occurring on the inside of a duct system component where liquids could accumulate.

Upright Broiler. An appliance used in the preparation of food by the exposure of the foods to intense radiant heat, and perhaps convective heat as well, with the food, or the food and radiant source not being limited to a horizontal mode.

1-3 General Requirements.

1-3.1 Cooking equipment used in processes producing smoke or grease-laden vapors shall be equipped with an exhaust system complying with the following:

(a) A hood complying with the requirements of Chapter 2, and

(b) A duct system complying with the requirements of Chapter 3, and

(c) Grease removal devices complying with the requirements of Chapter 4, and

(d) Fire extinguishing equipment complying with the requirements of Chapter 7.

1-3.2 Clearance. Hoods, grease extractors, and ducts shall have a clearance of at least 18 in. (457.2 mm) to combustible material.

Exception: When the hood, grease extractor or duct is listed for lesser clearances or the combustible material is protected in a manner satisfactory to the authority having jurisdiction.

1-3.3 If required by the authority having jurisdiction, notification in writing shall be given of any alteration, replacement, or relocation of any exhaust or extinguishing system or part thereof, or cooking equipment.

1-3.4 Nothing in this standard is intended to prevent the use of methods or devices, provided that sufficient technical data is submitted to the authority having jurisdiction to demonstrate that the proposed method or device is equivalent in quality, strength, fire endurance, effectiveness, durability, and safety to that prescribed by this standard.

Chapter 2 Hoods

2-1 Construction.

2-1.1 The hood or that portion of a primary collection means designed for collecting cooking vapors and residues shall be constructed of and be supported by steel not less than 0.043 in. (1.09 mm) (No. 18 MSG), stainless steel not less than 0.037 in. (0.94 mm) (No. 20 MSG), or of other approved material of equivalent strength, fire, and corrosion resistance.

Exception: Hoods or enclosures of listed grease extractors or listed automatic damper and hood assemblies, evaluated under the same fire severity as the hood or enclosure of listed grease extractors, shall be considered as complying with the material and construction requirements of 2-1.1, 2-1.2, and 2-1.3.

2-1.2 All seams and joints shall have a liquidtight continuous external weld.

Exception: See exception to 2-1.1 above.

2-2 Hood Size.

2-2.1 Canopy Hoods.

2-2.1.1 The overhead canopy-type hood shall be sized to completely cover the equipment it is designed to ventilate plus an overhang of at least 6 in. (152.4 mm) on all sides of equipment not immediately adjacent to walls or other construction extending above the cooking surface.

2-2.1.2 The distance between the floor and the lower edge of the canopy hood shall not exceed 7 ft (2.13 m).

2-2.1.3 The depth of a canopy-type hood from the lower to the upper edge shall be at least 2 ft (.61 m).

2-2.2 Noncanopy Hoods.

2-2.2.1 Noncanopy, prefabricated hoods shall be sized according to the manufacturer's specifications for the type cooking appliances being served.

2-3 Hoods with Integrated Outside Make-up Air in Which Introduction of the Make-up Air Requires the Penetration of the Exhaust Hood.

2-3.1 The construction of these hoods shall comply with the requirements of 2-1.1 and Section 2-2.

2-3.1.1 The construction of the outer shell or the inner exhaust shell shall have a continuous liquidtight external weld. If the outer shell is welded the inner shell shall be of greasetight construction.

2-3.1.2 A fire-actuated damper of at least the same gage as the hood shall be installed in the supply plenum at the same plane as the external weld.

Chapter 3 Duct Systems

3-1 Listed Grease Ducts. Listed grease ducts shall be installed in accordance with the terms of the listing and the manufacturer's instructions.

3-2 Other Grease Ducts. Other grease ducts shall comply with the following requirements.

3-2.1 Materials. Ducts shall be constructed of and supported by carbon steel not less than 0.054 in. (1.37 mm) (No. 16 MSG) or stainless steel not less than 0.043 in. (1.09 mm) (No. 18 MSG) in thickness.

3-2.2 All seams and joints shall have a liquidtight continuous external weld, except where the duct stub collar of the hood or a listed ventilator is connected to the exhaust duct. This connection shall be a continuous liquidtight external weld, a connection to a listed grease extractor, a connection to a listed automatic damper and hood assembly, or a method such as shown in Figure 3-2.2.

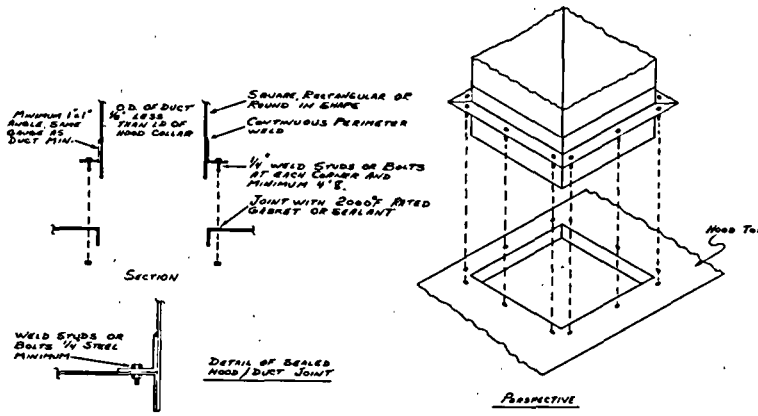

Figure 3-2.2

For SI units, 1 in. = 25.4 mm

3-2.3 Duct systems shall not be interconnected with any other building ventilating or exhaust system.

3-2.4 Ducts shall not pass though fire walls or fire partitions.

3-2.5 Where ducts pass through partitions or walls of combustible material, the material shall be cut away to provide a clearance to the duct not less than 18 in. (457.2 mm).

Exception: When the combustible construction is protected in a manner satisfatory to the authority having jurisdiction.

3-2.6 All ducts shall be installed without forming dips or traps which might collect residues.

Exception: Traps provided for continuous or automatic removal of residue are permissible.

3-2.7 All ducts shall lead, as directly as possible, to the exterior of the building.

3-2.8 Exterior Installations.

3-2.8.1 The vertical portion of exhaust ducts shall be connected to the horizontal portion of the duct system and shall be installed and adequately supported on the exterior of a building.

3-2.8.2 All ducts shall be protected on the exterior by paint or other suitable weather-protective coating or shall be constructed of noncorrosive stainless steel.

3-2.8.3 A residue trap shall be provided at the base of each vertical riser with provisions for cleanout.

3-2.9 Interior Installations.

3-2.9.1 In *all* buildings more than one story in height, and *in one-story buildings where the roof or roof-ceiling assembly is required to have a fire resistance rating*, the ducts shall be enclosed in a continuous enclosure extending from the ceiling above the hood, *through any concealed spaces*, to or through the roof so as to maintain the integrity of the fire separations required by the applicable building code provisions. The enclosure shall conform to the following:

3-2.9.1.1 If the building is less than 4 stories in height, the enclosure wall shall have a fire resistance rating of not less than 1 hr.

3-2.9.1.2 If the building is 4 stories or more in height, the enclosure wall shall have a fire resistance rating of not less than 2 hrs.

3-2.9.1.3 Clearance from the duct to the interior surface of enclosures of combustible construction shall not be less than 18 in. (457.2 mm) and clearance from the duct to the interior surface of enclosures of noncombustible construction shall not be less than 6 in. (152.4 mm). Provisions for reducing clearances as described in Appendix A are not applicable to enclosures.

3-2.9.1.4 If openings in the enclosure walls are provided they shall be protected by approved self-closing fire doors of proper rating. See NFPA 80, *Standard for Fire Doors and Windows.*

3-2.9.2 An opening large enough to permit cleaning shall be provided at each change in direction of the duct for purposes of inspection and cleaning. Such openings shall conform to the following:

3-2.9.2.1 Openings shall be at the sides of the duct.

3-2.9.2.2 In horizontal sections the lower edge of the opening shall be not less than 1½ in. (38.1 mm) from the bottom of the duct.

3-2.9.2.3 Covers shall be constructed of the same material and thickness as the duct and shall be greasetight when in place.

3-2.9.3 Each duct system shall constitute an individual system serving only exhaust hoods on one floor.

3-3 Termination of Ducts. Ducts shall terminate as follows:

3-3.1 With a minimum of 10 ft (3.05 m) of clearance from the outlet to adjacent buildings, property lines, air intakes and adjoining grade levels. When space limitations absolutely prevent a 10 ft (3.05 m) horizontal separation, a 3 ft (.92 m) vertical separation will be acceptable between the outlet and air intake, the air intake being at least 3 ft (.92 m) below the outlet. The outlet shall be directed up, or away from, the air intake.

3-3.2 With the direction of flow of exhaust air away from the surface of the roof.

Exception: If such is not possible, a metal pan shall be provided on the roof surface to catch residues that pass through the system. The pan shall have a minimum 1 in. (25.4 mm) lip at all edges to retain residues and shall be cleaned regularly.

3-3.3 With the discharge at least 40 in. (1016 mm) clearance from the outlet to the roof surface.

Exception No.1: When permitted by the authority having jurisdiction, ducts may terminate at the exterior of a masonry wall, provided there are no building openings which would permit a fire emanating from the duct to enter the building or to ignite or endanger exposed combustible construction or damage other property.

Exception No 2: When permitted by the authority having jurisdiction, ducts may terminate into the base of an up-discharge exhaust fan provided the ductwork extends a minimum of 18 in. (457.2 mm) above the roof surface and is constructed of materials complying with the provisions of 3-2.1 and at least 40 in. (1016 mm) of clearance above the roof is maintained between the exhaust discharge and the roof surface.

Chapter 4 Grease Removal Devices

4-1 Grease Removal Devices. Grease removal devices shall be provided and shall consist of one of the following types:

4-1.1 Listed Grease Extractors. Listed grease extractors shall be installed in accordance with the terms of the listing and the manufacturer's instructions.

4-1.2 Listed Grease Filters or Other Grease Removal Devices (Not Including Grease Extractors). Listed grease filters or other listed means of grease removal shall comply with the following requirements.

4-1.2.1 Materials.

4-1.2.1.1 Grease filters, including frames, or other grease removal devices shall be constructed of noncombustible materials.

4-1.2.1.2 Grease filters shall be a type listed for use with commercial cooking equipment.

4-1.2.2 Installation.

4-1.2.2.1 The distance between the grease filter or other grease removal device and the cooking surface shall be as great as possible. Where grease filters or other grease removal devices are used in conjunction with charcoal or charcoal-type broilers, including gas or electrically heated char-broilers, a minimum vertical distance of 4 ft (1.22 m) shall be maintained between the lower edge of the grease filter or removal device and the cooking surface.

4-1.2.2.2 Grease filters or other grease removal devices shall be protected from combustion gas outlets and from direct flame impingement occurring during normal operation of cooking appliances producing high flue gas temperatures, such as deep fat fryers, upright or high broilers (salamander broilers) when the distance between the filter or removal device and the appliance flue outlet (heat source) is less than 18 in. (457.2 mm) This protection may be accomplished by the installation of a steel or stainless steel baffle plate between the heat source and the filter or removal device. The baffle plate shall be so sized and located that flames or combustion gases must travel a distance not less than 18 in. (457.2 mm) from the heat source to the grease filter or removal device. The baffle shall be located not less than 6 in. (152.4 mm) from filters or removal devices.

4-1.2.2.3 Filters shall be tight fitting and firmly held in place.

4-1.2.2.4 Filters shall be easily accessible and removable for cleaning.

4-1.2.2.5 Filters shall be installed at an angle not less than 45 degrees from the horizontal.

4-1.2.2.6 Filters shall be equipped with a drip tray beneath the lower edge of the filters. The tray shall be kept to the minimum size needed to collect the grease and be pitched to drain to an enclosed metal container having a capacity not exceeding 1 gal (3.785 L).

Chapter 5 Air Movement

5-1 Exhaust Fans.[1] Exhaust fans and motors shall be approved and rated for continuous operation and shall be installed to comply with the following requirements:

5-1.1 All wiring and electrical equipment shall comply with NFPA 70, the *National Electrical Code®* (*also see Chapter 6*).

5-1.2 Means shall be provided for inspections, servicing, and cleaning.

5-2 Air Flow.

5-2.1 The air velocity through any duct shall not be less than 1,500 ft (457.2 m) per min.

5-2.2 Exhaust air volumes for hoods shall be of sufficient level to provide for capture and removal of grease-laden cooking vapors. Test data or performance acceptable to the authority having jurisdiction or both shall be provided or displayed or both upon request.

5-3 Replacement Air. When fuel-burning appliances that are directly vented to outdoors are located in the same room as the hood, the replacement air quantity shall be adequate to prevent negative pressures in the room from exceeding 0.02 in. water column (4.98 Pa).

[1]To offset the possibility of leaks in the duct system, it is recommended the fan be located near the discharge end of the duct.

Chapter 6 Auxiliary Equipment

6-1 Dampers. Dampers shall not be installed in exhaust ducts or exhaust duct systems.

Exception: When specifically listed for such use or required as part of a listed or approved device or system.

6-2 Mechical Equipment.

6-2.1 Wiring systems of any type shall not be installed in ducts.

6-2.2 Motors, lights and other electrical devices shall not be installed in ducts or hoods or located in the path of travel of exhaust products.

Exception: When specifically approved for such use.

6-2.3 Lighting units having steel enclosures mounted on the outer surface of the hood and separated from exhaust products by tight-fitting glass may be used.

6-2.4 Lighting units on hoods shall not be located in concealed spaces.

Exception No.1: When part of a listed grease extractor.

Exception No.2: When specifically listed for such use and installed in acordance with the terms of the listing.

6-2.5 All electrical equipment shall be installed in accordance with NFPA 70, the *National Electrical Code*, with due regard to the effects of heat, vapor, and grease on the equipment.

6-2.6 Fume incinerators, thermal recovery units, air pollution control devices, or other devices may be installed in ducts or hoods or located in the path of travel of exhaust products when specifically approved for such use, and shall not increase the fire hazard.

Chapter 7 Fire Extinguishing Equipment

7-1 Where Required.

7-1.1 Approved fire extinguishing equipment shall be provided for the protection of duct systems, grease removal devices, and hoods.

Exception: If acceptable to the authority having jurisdiction, the portion of the fire extinguishing system covered by the provisions of 7-1.1 may be omitted when all cooking equipment is served by listed grease extractors.

7-1.2 Cooking equipment (such as fat fryers, ranges, griddles, and broilers) which may be a source of ignition of grease in the hood, grease removal device, or duct shall be protected by approved extinguishing equipment.

7-2 Types of Equipment.

7-2.1 The extinguishing equipment shall include both of the following types:

7-2.1.1 Automatic systems specifically listed for the hazard or automatically operated fixed pipe systems.

7-2.1.1.1 Listed fire extinguishing systems shall be installed in accordance with the terms of their listing and the manfacturer's instructions.

7-2.1.1.2 Other fire extinguishing equipment shall be installed in compliance with the provisions of the following applicable standards:

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems.*

NFPA 13, *Standard for the Installation of Sprinkler Systems.*

NFPA 16, *Standard for the Installation of Deluge Foam-Water Sprinkler Systems and Foam-Water Spray Systems.*

NFPA 17, *Standard for Dry Chemical Extinguishing Systems.*

7-2.1.2 Portable Extinguishers Installed in the Kitchen Area.

7-2.1.2.1 Portable extinguishers installed adjacent to cooking equipment shall be installed in accordance with NFPA 10, *Standard*

for Portable Fire Extinguishers, Table 3-3.1.1, for extra hazard occupancy.[1]

7-2.1.2.2 Other extinguishers in the kitchen area shall be installed in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*.

7-3 Operating Requirements.

7-3.1 See NFPA 12 and NFPA 17 for requirements pertaining to the shut-off of fuel and heat sources.

7-3.2 The operation of a fixed system employing liquids with extinguishing and saponification characteristics shall automatically shut off all sources of fuel and heat to all equipment protected by the extinguishing system or located under ventilating equipment protected by the extinguishing system or located under ventilating equipment protected by the extinguishing system.

7-4 Review and Certification.

7-4.1 If required, complete drawings of the system installation to include the hood(s), exhaust duct(s), and appliances along with the interface of the fire extinguishing system detectors, piping, nozzles, fuel shut-off devices, agent storage container (s), and manual actuation device(s) shall be submitted to the authority having jurisdiction.

7-4.2 Installation of systems shall be made only by persons properly trained and qualified to install the specific system being provided. The installer shall certify to the authority having jurisdiction that the installation is in complete agreement with the terms of the listing and the manufacturer's instructions and/or approved design.[2]

[1]The system used to rate extinguishers on Class B fires (Flammable Liquids in Depth) does not take into consideration the special nature of heated grease fires. Cooking grease fires are a special hazard requiring agents suitable for this application. Extinguishers containing sodium bicarbonate or potassium bicarbonate dry chemical and potassium carbonate solutions are considered suitable; others may not be due to agent characteristics. Manufacturer's recommendations should be followed.

[2]It is recommended that such training and qualification be by the manufacturer of the equipment being installed.