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Standard Specification for Food Service Equipment Hoods for Cooking Appliances¹

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1. Scope

1.1 This specification covers the basic design and use of exhaust hoods including safety, performance, construction, grease removal devices, and related components for use in food service centers, commercial, industrial, institutional, and public places of assembly.

1.2 Nothing in this specification is intended to prevent the use of other 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 specification.

1.3 The values stated in inch-pound units are to be regarded as standard.

2. Referenced Documents

2.1 ASTM Standard:

F 760 Specification for Food Service Equipment Manuals²

2.2 Underwriters Laboratory Standards:³

UL 710 Grease Extractors for Exhaust Ducts

UL 1046 Grease Filters for Exhaust Ducts

3. Terminology

3.1 Classification and Descriptions of Terms Specific to This Standard:

3.1.1 Exhaust Hoods:

3.1.1.1 *canopy*—a covering fixed above cooking appliances and overhanging on all sides of its unclosed sides, whose lower edge is a maximum height of 7 ft from the finished floor. The purpose of the canopy is to contain and capture the unwanted by-products resulting from the cooking activities.

3.1.1.2 *noncanopy*—a fixed device located in close proximity over cooking appliances and in some cases having a shelf-like appearance. The purpose of which is to channel air movement to contain and capture the unwanted by-products resulting from the cooking activities.

3.1.1.3 *hood with integrated outside makeup air*—hoods with integrated outside makeup air can be a canopy or noncanopy type that introduces outside air through a plenum, that is an integral part of the hood.

3.1.2 Grease Removal Devices:

3.1.2.1 *grease extractors*—a system of components de-

signed for integration within the hood exhaust system for the processing of vapors, gases, or by collecting the airborne grease particles for future disposal, or all of the above.

3.1.2.2 *grease filters*—a component constructed of a series of overlapping baffles, that cause the grease vapors passing through it to impinge, condense, and drain. It shall be designed in such a way to provide an effective flame barrier. Velocity shall be in accordance with filter manufacturer's recommendations (see UL 1046).

3.1.2.3 *makeup air*—the supply of outside air, tempered or untempered, to a building in a controlled manner for the replacement of air exhausted through the hood or the supply of outside air, untempered, into the hood to reduce the amount of tempered air exhausted from the building.

3.1.3 *approved/approval*—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 an appropriate manner.

4. Construction

4.1 All sheet metal parts and other primary collection devices shall be constructed of No. 18 manufacturer's standard gage (0.050 in.) steel or other material equivalent in strength, fire, and corrosion resistance such that it complies with the requirements of UL 710. Construction methods shall be such that the structural integrity of the hood shall be maintained. If insulation is used in a hood with integrated outside makeup air, it shall be non-fibrous surface material where exposed to the airstream.

4.2 Hood Size:

4.2.1 *Hood Size Canopy*—The overhead canopy type hood shall be sized to completely cover the cooking surface plus a minimum 6 in. overhang beyond the edge of the cooking surface to the inside edge of the hood on all open sides.

4.2.2 *Noncanopy*—Noncanopy type hoods shall have the lower front edge of the hood located a maximum vertical distance of 36 in. from the cooking surface. The face of the hood shall not exceed a maximum horizontal setback of 12 in. from the leading edge of the cooking surface. The length of the hood shall not be less than the length of the cooking equipment.

4.3 *Exhaust Duct Collar of Hoods*—Duct collar shall be constructed of No. 16 manufacturer's standard gage (0.064 in.) carbon steel or heavier and not lighter than 18 gage (0.050 in.) stainless steel and shall be continuously welded to the exhaust plenum and shall be sized for minimum velocity

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² *Annual Book of ASTM Standards*, Vol 15.07.

³ Available from Underwriters Laboratory, 333 Pfingsten Road, Northbrook, IL 60062.

of 1500 fpm. Alternate construction methods approved by a nationally recognized agency shall be accepted.

4.4 Integrated Make-Up Air Hoods—Hoods with integrated outside make-up air in which introduction of the make-up air requires the penetration of the exhaust hood.

4.5 Fire Damper—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.

4.6 Grease Trough—The grease trough shall be constructed of the same gage as the exhaust plenum and shall be sealed/liquid tight. The trough shall be kept to a minimum size needed to collect the grease. It shall be pitched to drain to a removable container having a capacity not exceeding 1 qt (? L). Perimeter grease gutters shall not be allowed.

5. Application of Grease Removal Devices

5.1 Approved Grease Extractors—Approved grease extractors shall be installed in accordance with the terms of the approval and the manufacturer's instruction.

5.2 Grease Filters:

5.2.1 Grease filters shall be the type approved for use with commercial cooking equipment.

5.2.2 Filters shall be tight fitting and firmly held in place.

5.2.3 Filters shall be easily accessible and removable for cleaning.

5.2.4 Filters shall be installed at an angle of not less than 45° from the horizontal.

5.2.5 The filter rack shall be equipped with a grease trough beneath the lower edge of the filters.

5.3 Installation:

5.3.1 The distance between the grease filters or other grease removal devices and the cooking surface shall be as great as possible. Where listed, grease extractors or filters are used in conjunction with charcoal or charcoal type broilers, such as cast iron radiant, live charcoal, or wood burning. The minimum allowable travel distance between the nearest edge or the grease filter or grease extractor and the cooking surface shall be as follows: without flame the minimum distance shall be 18 in.; with exposed flame generated by the cooking equipment or cooking process, the minimum distance shall be 24 in.; and with charcoal burning appliances the minimum distance shall be 48 in.

5.3.2 Grease removal devices shall be protected from combustion gas outlets producing high flue gas temperatures. Deep fat fryers, upright or high broilers (salamander broilers) when the distance between the filter or grease removal device and the appliance flue outlet (heat source) is less than 18 in. shall be protected from combustion gas outlets producing high flue gas temperatures. The protection shall be accomplished by installation of a steel or stainless steel removable baffle plate between the heat source and the grease removal device. The baffle plate shall be so sized and located that flame or combustion gases must travel a distance not less than 18 in. from the heat source to the grease filter or removal device. The baffle shall be located not less than 6 in. from the filters or removal devices. All grease laden air, and flue gases not separately vented, shall pass through the grease extraction device.

6. Auxiliary Equipment

6.1 Dampers shall not be installed in exhaust duct or

exhaust duct collars, unless required as part of an approved system.

6.2 Electrical Equipment, Lighting, and Controls—Electrical equipment and controls shall conform to the National Electrical Code.⁴

7. Fire Extinguishing Equipment Where Required

7.1 Listed fire extinguishing equipment installed within the hood shall be installed in compliance with the provisions of applicable standards.

8. Recommended Design Criteria

8.1 Canopy Exhaust Hoods:

8.1.1 The minimum design criteria exhaust air quantities of the canopy type exhaust hood shall be calculated as follows:

$$\text{formula } Q = VPD$$

where:

Q = air quality (cfm),

V = capture velocity (fpm) of each piece of cooking equipment,

P = inside perimeter of hood over all exposed sides of each piece of equipment, and

D = vertical distance from the top of cooking surface to the lower edge of the canopy.

8.1.2 Velocity Values—Velocity values shall be used as related to each cooking load under the canopy as follows (see Figs. 1 and 2):

8.1.2.1 $V = 30$ fpm—Nongrease producing equipment and void spaces under the hood that serves to ventilate other cooking equipment and products described in 8.3.4.

8.1.2.2 $V = 50$ fpm—Low grease, medium heat producing equipment such as griddles, ranges, tilting skillets, steam kettles, and gas ovens.

8.1.2.3 $V = 75$ fpm—High grease, low heat producing equipment such as electric deep fat fryers, grooved griddles, hot tops, and hot top ranges.

8.1.2.4 $V = 100$ fpm—High grease, medium heat producing equipment such as counter top char broilers, woks, chain type char broilers, and gas fried deep fat fryers.

8.1.2.5 $V = 150$ fpm—High grease, high heat producing equipment such as upright broilers with pull out drawers, and open flame charcoal equipment, utilizing solid fuel.

8.1.3 All hoods for use over charcoal and other solid fuel charbroilers shall be provided with separate exhaust systems and hoods. The minimum airflow for charcoal and other solid fuel charbroilers shall be $V = 150$ fpm.

8.2 Noncanopy Exhaust Hoods:

8.2.1 Minimum design criteria for systems utilizing noncanopy type hood should be calculated as follows: 250 cfm/linear ft of cooking equipment for low grease producing equipment such as ranges, hot tops, electric fryers, steam producing equipment, griddles, and low BTU input gas fired fryers. Three hundred cfm/linear ft of cooking equipment for high heat and grease producing equipment such as small char grilles and high BTU input gas fired fryers.

8.2.2 All hoods for use over charcoal and other solid fuel

⁴ Available from National Electrical Manufacturers Assn., 2101 L St. NW, Washington, DC 20037.