



## CHAPTER 5: EXHAUST SYSTEMS

### MOTORS, FANS AND FILTERS

**503.1 General.** Motors and fans shall be sized to provide the required air movement. Motors in areas that contain flammable vapors or dusts shall be of a type approved for such environments. A manually operated remote control installed at an approved location shall be provided to shut off fans or blowers in flammable vapor or dust systems. Electrical equipment used in operations that generate explosive or flammable vapors, fumes, or dusts shall be interlocked with the ventilation system so that the equipment cannot be operated unless the ventilation fans are in operation. Motors for fans used to convey flammable vapors or dusts shall be located outside the duct or shall be protected with approved shields and dustproofing. Motors and fans shall be accessible for servicing and maintenance. Motors and fans located on roofs shall be accessible as specified in Section 904.10.3. A toilet exhaust fan shall automatically shut down when the associated air-handling units serving that space shut down.



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### 904.10.3 Access to Equipment and Appliances on Roofs.

**904.10.3.1** ~~Gas utilization~~ Equipment and Appliances located on roofs or other elevated locations shall be accessible. [NFPA 54-09:9.4.3.1]

**904.10.3.2** In Buildings where the point of access is more than fourteen (14) feet (4,267.24 mm) above grade, an inside means of access to the roof shall be provided. [NFPA 54-09:9.4.3.2]

**904.10.3.3** The inside means of access shall be a permanent or foldaway inside stairway or ladder, terminating in an enclosure, scuttle, or trapdoor. Such scuttles or trapdoors shall be at least twenty-two (22) inches × twenty-four (24) inches (560 mm × 610 mm) in size, shall open easily and safely under all conditions, especially snow, and shall be constructed so as to permit access from the roof side unless deliberately locked on the inside. At least 10 feet (3.048 m) of clearance shall be available between the access opening and the edge of the roof or similar hazard, or rigidly fixed rails or guards a minimum of forty-two (42) inches (1.1 m) in height shall be provided on the exposed side. Where parapets or other building structures are utilized in lieu of guards or rails, they shall be a minimum of forty-two (42) inches (1.1 m) in height. An attic or furred space in which a warm-air furnace is installed shall be provided with a pull down stairway with a clear opening not less than 22 inches in width and a load capacity of not less than 350 pounds and an unobstructed passageway as large as the largest piece of the furnace and in no case less than thirty (30) inches by thirty (30) inches (762 mm × 762 mm) continuous from the opening to the furnace and its controls.



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### **904.10.4 Permanent ladders providing roof access shall:**

- (1) Have side railings which extend at least thirty (30) inches (762 mm) above the roof edge or parapet wall.
  - (2) Have landings less than eighteen (18) feet (5486 mm) apart measured from the finished grade. Houston Amendments to 2006 UMC
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- (3) Be at least fourteen (14) inches (356 mm) in width.
  - (4) Have rungs not more than fourteen (14) inches (356 mm) on center.
  - (5) Have a minimum of six (6) inch (152 mm) toe space.

**904.10.5 Platform.** A furnace located on a roof shall be installed on a substantial, level platform. When the roof has a slope greater than one (1) in twelve (12), a level working platform at least thirty (30) inches (762 mm) in depth and width shall be provided along the firebox and control sides of the furnace. Sides of a working platform facing the roof edge below shall be protected by a substantial railing forty-two (42) inches (1067 mm) in height with vertical rails not more than twenty-one (21) inches (533 mm) apart, except that parapets at least twenty-four (24) inches (610 mm) in height may be utilized in lieu of rails or guards.



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### 504. CLOTHES DRYERS

**504.3.2.2 Length Limitation.** Unless otherwise permitted or required by the dryer manufacturer's installation instructions and approved by the Authority Having Jurisdiction, domestic dryer moisture exhaust ducts shall not exceed a total combined horizontal and vertical length of fourteen (14) feet (4,263 mm), including two (2) 90 degree (1.57 rad) elbows, of 25 feet for 4 inch diameter duct, and 40 feet for 5-inch diameter duct. Two (2) feet (610 mm) shall be deducted for each 90-degree (1.57 rad) elbow in excess of two. **For duct lengths in excess of 40 feet, a system designed by a registered professional engineer licensed to practice as such in the State of Texas is required.**



## CHAPTER 5: EXHAUST SYSTEMS

### UNIQUE TO HOUSTON

#### Re-enforcement of Chapter 4:

**504.7 Nail Salon Exhaust.** Nail Salons shall be exhausted to the exterior of the building at a rate of 200 cfm and provided with .22 cfm of outside makeup air per salon station. Each room provided with an exhaust system shall have air supplied to the room equal to 80% of the amount of air to be exhausted. When a stand-alone makeup air system is provided, it shall be interlocked to the exhaust fans.



## CHAPTER 5: EXHAUST SYSTEMS

### Added For Clarity

**505.5 Exhaust Duct Termination.** Exhaust ducts shall terminate outside the building unless otherwise approved by the Authority Having Jurisdiction.



## CHAPTER 5: EXHAUST SYSTEMS

# Section 506.7 – Duct Clearances

The Devil's in the Details

Read it.



## CHAPTER 5: EXHAUST SYSTEMS

# Part II – Commercial Hoods and Kitchen Ventilation

What is Significant is what the Mechanical Code Committee Edited Out.





## CHAPTER 5: EXHAUST SYSTEMS

**507.1** 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 Code. ~~standard, and all such equipment and performance shall be maintained per this standard during all periods of operation of the cooking equipment. Specifically, the following equipment shall be kept in good working condition:~~

~~(A) Cooking equipment~~

~~(B) Hoods~~

~~(C) Ducts (if applicable)~~

~~(D) Fans~~

~~(E) Fire suppression systems~~

~~(F) Special effluent or energy control equipment~~

~~All airflows shall be maintained. Maintenance and repairs shall be performed on all components at interval necessary to maintain these conditions.~~

**507.1.2** ~~Multiple tenancy applications shall require the concerted cooperation of design, installation, operation, and maintenance responsibilities by tenants and by the building owner.~~



## CHAPTER 5: EXHAUST SYSTEMS

### Hood Types – 1 & 2

**508.1 Where Required.** **Type 1** Hoods shall be installed at or above all commercial-type deep fat fryers, broilers, fry grills, steam-jacketed kettles, hot-top ranges, ovens, barbecues, solid-fuel burning appliances, rotisseries, dishwashing machines, and similar equipment that produces comparable amounts of steam, smoke, grease, or heat in a food-processing establishment to collect and remove the grease and smoke. For the purpose of this section, a food processing establishment shall include any building or portion thereof used for the processing of food, but shall not include a dwelling unit.

**Type 2** hoods shall be installed at or above other commercial-type ovens, rotisseries, and dishwashing machines.



## CHAPTER 5: EXHAUST SYSTEMS

### Important Exception

**510.1.1** Ducts shall not pass through fire walls or fire partitions.

**Exception:** Steel supply and exhaust ducts may be protected with a duct wrap material approved for such use, that provides an equivalent fire-rating when installed in accordance with the manufacturer's specifications and an in approved fire-rated design, including through-penetration fire-stop and sealants. A letter sealed by the design professional or a special inspector certifying compliance with the fire-rated design and manufacturer's installation requirements for the finished installation must be provided to the authority having jurisdiction .



## CHAPTER 5: EXHAUST SYSTEMS

# Do you really want personnel in ducts?

## Section 510.3.4

**510.3.4.1 Horizontal Ducts.** On horizontal ducts, at least one 20 inch by 20 inch (508 mm by 508 mm) opening shall be provided at twelve-foot intervals. ~~For personnel entry. Additionally, an access door shall be provided within two feet of any change in direction. [NFPA 96: 7.4.1.1]~~

**510.3.4.1.1** ~~Horizontal ducting shall be secured sufficiently to allow for the weight of personnel entry into the duct.~~ Where an opening of this size is not possible, openings large enough to permit thorough cleaning shall be provided at twelve (12) foot (3.7 m) intervals. [NFPA 96: 7.4.1.3]

**510.3.4.1.2** ~~Support systems for horizontal grease duct systems 609 mm (24 in.) and larger in any cross-sectional dimension shall be designed for the weight of the ductwork plus 363 kg (800 lb) at any point in the duct systems. [NFPA 96: 7.4.1.3]~~



## CHAPTER 5: EXHAUST SYSTEMS

### Can't use corridor air for Kitchen make-up

{EDITOR'S NOTE: DELETE SECTION 511.3 IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING.}

**511.3 Makeup Air.** Each room provided with an exhaust system shall have air supplied to the room that is a minimum of 95% of the amount of air to be exhausted. Supplied air may be transferred from adjacent conditioned spaces. Makeup diffusers shall be located to prevent a short-circuiting of air to the exhaust system. Exterior windows and doors shall not be used for the purpose of providing makeup air. The exhaust and makeup air systems shall be connected by an electrical interlocking switch. Compensating hoods shall meet the airflow requirements specified in Sections 508.4.1.3 through 508.4.1.5. Compensating hoods shall extract at least twenty percent (20%) of their required exhaust airflow from the kitchen area.

**Exceptions:**

- (1) When its fire-extinguishing system discharges, makeup air supplied internally to a hood shall be shut off.
- (2) ~~Compensating hoods shall meet the airflow requirements specified in Sections 508.4.1.3 through 508.4.1.5. Compensating hoods shall extract at least 20 percent of their required exhaust airflow from the kitchen area.~~



## CHAPTER 5: EXHAUST SYSTEMS

### For Purposes of Clarity.

#### **514.0 Procedures for the Use and Maintenance of Equipment.**

For the purpose of enforcement the building owner is responsible for compliance with all operating and maintenance procedures specified in this Code and by the manufacturer. Compliance with and enforcement of operating and maintenance procedures listed in the following sections is the responsibility of the building owner.



## CHAPTER 6: DUCT SYSTEMS

# Chapter 6 – Duct Systems



## CHAPTER 6: DUCT SYSTEMS

All Duct Systems are to be Designed  
by the Code

{EDITOR'S NOTE: DELETE SECTION 601.2 IN ITS ENTIRETY.}





## CHAPTER 6: DUCT SYSTEMS

### Add the Canadian Test Method & Clarify use of CPVC

**602.2 Combustibles Within Ducts or Plenums.** Materials exposed within ducts or plenums shall be noncombustible or shall have a flame spread index not greater than twenty-five (25) and a smoke developed index not greater than fifty (50), when tested as a composite product in general accordance with one of the following test methods: NFPA 255, Method of Test of Surface Burning Characteristics of Building Materials, ASTM E84, Surface Burning Characteristics of Building Materials, or UL 723, Test for Surface Burning Characteristics of Building Materials, or CAN/ULC S102.2-M88, Standard Method of Test For Surface Burning Characteristics of Floor Coverings, and Miscellaneous Materials and Assemblies, except as indicated below.

(12) Miscellaneous systems components of predominantly CPVC construction, including valve handles, that accumulatively do not exceed one pound of plastic material in any one hundred cubic feet volume of a return air plenum.



## CHAPTER 6: DUCT SYSTEMS

# Clarification on sealing and conformance to the Energy Code

**602.4 Joints and Seams of Ducts.** Joints of duct systems shall be made substantially airtight by means of tapes, mastics, gasketing, or other means. Sealant materials and methods of assemblage shall be in accordance with the manufacturer's instructions and conform to SMACNA Method A.



## CHAPTER 6: DUCT SYSTEMS

605.0 - Committee felt that size was more a determining factor than velocity for liner fastening

Duct liners in ducts ~~systems operating with air velocities~~ exceeding 18 inches in height and width ~~2000 feet per minute (10.16 m/s)~~ shall be fastened with both adhesive and mechanical fasteners, and exposed edges shall have adequate treatment to withstand the operating velocity.



## CHAPTER 6: DUCT SYSTEMS

Modifications to Table 6-6 were  
needed to comply with the Energy  
Code



## CHAPTER 7: COMBUSTION AIR

1. The Committee felt that 701.1.4 was in contradiction of Chapter 5, Make-up Air for Kitchens

**{EDITOR'S NOTE: DELETE AND RESERVE SECTION 701.1.4.}**

2. Addition of Table 7-1



## CHAPTER 8: CHIMNEY & VENTS

# Chapter 8 – Chimney & Vents



## CHAPTER 8: CHIMNEYS & VENTS

### Incinerators must be treated separately

**802.5.4 3.1** Where an incinerator is vented by a chimney, it shall not serve any ~~servicing~~ other fossil fuel gas utilization equipment. ~~, the gas input to the incinerator shall not be included in calculating chimney size, provided the chimney flue diameter is not less than one (1) inch (25 mm) larger in equivalent diameter than the diameter of the incinerator flue outlet. [NFPA 54:12.6.3.2]~~



## CHAPTER 8: CHIMNEYS & VENTS

For 802.8.2 & .3

Venting systems shall terminate at least three (3) feet above an outside air or makeup air inlet located within ten (10) feet and at least four (4) feet from a property line, except in a public way.





## CHAPTER 8: CHIMNEYS & VENTS

### VENTED APPLIANCE CATEGORIES –

**Category I** - An appliance which operates with a non-positive vent pressure and with a vent gas temperature that avoids excessive condensate production in the vent.

**Category II** - An appliance which operates with a non-positive vent pressure and with a vent gas temperature that is capable of causing excessive condensate production in the vent.

**Category III** - An appliance which operates with a positive vent pressure and with a vent gas temperature that avoids excessive condensate production in the vent.

**Category IV** - An appliance which operates with a positive vent pressure and with a vent gas temperature that is capable of causing excessive condensate production in the vent.



## CHAPTER 8: CHIMNEYS & VENTS

**{EDITOR'S NOTE: DELETE SECTION 802.9.2 IN ITS ENTIRETY.}**

Where local experience indicates that condensation is a problem, provision shall be made to drain off and dispose of condensate from venting systems serving Category I and Category III gas utilization equipment in accordance with Section 802.8.4.



## CHAPTER 8: CHIMNEYS & VENTS

### Any multiple connection vent should be engineered

**802.10.3.3** Where two or more gas appliances are connected to a common vent or chimney, each vent connector shall be sized in accordance with Section 803.0 ~~or other approved engineering methods. As an alternative method applicable only when all of the appliances are draft hood equipped, each vent connector shall have an effective area not less than the area of the draft hood outlet of the appliance to which it is connected.~~