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An American National Standard

Standard Specification for Recirculating Hood System for Cooking Appliances[1]

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1. Scope

1.1 This specification covers the requirements of recirculating systems rated 600 volts or less and intended for indoor use with integral and non-integral recirculating systems and for installation in commercial establishments using electric commercial cooking appliances for the preparation of food.

1.2 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip (Withdrawn 2014)[3]

A176 Specification for Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip (Withdrawn 2015)[3]

D3951 Practice for Commercial Packaging

F760 Specification for Food Service Equipment Manuals

F1704 Test Method for Capture and Containment Performance of Commercial Kitchen Exhaust Ventilation Systems

F2474 Test Method for Heat Gain to Space Performance of Commercial Kitchen Ventilation/Appliance Systems

F2519 Test Method for Grease Particle Capture Efficiency of Commercial Kitchen Filters and Extractors

2.2 *ANSI Standards:*[4]

ANSI B1.1 Unified Inch Screw Threads (UN and UNR Thread Form)

ANSI/UL 710B Standard for Recirculating Systems

ANSI/UL 1046 Grease Filters for Exhaust Ducts

ANSI Z1.4 Sampling Procedures and Tables for Inspection and Attributes

NSF/ANSI 2 Food Equipment

2.3 *Other Standards:*

EPA Method 202 Determination of Condensable Particulate Emissions from Stationary Sources[5]

3. Terminology

3.1 *Definitions:*

3.1.1 *grease removal device, n*—a device designed and installed in a Type I hood to remove condensable grease vapor or particles, or both, from the airstream.

3.1.1.1 *Discussion*—The device must be certified to ANSI/UL 1046 or be listed to ANSI/UL 710B as part of the hood.

3.1.1.1 *baffle filter, n*—typically have a series of vertical baffles designed to capture grease and drain to a grease trough.

3.1.1.1 *Discussion*—Filters are removable for cleaning and maintenance to the hood.

3.1.1.2 *electro-static precipitator (ESP), n*—an electric device that draws contaminated air past an ionizer that charges the particles in the airstream and deposits them on oppositely charged collecting plates.

3.1.2 *hood, n*—a device designed to capture and contain cooking effluent including, grease, smoke, steam, heat, and vapor until it is exhausted through a duct or recirculating system.

3.1.3 *recirculating system, n*—a system listed to ANSI/UL 710B incorporating a hood, a fan, and air treatment devices

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

[5] Available from United States Environmental Protection Agency (EPA), Ariel Rios Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20004, http://www.epa.gov.

designed to substantially remove grease and particulate matter from the airstream before reintroducing the treated air into the occupied space.

3.1.3.1 *integral, n*—a recirculating system that forms an integral part of the cooking appliance.

3.1.3.2 *non-integral, n*—a recirculating system intended for installation over specific commercial cooking equipment.

3.1.4 *Type I hood, n*—a hood used for collecting and removing convective heat, grease particulate, condensable vapor, and smoke.

3.1.4.1 *Discussion*—Includes listed grease filters, baffles, or extractors for removing the grease and a fire-suppression system.

4. Classification

4.1 Commercial recirculating systems shall be classified by Type, Style, Electrical Class and Size:

4.1.1 *Type:*

4.1.1.1 *Type 1*—Hood is integral and attached to the appliance.

4.1.1.2 *Type 2*—Hood is non-integral and unattached to the appliance and stands on adjustable legs.

(1) Type 2A—With plain adjustable legs.

(2) Type 2B—With flanged feet that allows the stand to be bolted to the floor.

4.1.2 *Style:*

4.1.2.1 *Style 1*—Electric grill.

4.1.2.2 *Style 2*—Electric open vat fryer.

4.1.2.3 *Style 3*—Electric kettle fryer.

4.1.2.4 *Style 4*—Electric pressure fryer.

4.1.2.5 *Style 5*—Electric oven.

4.1.2.6 *Style 6*—Combination of above electric appliances.

4.1.2.7 *Style 7*—Other electric appliance (specify).

4.1.3 *Electrical Class:*

4.1.3.1 *Class 1*—208 Volt, 1Ph, 60 Hz power supply.

4.1.3.2 *Class 2*—208 Volt, 3Ph, 60 Hz power supply.

4.1.3.3 *Class 3*—240 Volt, 1Ph, 60 Hz power supply.

4.1.3.4 *Class 4*—240 Volt, 3Ph, 60 Hz power supply.

4.1.3.5 *Class 5*—480 Volt, 3Ph, 60 Hz power supply.

4.1.3.6 *Class 6*—440 Volt, 3Ph, 60 Hz power supply (shipboard use).

4.1.3.7 *Class 7*—400 Volt, 3Ph, 50 Hz power supply.

4.1.3.8 *Class 8*—230 Volt, 1 Ph, 50 Hz.

4.1.4 *Size:*

4.1.4.1 *Size 1*—Length of less than 3 ft (0.914 m).

4.1.4.2 *Size 2*—Length greater than 3 ft (0.914 m) and less than 6 ft (1.829 m).

4.1.4.3 *Size 3*—Length greater than 6 ft (1.829 m).

5. Ordering Information

5.1 An order for a recirculating hood system under this specification shall include the following information in the purchasing document:

5.1.1 ASTM title, number, and date of issue.

5.1.2 Type,

5.1.3 Style,

5.1.4 Electrical class,

5.1.5 Size,

5.1.6 Quantity to be furnished,

5.1.7 Appliances to be installed under hood (if Style 7).

5.1.8 Spare and maintenance parts required.

5.2 The following options should be reviewed, and if desired they should be also be included in the order:

5.2.1 When Federal/Military procurement(s) is involved, refer to the supplemental pages.

5.2.2 When other than manufacturer's standard, commercial, and domestic packaging is required, specify packaging requirements.

5.2.3 When special or supplemental requirements, or both, such as inspections, options, accessories, modifications, changes for correctional facilities use, additional nameplate data, etc. are required.

5.2.4 When specified, a certification to ensure that samples representing each lot have been either tested or inspected as directed and the requirements have been met. When specified, a copy of the certification or test results, or both, shall be furnished to the purchaser.

6. Materials

6.1 *General*—Recirculating hood systems shall conform to the applicable documents listed in Section 2. Materials used shall be free of defects that would affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. The use of used or rebuilt products is not allowed under this specification unless otherwise specified.

6.2 *Hood*—The hood and other parts of an exhaust hood that serve to confine or convey the exhaust products, including dampers and structural parts, shall be made of materials equivalent in strength and fire resistance to Type 302, 304, or 430 stainless steel not less than 0.037 inch (0.94 mm) or steel not less than 0.043 inch (1.09 mm) thick. Internal ferrous metal parts of the hood shall be made of one of the 300 or 400 series of stainless steel or provided with corrosion protection.

6.3 *Hardware and Fittings*—Unless otherwise specified, all hardware and fittings shall be corrosion resistant to Specifications A167 or A176 or suitably processed to resist corrosion in accordance with the manufacturer's standard practice.

6.4 *Threaded Parts*—All threaded parts shall conform to ANSI B1.1.

7. Physical Requirements

7.1 *General*—These devices incorporate an air filtering system enclosed in a hooded area intended to capture effluent from the cooking process. The hood assembly typically includes a fan, hood, and an air filtering system (consisting of a grease filter with or without other filtering means). In addition, the hood assembly includes a fire actuated damper, and a fire extinguishing system.

7.2 *Grease Removal Devices:*

7.2.1 Grease filters and extractors shall be installed in accordance with the terms of the approval and the manufacturer's instruction.

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

7.2.3 Filters shall be easily accessible and readily removable for cleaning.

7.3 *Filter Interlocks*—Each filter, including electrostatic precipitators and odor filters, shall be provided with an interlock to determine if the filter is in place and positioned as intended. When the filter is not in place or not positioned as intended, the interlock shall de energize the heat source for the cooking appliance.

7.4 *Fire Extinguishing Equipment*—A UL Listed fire extinguishing system listed shall be installed with hood fire actuated damper when the grease emissions exceed 5 mg/m^3 before the first filter or when specified by user.

7.5 *Hood Airflow*—A manually resettable device for use as a safety interlock shall be provided after the last filter component to disable the heating portion of the cooking appliance if the airflow through the hood drops 10 % below the minimum airflow that will capture and contain the cooking effluent during full load cooking conditions.

8. Performance Requirements

8.1 *General*—Recirculating hood systems shall conform to the requirements of ANSI/UL 710B.

8.2 When requested by the user, capture and containment exhaust flow rate results per Test Method F1704, grease emissions results per EPA Method 202, filtration efficiency results per Test Method F2519, and heat and moisture loading results per Test Method F2474 will be furnished.

8.2.1 *Capture and Containment Exhaust Flow Rate*—The minimum airflow rate through the recirculating system shall capture and contain the cooking effluent according to Test Method F1704.

8.2.2 *Grease Emissions*—The total particulate and condensable grease shall not exceed a concentration 5 mg/m^3 in the exhaust airstream as determined in 8.1.

8.2.3 *Filtration Efficiency*—The filtration efficiency of the primary filter shall be determined by Test Method F2519.

8.2.4 *Heat and Moisture Loading*—The radiant, convective, latent and moisture loading shall be determined by applying Test Method F2474. The heat and moisture loading to the space shall not exceed the capacity of the general HVAC system for the space.

9. Certification

9.1 *Standards and Compliance*—The recirculating hood systems shall conform to the requirements of ANSI/UL 710B and NSF/ANSI 2. Acceptable evidence of meeting these requirements shall be a current listing mark, label, or symbol of a recognized independent testing laboratory and a current listing in the testing laboratory's appropriate publication.

9.1.1 Certification of compliance with the standards cited in this specification shall be provided, when specified.

10. Sampling

10.1 When specified in the contract or purchase order, sampling, testing, and quality assurance of finished units shall be performed in accordance to the requirements specified by ANSI Z1.4.

11. Instructional Material

11.1 Manufacturer's standard commercial publications shall include the following information:

11.1.1 Installation Instructions,

11.1.2 Operating guide or instructions,

11.1.3 Routine maintenance and service procedures,

11.1.4 Replacement parts list.

11.2 Manuals shall comply with Specification F760.

12. Quality Assurance

12.1 When specified in the contract or purchase order, sampling, testing, and quality assurance of finished units shall be performed in accordance to the requirements specified by ANSI/UL 710B and NSF/ANSI 2.

13. Product Marking

13.1 Identification shall be permanently and legibly marked on a corrosion-resistant material securely attached to the machine at the source of manufacture. Identification shall include the manufacturer's model and serial number, name and trade name, and total emissions to be readily identifiable.

13.2 Marking shall be readily visible after installation.

14. Packaging and Package Marking

14.1 Unless otherwise specified, packaging shall be manufacturer's standard commercial packaging as meets interstate shipping requirements and in accordance with Practice D3951.

15. Keywords

15.1 commercial kitchen ventilation (CKV); kitchen ventilation; recirculating hood; recirculating system; ventless; ventless hood

SUPPLEMENTARY REQUIREMENTS

S1. When specified in the purchase order, supplementary requirements shall apply when this standard is used in government procurement of commercial recirculating hood system for cooking appliances. The identification plate shall include the contract number, national stock number, name, brand, or trademark of the manufacturer of such name character as to be readily traceable to the manufacturer.

S2. *Navy Supplement*— The unit shall be furnished with a watertight control box in accordance with UL/NEMA 12.