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NFPA 96 Vapor Removal from Cooking Equipment 1987 Edition

National Fire Protection Association Batterymarch Park, Quincy, MA 02269

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Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

Statement on NFPA Procedures

This material has been developed under the published procedures of the National Fire Protection Association, which are designed to assure the appointment of technically competent Committees having balanced representation. While these procedures assure the highest degree of care, neither the National Fire Protection Association, its members, nor those participating in its activities accepts any liability resulting from compliance or noncompliance with the provisions given herein, for any restrictions imposed on materials or processes, or for the completeness of the text.

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NFPA 96

Standard for the Installation of Equipment for the

Removal of

Smoke and Grease-Laden Vapors

from Commercial Cooking Equipment

1987 Edition

This 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 acted on by the National Fire Protection Association, Inc. at its Annual Meeting held May 18-21, 1987 in Cincinnati, Ohio. It was issued by the Standards Council on June 10, 1987, with an effective date of June 30, 1987, and supersedes all previous editions.

The 1987 edition of this standard has been approved by the American National Standards Institute.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

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, *Standard for the Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying*. 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, 1980, and 1984.

The Correlating Committee on Chimneys and Other Heat and Vapor Removal Equipment was discharged by the Standards Council in 1986. The Technical Committee that prepared this 1987 edition is now known as the Technical Committee on Venting Systems for Cooking Appliances.

Technical Committee on Venting Systems for Cooking Appliances

James N. Macdonald, *Chairman*
Travelers Insurance Co.

Thomas J. Hard, *Secretary*
Harold D. Hard Co.
Rep. Nat'l. Assn. of Fire Equipment Dist., Inc.

Charles E. Boyes, Boulder Fire Dept., CO
Rep. Fire Marshals Assn. of North America
Barry L. Clark, ISO – Commercial Risk Services
Samuel Crabtree, Crabtree Associates, Inc.
Rep. FSCSI
Paul W. Droll, Div. of Household Int'l.
Edson C. Gaylord, Gaylord Industries, Inc.
Rep. Nat'l. Assn. of Food Equipment Manufacturers
K. W. Howell, Underwriters Laboratories Inc.
Joseph Knapp, McDonald's Corp.
John P. Langmead, Gas Appliance Manufacturers Assn.
Donald T. Mann, Aetna Life & Casualty
Rep. American Insurance Services Group, Inc.
Robert A. Modlin, American Gas Assn.
Gary A. Nadolny, Ansul Fire Protection
Rep. FEMA
Joseph F. Schulz, Van-Packer Products Co.
Rep. ASHRAE
Lawrence E. Stahl, Hardee's Food Systems, Inc.
Rep. Nat'l. Restaurant Assn.
Leo Stambaugh, Texas Utilities Electric Co.
Rep. Edison Electric Inst.

Alternates

Donald J. Begley, Andersen Fire Equipment Co., Inc.
(Alternate to T. J. Hard)
Robert L. Donahue, Underwriters Laboratories Inc.
(Alternate to K. W. Howell)
William L. Henderson, Walter Kidde
(Alternate to G. A. Nadolny)
Philip O. Morton, Gaylord Industries, Inc.
(Alternate to E. C. Gaylord)
Harry Schildkraut, Cini-Grissom Associates, Inc.
(Alternate to S. Crabtree)

Richard Best, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

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

Contents

NFPA 96

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

1987 Edition

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 used for the purpose of cleaning air passing through or by them in such a manner as to reduce or remove the impurities contained therein.

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

Approved. 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, such as 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.

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, 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.

Damper. 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 subcomponents of such instruments whose purpose is to cause an automatic action 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 Link. 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 from cooking and/or preparing foods. Grease may be liberated and entrained with exhaust air, or may be visible as liquid or solid.

Grease Ducts. A containment system for the transportation of air and grease vapors, designed and installed to reduce the possibility of the accumulation of combustible condensation and the occurrence of damage should a fire occur 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 Filter. A component of the grease vapor removal system that deflects the air and vapors passing through it in a manner that causes grease vapor concentration and/or condensation for the purpose of collection, leaving the exiting air with a lower amount of combustible matter.

Grease Removal Devices. Other components of the grease and vapor removal system that do not fit the definition of "grease extractors" or "grease filters" yet are designed, installed, and perform by removing 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.

Greasetight. Constructed and performing in such a manner as not to permit the passage of any grease under normal cooking conditions.

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. Its purpose is the secondary limitation of temperature allowed 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 to withstand adverse conditions. It may be located over most or all of the cooking appliance(s), or it may be a fixed device located in close proximity to a cooking appliance(s). (*See 1-3.1.*)

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.

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

Removable. Capable of being transferred to another location with a limited application of effort and tools.

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 to compensate for the vapor and/or gases being consumed or expelled.

Salamander Broiler. (See Upright Broiler.)

Shall. Indicates a mandatory requirement.

Single Hazard Area. Shall be as considered in the applicable extinguishing system standard (*see Section 7-2*) or as determined by the authority having jurisdiction.

Solvent. A substance (usually liquid) capable of dissolving or dispersing another substance. A chemical compound designed and used for the purpose of converting solidified grease into a liquid or semiliquid 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 located 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 or grease extractor 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 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) in thickness, 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 conditions of 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 and 2-1.2.

2-1.2 All seams, joints, and penetrations shall have a liquidtight continuous external weld. Penetrations may also be sealed by other listed devices that are evaluated under the same conditions of fire severity as the hood or enclosure of listed grease extractors, and whose presence does not detract from the hood's or duct's structural integrity. (*See definition of continuous external weld in Section 1-2.*)

Exception: See exception to 2-1.1 above.

2-2 Hood Size. Hoods shall be sized and configured to provide for the capture and removal of grease-laden vapors (*see 5-2.2*).

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 comply with 2-1.2. 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.

2-4 Listed Hood Assemblies. Listed hood assemblies shall be installed in accordance with the terms of their listing and the manufacturer's instructions.

Chapter 3 Duct Systems

3-1 General.

3-1.1 Ducts shall not pass through fire walls or fire partitions.

3-1.2 All ducts shall lead, as directly as possible, to the exterior of the building.

3-1.3 Duct systems shall not be interconnected with any other building ventilating or exhaust system.

3-1.4 All ducts shall be installed without forming dips or traps that might collect residues.

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

3-1.5 Clearance.

3-1.5.1 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 satisfactory to the authority having jurisdiction.

3-1.5.2 For listed grease ducts, see Section 3-2.

3-1.6 Openings.

3-1.6.1 An opening large enough to permit cleaning shall be provided at each change in direction of the duct for purposes of inspection and cleaning.

3-1.6.2 Openings shall conform to the following:

3-1.6.2.1 Openings shall be at the sides of the duct.

3-1.6.2.2 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.

3-1.6.2.3 Covers shall be constructed of the same material and thickness as the duct and shall not permit the passage of grease under any conditions.

3-1.6.3 Openings for installation, servicing, and inspection of listed fire protection system devices shall be permitted in ducts and enclosures provided they conform to the requirements of 3-1.6.2 and 3-5.1.5.

3-2 Listed Grease Ducts. Listed grease ducts shall be installed in accordance with the terms of the listing and the manufacturer's instructions.

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

3-3.1 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.

3-3.2 Installation.

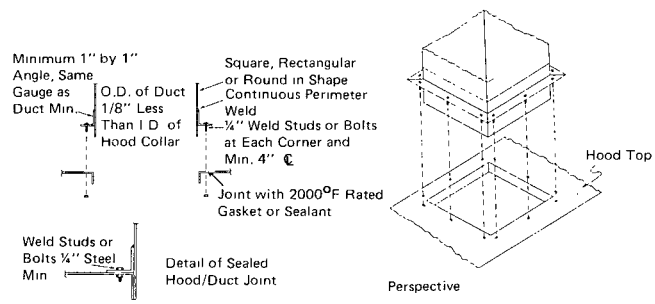
3-3.2.1 All seams, joints, and penetrations shall have a liquidtight continuous external weld, except where the duct stub collar of the hood or a listed ventilator is connected to the exhaust duct. This connection shall be a continuous liquidtight external weld, a connection to a listed grease extractor, a connection to a listed automatic damper and hood assembly, or a method such as that shown in Figure 3-3.

3-3.2.2 Penetrations may also be sealed by other listed devices that are evaluated under the same conditions of fire severity as the hood or enclosure of listed grease extractors, and whose presence does not detract from the hood's or duct's structural integrity.

3-4 Exterior Installations.

3-4.1 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.

3-4.2 All ducts shall be protected on the exterior by paint or other suitable weather-protective coating, or shall be constructed of noncorrosive stainless steel.



For SI units, 1 in. = 25.4 mm

Figure 3-3

3-4.3 A residue trap shall be provided at the base of each vertical riser with provisions for cleanout.

3-5 Interior Installations.

3-5.1 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:

3-5.1.1 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.

3-5.1.2 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.

3-5.1.3 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.

NOTE: Noncombustible materials such as reinforced concrete floors or protected steel beams, which may protrude into an enclosure and cause reduced clearance, may be acceptable to the authority having jurisdiction if the installation and accessibility of the duct system is considered adequate.

3-5.1.4 For listed grease ducts, see Section 3-2.

3-5.1.5 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*.

3-5.1.6 Each duct system shall constitute an individual system serving only exhaust hoods on one floor.

3-6 Termination of Ducts.

3-6.1 Ducts shall terminate as follows:

3-6.1.1 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 (0.92 m) vertical separation will be acceptable between the outlet and air intake, the air intake being at least 3 ft (0.92 m) below the outlet. The outlet shall be directed up, or away from, the air intake.

3-6.1.2 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.

3-6.1.3 With the discharge having at least 40 in. (1016 mm) of 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 that 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 Systems. Grease removal devices supplied as a part of a listed hood assembly 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 Listed Systems). 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 protec-

tion 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 Airflow.

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, performance acceptable to the authority having jurisdiction, or both, shall be provided, displayed, or both upon request.

5-2.3 Hood exhaust fan(s) shall continue to operate after the extinguishing system has been activated, unless fan shutdown is required by a listed component of the ventilation system or by the design of the extinguishing system.

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 that 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 Electrical 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 accordance 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 Other Equipment. 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 deep fat fryers, ranges, griddles, and broilers) that 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 manufacturer'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 on Deluge Foam-Water Sprinkler 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 shall be installed in kitchen cooking areas in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*, Table 3-3.1 for Extra (high) Hazard.[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 Fixed pipe extinguishing equipment shall be installed to conform with the following requirements:

7-3.1.1 A readily accessible means to manually activate the fire extinguishing system shall be provided in a path of exit or egress and shall be clearly identified. Such means shall be mechanical and shall not rely on electrical power for actuation.

Exception No. 1: A sprinkler system does not require manual activation.

Exception No. 2: Electrical power may be used to manually activate the system if a reserve power supply is provided.

7-3.1.2 Fixed pipe extinguishing systems in a single hazard area (*see Section 1-2*) shall be arranged for simultaneous automatic operation upon actuation of any one of the systems.

Exception: When the fixed pipe extinguishing system is an automatic sprinkler system.

7-3.1.3 The operation of any extinguishing system shall automatically shut off all sources of fuel and heat to all equipment requiring protection by an extinguishing system. Any gas appliance not requiring protection but located under ventilating equipment shall also be shut off. All shut-down devices shall be considered integral parts of the system and shall function with the system operation. This equipment shall be of the type that requires manual resetting prior to fuel or power restoration.

7-4 Review and Certification.

7-4.1 If required, complete drawings of the system installation including 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.[1]

Chapter 8 Procedures for the Use and Maintenance of Equipment

8-1 Operating Procedures.

8-1.1 Exhaust systems shall be operated during all periods of cooking.

8-1.2 Filter-equipped exhaust systems shall not be operated with filters removed.

8-1.3 Openings provided for replacing air exhausted through ventilating equipment shall not be restricted by covers, dampers, or any other means which would reduce the operating efficiency of the exhaust system.

8-1.4 Instructions for manually operating the fire extinguishing system shall be posted conspicuously in the kitchen and shall be reviewed periodically with employees by the management.

8-1.5 Listed grease extractors shall be operated in accordance with the terms of their listings and manufacturer's instructions.

8-2 Inspection.

8-2.1 An inspection and servicing of the fire extinguishing system by properly trained and qualified persons shall be made at least every six months.[2]

8-2.1.1 All actuation components including remote manual pull stations, mechanical or electrical devices, detectors, actuators, etc., shall be checked for proper

[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.

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

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

operation during the inspection in accordance with the manufacturer's listed procedures. In addition to these requirements, specific inspection requirements in the applicable NFPA standard (*see 7-2.1.1.2*) shall also be followed.

8-2.1.2 Fusible links and automatic sprinkler heads shall be replaced at least annually or more frequently if necessary to assure proper operation of the system. Other detection devices shall be serviced or replaced in accordance with the manufacturer's recommendations.

Exception: When automatic bulb-type sprinklers or spray nozzles are used and annual examination shows no buildup of grease or other material on the sprinkler or spray nozzles.

8-2.1.3 If required, certificates of inspection and maintenance shall be forwarded to the authority having jurisdiction.

8-3 Cleaning.

8-3.1 Hoods, grease removal devices, fans, ducts, and other appurtenances shall be cleaned at frequent intervals prior to surfaces becoming heavily contaminated with grease or oily sludge.[1]

8-3.2 Flammable solvents or other flammable cleaning aids shall not be used.

8-3.3 At the start of the cleaning process, electrical switches, detection devices, and system components that may be accidentally activated shall be locked, pinned, protectively covered, and/or sealed.

8-3.4 Care shall be taken not to apply cleaning chemicals on fusible links or other detection devices of the automatic extinguishing system.

8-3.5 WHEN CLEANING PROCEDURES ARE COMPLETED, ALL ELECTRICAL SWITCHES, DETECTION DEVICES, AND SYSTEM COMPONENTS SHALL BE RETURNED TO AN OPERABLE STATE BY QUALIFIED PERSONNEL IN ACCORDANCE WITH 7-3.2. COVER PLATES SHALL BE REPLACED AND DAMPERS AND DIFFUSERS SHALL BE POSITIONED FOR PROPER AIRFLOW.

Chapter 9 Minimum Safety Requirements for Cooking Equipment

9-1 Cooking Equipment.

9-1.1 Cooking equipment shall be approved based on:

(a) Listings by a testing laboratory, or

(b) Test data acceptable to the authority having jurisdiction.

[1]Depending on the amount of cooking equipment usage the entire exhaust system, including grease extractors, should be inspected daily or weekly to determine if grease or other residues have been deposited within. When grease or other residues are in evidence as deposits within the hood, grease removal devices or ducts, or both, the system should be cleaned in accordance with Section 8-3.

9-1.2 Installation.

9-1.2.1 All listed appliances shall be installed in accordance with the terms of their listings and the manufacturer's instructions.

9-1.2.2 All deep fat fryers shall be installed with at least a 16-in. (406.4-mm) space between the fryer and surface flames from adjacent cooking equipment.

9-2 Operating Controls. Deep fat fryers shall be equipped with a separate high limit control in addition to the adjustable operating control (thermostat) to shut off fuel or energy when the fat temperature reaches 475°F (246°C), 1 in. (25.4 mm) below the surface.

Chapter 10 Referenced Publications

10-1 The following documents or portions thereof are referenced within this document and shall be considered part of the requirements of this document. The edition indicated for each reference shall be the current edition as of the date of the NFPA issuance of this document. These references shall be listed separately to facilitate updating to the latest edition by the user.

10-1.1 NFPA Publications. National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 10-1984, *Standard for Portable Fire Extinguishers*

NFPA 12-1985, *Standard on Carbon Dioxide Extinguishing Systems*

NFPA 13-1987, *Standard for the Installation of Sprinkler Systems*

NFPA 16-1986, *Standard on Deluge Foam-Water Sprinkler and Foam-Water Spray Systems*

NFPA 17-1985, *Standard for Dry Chemical Extinguishing Systems*

NFPA 70-1987, *National Electrical Code*

NFPA 80-1986, *Standard for Fire Doors and Windows.*

Appendix A Clearance Reduction

This Appendix is not a part of the requirements of this NFPA document but is included for information purposes only.

A-1 Where 18 in. (457.2 mm) clearance is required to unprotected combustible material, the clearance to combustible material may be reduced if the combustible material is protected by an engineered construction system acceptable to the authority having jurisdiction, or by the use of materials or products listed for protection purposes, or by the use of materials listed on the following page:

Type of Protection	Clearance to Combustible Material
1. 0.013-in. (0.33-mm) (28 gage) sheet metal spaced out 1 in. (25.4 mm) on noncombustible spacers.	9 in. (228.6 mm)
2. 0.027-in. (0.69-mm) (22 gage) sheet metal on 1-in. (25.4-mm) mineral wool bats reinforced with wire mesh or equivalent spaced out 1 in. (25.4 mm) on noncombustible spacers.	3 in. (76.2 mm)

A-2 Materials and products listed for the purpose of reducing clearance to combustibles shall be installed in accordance with the condition of the listing and the manufacturer's instruction.

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SUBMITTING PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Contact NFPA Standards Administration for final date for receipt of proposals on a specific document.

INSTRUCTIONS

Please use the forms which follow for submitting proposed amendments. Use a separate form for each proposal.

1. For each document on which you are proposing amendment indicate:
   (a) The number and title of the document
   (b) The specific section or paragraph.

2. Check the box indicating whether or not this proposal recommends new text, revised text, or to delete text.

3. In the space identified as "Proposal" include the wording you propose as new or revised text, or indicate if you wish to delete text.

4. In the space titled "Statement of Problem and Substantiation for Proposal" state the problem which will be resolved by your recommendation and give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If a statement is more than 200 words in length, the technical committee is authorized to abstract it for the Technical Committee Report.

5. Check the box indicating whether or not this proposal is original material, and if it is not, indicate source.

6. If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.

NOTE: The NFPA Regulations Governing Committee Projects in Paragraph 10-10 state: Each proposal shall be submitted to the Council Secretary and shall include:

(a) identification of the submitter and his affiliation (Committee, organization, company) where appropriate, and

(b) identification of the document, paragraph of the document to which the proposal is directed, and

(c) a statement of the problem and substantiation for the proposal, and

(d) proposed text of proposal, including the wording to be added, revised (and how revised), or deleted.