

**45.5.4.4** If such storage vaults are located outside of buildings but have openings that expose other buildings (not sufficiently detached to be considered cutoff), each such opening shall be protected on each side of the wall by an approved opening protective assembly having a fire resistance rating of 1½ hours.

**45.5.4.5** Roofs of outside vaults shall be of noncombustible material, but shall be permitted to be constructed so as to readily give way in case of an internal explosion.

**45.5.5 Storage Vaults for Quantities of Loose Combustible Fibers Exceeding 1000 ft<sup>3</sup> (28.3 m<sup>3</sup>).**

**45.5.5.1** Quantities exceeding 1000 ft<sup>3</sup> (28.3 m<sup>3</sup>) of loose combustible fibers shall be permitted to be stored in storage vaults as indicated in 45.5.4.

**45.5.5.2** The storage vault shall also be protected by an approved automatic sprinkler system designed and installed in accordance with Section 13.3.

**45.5.6 Loose House.**

**45.5.6.1** Not more than 2500 ft<sup>3</sup> (71 m<sup>3</sup>) of loose fibers shall be permitted to be stored in a detached loose house, with openings properly protected against the entrance of sparks.

**45.5.6.2** The loose house shall be used for no other purpose.

**45.6 Baled Storage.**

**45.6.1 Blocks or Piles.**

**45.6.1.1** No single block or pile shall contain more than 25,000 ft<sup>3</sup> (708 m<sup>3</sup>) of combustible fibers, exclusive of aisles or clearances.

**45.6.1.2** Blocks or piles of baled fiber shall be separated from adjacent storage by aisles not less than 5 ft (1.5 m) wide or by flash fire barriers consisting of continuous sheets of noncombustible material extending from the floor to a height of at least 1 ft (0.3 m) beyond the top of the piles and projecting not less than 1 ft (0.3 m) beyond the sides of the piles.

**45.6.1.3** Baled cotton storage and combustibles shall be kept at least 4 ft (1.2 m) from fire door openings.

**45.6.2 Sisal and Other Fibers.**

**45.6.2.1** Sisal and other fibers in bales bound with combustible tie ropes or jute and other fibers that are liable to swell when wet shall be stored in a manner that allows for expansion in any direction without endangering building walls, ceilings, or columns.

**45.6.2.2** Not less than 3 ft (0.9 m) of clearance shall be left between walls and sides of piles, except that in storage compartments not more than 30 ft (9 m) in width, 1 ft (0.3 m) clearance at side walls shall be sufficient, provided that a center aisle not less than 5 ft (1.5 m) wide is maintained.

**45.7 Storage of Hay, Straw, and Other Similar Agricultural Products.**

**45.7.1** Hay, straw, and other similar agricultural products shall not be stored adjacent to buildings or combustible material unless a cleared horizontal distance equal to the height of pile is maintained between such storage and combustible material and buildings.

**45.7.2** Storage shall be limited to stacks of 100 tons (90,720 kg) each.

**45.7.3** Either an approved 1-hour fire wall installed in accordance with NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls*, or a clear space of 20 ft (6.1 m) shall be maintained between such stacks.

**45.7.4** Unlimited quantities of hay, straw, and other agricultural products shall be permitted to be stored in or near farm buildings located outside of closely built areas.

**45.8 Hazardous Materials.** Combustible fibers shall not be stored in rooms or buildings with hazardous gases, flammable liquids, dangerous chemicals, or other similar materials.

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**Chapter 49 Reserved**

**Chapter 50 Commercial Cooking Equipment**

**50.1 Application.**

**50.1.1\*** The design, installation, operation, inspection, and maintenance of all public and private commercial cooking equipment shall comply with this chapter and NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*.

**50.1.2** This chapter shall apply to residential cooking equipment used for commercial cooking operations. [96:1.1.2]

**50.1.3** This chapter shall not apply to cooking equipment located in a single dwelling unit. [96:1.1.3]

**50.1.4\*** This chapter shall not apply to facilities where all of the following are met:

- (1) Only residential equipment is being used.
- (2) Fire extinguishers are located in all kitchen areas in accordance with Section 13.6.
- (3) The facility is not an assembly occupancy.
- (4) The AHJ has approved the installation. [96:1.1.4]

**50.2 General Requirements.**

**50.2.1 General.**

**50.2.1.1** Cooking equipment used in processes producing smoke or grease-laden vapors shall be equipped with an exhaust system that complies with all the equipment and performance requirements of this chapter. [96:4.1.1]

**50.2.1.1.1\*** Cooking equipment that has been listed in accordance with ANSI/UL 197, *Standard for Commercial Electric Cooking Appliances*, or an equivalent standard for reduced emissions shall not be required to be provided with an exhaust system. [96:4.1.1.1]

**50.2.1.1.2** The listing evaluation of cooking equipment covered by 50.2.1.1.1 shall demonstrate that the grease discharge at the exhaust duct of a test hood placed over the appliance shall not exceed 0.00018 oz/ft<sup>3</sup> (5 mg/m<sup>3</sup>) when operated with a total airflow of 500 cfm (0.236 m<sup>3</sup>/s). [96:4.1.1.2]

**50.2.1.2** All such equipment and its performance shall be maintained in accordance with the requirements of this chapter during all periods of operation of the cooking equipment. [96:4.1.2]

**50.2.1.3** The following equipment shall be kept in working condition:

- (1) Cooking equipment
- (2) Hoods
- (3) Ducts (if applicable)
- (4) Fans
- (5) Fire-extinguishing equipment
- (6) Special effluent or energy control equipment [96:4.1.3]

**50.2.1.3.1** Maintenance and repairs shall be performed on all components at intervals necessary to maintain good working condition. [96:4.1.3.1]

**50.2.1.4** All airflows shall be maintained. [96:4.1.4]

**50.2.1.5** The responsibility for inspection, testing, maintenance, and cleanliness of the ventilation control and fire protection of the commercial cooking operations shall ultimately be that of the owner of the system, provided that this responsibility has not been transferred in written form to a management company, tenant, or other party. [96:4.1.5]

**50.2.1.6\*** All solid fuel cooking equipment are required to comply with the requirements of Chapter 14 of NFPA 96. [96:4.1.6]

**50.2.1.7** Multi-tenant applications shall require the concerted cooperation of design, installation, operation, and maintenance responsibilities by tenants and by the building owner. [96:4.1.7]

**50.2.1.8** All interior surfaces of the exhaust system shall be accessible for cleaning and inspection purposes. [96:4.1.8]

**50.2.1.9\*** Cooking equipment used in fixed, mobile, or temporary concessions, such as trucks, buses, trailers, pavilions, tents, or any form of roofed enclosure, shall comply with NFPA 96 or this chapter unless otherwise exempted by the AHJ in accordance with 1.3.2 of NFPA 96. [96:4.1.9]

#### **50.2.2\* Clearance.**

**50.2.2.1** Where enclosures are not required, hoods, grease removal devices, exhaust fans, and ducts shall have a clearance of at least 18 in. (457 mm) to combustible material, 3 in. (76 mm) to limited-combustible material, and 0 in. (0 mm) to noncombustible material. [96:4.2.1]

**50.2.2.2** Where a hood, duct, or grease removal device is listed for clearances less than those required in 50.2.2.1, the listing requirements shall be permitted. [96:4.2.2]

#### **50.2.2.3 Clearance Reduction.**

**50.2.2.3.1** Where a clearance reduction system consisting of 0.013 in. (0.33 mm) (28 gauge) sheet metal spaced out 1 in. (25 mm) on noncombustible spacers is provided, there shall be a minimum of 9 in. (229 mm) clearance to combustible material. [96:4.2.3.1]

**50.2.2.3.2** Where a clearance reduction system consisting of 0.027 in. (0.69 mm) (22 gauge) sheet metal on 1 in. (25 mm) mineral wool batts or ceramic fiber blanket reinforced with wire mesh or equivalent spaced 1 in. (25 mm) on noncombustible spacers is provided, there shall be a minimum of 3 in. (76 mm) clearance to combustible material. [96:4.2.3.2]

**50.2.2.3.3** Zero clearance to limited-combustible materials shall be permitted where protected by metal lath and plaster, ceramic tile, quarry tile, other noncombustible materials or assembly of noncombustible materials, or materials and products that are listed for the purpose of reducing clearance. [96:4.2.3.3]

**50.2.3 Drawings.** A drawing(s) of the exhaust system installation along with copies of operating instructions for subassemblies and components used in the exhaust system, including electrical schematics, shall be kept on the premises. [96:4.6]

**50.2.4 AHJ Notification.** If required by the AHJ, notification in writing shall be given of any alteration, replacement, or relocation of any exhaust or extinguishing system or part thereof or cooking equipment. [96:4.7]

#### **50.3 Protection of Coverings and Enclosure Materials.**

**50.3.1** Measures shall be taken to prevent physical damage to any covering or enclosure material. [96:7.7.3.1]

**50.3.2** Any damage to the covering or enclosure shall be repaired, and the covering or enclosure shall be restored to meet its intended listing and fire resistance rating and to be acceptable to the AHJ. [96:7.7.3.2]

**50.3.3** In the event of a fire within a kitchen exhaust system, the duct, the enclosure, and the covering directly applied to the duct shall be inspected by qualified personnel to determine whether the duct, the enclosure, and the covering directly applied to the duct are structurally sound, capable of maintaining their fire protection functions, suitable for continued operation, and acceptable to the AHJ. [96:7.7.3.3]

**50.3.4** Listed grease ducts shall be installed in accordance with the terms of the listing and the manufacturer's instructions. [96:7.7.3.4]

#### **50.4 Fire-Extinguishing Equipment.**

**50.4.1** Prior to installation of any fire-extinguishing system, construction documents shall be reviewed and approved by the AHJ.

**50.4.2 Permits.** Permits, where required, shall comply with Section 1.12.

#### **50.4.3 General Requirements.**

**50.4.3.1** Fire-extinguishing equipment for the protection of grease removal devices, hood exhaust plenums, and exhaust duct systems shall be provided. [96:10.1.1]

**50.4.3.2\*** Cooking equipment that produces grease-laden vapors and that might be a source of ignition of grease in the hood, grease removal device, or duct shall be protected by fire-extinguishing equipment. [96:10.1.2]

#### **50.4.4 Types of Equipment.**

**50.4.4.1** Fire-extinguishing equipment shall include both automatic fire-extinguishing systems as primary protection and portable fire extinguishers as secondary backup. [96:10.2.1]

**50.4.4.2\*** A placard shall be conspicuously placed near each extinguisher that states that the fire protection system shall be activated prior to using the fire extinguisher. [96:10.2.2]

**50.4.4.2.1** The language and wording for the placard shall be approved by the AHJ. [96:10.2.2.1]

**50.4.4.3\*** Automatic fire-extinguishing systems shall comply with ANSI/UL 300, *Standard for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas*, or other equivalent standards and shall be installed in accordance with the requirements of the listing. [96:10.2.3]

**50.4.4.3.1\*** In existing systems, when changes in the cooking media, positioning, or replacement of cooking equipment occur, the fire-extinguishing system shall be made to comply with 50.4.4.3. [96:10.2.3.1]

**50.4.4.4** Grease removal devices, hood exhaust plenums, exhaust ducts, and cooking equipment that are not addressed in ANSI/UL 300 or other equivalent test standards shall be protected with an automatic fire-extinguishing system(s) in accordance with the applicable NFPA standard(s), all local building and fire codes, and the fire extinguishing system's manufacturer's recommendations and shall be approved by the AHJ. [96:10.2.4]

**50.4.4.5** Automatic fire-extinguishing equipment provided as part of listed recirculating systems shall comply with ANSI/UL 710B, *Outline of Investigation for Recirculating Exhaust System*. [96:10.2.5]

**50.4.4.6** Automatic fire-extinguishing systems shall be installed in accordance with the terms of their listing, the manufacturer's instructions, and the following standards where applicable:

- (1) NFPA 12
- (2) NFPA 13
- (3) NFPA 17
- (4) NFPA 17A [96:10.2.6]

**50.4.4.7 Modifications to Existing Hood Systems.**

**50.4.4.7.1** Any abandoned pipe or conduit from a previous installation shall be removed from within the hood, plenum, and exhaust duct. [96:10.2.7.1]

**50.4.4.7.2** Penetrations and holes resulting from the removal of conduit or piping shall be sealed with listed or equivalent liquidtight sealing devices. [96:10.2.7.2]

**50.4.4.7.3** The addition of obstructions to spray patterns from the cooking appliance nozzle(s) such as baffle plates, shelves, or any modification shall not be permitted. [96:10.2.7.3]

**50.4.4.7.4** Changes or modifications to the hazard after installation of the fire-extinguishing systems shall result in re-evaluation of the system design by a properly trained, qualified, and certified person(s). [96:10.2.7.4]

**50.4.4.8 Fixed Baffle Hoods with Water Wash.**

**50.4.4.8.1** Grease removal devices, hood exhaust plenums, and exhaust ducts requiring protection in accordance with 50.4.3.1 shall be permitted to be protected by a listed fixed baffle hood containing a constant or fire-actuated water-wash system that is listed and in compliance with ANSI/UL 300 or other equivalent standards and shall be installed in accordance with the requirements of their listing. [96:10.2.8.1]

**50.4.4.8.2** Each such area not provided with a listed water-wash extinguishing system shall be provided with a fire-extinguishing system listed for the purpose. [96:10.2.8.2]

**50.4.4.8.3** The water for listed fixed baffle hood assemblies shall be permitted to be supplied from the domestic water supply when the minimum water pressure and flow are provided in accordance with the terms of the listing. [96:10.2.8.3]

**50.4.4.8.4** The water supply shall be controlled by a supervised water supply control valve. [96:10.2.8.4]

**50.4.4.8.5** The water wash in a fixed baffle hood specifically listed to extinguish a fire shall be activated by the cooking equipment extinguishing system. [96:10.2.8.5]

**50.4.4.8.6** A water-wash system approved to be used for protection of the grease removal device(s), hood exhaust plenum(s), exhaust duct(s), or combination thereof shall include instructions and appropriate electrical interface for simultaneous activation of the water-wash system from an automatic fire-extinguishing system, where the automatic fire-extinguishing system is used for cooking equipment protection only. [96:10.2.8.6]

**50.4.4.8.7** Where the fire-extinguishing system provides protection for the cooking equipment, hood, and duct, activation of the water wash shall not be required. [96:10.2.8.7]

**50.4.4.8.7.1** Where the automatic fire extinguishing system in accordance with NFPA 17A provides protection for the hood and duct in a fixed baffle hood containing a water-wash system, the water-wash system shall be made inoperable or delayed for a minimum of 60 seconds upon operation of the automatic fire-extinguishing system. [96:10.2.8.7.1]

**50.4.4.8.8** Grease removal devices, hood exhaust plenums, and exhaust ducts on fixed baffle hoods with water wash shall be permitted to be protected by a sprinkler system with an individual control valve if the design of the hood prevents the water from reaching the cooking appliances. [96:10.2.8.8]

**50.4.4.9** The water required for listed automatic fire-extinguishing systems shall be permitted to be supplied from the domestic water supply where the minimum water pressure and flow are provided in accordance with the terms of the listing. The water supply shall be controlled by a supervised water supply control valve. [96:10.2.9]

**50.4.4.10 Water Valve Supervision.** Valves controlling the water supply to listed fixed baffle hood assemblies, automatic fire-extinguishing systems, or both shall be listed indicating type of valve and shall be supervised open by one of the following methods:

- (1) Central station, proprietary, or remote station alarm service
- (2) Local alarm service that will cause the sounding of an audible signal at a constantly attended point
- (3) Locking valves open
- (4)\* Sealing of valves and approved weekly recorded inspection [96:10.2.10]

**50.4.5 Simultaneous Operation.**

**50.4.5.1** Fixed pipe extinguishing systems in a single hazard area (see 3.3.45 of NFPA 96 for the definition of single hazard area) shall be arranged for simultaneous automatic operation upon actuation of any one of the systems. [96:10.3.1]

**50.4.5.1.1** Hoods installed end to end, back to back, or both, or sharing a common ductwork, and having a grease-producing appliance(s) located under one or more of the hoods shall be considered a single hazard area requiring simultaneous automatic fire protection in all hoods and ducts. [96:10.3.1.1]

**50.4.5.1.2** Hoods installed end to end, back to back, or both that do not share a common exhaust and are separated by a wall(s) or other means to ensure that grease-laden vapors exhausted under one hood cannot propagate to the other hoods or exhaust systems shall not be required to comply with 50.4.5.1.1. [96:10.3.1.2]

**50.4.5.2** Simultaneous operation shall not be required where the fixed pipe extinguishing system is an automatic sprinkler system. [96:10.3.2]

**50.4.5.3** Simultaneous operation shall be required where a dry or wet chemical system is used to protect common exhaust ductwork by one of the methods specified in NFPA 17 or NFPA 17A. [96:10.3.3]

#### **50.4.6 Fuel and Electric Power Shutoff.**

**50.4.6.1** Upon activation of any fire-extinguishing system for a cooking operation, all sources of fuel and electric power that produce heat to all equipment requiring protection by that system shall automatically shut off. [96:10.4.1]

**50.4.6.2** Steam supplied from an external source shall not be required to automatically shut off. [96:10.4.2]

**50.4.6.3** Any gas appliance not requiring protection but located under the same ventilating equipment shall also automatically shut off upon activation of any extinguishing system. [96:10.4.3]

**50.4.6.4** Shutoff devices shall require manual reset. [96:10.4.4]

#### **50.4.7 Manual Activation.**

**50.4.7.1** A readily accessible means for manual activation shall be located between 42 in. and 48 in. (1067 mm and 1219 mm) above the floor, be accessible in the event of a fire, be located in a path of egress, and clearly identify the hazard protected. [96:10.5.1]

**50.4.7.1.1** At least one manual actuation device shall be located a minimum of 10 ft (3 m) and a maximum of 20 ft (6 m) from the protected kitchen appliance(s) within the path of egress. [96:10.5.1.1]

**50.4.7.1.2** Manual actuation using a cable-operated pull station shall not require more than 40 lb (178 N) of force, with a pull movement not to exceed 14 in. (356 mm) to actuate the automatic fire-extinguishing equipment. [96:10.5.1.2]

**50.4.7.2** The automatic and manual means of system activation external to the control head or releasing device shall be separate and independent of each other so that failure of one will not impair the operation of the other except as permitted by 50.4.7.3. [96:10.5.2]

**50.4.7.3** The manual means of system activation shall be permitted to be common with the automatic means if the manual activation device is located between the control head or releasing device and the first fusible link. [96:10.5.3]

**50.4.7.4** An automatic sprinkler system shall not require a manual means of system activation. [96:10.5.4]

**50.4.7.5** The means for manual activation shall be mechanical or rely on electrical power for activation in accordance with 50.4.7.6. [96:10.5.5]

**50.4.7.6** Electrical power shall be permitted to be used for manual activation if a standby power supply is provided or if supervision is provided in accordance with 50.4.9. [96:10.5.6]

**50.4.7.7** Instruction shall be provided to employees regarding the proper use of portable fire extinguishers and the manual activation of fire-extinguishing equipment. [96:10.5.7]

#### **50.4.8 System Annunciation.**

**50.4.8.1** Upon activation of an automatic fire-extinguishing system, an audible alarm or visual indicator shall be provided to show that the system has activated. [96:10.6.1]

**50.4.8.2** Where a fire alarm signaling system is serving the occupancy where the extinguishing system is located, the activation of the automatic fire-extinguishing system shall activate the fire alarm signaling system. [96:10.6.2]

#### **50.4.9 System Supervision.**

**50.4.9.1** Where electrical power is required to operate the fixed automatic fire-extinguishing system, the system shall be provided with a reserve power supply and be monitored by a supervisory alarm except as permitted in 50.4.9.2. [96:10.7.1]

**50.4.9.2** Where fixed automatic fire-extinguishing systems include automatic mechanical detection and actuation as a backup detection system, electrical power monitoring and a reserve power supply shall not be required. [96:10.7.2]

**50.4.9.3** System supervision shall not be required where a fire-extinguishing system(s) is interconnected or interlocked with the cooking equipment power source(s) so that if the fire-extinguishing system becomes inoperable due to power failure, all sources of fuel or electrical power that produce heat to all cooking equipment serviced by that hood shall automatically shut off. [96:10.7.3]

**50.4.9.4** System supervision shall not be required where an automatic fire-extinguishing system, including automatic mechanical detection and actuation, is electrically connected to a listed fire-actuated water-wash system for simultaneous operation of both systems. [96:10.7.4]

#### **50.4.10 Special Design and Application.**

**50.4.10.1** Hoods containing automatic fire-extinguishing systems are protected areas; therefore, these hoods are not considered obstructions to overhead sprinkler systems and shall not require floor coverage underneath. [96:10.8.1]

**50.4.10.2** A single detection device, listed with the extinguishing system, shall be permitted for more than one appliance where installed in accordance with the terms of the listing. [96:10.8.2]

#### **50.4.11 Review and Certification.**

**50.4.11.1** Where 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 and electric power shutoff devices, agent storage container(s), and manual actuation device(s), shall be submitted to the AHJ. [96:10.9.1]

#### **50.4.11.2\* Installation Requirements.**

**50.4.11.2.1** Installation of systems shall be performed only by persons properly trained and qualified to install the specific system being provided. [96:10.9.2.1]

**50.4.11.2.2** The installer shall provide certification to the AHJ that the installation is in agreement with the terms of the listing and the manufacturer's instructions and/or approved design. [96:10.9.2.2]

#### **50.4.12 Portable Fire Extinguishers.**

**50.4.12.1\*** Portable fire extinguishers shall be installed in kitchen cooking areas in accordance with Section 13.6 and shall be specifically listed for such use. [96:10.10.1]

**50.4.12.2** Portable extinguishers shall use agents that saponify upon contact with hot grease in accordance with NFPA 10 (Class K extinguishers). [96:10.10.2]

**50.4.12.3** Other fire extinguishers in the kitchen area shall be installed in accordance with Section 13.6. [96:10.10.3]

**50.4.12.4** Portable fire extinguishers shall be maintained in accordance with Section 13.6. [96:10.10.4]

#### **50.5 Procedures for the Use, Inspection, Testing, and Maintenance of Equipment.**

##### **50.5.1 Operating Procedures.**

**50.5.1.1** Exhaust systems shall be operated whenever cooking equipment is turned on. [96:11.1.1]

**50.5.1.2** Filter-equipped exhaust systems shall not be operated with filters removed. [96:11.1.2]

**50.5.1.3** Openings provided for replacing air exhausted through ventilating equipment shall not be restricted by covers, dampers, or any other means that would reduce the operating efficiency of the exhaust system. [96:11.1.3]

**50.5.1.4** Instructions for manually operating the fire-extinguishing system shall be posted conspicuously in the kitchen and shall be reviewed with employees by the management. [96:11.1.4]

**50.5.1.5** Listed exhaust hoods shall be operated in accordance with the terms of their listings and the manufacturer's instructions. [96:11.1.5]

**50.5.1.6** Cooking equipment shall not be operated while its fire-extinguishing system or exhaust system is nonoperational or impaired. [96:11.1.6]

**50.5.1.6.1** Where the fire-extinguishing system or exhaust system is nonoperational or impaired, the systems shall be tagged as noncompliant, and the owner or owner's representative shall be notified in writing of the impairment. [96:11.1.6.1]

**50.5.1.7** Secondary filtration and pollution control equipment shall be operated in accordance with the terms of its listing and the manufacturer's recommendations. [96:11.1.7]

**50.5.1.8** Inspection and maintenance of "other equipment" allowed in 9.3.1 of NFPA 96 shall be conducted by properly trained and qualified persons at a frequency determined by the manufacturer's instructions or equipment listing. [96:11.1.8]

##### **50.5.2 Inspection, Testing, and Maintenance of Fire-Extinguishing Systems.**

**50.5.2.1\*** Maintenance of the fire-extinguishing systems and listed exhaust hoods containing a constant or fire-activated water system that is listed to extinguish a fire in the grease removal devices, hood exhaust plenums, and exhaust ducts shall be made by properly trained, qualified, and certified person(s) acceptable to the AHJ at least every 6 months. [96:11.2.1]

**50.5.2.2\*** All actuation and control components, including remote manual pull stations, mechanical or electrical devices, detectors, and actuators, shall be tested for proper operation during the inspection in accordance with the manufacturer's procedures. [96:11.2.2]

**50.5.2.3** The specific inspection and maintenance requirements of the extinguishing system standards as well as the applicable installation and maintenance manuals for the listed system and service bulletins shall be followed. [96:11.2.3]

**50.5.2.4\*** Fusible links of the metal alloy type and automatic sprinklers of the metal alloy type shall be replaced at least semiannually except as permitted by 50.5.2.6 and 50.5.2.7. [96:11.2.4]

**50.5.2.5** The year of manufacture and the date of installation of the fusible links shall be marked on the system inspection tag. [96:11.2.5]

**50.5.2.5.1** The tag shall be signed or initialed by the installer. [96:11.2.5.1]

**50.5.2.5.2** The fusible links shall be destroyed when removed. [96:11.2.5.2]

**50.5.2.6\*** Detection devices that are bulb-type automatic sprinklers and fusible links other than the metal alloy type shall be examined and cleaned or replaced annually. [96:11.2.6]

**50.5.2.7** Fixed temperature-sensing elements other than the fusible metal alloy type shall be permitted to remain continuously in service, provided they are inspected and cleaned or replaced if necessary in accordance with the manufacturer's instructions, every 12 months or more frequently to ensure proper operation of the system. [96:11.2.7]

**50.5.2.8** Where required, certificates of inspection and maintenance shall be forwarded to the AHJ. [96:11.2.8]

##### **50.5.3 Inspection of Fire Dampers.**

**50.5.3.1** Actuation components for fire dampers shall be inspected for proper operation in accordance with the manufacturer's listed procedures. [96:11.3.1]

##### **50.5.3.2 Replacement of Fusible Links.**

**50.5.3.2.1** Fusible links on fire damper assemblies shall be replaced at least semiannually or more frequently as necessary. [96:11.3.2.1]

**50.5.3.2.2** Replacement shall be made by a certified person acceptable to the AHJ. [96:11.3.2.2]

##### **50.5.3.3\* Documentation Tag.**

**50.5.3.3.1** The year of manufacture and the date of installation of the fusible links shall be documented. [96:11.3.3.1]

**50.5.3.3.2** The tag shall be signed or initialed by the installer. [96:11.3.3.2]

**50.5.4\*** Inspection for Grease Buildup. The entire exhaust system shall be inspected for grease buildup by a properly trained, qualified, and certified person(s) acceptable to the AHJ and in accordance with Table 50.5.4. [96:11.4]

**50.5.5 Inspection, Testing, and Maintenance of Listed Hoods Containing Mechanical, Water Spray, or Ultraviolet Devices.** Listed hoods containing mechanical or fire-actuated dampers, internal washing components, or other mechanically operated devices shall be inspected and tested by properly trained, qualified, and certified persons every 6 months or at frequencies recommended by the manufacturer in accordance with their listings. [96:11.5]

**Table 50.5.4 Schedule of Inspection for Grease Buildup**

Type or Volume of Cooking	Inspection Frequency
Systems serving solid fuel cooking operations	Monthly
Systems serving high-volume cooking operations, such as 24-hour cooking, charbroiling, or wok cooking	Quarterly
Systems serving moderate-volume cooking operations	Semiannually
Systems serving low-volume cooking operations, such as churches, day camps, seasonal businesses, or senior centers	Annually

[96: Table 11.4]

### 50.5.6 Cleaning of Exhaust Systems.

**50.5.6.1** Upon inspection, if the exhaust system is found to be contaminated with deposits from grease-laden vapors, the contaminated portions of the exhaust system shall be cleaned by a properly trained, qualified, and certified person(s) acceptable to the AHJ. [96:11.6.1]

**50.5.6.2\*** Hoods, grease removal devices, fans, ducts, and other appurtenances shall be cleaned to remove combustible contaminants prior to surfaces becoming heavily contaminated with grease or oily sludge. [96:11.6.2]

**50.5.6.3** At the start of the cleaning process, electrical switches that could be activated accidentally shall be locked out. [96:11.6.3]

**50.5.6.4** Components of the fire suppression system shall not be rendered inoperable during the cleaning process. [96:11.6.4]

**50.5.6.5** Fire-extinguishing systems shall be permitted to be rendered inoperable during the cleaning process where serviced by properly trained and qualified persons. [96:11.6.5]

**50.5.6.6** Flammable solvents or other flammable cleaning aids shall not be used. [96:11.6.6]

**50.5.6.7** Cleaning chemicals shall not be applied on fusible links or other detection devices of the automatic extinguishing system. [96:11.6.7]

**50.5.6.8** After the exhaust system is cleaned, it shall not be coated with powder or other substance. [96:11.6.8]

**50.5.6.9** When cleaning procedures are completed, all access panels (doors) and cover plates shall be restored to their normal operational condition. [96:11.6.9]

**50.5.6.10** When an access panel is removed, a service company label or tag preprinted with the name of the company and giving the date of inspection or cleaning shall be affixed near the affected access panels. [96:11.6.10]

**50.5.6.11** Dampers and diffusers shall be positioned for proper airflow. [96:11.6.11]

**50.5.6.12** When cleaning procedures are completed, all electrical switches and system components shall be returned to an operable state. [96:11.6.12]

**50.5.6.13** When an exhaust cleaning service is used, a certificate showing the name of the servicing company, the name of the person performing the work, and the date of inspection or cleaning shall be maintained on the premises. [96:11.6.13]

**50.5.6.14** After cleaning or inspection is completed, the exhaust cleaning company and the person performing the work at the location shall provide the owner of the system with a written report that also specifies areas that were inaccessible or not cleaned. [96:11.6.14]

**50.5.6.15** Where required, certificates of inspection and cleaning and reports of areas not cleaned shall be submitted to the AHJ. [96:11.6.15]

### 50.5.7 Cooking Equipment Maintenance.

**50.5.7.1** Inspection and servicing of the cooking equipment shall be made at least annually by properly trained and qualified persons. [96:11.7.1]

**50.5.7.2** Cooking equipment that collects grease below the surface, behind the equipment, or in cooking equipment flue gas exhaust, such as griddles or charbroilers, shall be inspected and, if found with grease accumulation, cleaned by a properly trained, qualified, and certified person acceptable to the AHJ. [96:11.7.2]

### 50.6 Minimum Safety Requirements for Cooking Equipment.

#### 50.6.1 Cooking Equipment.

**50.6.1.1** Cooking equipment shall be approved based on one of the following criteria:

- (1) Listings by a testing laboratory
- (2) Test data acceptable to the AHJ [96:12.1.1]

#### 50.6.1.2 Installation.

**50.6.1.2.1** All listed appliances shall be installed in accordance with the terms of their listings and the manufacturer's instructions. [96:12.1.2.1]

**50.6.1.2.2\*** Cooking appliances requiring protection shall not be moved, modified, or rearranged without prior re-evaluation of the fire-extinguishing system by the system installer or servicing agent, unless otherwise allowed by the design of the fire-extinguishing system. [96:12.1.2.2]

**50.6.1.2.3** The fire-extinguishing system shall not require re-evaluation where the cooking appliances are moved for the purposes of maintenance and cleaning, provided the appliances are returned to approved design location prior to cooking operations, and any disconnected fire-extinguishing system nozzles attached to the appliances are reconnected in accordance with the manufacturer's listed design manual. [96:12.1.2.3]

**50.6.1.2.3.1** An approved method shall be provided that will ensure that the appliance is returned to an approved design location. [96:12.1.2.3.1]

**50.6.1.2.4** All deep-fat fryers shall be installed with at least a 16 in. (406 mm) space between the fryer and surface flames from adjacent cooking equipment. [96:12.1.2.4]

**50.6.1.2.5** Where a steel or tempered glass baffle plate is installed at a minimum 8 in. (203 mm) in height between the fryer and surface flames of the adjacent appliance, the requirement for a 16 in. (406 mm) space shall not apply. [96:12.1.2.5]

**50.6.1.2.5.1** If the fryer and the surface flames are at different horizontal planes, the minimum height of 8 in. (203 mm) shall be measured from the higher of the two. [96:12.1.2.5.1]

**50.6.2 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) at 1 in. (25.4 mm) below the surface. [96:12.2]

**50.6.3 Commercial Kitchen Cooking Oil Storage Tank Systems.** Storage of cooking oil (grease) in commercial cooking operations utilizing aboveground tanks to store cooking oils with a capacity greater than 60 gal (227 L) shall also comply with 50.6.3.1 through 50.6.3.5.

**50.6.3.1 Cooking Oil Classification.** For purposes of this section, cooking oil shall be classified as a Class IIIB liquid unless otherwise determined by testing.

**50.6.3.2 Aboveground Storage Tanks.** Cooking oil storage tanks shall be listed in accordance with ANSI/UL 142 or ANSI/UL 80, and shall be installed in accordance with Chapter 66 and the aboveground tank manufacturer's instructions.

**50.6.3.3 System Components.** Cooking oil storage system components, including but not limited to piping, connections, fittings, valves, tubing, and other related components used for the transfer of cooking oil from the cooking appliance to the storage tank, and from the storage tank to the discharge point, shall be installed in accordance with 66.22.1.

**50.6.3.4 Tank Venting.** Normal and emergency venting for cooking oil storage tanks shall terminate outside the building as specified in 66.21.4.3, 66.22.7.1, and NFPA 30, *Flammable and Combustible Liquids Code*.

**50.6.3.5 Electrical Equipment.** Electrical equipment used for the operation and heating of the cooking grease storage system shall be listed and comply with 66.7.3 and NFPA 70.

## Chapter 51 Industrial Ovens and Furnaces

### 51.1 General.

**51.1.1 Application.** Industrial ovens and furnaces shall comply with this chapter and the applicable provisions of NFPA 86, *Standard for Ovens and Furnaces*.

### 51.1.2 Permits.

**51.1.2.1** Permits, where required, shall comply with Section 1.12.

**51.1.2.2** Applications for a permit shall be accompanied by plans for safe operation showing all essential details and calculations.

**51.2 Location.** Special consideration shall be given to the location of equipment using flammable liquids or when using gas fuels with a vapor density greater than air.

**51.3 Safety Controls.** Safety controls, as specified in NFPA 86, shall be sufficient in number and substantially constructed and arranged to maintain the required conditions of safety and prevent the development of fire and explosion hazards.

## Chapter 52 Stationary Storage Battery Systems

**52.1 General.** Stationary storage battery systems having an electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in unsprinklered buildings for flooded lead-acid, nickel-cadmium, and valve-regulated lead-acid (VRLA) batteries or 1000 lb (454 kg) for lithium-ion and lithium metal polymer batteries used for facility standby power, emergency power, or uninterrupted power supplies shall be in accordance with Chapter 52 and Table 52.1.

### 52.2 Permits.

**52.2.1** Permits, where required, shall comply with Section 1.12.

**52.2.2** Prior to installation, plans shall be submitted and approved by the AHJ.

### 52.3 Safety Features.

**52.3.1 Safety Venting.** Batteries shall be provided with safety venting caps as follows in 52.3.1.1 through 52.3.1.3.

**52.3.1.1 Nonrecombinant Batteries.** Vented lead-acid, nickel-cadmium, or other types of nonrecombinant batteries shall be provided with safety venting caps.

**52.3.1.2 Recombinant Batteries.** VRLA or other types of sealed, recombinant batteries shall be equipped with self-resealing flame-arresting safety vents.

**52.3.1.3** Lithium-ion and lithium metal polymer batteries shall not require safety venting caps.

**52.3.2 Thermal Runaway.** VRLA, lithium-ion, and lithium metal polymer battery systems shall be provided with a listed device or other approved method to preclude, detect, and control thermal runaway.

### 52.3.3 Location and Occupancy Separation.

**52.3.3.1** Battery systems shall be permitted in the same room as the equipment that they support.

**52.3.3.2** Battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.

**52.3.3.3** In other than assembly, educational, detention and correction facilities, health care, ambulatory health care, day care centers, residential board and care, and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

**52.3.3.4** In assembly, educational, detention and correction facilities, health care, ambulatory health care, day care centers, residential board and care, and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

### 52.3.4 Spill Control.

**52.3.4.1** Rooms, buildings, or areas containing free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208 L) or multiple vessels having an aggregate capacity exceeding 1000 gal (3785 L) shall be provided with spill control to prevent the flow of liquids to adjoining areas.

**52.3.4.2\*** An approved method and materials for the control of a spill of electrolyte shall be provided that will be capable of controlling a spill from the single largest vessel.