DEPARTMENT OF HEALTH AND MENTAL HYGIENE
MARYLAND VENTILATION CRITERIA
FOR FOOD ESTABLISHMENTS

Chapter 1 - Purpose And Definitions
1.100 Title
1.200 Intent
1.300 Scope
1.400 Definitions

Chapter 2 - General Hood Standards
2.100 Underwriters Laboratories (UL) 710 Hoods
2.101 Air Volume Exemption
2.102 Applicable Standards for UL 710 Hoods
2.200 Non-UL 710 Hoods
2.201 Applicable Standards for Non-UL 710 Hoods
2.202 Total Exhaust Volume
2.203 Net Exhaust Volume

Chapter 3 - Compliance to Applicable Codes and Standards
3.100 Code of Maryland Regulations
3.200 State Fire Prevention Code and ANSI/NFPA-96
3.300 BOCA/National Mechanical Code or other Applicable Code
3.400 National Sanitation Foundation Standard 2 or Equivalent

Chapter 4 - Design, Construction, and Installation of Ventilation Systems
4.100 System Approach
4.101 Hoods Needed
4.102 Ventilation System Not Using a Hood
4.013 Overall Positive Pressure
4.104 Makeup Air Strategies
4.200 Air Volumes and Velocities
4.201 Total and Net Exhaust Air Volumes
4.202 Makeup Air Volumes
4.203 Duct Velocities
4.204 Air Velocities Through Filters
4.300 Hoods
4.301 General
4.302 Materials of Construction
4.303 Grease Filter Support Framework
4.304 Grease Removal System
4.305 Duct Collar Locations
4.306 Vent Hoods
4.307 Hood Lighting
4.308 Fire Suppression
4.309 Minimize Cross-Contamination Potential

4.310 Multiple Hood Configurations
4.311 Recirculating Systems
4.312 Overshelves
4.400 Grease Removal Devices
4.401 Accepted Types
4.402 Materials of Construction
4.403 Design and Installation
4.500 Ducts
4.600 Fans
4.700 Dimensional Offsets
4.701 Height of Hood
4.702 Cooking Surface to Grease Removal Device
4.703 Hood Overhangs and Offsets
4.704 Supply Fan Intake from Exhaust Fan

Chapter 5 - Plan Review Submittals
5.100 General
5.200 UL 710 Hood Plans
5.300 Non-UL 710 Hood Plans

Chapter 6 - Inspection and Performance Testing
6.100 System Evaluation
6.101 Smoke Test
6.102 Use Test
6.103 Anemometer Readings
6.200 Approval Criteria

Chapter 7 - System Use and Maintenance
7.100 Operating Procedures
7.200 Cleaning
7.200 Equipment Additions and Changes

Chapter 8 - Exceptions
8.100 Existing Hoods
8.200 Non-Conforming Hoods

MARYLAND VENTILATION CRITERIA FOR FOOD ESTABLISHMENTS

Chapter 1 - Purpose and Definitions

1.100 Title.

These provisions shall be known as the Ventilation Criteria, hereinafter referred to as "the Criteria".

1.200 Intent.

The purpose of the Criteria is to help ensure that ventilation systems in food establishments effectively and safely remove the grease vapors, smoke, heat, steam, fumes, and obnoxious odors produced from activities associated with the processing of food to promote a sanitary and well-ventilated environment.

1.300 Scope.

The Criteria establishes the standards for the plan review, construction, inspection, evaluation, and maintenance of ventilation systems in food establishments.

1.400 Definitions.

The following definitions apply in the interpretation and application of the Criteria.

(1) "Anemometer" means a device used to measure air velocity.

(2) "Approved" means acceptable to the regulatory authority based on a determination of conformity with principles, practices, codes, and generally recognized standards.

(3) "Balance Report" means a report completed by a qualified person, who after on-site testing of a ventilation system, specifies in the report certain air volumes and the building's overall static pressure.

(4) "Compensating Supply Air" means air supplied through a plenum in the hood which is directed into the hood's capture area or down along the hood's perimeter. Air supplied through the hood's front face or behind the cooking equipment close to the floor is not considered compensating supply air.

(5) "Damper" means a plate or other device within a duct for controlling the flow of gases.

(6) "Department" means the Department of Health and Mental Hygiene, or the

Department's designee.

(7) "Easily Cleanable" means fabricated and installed so soil is removed by normal cleaning methods.

(8) "Grease" means rendered animal fat or vegetable shortening in any form associated with cooking and other food preparation.

(9) "Grease Extractor" means a device or a system of components for reducing the grease concentration from the air stream entering the system and concentrating the grease for further action.

(10) "Grease Filter" means a baffled metal filter that deflects entering air and entrained vapors in such a way as to remove grease and allow it to drain to a grease trough.

(11) "Grease Laden Vapors/Air" means vapors in concentrated level of above 5 mg per cubic meter released into the air due to grease being heated to its vaporization point.

(12) "Grease Removal Devices" means any device for removing vapor suspended grease particles from an air stream.

(13) "Hood" means a device provided for cooking, warewashing, and other food processing functions that as part of the ventilation system, directs and contains grease-laden vapors, fumes, smoke, steam, heat, and obnoxious odors before discharge through an exhaust duct.

(A) "Compensating Hood" means a hood that is designed to introduce supply air through an integral plenum either directly into the hood capture area or by directing air down along the hood perimeter. A hood with only front face discharge of supply air is not a compensating hood.

(B) "Short-Circuit Hood" means a compensating hood with a integral plenum which discharges supply air directly into the hood's capture area.

(C) "Canopy Hood" means a hood located over equipment which is designed to overhang the equipment on all exposed sides and capture large surges of contaminated air.

(D) "Island Hood" means a canopy hood that is mounted from the ceiling with all four sides or the longitudinal sides exposed.

(E) "Back-Shelf Hood" means a hood designed to be mounted behind the equipment and which does not overhang the front of the equipment.

(F) "Eye-Brow Hood" means a hood designed to capture the vapors and heat escaping

the open doors of equipment and which is located above and overhangs the door openings.

(G) "Vent Hood" means a hood designed to capture and remove steam, fumes, and heat but not grease.

(14) "Duct" means an enclosure for the transmission of air and vapors.

(15) "Make-up Air" means forced and/or passive air entering a space that replaces air exhausted from the space. Make-up air consists of compensating supply air, other supply air delivered through the hood such as front face discharge, supply air delivered through ceiling and wall diffusers, and air passively transferred to the point of exhaust.

(16) "Overshelf" means any equipment such as a shelf, cheesemelter, bun warmer, or salamander, which is located over cooking equipment and below a hood exhaust plenum.

(17) "Recirculating System" means a system for controlling the smoke or grease-laden vapors from commercial cooking equipment that does not exhaust to the outside.

(18) "Smoke Bomb" means a device which releases smoke in order to simulate the operation of smoke and vapor producing equipment for test purposes.

Chapter 2 – General Hood Standards

2.100 Hoods Listed by Underwriters Laboratories (UL) or Equivalent as Conforming to the Standard for Exhaust Hoods for Commercial Cooking Equipment UL 710.

2.101 Exemption from Air Volume Requirements for UL 710 Hoods.

A hood tested in accordance with UL Standard 710, and bearing the label of an approved agency, hereinafter referred to as a UL 710 hood, is exempt from the exhaust air volumes required in the building code and those in the Criteria, and from other sections of the Criteria as listed in Section 3.102(D) when it is designed for the type of cooking appliance(s) provided.

2.102 Applicable Standards for UL 710 Hoods.

(A) A UL 710 hood must be installed in accordance with its listing and per the manufacturer's instructions for the labeled equipment;

(B) No equipment having a cooking temperature exceeding the test temperature of a

specific hood may be installed under a UL 710 hood;

(C) A UL 710 hood must be installed in conformance to the complete UL 710 testing report for the model hood, and an installed hood's duct locations must be the same as those of the model tested; and

(D) A UL 710 hood must comply with the Criteria, except that Sections 4.201(B)-(D), 4.303, 4.305, 4.701, and 4.703 of the Criteria do not apply to UL 710 hoods.

2.200 Hoods Not Listed by UL under Standard 710.

2.201 Applicable Standards for Non-UL 710 Hood.

A non-UL 710 hood must comply fully with the Criteria.

2.202 Total Exhaust Volume.

A hood which has not been certified as complying to UL Standard 710, hereinafter referred to as a non-UL 710 hood, must exhaust the minimum volume of air as specified by the applicable building code.

2.203 Net Exhaust Volume.

A non-UL 710 hood, if a compensating hood, must have a net exhaust (Total exhaust minus compensating supply) as prescribed in Section 4.201(D) of the Criteria.

Chapter 3 - Compliance to Applicable Codes and Standards

3.100 Code of Maryland Regulations (COMAR).

Ventilation systems in food service facilities must comply with COMAR 1O.15.03. Ventilation systems in food processing plants must comply with COMAR 10.15.04.

3.200 State Fire Prevention Code (COMAR 12.03.01) and the National Fire Prevention Association Document ANSI/NFPA 96.

Exhaust systems used to remove smoke and grease-laden vapors generated by commercial cooking equipment must comply with the State Fire Prevention Code and the latest edition of ANSI/NFPA-96.

3.300 The Building Officials & Code Administrators (BOCA) Basic/National Mechanical Code, Southern Building Code Congress (SBCCI) Standard Mechanical Code, or other Applicable Code.

Commercial exhaust hood systems must comply with the latest requirements of the applicable building code.

3.400 National Sanitation Foundation (NSF) STANDARD 2 or Equivalent.

Hoods in food service facilities must comply with NSF STANDARD 2 or equivalent and must bear the NSF mark or equivalent.

Chapter 4 - Design, Construction, and Installation of Ventilation Systems

4.100 System Approach.

The smoke, grease vapors, steam, heat, fumes, and obnoxious odors generated in a food establishment must be captured, exhausted, or otherwise removed in such a manner as to allow and promote a safe and sanitary environment. Where required, exhaust hood systems must be designed as part of the general facility ventilation system in such a way as to allow the complete system to provide adequate ventilation and climate control while not interfering with the capture and exhaust of smoke, grease, steam, heat, fumes, and obnoxious odors.

4.101 Hoods Needed.

(A) Grease removing exhaust hoods must be installed in conjunction with commercial cooking equipment which produce grease vapors, as specified in the State Fire Prevention Code, NFPA-96, and the applicable building code. For the purpose of the Criteria, cooking equipment which by heating grease produce vapors in concentrated level of above 5.0 mg per cubic meter require a grease hood without exception. Such equipment may include:

(1) Grills;

(2) Fryers;

(3) Charbroilers;

(4) Ovens used to cook fatty foods at a temperature which exceeds the vaporization point of grease; and

(5) Solid Fuel Cooking Equipment.

(B) Grease removing hoods may be required in conjunction with equipment which by heating grease produce vapors in concentrated level of 5 mg per cubic meter or less when an insanitary condition or cross-contamination hazard may result without a grease hood. Such equipment may include:

(1) Closed ovens used to cook fatty foods at a temperature which exceeds the vaporization point of grease; and

(2) Conveyor pizza ovens.

(C) In determining whether a piece of equipment which emits vapors in concentrated level of 5 mg per cubic meter or less requires a grease removing hood, the following factors shall be considered:

(1) Equipment size;

(2) Size of room or enclosing structure;

(3) Design of the overall ventilation system;

(4) Amount of equipment use;

(5) Cross-contamination potential from grease condensate; and

(6) Advice from the State Fire Marshal or local fire authority.

(D) Vent hoods must be installed in conjunction with food equipment that generate steam, heat, or fumes which can not otherwise be removed in a safe and sanitary manner. Such equipment may include:

(1) High temperature ovens not cooking fatty foods or not emitting grease vapors;

(2) Steam kettles; and

(3) Warewashing machines using hot water sanitization.

(E) In determining whether a piece of equipment which does not emit grease vapors requires a vent hood, the following factors shall be considered:

(1) Equipment size;

(2) Size of room or enclosing structure;

(3) Design of the overall ventilation system;

(4) Amount of equipment use; and

(5) Cross-contamination potential from condensate.

(F) The following types of equipment do not require a hood unless it is determined by an inspection of the operating equipment that a hood is necessary to maintain a sanitary condition:

(1) Hot food holding units;

(2) Low temperature, insulated, enclosed ovens;

(3) Microwave ovens; and

(4) Warewashing machines using a chemical sanitizer.

4.102 Ventilation System Not Using a Hood

(A) A food establishment that does not use equipment that produces grease, smoke, or excessive steam and therefore is not required to have a hood, shall use a ventilation system that complies with this section and Sections 4.103, 4.104, 4.202, 4.704, 6.102, 6.103, 6.200, and 7.100 of the Criteria.

(B) A food establishment that does not use a hood shall use a ventilation system that:

(1) Exhausts or otherwise effectively removes excessive heat, fumes, and obnoxious odors using mechanical exhaust fans with proper weatherproofing, dampers and insect screening;

(2) Provides make-up air in accordance with the Criteria to provide proper air balance;

(3) Provides proper ventilation and air exchange; and

(4) Prevents steam from condensing on a non-food contact surface located above food or a food-contact surface and otherwise precludes food contamination.

4.103 Overall Positive Pressure.

In order to exclude outside airborne contaminants from the food establishment, the overall ventilation system should maintain the building under a slight positive pressure. This

requires a volume of outside air be introduced into the building in slight excess to the volume of air exhausted. In all cases, the amount of makeup air must be adequate to prevent negative pressures in the cooking area(s) from exceeding 0.02 inches water column (4.98 PA). A slight negative pressure is allowed in the cooking area to confine odors to that area, but the negative pressure can not exceed this figure.

4.104 Makeup Air Strategies.

(A) The outside makeup air supplied into a food establishment may enter via the HVAC system, a separate supply fan unit, or a combination of the two, and in limited situations, passively, through unforced makeup air openings.

(B) Regardless of the mechanism used to introduce forced makeup air, the supply air must be filtered so as to remove airborne contaminants.

(C) Makeup air must be tempered when necessary to:

(1) Prevent condensation from being a sanitation or cross-contamination problem;

(2) Promote comfortable conditions; and

(3) Comply with the applicable building code.

(D) The makeup air delivered through plenums in short circuit and other compensating hoods must not interfere with the ability of the hoods to capture smoke and grease laden vapors.

(E) Forced air makeup systems must be connected by an electrical interlocking switch so that the makeup unit(s) operate when the exhaust fan(s) operate.

(F) Makeup air must be supplied in such a manner so as to prevent large pressure differentials between separate areas.

(G) Passive makeup air devices or openings may be considered only when:

(1) The required volume of air is delivered with an in-draft velocity of no more than 400 feet per minute;

(2) Air delivered from the outside or from a non-food area is adequately filtered to remove contaminants;

(3) An opening to the outside is adequately screened to prevent insect entry;

(4) Tempered air is not required for the comfort of employees or customers;

(5) Untempered makeup air does not create an insanitary condition or food contamination problem due to condensation; and

(6) The use of unforced makeup air does not violate any applicable standard or code.

4.200 Air Volumes and Velocities.

4.201 Total and Net Exhaust Air Volumes.

(A) UL 710 hoods must exhaust the minimum air volume per its listing.

(B) Non-UL 710 hoods must exhaust the minimum volume of air required in the applicable building code. When a building code does not exist or does not apply, the volumes listed in Section 4.201(D) of the Criteria represent the minimum exhaust air volume.

(C) Compensating hoods not listed under UL Standard 710 must have a net exhaust (total exhaust volume minus integral compensating supply volume)as listed in Section 4.201 (D) of the Criteria.

(D) Minimum Exhaust Volumes.

(1) Canopy Hoods

$$Q = (v)(l)(d) + 50(L)$$

where:

Q = Quantity of exhaust air in cubic feet per minute (CFM);
v = updraft velocity of contaminated air in feet per minute (fpm) given in Table 1 below;
l = length of equipment or line of equipment with the same updraft velocity;
d = depth of equipment or line of equipment with the same updraft velocity, or the vertical distance from the cooking surface to the lower edge of the filter bank plenum, whichever is greatest; and
L = total length of the longitudinal side(s) which are void of equipment plus the length of exposed ends. (An exposed end does not include an end of a hood that is equipped with a full side curtain. For island hoods with a single line of equipment, one longitudinal side is considered to be void of equipment).

Table 1 – Equipment Updraft Velocities and Reference Temperatures

Equipment Type	Updraft Velocity (fpm)	Reference Temperature (°F)
Low heat, steam, and grease (pizza ovens, single enclosed ovens, small steam kettles, open burner ranges, and steamers)	**50**	**400**
Medium heat and grease (griddles, fryers, skillets, braising pans, hot top ranges, double ovens, and pressure fryers)	**85**	**400**
High heat and grease (charbroilers, broilers, and woks)	**125**	**600**
Wood and Charcoal	**150**	**700**

(2) Backshelf Hoods

$Q = 250\ (l)$

where:

Q = Exhaust volume, and
l = length of hood

(3) Eyebrow Hoods Without Grease Extractors

$Q = 150\ (l)$

where:

Q = Exhaust volume, and
l = length of door opening

(4) Eyebrow Hoods With Grease Extractors

$Q = 250\ (l)$

where:

Q = Exhaust volume, and
l = length of door opening

4.202 Makeup Air Volumes.

(A) A volume of outside air approximately equal to the volume of air exhausted must be introduced into the facility.

(B) Sufficient makeup air must be introduced in the vicinity of the exhaust points so as to prevent a negative pressure exceeding .02 inches wg from developing. The remaining quantity of supply air can be introduced into adjoining areas which allow air transfer to the exhaust points.

(C) A compensating hood that is UL 710 listed must not introduce compensating supply air in excess of its listed maximum supply volume.

(D) A compensating hood not listed under UL Standard 710 must not introduce compensating supply air in a volume such that the minimum net exhaust volume listed in Section 4.201(D) is not met.

4.203 Duct Velocities.

Duct systems must be designed and installed such that the air velocity in a duct shall be a minimum of 1500 feet per minute.

4.204 Air Velocity Through Filters.

(A) Grease filters and other grease extractors must be sized and arranged such that the air traveling through each device is at a rate specified by the manufacturer as optimizing grease extraction.

(B) The velocity of air traveling through a filter must be in the velocity range recommended by the filter manufacturer.

4.300 Hoods.

4.301 General.

Hoods and related appurtenances must be designed and installed such that when connected to a proper exhaust fan and duct system and used per the manufacturer's direction, the effective capture, containment, and removal of the heat, steam, grease, smoke, vapors, condensation, fumes, and obnoxious odors that otherwise might create an unsafe or

insanitary condition is assured.

4.302 Materials of Construction.

(A) In food service facilities, the interior surfaces of hoods, which include all the hood surfaces exposed to food and equipment except baffle filters, must meet the food zone requirements of the National Sanitation Foundation (NSF) Standard 2 or equivalent. Stainless steel with a #3 polish (100 grit) finish or smoother is acceptable.

(B) The interior surfaces of such hoods may not be paint, galvanized metal, black iron steel, or a any other material not meeting NSF Standard 2 or equivalent food zone material requirements.

(C) In food processing plants, hood surfaces over open food product or utensils must conform to the requirements in Sections 4.302(A) and (B).

(D) The interior surfaces of hoods that do not cover open food product or utensils must, as a minimum, meet NSF Standard 2 or equivalent requirements for splash zone materials. Steam hoods must be corrosion resistant.

(E) The construction materials and material thickness of hoods must meet the requirements of the applicable building and fire code while complying with the other requirements of this Section.

4.303 Grease Filter Support Framework.

Filter frames must be designed to firmly hold the filters in place so as to accomplish a continuous surface to surface contact between filters or between filters and supports.

4.304 Grease Removal System.

(A) A hood serving grease producing commercial cooking equipment must contain a system to capture and remove a large percentage of suspended grease particles from the entering air stream.

(B) The grease removal system may consist of a grease extractor, grease filter with trough and cup, or other approved device.

(C) Grease removal devices must be listed with an organization accepted by the State Fire Marshal.

(D) Grease cups must be readily accessible, removable, and easily cleanable.

(E) Grease troughs must be readily accessible or removable, easily cleanable, and properly pitched to a grease cup. Sections of grease troughs less than 3 feet long do not require grease cup and may be level as long as the trough is readily accessible and easily cleanable.

4.305 Duct Collar Locations.

(A) Duct collars shall be located so as to maximize the efficiency of the hood in performing its intended function.

(B) Grease hoods with a length of 9 feet or less may have a single duct outlet. Grease hoods with a length between 9 and 18 feet shall have at least 2 duct outlets. Grease hoods with a length between 18 and 24 feet shall have at least 3 duct outlets. Grease hoods with a length of between 24 and 30 feet shall have a minimum of 4 duct outlets.

(C) Grease hood exhaust duct collars must be evenly spaced with no more than 8 feet separating the centerline of ducts.

(D) The requirements in (B) and (C) above may be waived when previous testing has shown that the velocity at each filter or slot is within the manufacturer's recommended range, and that the hood performs satisfactorily with an exhaust duct configuration other than listed above. Such testing must be completed by a bona-fide testing lab.

4.306 Vent Hoods.

(A) Hoods used to exhaust steam, fumes, and heat shall be designed so as to prevent condensation from accumulating on non-food contact surfaces and dripping or draining onto food or food contact surfaces.

(B) When integral condensate baffles and gutters are connected to a drain, the condensate must discharge through an approved air gap.

(C) Air and grease filters are not required for vent hoods. Mesh filters may be used provided they are accessible for cleaning and do not pose a cross-contamination hazard.

4.307 Hood Lighting.

(A) Lighting fixtures in kitchen hoods must be certified by a bona-fide testing lab as meeting all the requirements of NFPA-96 and the applicable electrical code.

(B) Lighting fixtures in hoods over open food product or food contact surfaces must meet

NSF Standard 2 or equivalent requirements.

(C) Lighting fixtures must be provided with plastic coated thermal and shock-resistant globes. Recessed fixtures must be provided heat and shock resistant diffusers.

4.308 Fire Suppression.

(A) Grease hoods must include a fixed automatic fire extinguishing system that conforms to NFPA-96 and to the requirements of the State Fire Marshal's Office.

(B) Automatic fire extinguishing systems must be listed with an organization acceptable to the State Fire Marshal.

(C) A readily accessible means for manual activation of the fire extinguishing system must be provided unless an exception is allowed by the State Fire Marshal's Office.

(D) The components of the fire extinguishing system located within the hood cavity must be easily cleanable and designed to preclude food adulteration.

4.309 Minimize Cross-Contamination Potential.

Ventilation systems including exhaust hoods and associated components must be designed, constructed, installed, and maintained so as to prevent grease or water condensation from accumulating on non-food contact surfaces and dripping or draining onto food, food contact surfaces, food equipment, or food utensils.

4.310 Multiple Hood Configurations.

Individual canopy hoods may be joined to create larger ventilation units as long as the joints are properly sealed by continuous welding or other method approved by a testing laboratory. The joints must be grease tight.

4.311 Recirculating Systems.

Recirculating systems may be used only when all of the following conditions are met:

(1) The air recirculated into the space contains a grease concentration of less than 5 mg per cubic meter;

(2) The recirculating system and associated equipment must be located in a room or area which is properly ventilated to the outside so as to prevent an increase in the

concentration of emitted grease and other particulates to an unsafe or insanitary level.

(3) The recirculated air meets all Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) requirements regarding particulate matter;

(4) The recirculating system and any associated hood, grease collection, and fire suppression system meet the requirements of NFPA-96 and the State Fire Marshal;

(5) Recirculating systems must be listed with a testing laboratory;

(6) The recirculating system is associated only with equipment for which testing by a bona-fide testing laboratory has shown that (1), (3), and (4) above are met; and

(7) The system meets the requirements of NSF Standard 2 or equivalent.

4.312 Overshelves.

Overshelves may be used only when all the following conditions are met:

(1) A deflector or the design of the overshelf prevents grease from accumulating on the bottom of the overshelf and dripping or draining onto food or food contact surfaces and otherwise precludes cross-contamination;

(2) A deflector meets NSF Standard 2 or equivalent standards for food zone materials; and

(3) The hood's ability to capture grease vapors and smoke is not impaired.

4.400 Grease Removal Devices.

4.401 Accepted Types.

Grease filters, baffles, grease extractors, and other grease removal devices must be listed with an organization approved by the State Fire Marshal. Mesh filters may not be used for removing grease laden vapors.

4.402 Materials of Construction.

Listed grease filters must be made of materials that are durable so as to permit proper cleaning. Aluminum, galvanized steel, or stainless steel may be used.

4.403 Design and Installation.

(A) Grease filters must be sized according to the manufacturer's instructions so as to operate within its listed recommended velocity range.

(B) Grease filters shall be easily accessible for cleaning and shall be installed at an angle not less than 45 degrees from horizontal.

(C) Blanks when used must:

(1) Not interfere with the proper operation of the hood system;

(2) Be easily cleanable;

(3) Constructed of materials that are accepted for grease filters;

(4) Be installed only at the ends;

(5) Have a total length of 12 inches or less; and

(6) Not violate NFPA-96, State Fire Prevention Code, or an exhaust hood system's listing.

4.500 Ducts.

(A) Duct systems must conform to the applicable requirements of NFPA-96, the local building code, and the State Fire Marshal's Office.

(B) Dampers shall not be installed in exhaust ducts unless specifically listed for such use or required as part of a listed or approved device or system.

(C) Insulation in supply ducts and hood plenums must be properly secured and covered so as not to contaminate food or food contact surfaces.

4.600 Fans.

Exhaust fans for commercial cooking equipment shall be up-discharge fans, which are listed, accepted by the State Fire Marshal, and meet all the requirements of NFPA-96.

4.700 Dimensional Offsets.

UL 710 hoods are exempt from the requirements of this section, except 4.702, when

installed in accordance with their listing. Non-UL 710 hoods must comply fully with this section.

4.701 Height of Hood.

(A) Canopy hoods must be installed such that the face opening is not less than 75 inches nor more than 84 inches from the floor.

(B) Canopy hoods shall have a minimum interior capture height of 2 feet.

4.702 Cooking Surface to Grease Removal Device.

The distance between the grease removal device and the cooking surface must comply with NFPA-96 and the applicable building code. For charcoal broilers, including gas or electrically heated charbroilers, a minimum vertical separation of 4 feet must be maintained between the lower edge of the grease removal device and the cooking surface except that grease removal devices supplied as part of a listed hood assembly must be installed according to the terms of the listing and the manufacturer's instructions.

4.703 Hood Overhangs and Offsets.

(A) Canopy hoods shall overhang associated equipment at least 12 inches on all exposed sides. An overhang of 18 inches is recommended in the area of charbroilers.

(B) Overhangs are not required when full side curtains which extend to the front edge of the equipment are provided.

(C) For back-shelf hoods, the cooking surface must not extend greater than 12 inches past the hood's leading edge, and the vertical distance from the cooking surface to the bottom of the hood's leading edge shall not exceed 36 inches.

(D) Eyebrow hoods with grease removal devices shall extend past the front of the equipment opening by at least 18 inches, and the hood's leading edge must be within 42 inches of the lowest opening.

(E) Eyebrow hoods without grease removal devices shall extend past the front of the equipment opening by at least 12 inches.

(F) The length of eyebrow and backshelf hoods shall equal or exceed the length of the cooking surface or door opening of associated equipment.

4.704 Supply Fan Intake from Exhaust Fan.

The exhaust fan must be located with a minimum separation of 10 feet to adjacent buildings, property lines, and supply air intakes. Where space limitations prevent this separation, the exhaust outlet must be installed at least 3 feet above any air intake that is less than 10 feet horizontally removed.

CHAPTER 5 - PLAN REVIEW SUBMITTALS

5.100 General.

Properly prepared plans and specifications must be submitted to the Department for a proposed new hood or ventilation system, for modifications to an existing hood or ventilation system, and when substitutions of equipment under hoods are planned. The information required by the Department may include:

(1) The manufacturer's name and the hood model number;

(2) Hood material of construction;

(3) Hood drawing in horizontal section (plan view) drawn to scale which indicates the following:

(a) Size of hood;

(b) Size and location of exhaust and supply collars and plenums; and

(c) Location and size of equipment associated with the hood.

(4) Hood drawing in section view which indicates the arrangement of the grease or condensate removal system, the exhaust and supply plenums, and the filter support framework;

(5) Type, number, size, material of construction, effective area, and manufacturer's recommended velocity range of all grease removal devices;

(6) Exhaust and supply volumes at the calculated static loss;

(7) Equipment list and specifications to include maximum cooking temperature;

(8) Documentation of hood listings such as National Sanitation Foundation Standard 2, Underwriter's Laboratories Standard 710, and American National Standard/National Fire Prevention Association Standard 96;

(9) Exhaust and supply fan model numbers and fan curves; and

(10) Calculated air balance.

5.200 UL 710 Hood Plans.

In addition to the requirements in Section 5.100, for a proposed UL 710 hood, the UL listing card information for the hood must be submitted to include the following:

(1) Hood lengths listed;

(2) Minimum exhaust;

(3) Maximum supply (if compensating hood);

(4) Maximum cooking surface temperature;

(5) Vertical offset from cooking surface to hood; and

(6) Minimum front and side overhangs.

5.300 Non-UL 710 Hood Plans.

In addition to the requirements in Section 5.1, for a non-UL 710 hood, the manufacturer must specify the building code(s) to whose requirements the hood complies.

CHAPTER 6 - INSPECTION AND PERFORMANCE TESTING

6.100 System Evaluation.

The evaluation criteria in this Section can be applied only after the building has been air balanced.

6.101 Smoke Test.

(A) Each new or remodeled hood system that serves equipment which produces smoke and/or grease vapors shall be smoke tested as described in this section.

(B) Smoke bomb(s) with a total duration of 60 seconds shall be placed in metal can(s) so as to direct the smoke up. The bomb(s) must then be situated on the leading heated edge of hot cooking equipment at length intervals suggested by the smoke bomb

manufacturer as creating a representative test.

(C) Total or practically complete smoke capture and exhaust constitutes a passing test.

(D) Substantial escape of smoke constitutes a failing smoke test.

(E) Hoods may be tested with smoke bombs of less duration and smoke volume if a representative test results. The bomb manufacturer's recommendations as to number and spacing must be followed.

6.102 Use Test

(A) Vent hoods shall be tested by operating the associated equipment. For steam hoods practically complete steam capture and exhaust is required and no cross-contamination potential may be evident.

(B) Ventilation systems that do not contain a hood shall be tested by operating the associated equipment. Heat, fumes, and obnoxious odors must not be excessive and steam must not condense on any surface located above food or a food-contact surface.

6.103 Anemometer Readings.

When used to take velocity measurements in order to calculate approximate air volumes, anemometer readings shall be taken and used as follows:

(A) Exhaust Measurements

(1) Take several air velocity readings (fpm) at different points across each filter by holding the instrument probe approximately one (1) inch from an open slot in the filter face;

(2) Average the readings for each filter and multiply this figure by the effective area of the filter in square feet. The resultant product is the exhaust volume in cubic feet per minute (CFM) for that filter; and

(3) Calculate the volumes in a like manner for each filter. The sum of the volumes gives the approximate total exhaust volume.

(B) Supply Air Measurements

The approximate makeup air volume for open plenum style compensating hoods may be approximated by averaging velocity readings taken at different points across the opening and multiplying this figure times the area of the opening.

6.200 Approval Criteria.

(A) A ventilation system installation is acceptable when:

(1) The ventilation system and any associated hood passes the mandatory smoke or use test;

(2) A properly prepared balance report shows that the building is:

(a) Neutrally balanced or under a slight positive pressure as evidenced in a properly prepared balance report; and

(b) Properly ventilated with an adequate number of air exchanges for its use.

(3) Anemometer readings, if taken, indicate velocities and volumes consistent with design values;

(4) All hoods bear the proper listing labels such as NSF or UL; and

(5) Inspection reveals compliance with the Criteria and no problems with the design, construction, or installation of the hood or ventilation system that could adulterate food are observed.

(B) If upon inspection, one or more of the above approval criteria is not met, the ventilation system shall be disapproved until corrections are made.

CHAPTER 7 - SYSTEM USE AND MAINTENANCE

7.100 Operating Procedures.

(A) Exhaust ventilation systems, including the supply air components shall be in operation while associated equipment is used.

(B) Exhaust hoods using grease filters shall not be operated with filters removed.

(C) The equipment under a grease hood with a fire extinguishing system shall not be used if the fire extinguishing system is not operational.

7.200 Cleaning.

(A) Hood surfaces, grease troughs, grease cups, and grease removal devices shall be inspected daily to determine if grease and filth have accumulated to an extent which requires cleaning or other maintenance.

(B) Hoods, grease troughs, grease cups, and grease removal devices must be cleaned to bare metal before heavy deposits of grease and filth accumulate.

(C) All cleaning chemical residues must be removed from those hood surfaces in the food zone so as to prevent the contamination of food, food utensils, and food contact surfaces.

7.300 Equipment Additions and Changes.

(A) Equipment shall not be added or substituted such that the capacity of a hood to effectively remove heat, steam, smoke, grease, fumes, and obnoxious odors is exceeded.

(B) The velocities and volumes given in Section 4.200 may be used as a guide when evaluating whether an existing hood system has a sufficient exhaust volume to allow the addition or substitution of equipment.

CHAPTER 8 - EXCEPTIONS

8.100 Existing Hoods.

Existing hood systems that are functioning properly and which comply with all Code of Maryland Regulations applicable at the time of installation, are exempt from those requirements of the Criteria not codified elsewhere. Unless granted by the appropriate regulating authority, there is no exemption to the requirements of the applicable fire and building codes.

8.200 Non-Conforming Hoods.

(A) Proposed hood systems which do not fully comply with the Criteria, including innovative designs, may be approved if:

(1) The design conforms to the applicable codes;

(2) The design precludes the contamination of food; and

(3) Documentation is submitted from a bona-fide testing organization that indicates the system as designed will perform its intended function, satisfy the requirements of COMAR, and effectively remove the heat, steam, smoke, fumes, obnoxious odors, and grease laden vapors from the food establishment.

(B) If substantial and reliable documentation exists that indicates that a particular non-

conforming hood system has successfully operated in a similar application, the requirement for a testing lab certification may be waived at the discretion of the approving authority if compliance with Sections 8.0200(A)(1) and (2) is verified.