

2012 ICC Commercial Kitchen Hoods

2012 ICC Commercial Cooking Hoods

Based on the:
2012 International Mechanical Code® (IMC®)
2012 International Fire Code® (IFC®)
2012 International Fuel Gas Code®, (IFGC®)
2012 International Building Code®, (IBC®)
2012 International Energy Conservations Code® (IECC®)



Welcome

- Instructor
- Exits
- Breaks and Schedule
- Cell Phones
- Student Introductions



Accreditation



- The International Code Council has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET).
 - As a result of their Authorized Provider accreditation status, ICC is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.
- You will obtain full CEUs for this course, if you actively participate in the training activities and stay for the entire session. Evidence of this will be the sign out sheet.



2012 ICC Commercial Kitchen Hoods

3



Scope

- This course is designed to assist code officials, design professionals and builders in understanding the codes regulating commercial cooking exhaust hood systems
- The applicable requirements in the IMC, IFC, IFGC, IBC and IECC are addressed in detail with accompanying illustrations, photographs and sample calculations to clarify the intent of the codes



2012 ICC Commercial Kitchen Hoods

4



2012 ICC Commercial Kitchen Hoods

Objectives

Upon completion of this seminar, the attendee will be better able to:

- Define terminology used in the commercial cooking industry
- Identify how commercial cooking exhaust systems are built
- Recognize where commercial cooking hoods are required



2012 ICC Commercial Kitchen Hoods

5



We will review...

- Chapter 1 Hazards and Applicable Codes and Standards
- Chapter 2 Mechanical Ventilation Systems
- Chapter 3 Commercial Kitchen Exhaust Hoods
- Chapter 4 Commercial Kitchen Exhaust Duct System
- Chapter 5 Fire Protection for Commercial Cooking Systems



2012 ICC Commercial Kitchen Hoods

6



Chapter 1

Hazards and Applicable Codes and Standards



2012 ICC Commercial Kitchen Hoods

7

Definitions

CODE. These regulations, subsequent amendments thereto, or any emergency rule or regulation that the administrative authority having jurisdiction has lawfully adopted.

COMBUSTION. In the context of this code, refers to the rapid oxidation of fuel accompanied by the production of heat or heat and light.

HOOD. An air intake device used to capture by entrapment, impingement, adhesion or similar means, grease, moisture, heat and similar contaminants before they enter a duct system.

Type I Hood. A kitchen hood for collecting and removing grease vapors and smoke. Such hoods are equipped with a fire suppression system.

Type II Hood. A general kitchen hood for collecting and removing steam, vapor, heat, odors and products of combustion.



2012 ICC Commercial Kitchen Hoods

8






2012 ICC Commercial Kitchen Hoods

KEY LEARNING

Key Concept



- Mechanical commercial kitchen hoods are required to remove the products of combustion that are produced by cooking appliances
 - Maintains the comfort and safety of the kitchen personnel
 - Provides a safe environment for the handling and preparation of the food



 2012 ICC Commercial Kitchen Hoods 9 


Hazards of Commercial Cooking Operations



- There is no definition in the IMC or IFC for the term “cooking,” but there is a definition of “Commercial cooking appliances” as follows:
 - **COMMERCIAL COOKING APPLIANCES.** Appliances used in a commercial food service establishment for heating or cooking food and which produce grease vapors, steam, fumes, smoke or odors that are required to be removed through a local exhaust ventilation system... For the purpose of this definition, a food service establishment shall include any building or a portion thereof used for the preparation and serving of food.

 2012 ICC Commercial Kitchen Hoods 10 

Hazards of Commercial Cooking Operations


- “Food service establishment” includes:
 - Preparing, handling, cleaning, cooking and packaging food items
- Cooking appliances are used for commercial purposes when primarily intended for the preparation of food for compensation, trade or services rendered





 2012 ICC Commercial Kitchen Hoods 11 

Safety of Kitchen Personnel

- The safety and comfort of kitchen personnel can be adversely affected by excess heat, humidity, smoke and grease-laden cooking effluents that are not properly captured and controlled by the kitchen exhaust system



- Scientific studies suggest that prolonged exposure to smoke can result in breathing-related disorders such as chronic obstructive pulmonary disease (COPD)

 2012 ICC Commercial Kitchen Hoods 12 

2012 ICC Commercial Kitchen Hoods

Food Safety

- Increased room temperatures and humidity levels caused by improper exhaust and ventilation, as well as deposits of grease particles on cooking and food preparation surfaces, can promote the development of food-borne pathogens or allergens
- Local health and building departments generally provide routine inspections of commercial cooking operations to ensure the health and safety of the general public



2012 ICC Commercial Kitchen Hoods

13



Food Safety

- A properly designed mechanical ventilation system in retail food establishments and food-processing plants will provide adequate supply, makeup and exhaust air to limit the room temperature and humidity, which reduces a potential pathway for the growth and spread of allergens and food-borne pathogens



2012 ICC Commercial Kitchen Hoods

14



Fire Hazards in Commercial Cooking Operations

- Restaurants pose unique fire risks
 - Large numbers of customers
 - Cooking activities being performed in the same building
- Cooking hazards
 - Flammable grease and effluents carried by exhaust system
 - Cooking equipment can be an ignition source



2012 ICC Commercial Kitchen Hoods

15



Fire Hazards of Cooking Oils

- Cooking oils used today require more heat to reach proper cooking temperatures
- If ignition occurs, these oils have a higher heat release rate that is more difficult to suppress



2012 ICC Commercial Kitchen Hoods

16



2012 ICC Commercial Kitchen Hoods

Fire Hazards of Cooking Oils

Cooking Oil Flash Point & Ignition Temperature

Cooking Oil	Flash Point Temperature (°F)	Ignition Temperature (°F)
Canola Oil	450	626
Corn Oil	490	740
Cotton Seed Oil	486	650
Palm Oil	323	600
Peanut Oil	540	833
Soybean Oil	549	833
Sunflower Seed Oil	550	undetermined



2012 ICC Commercial Kitchen Hoods

17



Fire Hazards of Cooking Oils

- The term “grease” refers to animal and vegetable fats and oils, such as vegetable oil, that are used to cook foods or byproducts of the cooking process, such as the grease rendered during the cooking of bacon
- An excess accumulation and buildup of these grease deposits provides a potential fuel supply for a duct fire or for intensifying a fire that starts on the cooking surface



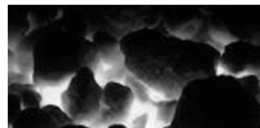
2012 ICC Commercial Kitchen Hoods

18



Fire Hazards of Solid Fuels

- Solid fuels are typically hardwoods, such as mesquite or hickory, but can also be charcoal or briquettes.
- Depending on the type of wood, the surface area and mass, most woods have ignition temperatures in the range of 500–700°F
- Woods have lower heats of combustion than oils but produce a greater amount of smoke because the cooking temperatures do not promote complete or clean combustion



2012 ICC Commercial Kitchen Hoods

19



Applicable ICC Codes and Standards

- The proper and correct design of commercial kitchen exhaust systems will require compliance with not only the mechanical and fire codes but also the building, fuel gas and energy conservation codes.



2012 ICC Commercial Kitchen Hoods

20



2012 ICC Commercial Kitchen Hoods

International Mechanical Code

- IMC regulates the design, installation, maintenance and alteration of mechanical appliances and building mechanical systems that are used to control the environment and related processes
- IMC **does not apply** to the installation of fuel-gas distribution piping and fuel-gas burning appliances
 - These systems are regulated by IFGC



2012 ICC Commercial Kitchen Hoods

21



2012 International Mechanical Code



IMC Chapter 2 Definitions

- All definitions were placed in Ch 2
- Some definitions that contain information not found elsewhere in the code
 - Extra-heavy-duty cooking appliances
 - Heavy-duty cooking appliances
 - Medium-duty cooking appliances
 - Light-duty cooking appliances
- This information is necessary when deciding the type of hood is required



2012 ICC Commercial Kitchen Hoods

23



Extra-Heavy-Duty Cooking Appliance

- Extra-heavy-duty cooking appliances include appliances utilizing solid fuel such as wood, charcoal, briquettes and mesquite as the primary source of heat for cooking



2012 ICC Commercial Kitchen Hoods

24



2012 ICC Commercial Kitchen Hoods

Heavy-Duty Cooking Appliance

- Heavy-duty cooking appliances include:
 - Electric under-fired broilers
 - Electric chain (conveyor) broilers
 - Gas under-fired broilers
 - Gas chain (conveyor) broilers
 - Gas open-burner ranges
 - Electric and gas wok ranges
 - Electric and gas over-fired (upright) broilers and salamanders



2012 ICC Commercial Kitchen Hoods

25



Medium-Duty Cooking Appliance

- Medium-duty cooking appliances include:
 - Electric discrete element & hot top ranges
 - Electric and gas griddles
 - Electric and gas double sided griddles
 - Electric and gas fryers
 - Electric and gas pasta cookers
 - Electric and gas conveyor pizza ovens
 - Electric and gas tilting skillets (braising pans)
 - Electric and gas rotisseries



2012 ICC Commercial Kitchen Hoods

26



Light-Duty Cooking Appliances

- Light-duty cooking appliances include:
 - Electric and gas ovens
 - Electric and gas steam-jacketed kettles
 - Electric and gas compartment steamers
 - Electric and gas cheese-melters



2012 ICC Commercial Kitchen Hoods

27



IMC Chapter 3 General Regulations

3 important issues pertaining to commercial kitchen exhaust hoods in Ch 3

- §301.7 – appliances and equipment must be listed and labeled
- §302.3, §302.4, 302.5 – requirements for wood or steel structural components and trusses modified to facilitate installation of duct-work
- §507 – adequate clearance from combustible walls, ceilings and kitchen cabinetry



2012 ICC Commercial Kitchen Hoods

28



2012 ICC Commercial Kitchen Hoods

IMC Chapter 4 Ventilation

- Establishes the minimum means for protecting the health of the building occupants
 - Controls the quality of the indoor air
 - Removing harmful contaminants
- Minimum outside air ventilation rate of 0.7 cfm/ft²
- Captured air in the hood exhaust must be discharge to the exterior and not recirculated



2012 ICC Commercial Kitchen Hoods

29



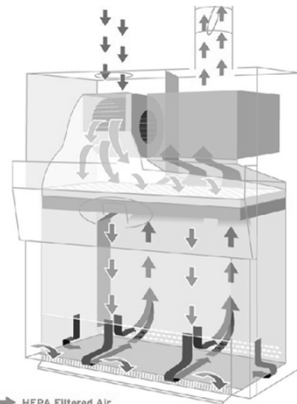
IMC Chapter 5 Exhaust Systems

- §506 – regulates exhaust ducts and equipment that serve commercial kitchen hoods
 - Exhaust fans
 - Fan motors
 - Grease reservoirs



2012 ICC Commercial Kitchen Hoods

30



→ HEPA Filtered Air
→ Contaminated Worksurface Air
→ Contaminated Room Air
→ Contaminated Room Air Supply



2012 ICC Commercial Kitchen Hoods

31



Exhaust Systems §506.3.4

- Minimum air velocity of 500fpm for ducts serving Type I hoods
- No corresponding velocity prescribed for ducts serving Type II hoods

Exhaust Systems

- §506.3.10 – minimum requirements for grease duct enclosures
 - Fire-resistance-rated shaft, or
 - Fire resistance-rated duct wrap
- §506.3.13 – requirements for grease duct exhaust outlets and terminations
 - The exhaust outlet requirements for ducts serving Type II hoods are less stringent (IMC §506.4.2)



2012 ICC Commercial Kitchen Hoods

32



2012 ICC Commercial Kitchen Hoods

Commercial Kitchen Hoods §507

- Addresses where Type I and Type II hoods are required
- Covers construction, installation and operation of commercial kitchen hoods
- Performance testing required for hoods before being put into operation
- Specifies:
 - Hood construction materials and their thicknesses
 - Joints and seams
 - Clearances from combustibles
 - Size and location of the hoods
 - Minimum airflow



2012 ICC Commercial Kitchen Hoods

33



Commercial Kitchen Hoods §507

Minimum Net Airflow for Hoods Serving Commercial Cooking Appliances
(cfm per linear foot of hood)

	Extra-heavy-duty Type I Only	Heavy-duty Type I Only	Medium-duty Type I Only	Light-duty Type I or Type II
Backshelf/pass-over	Not allowed	400	300	250
Double Island Canopy	550	400	300	250
Eyebrow	Not allowed	Not allowed	250	250
Single Island Canopy	700	600	500	400
Wall-mounted Canopy	550	400	300	200

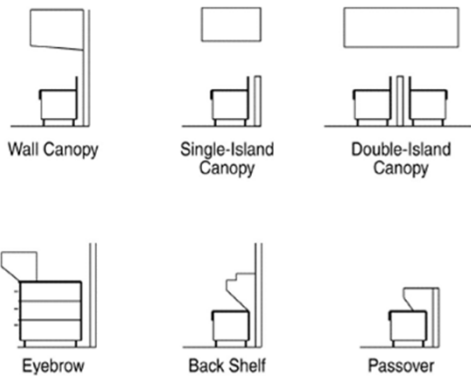


2012 ICC Commercial Kitchen Hoods

34



Types of Hoods



2012 ICC Commercial Kitchen Hoods

35



Commercial Kitchen Hoods

- Backshelf Hood:
 - Also referred to as a low-proximity hood or as a sidewall hood where wall mounted
 - The front lower lip is low over the appliances and is “set back” from the front of the appliances
 - It is always closed to the rear of the appliances
 - The height above the cooking surface varies
 - Can be constructed with partial end panels to increase its effectiveness in capturing the effluent generated by the cooking operation



2012 ICC Commercial Kitchen Hoods

36



2012 ICC Commercial Kitchen Hoods

Backshelf Hood



Commercial Kitchen Hoods

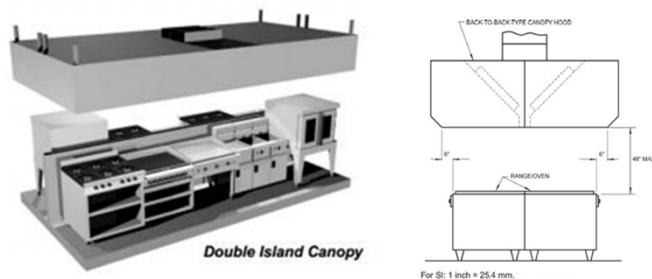
- Double Island Canopy Hood:
 - Placed over back to back appliances
 - It is open on all sides
 - Overhangs both fronts and all sides of the appliances
 - It could have a wall panel between the backs of the appliances, but is not required



2012 ICC Commercial Kitchen Hoods



Double Island Canopy Hood



2012 ICC Commercial Kitchen Hoods



Commercial Kitchen Hoods

- Eyebrow Hood:
 - Mounted directly to the face of an appliance, such as an oven or dishwasher, above the openings from which effluent is emitted
 - Extends past the sides
 - Overhangs the front of the opening to capture the effluent



2012 ICC Commercial Kitchen Hoods



2012 ICC Commercial Kitchen Hoods

Commercial Kitchen Hoods



- Pass-over Hood:
 - Free-standing form of a backshelf hood
 - Constructed low enough to pass food over the top



2012 ICC Commercial Kitchen Hoods

41



Commercial Kitchen Hoods

- Single Island Canopy Hood:
 - Placed over a single appliance or appliance line
 - Open on all sides
 - Overhangs the front, rear, and sides of the appliances
 - It is more susceptible to cross drafts and requires a greater exhaust air flow than an equivalently sized wall-mounted canopy to capture and contain effluent generated by cooking operations

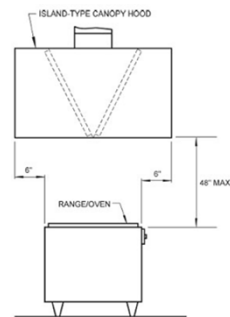
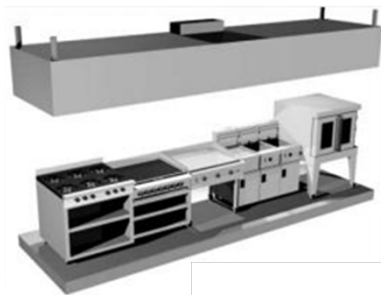


2012 ICC Commercial Kitchen Hoods

42



Single Island Canopy Hood



2012 ICC Commercial Kitchen Hoods

43



Commercial Kitchen Hoods

- Wall-mounted Canopy Hood:
 - Mounted against a wall above a single appliance or line of appliances
 - It also could be free-standing with a back panel at the rear of the appliances
 - Overhangs the front and sides of the appliances
 - The wall acts as a back panel, forcing the makeup air to be drawn across the front of the cooking equipment, thus increasing the effectiveness of the hood to capture and contain effluent generated by the cooking operations



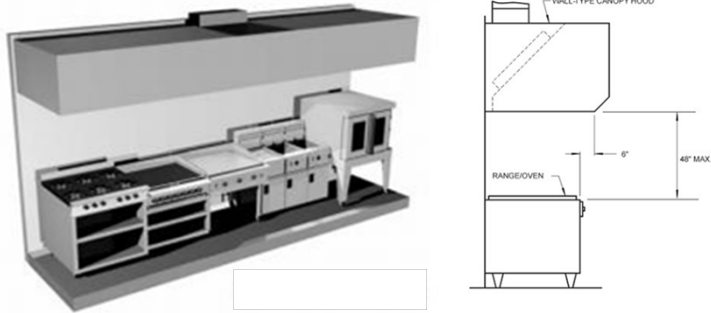
2012 ICC Commercial Kitchen Hoods

44



2012 ICC Commercial Kitchen Hoods

Wall-mounted Canopy Hood



2012 ICC Commercial Kitchen Hoods

45



Grease Ducts and Exhaust Equipment

Topic	Section
Protect exterior ducts from corrosion	§506.2
Ducts of steel construction, except listed	§506.3.1
Ducts welded on exterior or listed	§506.3.2
Joints, penetrations and connections (overlap joints acceptable)	§506.3.2.1
Duct to hood connection can be flanged and gasketed or listed duct hood collar	§506.3.2.2
Vibration isolation connectors	§506.3.2.4
Grease Duct Test	§506.3.2.5
Air velocity and transition exception	§506.3.4



2012 ICC Commercial Kitchen Hoods

46



Makeup Air Ducts §506.3.1.2

- Make up air ducts connected to or within 18" of a Type I hood shall be constructed and installed in accordance with Sections 603.1, 603.4 603.5 603.11 and 603.14.
- Duct insulation installed <18" of a Type I hood shall be noncombustible or shall be listed for the application

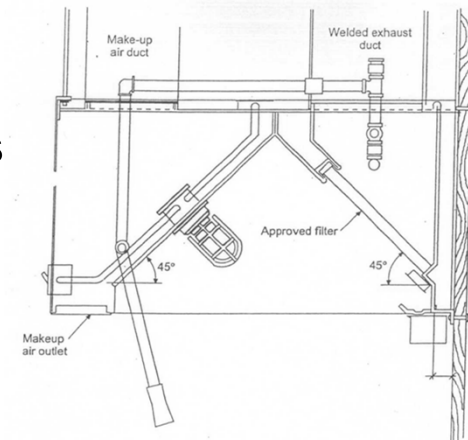


2012 ICC Commercial Kitchen Hoods

47



Makeup Air Ducts



2012 ICC Commercial Kitchen Hoods

48



2012 ICC Commercial Kitchen Hoods

Duct Joint Types §506.3.2.1

Male end
I.D. mm
I.D. mm + 6.4 mm (max)
Female end
I.D. mm

Exhaust duct
Weld around
50.8 mm (max) [2 in. (max)]
16-gauge [1.6 mm (1/16-in.)] black iron

Telescoping duct joint
Inside section
I.D. mm
Outside section
I.D. mm + 6.4 mm (max)
Weld around
50.8 mm (max) [2 in. (max)]
16-gauge [1.6 mm (1/16-in.)] black iron

Comment 1. Duct size stays the same throughout the duct system.
2. Smaller (male) duct end is always above or upfit (on slope duct), to be self-aligning into larger (female) female duct end.

Comment 1. Duct size decreases (going upward) with each telescoping.
2. Smaller (male) duct section is always above or upfit (on slope duct), to be self-aligning into larger (outside) duct.

IMC 2012 ICC Commercial Kitchen Hoods 49

Section 506.3 and 506.4 Ducts serving Type I and II Hoods

- Type I exhaust systems shall be independent of all other exhaust systems except as provided in §506.3.5
- Type II single or combined Type II exhaust systems for food processing operations shall be independent of all other exhaust systems

IMC 2012 ICC Commercial Kitchen Hoods 50

Grease Duct Clearances §506.3.6

- Clearances to grease duct systems and exhaust equipment serving a Type I hoods
 - Clearance to combustible construction >18"
 - Clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures >3"
 - Exception: Listed and labeled factory built commercial kitchen grease ducts and exhaust equipment

IMC 2012 ICC Commercial Kitchen Hoods 51

Prevention of Grease Accumulation

CLEANOUTS PER SECTION 506.3.9

NOTE: NO OBSTRUCTIONS WITHIN THAT WOULD COLLECT GREASE

20'-0" MAX. 20'-0" MAX.

TYPE I HOOD

IMC 2012 ICC Commercial Kitchen Hoods 52

2012 ICC Commercial Kitchen Hoods

Grease Duct Enclosure §506.3.10

- Grease ducts serving Type I hoods that penetrate a ceiling, wall or floor shall be enclosed from the point of penetration to the outlet terminal
- Ducts shall penetrate exterior walls only at locations where unprotected openings are permitted by the IBC
- Duct enclosures shall be sealed around the duct at the point of penetration
- Duct enclosures shall be vented to the outside of the building through a weather-protected opening



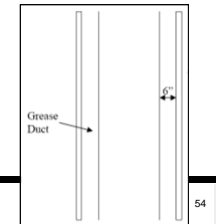
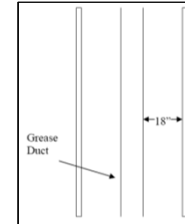
2012 ICC Commercial Kitchen Hoods

53



Grease Duct Enclosure §506.3.10

- Clearance from the duct to the interior surface of enclosures of combustible construction shall be $\geq 18"$
- Clearance from the duct to the interior surface of enclosures of noncombustible construction or gypsum wall board attached to noncombustible structures shall be $\geq 6"$



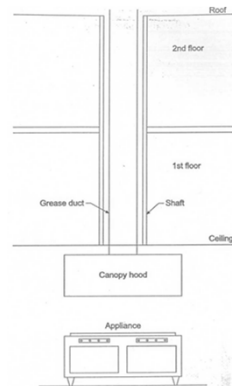
2012 ICC Commercial Kitchen Hoods

54



Grease Duct Enclosure §506.3.10

- A shaft is required around a grease duct in a building that is more than one story in height



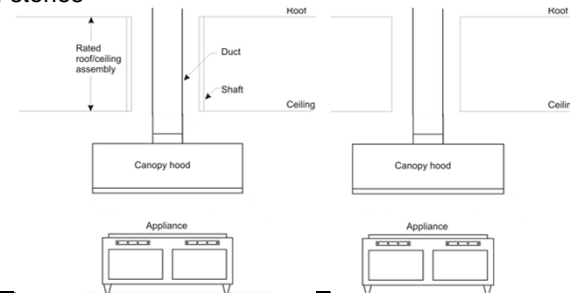
2012 ICC Commercial Kitchen Hoods

55



Grease Duct Enclosure §506.3.10

- A shaft is required around a grease duct that penetrates a rated roof/ceiling assembly regardless of the number of stories



2012 ICC Commercial Kitchen Hoods

56



2012 ICC Commercial Kitchen Hoods

Exhaust Fan Discharge §506.5.2

- Exhaust fans shall be positioned so that the discharge will not impinge on the roof, other equipment or appliances or parts of the structure
- A vertical discharge fan shall be manufactured with an approved drain outlet at the lowest point of the housing to permit drainage of grease to an approved grease reservoir



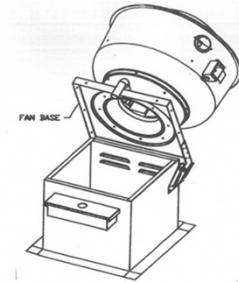
2012 ICC Commercial Kitchen Hoods

57



Exhaust Fan Mounting §506.5.3

- An up blast fan shall be hinged and supplied with a flexible weatherproof electrical cable to permit inspection and cleaning
- The ductwork shall extend a minimum of 18" above the roof



2012 ICC Commercial Kitchen Hoods

58



Exhaust Fan Mounting §506.5.3

- The minimum horizontal distance between vertical discharge fans and parapet-type building structures shall be 2' provided that such structures are not higher than the top of the fan discharge opening



2012 ICC Commercial Kitchen Hoods

59



Commercial Kitchen Hoods §507.1

- Commercial kitchen exhaust hoods shall be:
 - Type I or Type II
 - Designed to capture and confine cooking vapors and residues
 - Operate during the cooking operation
 - Exception 1. UL 710 listed factory-built commercial exhaust hoods
 - Exception 2. UL 710B listed factory-built commercial cooking recirculating systems



2012 ICC Commercial Kitchen Hoods

60



2012 ICC Commercial Kitchen Hoods

Where Required §507.2

- A Type I or Type II hood shall be installed at or above all commercial cooking appliances
- Where any cooking appliance under a hood requires a Type I hood, then a Type I hood shall be installed
- Where a Type II hood is required, a Type I or Type II hood can be installed



2012 ICC Commercial Kitchen Hoods

61



Type I vs. Type II Hoods

Type I Hood

- Heat, odors and steam
- Grease or smoke
- 18 gage steel
- 20 gage stainless steel
- Secured in place by non-combustible supports
- Adequate for the applied load of the hood and ductwork

Type II Hood

- Heat, odors and steam
- -
- 22 gage steel
- 24 gage stainless steel
- -
- Adequate for the applied load of the hood and ductwork



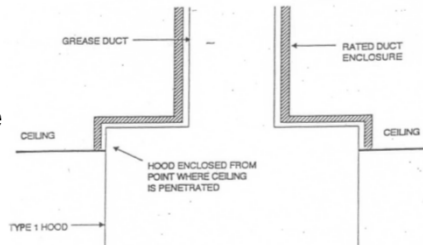
2012 ICC Commercial Kitchen Hoods

62



Hoods Penetrating a Ceiling

- Duct Enclosure not required for a grease duct that penetrates only a non-fire-resistance rated roof/ceiling assembly



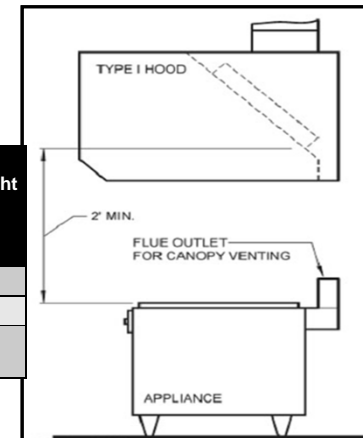
2012 ICC Commercial Kitchen Hoods

63



Grease Filter §507.11

Type of Cooking Appliances	Grease Filter Height Above Cooking Surface
Without exposed flame	.05'
Exposed flame and burners	2'
Exposed charcoal and charbroil type	3.5'



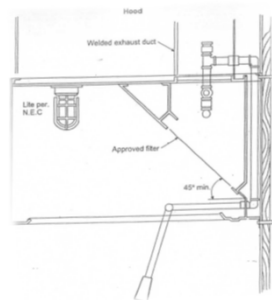
2012 ICC Commercial Kitchen Hoods

64



2012 ICC Commercial Kitchen Hoods

Mounting Position §507.11.2

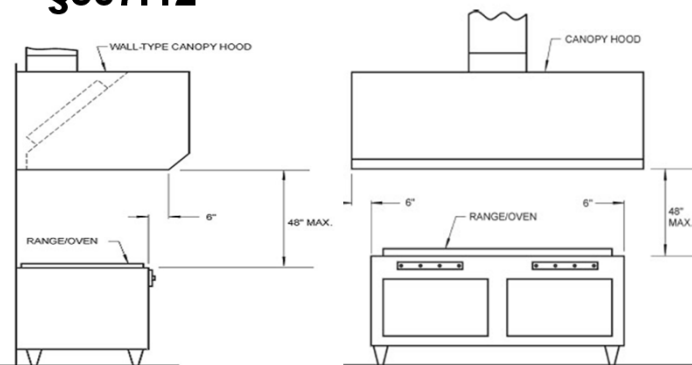


2012 ICC Commercial Kitchen Hoods

65



Wall-Type Canopy Hood §507.12



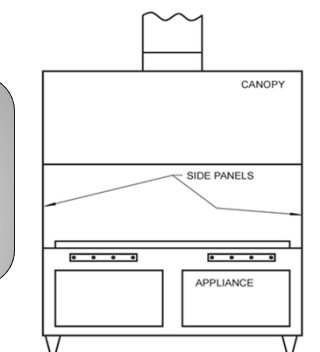
2012 ICC Commercial Kitchen Hoods

66



Canopy Size and Location §507.12

The hood shall be permitted to be flush with the outer edge of the cooking surface where the hood is closed to the appliance side by a noncombustible wall or panel



2012 ICC Commercial Kitchen Hoods

67



Performance Test §507.16

- Performance test shall be conducted upon completion and before final approval of the ventilation system
- The test shall verify
 - Exhaust airflow
 - Makeup airflow
 - Proper operation as specified in this chapter
- Permit holder shall furnish the necessary test equipment and devices required to perform the tests



2012 ICC Commercial Kitchen Hoods

68



2012 ICC Commercial Kitchen Hoods

Capture and Containment Tests §507.16.1

- The permit holder shall verify capture and containment performance of the exhaust system
- This field test shall be conducted with:
 - All appliances under the hood at operating temperatures
 - All sources of outdoor air providing makeup air for the hood operating
 - All sources of re-circulated air providing conditioning for the space in which the hood is located operating
- Capture and containment shall be verified visually by observing simulated smoke or steam

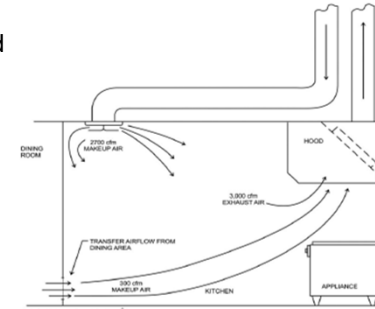


2012 ICC Commercial Kitchen Hoods

69

Commercial Kitchen Makeup Air §508

- Makeup air to the kitchen must be supplied to replace the air exhausted through the kitchen hood
- Amount of makeup air is usually slightly less than the air that is exhausted
- This difference in air volume maintains a slightly negative pressure in the kitchen



2012 ICC Commercial Kitchen Hoods

70

Makeup Air §508.1

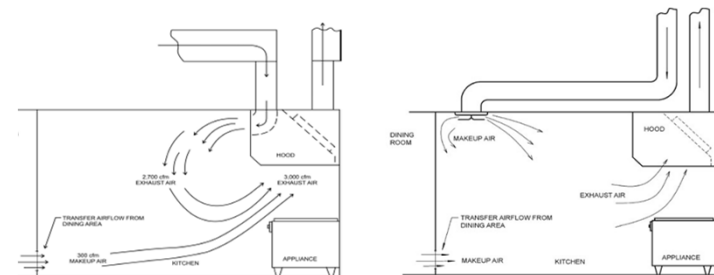
- Makeup air shall be supplied during the operation of commercial kitchen exhaust systems
- For mechanical makeup air systems, the exhaust and makeup air systems shall be electrically interlocked
- The temperature differential between makeup air and the air in the conditioned space shall not exceed 10°F



2012 ICC Commercial Kitchen Hoods

71

Makeup Air §508.1



2012 ICC Commercial Kitchen Hoods

72

2012 ICC Commercial Kitchen Hoods



2012 International Building Code



Fire and Smoke Protection Features

- Fire testing to ASTM E 119 and UL 263
- These national standards are used to determine the fire-resistance ratings of building components or assemblies
- ASTM E 119 vertical furnace used for evaluating wall assemblies



2012 ICC Commercial Kitchen Hoods

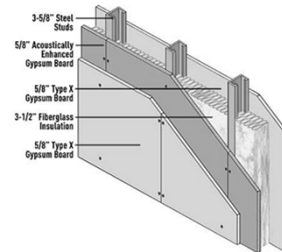
74



Duct Penetrations §716

- Duct penetrations must be protected
- Same requirements as those discussed in IMC §607
- IBC §703.6 requires the marking of fire walls, fire barriers and fire partitions

Featured Design — UL U465
51C57 1-HOUR FIRE-RATED ASSEMBLY — 5-1/2" WALL THICKNESS



2012 ICC Commercial Kitchen Hoods

75



2012 Fuel Gas Code

2012 ICC Commercial Kitchen Hoods

2012 Fuel Gas Code

- The IFGC regulates the installation of natural gas and LP-gas systems, fuel gas utilization equipment/appliances
- The scope of the IFGC extends from the utility company's point of delivery to the appliance shutoff valve
- IFGC covers pipe sizing and arrangement, approved materials, installation, testing, inspection, operation and maintenance
- The equipment installation requirements include combustion and ventilation air, approved venting and connections to the fuel gas system



2012 ICC Commercial Kitchen Hoods

77



General Regulations Chapter 3

- Requires listing and labeling of equipment and appliances
- Addresses cutting, notching and boring of structural elements of the building
- Provides criteria for combustion air



2012 ICC Commercial Kitchen Hoods

78



Fuel Gas Piping Chapter 4

- §402 – specifies the size of the piping system
 - Contains sizing tables and equations for determining minimum pipe diameters
- §403 – establishes material requirements
 - Identifies the national standard governing pipe and fitting design and construction
 - Regulates the type of joints based on the piping material



2012 ICC Commercial Kitchen Hoods

79



Cooking Appliances §623

- This section of the IFGC provides the requirements for cooking appliances, including the standards to which they must be listed and labeled. It has the same restriction as the IMC on commercial cooking appliances being used in domestic kitchens.
- IFGC Section 623.6 requires commercial cooking appliances to be connected to a vent or chimney to remove the products of combustion.



2012 ICC Commercial Kitchen Hoods

80



2012 ICC Commercial Kitchen Hoods

Commercial or Domestic???

IMC 917.2 [IFGC 623.2] Prohibited location.

Cooking appliances designed, tested, listed and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.

IMC 917.3 [IFGC 623.3] Domestic appliances.

Cooking appliances installed within dwelling units and within areas where domestic cooking operations occur shall be listed and labeled as household-type appliances for domestic use.



2012 ICC Commercial Kitchen Hoods

81



2012 International Fire Code

Fire-Extinguishing System

IMC 509.1 Where required.

Commercial cooking appliances required by §507.2.1 to have a Type I hood shall be provided with an approved automatic fire suppression system complying with the IBC and the IFC.



2012 ICC Commercial Kitchen Hoods

83



Fire-Extinguishing System

IFC 904.11 [IBC 904.11] Commercial cooking systems.

The automatic fire-extinguishing system for commercial cooking systems shall be of a type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Pre-engineered automatic dry- and wet-chemical extinguishing systems shall be tested in accordance with UL 300 and listed and labeled for the intended application. Other types of automatic fire-extinguishing systems shall be listed and labeled for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, its listing and the manufacturer's installation instructions.



2012 ICC Commercial Kitchen Hoods

84



2012 ICC Commercial Kitchen Hoods

Fire-Extinguishing System

Automatic fire-extinguishing systems of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon dioxide extinguishing systems, NFPA 12.
2. Automatic sprinkler systems, NFPA 13.
3. Foam-water sprinkler system or foam-water spray systems, NFPA 16.
4. Dry-chemical extinguishing systems, NFPA 17.
5. Wet-chemical extinguishing systems, NFPA 17A.



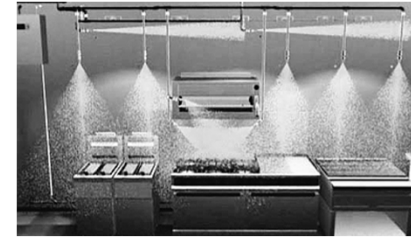
2012 ICC Commercial Kitchen Hoods

85



UL 300

- Dry-chemical fire-extinguishing systems have not yet passed the UL 300 test
- The AFES does not replace fire sprinklers in the kitchen



2012 ICC Commercial Kitchen Hoods

86



Commercial Cooking Systems

- Activation must be available by automatic and manual means
- Interlock to disconnect the fuel gas and/or electrical power to all appliances located under upon activation of the fire protection system



Photo courtesy of Ansul Inc.



Photo courtesy of Ansul Inc.



2012 ICC Commercial Kitchen Hoods



Commercial Cooking Systems

- Portable fire extinguishers are required for protection of commercial cooking systems
 - Installation of a listed Type K extinguisher
 - Travel distance to the extinguisher $\leq 30'$
 - When protecting deep fat fryers, §904.11.5.2 specifies the extinguisher size based on the number of fryers, the surface area, and the amount of cooking medium



Photo courtesy of Amerex Inc.



2012 ICC Commercial Kitchen Hoods

Fire-Extinguishing System Design

- Manual operation is not required for fire sprinkler system
- The fire-extinguishing system must be listed and labeled to UL 300

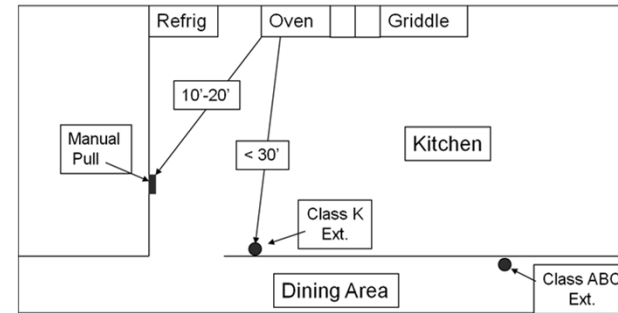


2012 ICC Commercial Kitchen Hoods

89



Fire-Extinguishing System Design



2012 ICC Commercial Kitchen Hoods

90



Inspection of System §609.3.3.1

Type of Cooking Operations	Frequency of Inspection
High-volume cooking operations such as 24-hour cooking, charbroiling or wok cooking	3 months
Low-volume cooking operations such as places of religious worship, seasonal businesses and senior centers	12 months
Cooking operations utilizing solid fuel-burning cooking appliances	1 month
All other cooking operations	6 months

Inspection by qualified individuals, and a certificate shall be forwarded to the fire code official



2012 ICC Commercial Kitchen Hoods

91



Inspection of System §609.3.3.1

- UL 300 AFES
- Recently serviced
- All appliances under the hood
- Changes in appliances, or relocation of appliances
- Relocated spray nozzles
- Protective covers on nozzles
- Manual pull visible, identified and unobstructed



2012 ICC Commercial Kitchen Hoods

92



2012 ICC Commercial Kitchen Hoods

Maintenance

§904.11

- When changes in the cooking media, positioning of cooking equipment or replacement of cooking equipment occur, the AFES must comply with current requirements
- AFES **serviced** at least every 6 months and after activation of the system
- Service by qualified individuals, and a certificate shall be forwarded to the fire code official
- Fusible links and sprinklers replaced annually



2012 ICC Commercial Kitchen Hoods

93



2012 International Energy Conservation Code

2012 International Energy Conservation Code

- Regulates the design and construction of buildings for the effective use of energy
- Applies to new construction, additions, and alterations to some buildings but exempts certified historical buildings
- Exhausting conditioned air through the kitchen hood system represents a large percentage of the energy loss in a commercial cooking operation
- This is the reason many kitchen designers bring unconditioned makeup air into the kitchen as close as possible to the hood, thus minimizing the amount of conditioned air that is exhausted

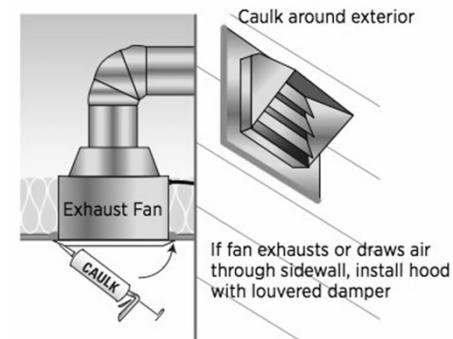


2012 ICC Commercial Kitchen Hoods

95



IECC 403.2.7



2012 ICC Commercial Kitchen Hoods

96



2012 ICC Commercial Kitchen Hoods

Questions and Answers

Any questions?



2012 ICC Commercial Kitchen Hoods

97



International Code Council is a Registered Provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Copyright Materials

This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

© International Code Council 2014



Thank you for participating

To schedule a seminar, contact:

The ICC Training & Education Department

1-888-ICC-SAFE (422-7233) Ext. 33818

OR

E-mail: icctraining@iccsafe.org