

2012 International Mechanical Code Update

Based on the 2012 International Mechanical Code® (IMC®)



1

Seminar Content

- This seminar introduces participants to the key changes from the 2009 IMC to the 2012 IMC.
- Participants will discuss the changes and reasons for the changes.
- Participants will apply these code requirements to the design, plan review and/or inspection process.



2012 IMC Update

3

Description

- The 2012 *International Mechanical Code*® (IMC®) code changes help resolve common interpretation problems and provide clarity of the content.
- The scope of the IMC continues to include the initial design of mechanical systems through the installation and construction phases, and into the maintenance of operating systems



2012 IMC Update

2

Goal

- Participants will be able to use this document to identify key changes from the 2009 IMC to the 2012 IMC, allowing them to apply these code requirements to design, plan review and/or inspection.



2012 IMC Update

4

Content of Update

Chapter 2: Definitions	Chapter 6: Duct Systems
Chapter 3: General Regulations	Chapter 8: Chimneys and Vents
Chapter 4: Ventilation	Chapter 9: Special Appliances, Fireplaces and Solid Fuel Burning Equipment
Chapter 5: Exhaust Systems	Chapter 11: Refrigeration

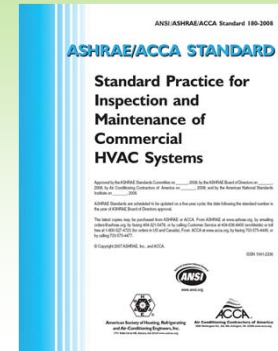


2012 IMC Update

5

102.3 Maintenance

- **Modified:** ASHRAE/ACCA/ANSI Standard 180 is now specified for the inspection for maintenance of the HVAC system.



2012 IMC Update

7



Marginal Markings within the codebook

- **Solid vertical lines** indicate a technical change from the requirements of the 2009 edition.
- ➔ **Arrows** indicate where a section, paragraph, item in a list, exception or table has been deleted.
- * **A single asterisk** [*] indicates that text or a table has been relocated elsewhere in the code.
- ** **A double asterisk** **[**] indicates that the section or table immediately following has been relocated here from a different section.



2012 IMC Update

6

Chapter 2 Definitions

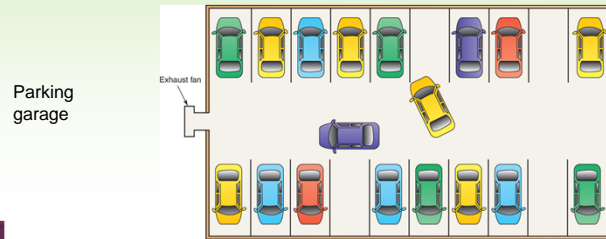


2012 IMC Update

8

202 Environmental Air

- Clarified: The definition of environmental air has been expanded through the addition of parking garage exhaust.



2012 IMC Update

9

Section 202 General Definitions

Type of Change
New

▪ Third-party Testing

Means that a manufactured item (product) is tested one time by an independent laboratory to verify that the product conforms to the applicable standards. The manufacturer provides for this verification.



2012 IMC Update

11

Section 202

Type of Change
Modification

▪ Environmental Air

This expanded definition of environmental air will provide guidance in the determination of where a parking garage exhaust system must terminate based on the requirements of Section 501.3.1 in the IMC.



2012 IMC Update

10

Section 202 General Definitions

Type of Change
New

▪ Third-party Certified

Certification obtained by the manufacturer indicating:

- Function and performance characteristics of a product or material
- Testing and ongoing surveillance used in their determination
- Approved third-party certification agency performed testing



2012 IMC Update

12

Section 202 General Definitions

Type of Change
New

- **Third-party Certification Agency**
 - Approved organization
 - Independent of the manufacturer
 - Qualified to perform product testing, assessment and surveillance
 - Uses nationally recognized standards



2012 IMC Update

13

Section 301.3

Type of Change:
New

▪ Identification

Pipe, tubing and pipe fitting utilized in a mechanical system shall bear the identification of the manufacturer.



2012 IMC Update

15

Chapter 3 General Regulations



2012 IMC Update

14

Section 301.4

Type of Change:
New

▪ Plastic pipe, fittings and components

Must be third-party certified as conforming to NSF 14*.

*A consensus standard that enables assessment for health effects, quality control, quality assurance, marking, material property requirements, long-term strength evaluation, and short-term product performance evaluation to various standards such as ASME, ASTM, ASSE, etc.



2012 IMC Update

16

Section 301.5

Type of Change:
New

Third-party testing and certification

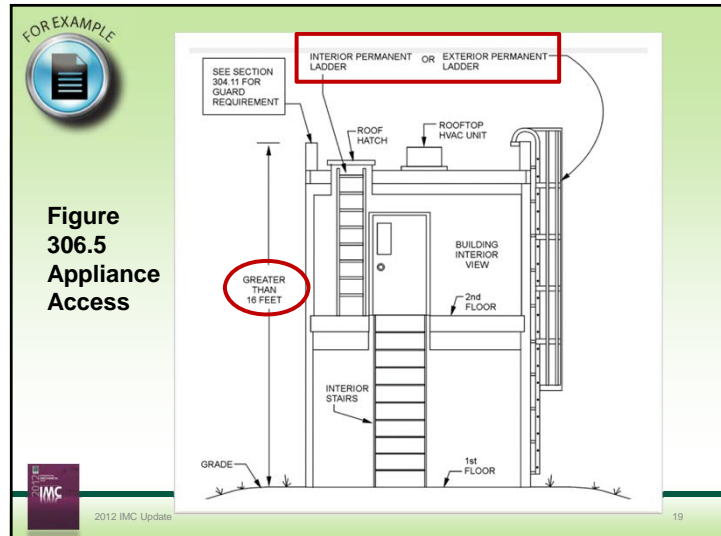
Piping, tubing and fittings must be either

- Tested by an approved third-party testing agency, or
- Certified by an approved third-party certification agency.



2012 IMC Update

17



Section 306.5

Type of Change:
Modified

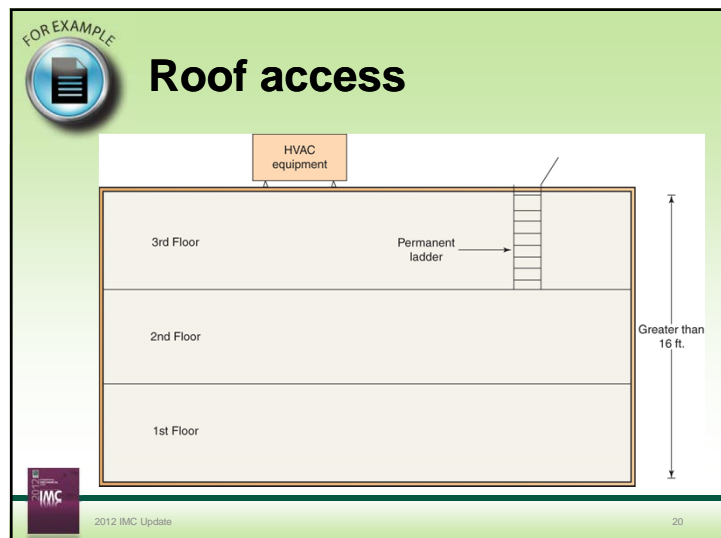
Equipment and appliances on roofs or elevated structures

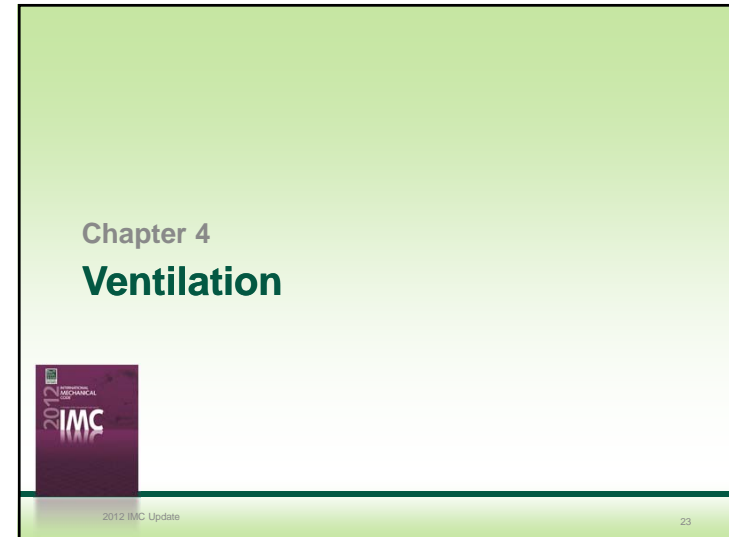
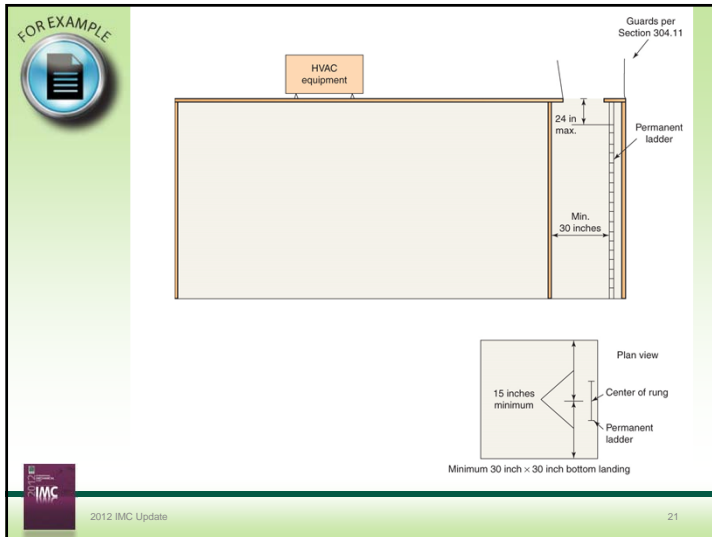
Clarifies that a **permanent** means of access must be provided where a piece of equipment or an appliance, that requires access, is located on a roof or elevated structure **more than 16 feet above grade level**.



2012 IMC Update

18





308.5 Labeled Assemblies

- Modified:** Allowable clearance reductions must now be based on listed and labeled reduced-clearance protective assemblies in accordance with UL 1618.

Listed and labeled clearance protection assembly
(Courtesy of Northwest Stoves)

2012 IMC Update

22

Section 401.2

Type of Change:
Modification

- Ventilation required**
Every occupied space must be ventilated by:
 - Natural means (Section 402) or
 - Mechanical means (Section 403)

Blower door test results of an air infiltration rate of < than five air changes per hour require ventilation by mechanical means.

2012 IMC Update

24

Section 401.4

Intake opening location

Intake openings must be located a **minimum of 10 feet** (3048 mm) from lot lines or buildings on the same lot.

- Where openings front on a street or public way, the distance shall be measured from the **closest edge** of the street or public way.



2012 IMC Update

25

Figure 401.4(1)

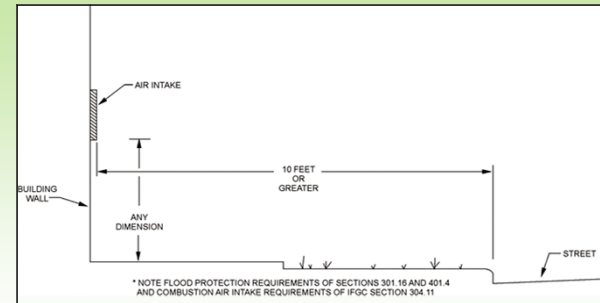


Figure 401.4(1) illustrates that there are no vertical height requirements for outdoor air intake openings where they are located 10 feet (3048 mm) or more horizontally from the source of contamination.

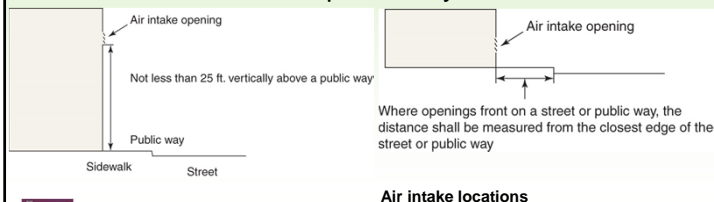


2012 IMC Update

27

401.4 Intake Opening Location

- Modified:** The minimum clearance between an air intake opening and any public way is now measured from the opening to the lot line, not to the centerline of the public way.



Air intake locations

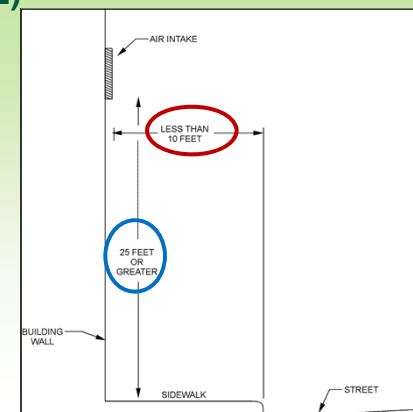


2012 IMC Update

26

Figure 401.4(2)

Intake openings can be located **less than 10 feet horizontally** from streets, alleys, parking lots and loading docks provided that they are positioned **more than 25 feet vertically** above such locations.

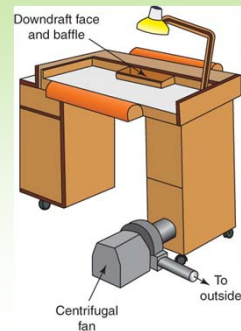


2012 IMC Update

28

Table 403.3 Minimum Ventilation Rates for Nail Salons

- Modified:** Nail stations in nail salons must now each be provided with a source capture system.



Nail salon station



2012 IMC Update

29

Table 403.3

Type of Change:
Modification

Minimum Ventilation Rates

The table columns were reordered.

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² ^a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _o CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, A _o CFM/FT ² ^a	EXHAUST AIRFLOW RATE CFM/FT ² ^a
--------------------------	---	---	---	---

Notes e and f were modified to clarify the dual airflow rates listed in Table 403.3. (Example)

Occupancy Classification	Exhaust Airflow Rate CFM/FT ^{2a}
Hotels, motels, resorts and dorms	
Bathrooms/toilet - private	25/50 ^f
Public spaces	
Toilet rooms - public	50/70 ^e



2012 IMC Update

31

TABLE 403.3 Minimum Ventilation Rates

Occupancy Classification	People Outdoor Airflow Rate In Breathing Zone R _o CFM/Person Occupant Density #/1000 ft ^{2a}	Area Outdoor Airflow Rate In Breathing Zone A _o CFM/Person	Default Occupant Density #/1000 ft ^{2a}	Exhaust Airflow Rate CFM/FT ^{2a}
Beauty and nail salons ^{b,h}	20	0.12	25	0.6
Nail Salons ^{b,h}	25	20	0.12	0.6

e. Rates are per water closet or urinal. The higher rate shall be provided where periods of heavy use are expected to occur, such as, toilets in theaters, schools, and sports facilities. The lower rate shall be permitted where periods of heavy use are not expected. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied normal hours of use.

h. For nail salons, the required exhaust shall include ventilation tables or other systems that capture the contaminants and odors at their source and are capable of exhausting a minimum of 50 cfm per station each nail station shall be provided with a source capture system capable of exhausting not less than 50 cfm per station.



2012 IMC Update

30

Table 403.3

Type of Change:
Modification

Minimum Ventilation Rates

Note h was modified to clarify that for nail salons, each nail station shall be provided with a source capture system capable of exhausting not less than 50 cfm per station.

- Source capture systems** are mechanical exhaust systems that capture manicuring vapors, mists, and dusts at the source and expel to the outdoors.



2012 IMC Update

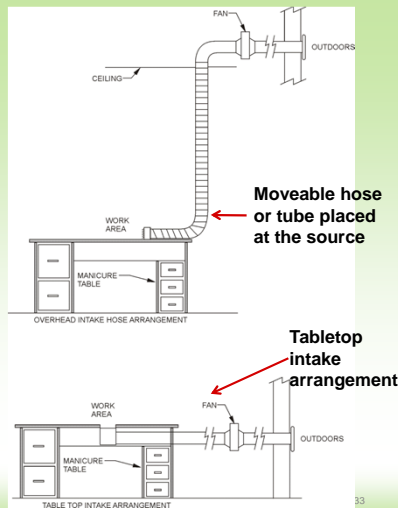
32

Figure 403.3

Examples:

An overhead intake hose arrangement that consists of a moveable hose or tube placed at the source of the contaminant.

A tabletop intake arrangement specifically designed for this application.



2012 IMC Update

33

Chapter 5 Exhaust Systems



2012 IMC Update

35

404.1 Enclosed Parking Garages

- **Modified:** The mechanical ventilation systems required in enclosed parking garages are now permitted to be operated automatically by carbon monoxide detectors.



Carbon monoxide detector
(Courtesy of Brash Manufacturing Co.)



2012 IMC Update

34

Section 501.2

Type of Change:
New

▪ Independent system required

Those locations where an **independent exhaust system** is required are all now established in a single code provision.

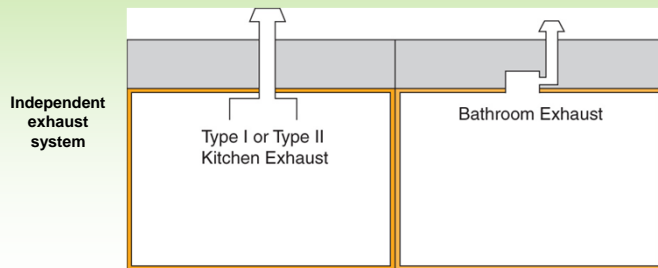
- Single or combined mechanical exhaust systems for environmental air
- Dryer exhaust
- Type I exhaust (exception: Section 506.3.5)
- Single or combined Type II exhaust systems for food processing operations



2012 IMC Update

36

501.2 Independent Exhaust Systems Required

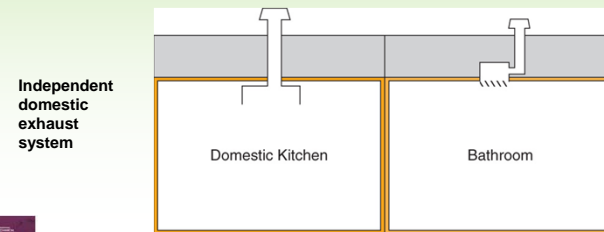


2012 IMC Update

37

505.1 Domestic Kitchen Exhaust Systems

- **Modified:** Domestic kitchen exhaust ducts are now required to be independent of all other exhaust systems.



2012 IMC Update

39

Section 505.1

Type of Change:
Modification

▪ Domestic systems

Dwelling unit kitchen appliances equipped with downdraft exhaust must:

- Discharge to the outdoors through sheet metal ducts
 - ✓ Constructed of galvanized steel, stainless steel, aluminum or copper
 - ✓ Have smooth inner walls,
 - ✓ Are air tight
 - ✓ Equipped with a backdraft damper
 - ✓ Be independent of all other exhaust systems.



2012 IMC Update

38

Section 506.3.7.1

Type of Change:
New

▪ Grease reservoirs

Previous editions of the IMC have required a grease duct to be sloped toward an approved grease reservoir but there have never been any provisions to address how a grease reservoir should be constructed.

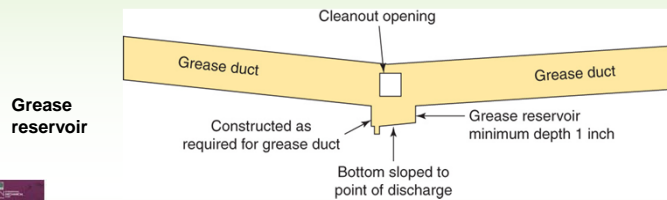


2012 IMC Update

40

506.3.7.1 Grease Reservoirs

- **Added:** Criteria provided for the construction of a grease reservoir in a grease duct system where the reservoir is not a manufactured product.



2012 IMC Update

41

506.3.8 Grease Duct Cleanouts and Other Openings

- In addition to the reformatting of previous criteria for grease duct cleanouts, gasket and sealing materials on grease duct cleanout doors must now be rated at a minimum of 1500°F.

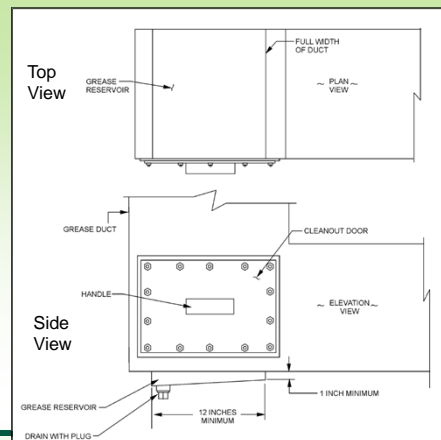


2012 IMC Update

43

Figure 506.3.7.1

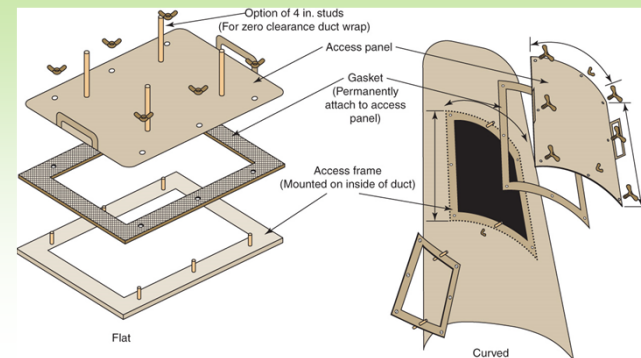
Illustrates the prescribed requirements for the construction of a **grease reservoir in a grease duct.**



2012 IMC Update

42

Grease duct cleanout opening



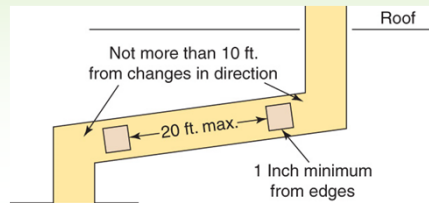
2012 IMC Update

44

506.3.9 Grease Duct Horizontal Cleanouts

- **Modified:** Criteria for cleanouts serving horizontal grease ducts have been rearranged for ease of use and clarification, and several technical provisions have been added or modified.

Horizontal grease duct cleanout opening



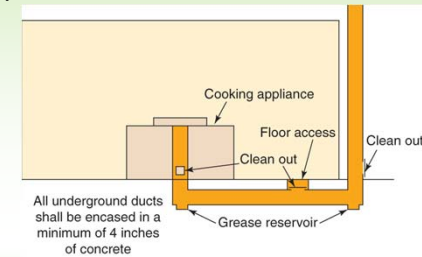
2012 IMC Update

45

506.3.10 Underground Grease Duct Installations

- **Addition:** Grease ducts installed in underground locations are now regulated based upon a number of new provisions.

Underground grease duct



2012 IMC Update

47

Section 506.3.10

Type of Change:
New

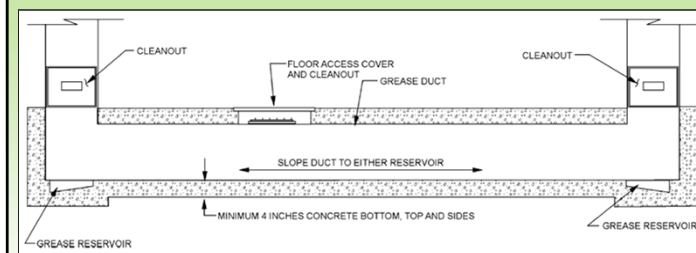
- **Underground grease duct installation**
Provides prescriptive requirements on the installation of the underground grease ducts used for table top cooking.
- For example, new provisions require:
 - Encasing underground grease ducts in at least 4 inches of concrete.
 - Mandate that cleanouts be provided at the locations of reservoirs.



2012 IMC Update

46

Figure 506.3.10



Illustrates the new requirements for **underground grease duct installations** including requirements for materials, reservoirs, slope and cleanouts.

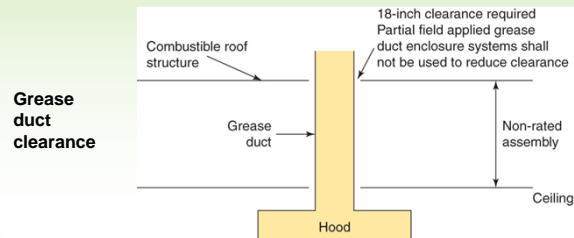


2012 IMC Update

48

506.3.11.2 Field-Applied Grease Duct Enclosures

- **Clarified:** Field-applied grease duct enclosure systems are now specifically prohibited from being used to reduce clearance to combustibles.



2012 IMC Update

49

507.2.1 Type I Hoods

- **Modified:** Type I hoods no longer are required to be installed where complying electric cooking appliances are being used.

Electric oven where a hood is not required (Courtesy of TurboChef Global)



2012 IMC Update

51

507.2 Type I or Type II Hood Required

- **Modified:** A Type I or Type II commercial kitchen hood is not required for appliances with listed integral downdraft exhaust systems.



Hibachi table with integral downdraft exhaust system (Courtesy of Roaster Tech)



2012 IMC Update

50

507.2.1.1 Operation of Type I Hoods

- **Modified:** A method is now required to keep the pilot burner on a gas cooking appliance from being extinguished when the kitchen exhaust fan interlock shuts off appliances.



2012 IMC Update

52

FOR EXAMPLE

Commercial cooking appliance vented by exhaust hoods

The diagram illustrates a commercial kitchen exhaust system. A canopy hood is positioned above a range/oven. A gas supply line serves the range/oven, with a solenoid shutoff valve located between the gas supply and the range/oven. The hood fan control is connected to the hood fan, which is also connected to the hood fan interlock with solenoid valve. The hood fan interlock with solenoid valve is connected to the solenoid shutoff valve. The solenoid shutoff valve is connected to the range/oven. The hood fan control is also connected to the hood fan interlock with solenoid valve. The hood fan interlock with solenoid valve is connected to the solenoid shutoff valve. The solenoid shutoff valve is connected to the range/oven. The hood fan control is also connected to the hood fan interlock with solenoid valve. The hood fan interlock with solenoid valve is connected to the solenoid shutoff valve. The solenoid shutoff valve is connected to the range/oven. The hood fan control is also connected to the hood fan interlock with solenoid valve. The hood fan interlock with solenoid valve is connected to the solenoid shutoff valve. The solenoid shutoff valve is connected to the range/oven.

Gas supply serving range/oven is shut off when exhaust hood is not operating

Heat detectors automatically activate exhaust during range/oven operation

Alternate: Hood interlock with solenoid valve is not required if exhaust system operates automatically when range/oven is in operation

Hood fan control

Hood fan interlock with solenoid valve

Gas supply

Solenoid shutoff valve

Bypass of solenoid valve prohibited

Range/Oven

Canopy hood

To fan

2012 IMC Update

53

507.2.2 Type II Hoods

- Modified:** A Type II hood is now required to be installed above all appliances that produce products of combustion but do not produce grease or smoke. An exact exhaust rate is specified for areas where a cooking appliance is being used but a Type II hood is not required.

The diagram shows a cooking appliance installed in a room. A makeup air inlet and an exhaust fan are shown on the ceiling. The cooking appliance is labeled "Cooking appliance".

Room = 2000 sq.ft.
Cooking appliance = 100 sq.ft.
 $2100 \times 0.70 = 1470$ CFM of exhaust required

Cooking appliance that does not require a Type II hood

2012 IMC Update

55

507.2.1.2 Exhaust Flow Rate Label for Type I Hoods

- Added:** Manufacturers of listed Type I commercial cooking hoods are now required to provide information on a label attached to the hood specifying the listed minimum exhaust air flow for the hood based upon the cooking appliance duty classification.

LISTING DESCRIPTION
TESTED, LISTED, AND APPROVED TO EXHAUST A MINIMUM OF 200 CFM PER LINEAR FOOT OVER 600-DEGREE COOKING EQUIPMENT

Type I hood label

2012 IMC Update

54

507.10 Hoods Penetrating a Ceiling

- Added:** Field-applied grease duct enclosure systems are now specifically prohibited from being used as enclosures over the top of Type I hoods.

The diagram shows a Type I hood penetrating a ceiling. A grease duct is shown extending from the hood through the ceiling. A field-applied grease duct enclosure is shown over the top of the hood, with a note stating "Field applied grease duct enclosures shall not be used". A rated duct enclosure is shown over the top of the hood, with a note stating "Rated duct enclosure". The hood is labeled "Type I hood".

Grease duct

Field applied grease duct enclosures shall not be used

Ceiling

Hood enclosure

Rated duct enclosure

Ceiling

Hood enclosed from point where ceiling is penetrated

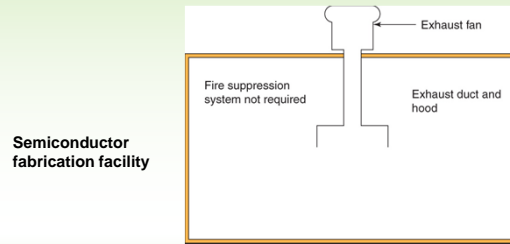
Type I hood

2012 IMC Update

56

510.7 Fire Suppression Required for Hazardous Exhaust Ducts

- **Modified:** Automatic fire suppression systems are no longer required in the exhaust ducts in semiconductor fabrication facilities.



Significant Changes to the International Mechanical and Fuel Gas Codes, 2012 Edition

57



601.4 Contamination Prevention in Plenums

- **Modified:** Chimneys and vents are now permitted to pass through a plenum where in compliance with one of three new allowances.



2012 IMC Update

59

Chapter 6 Duct Systems

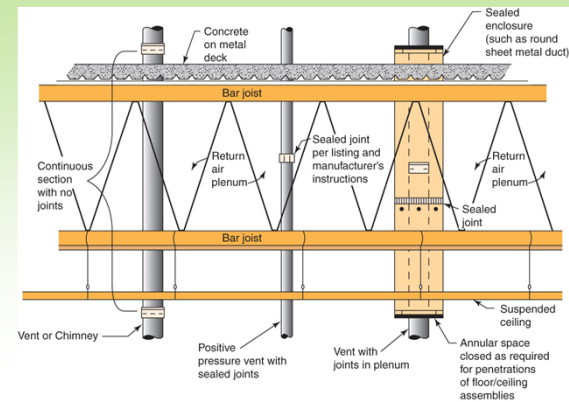


2012 IMC Update

58



Chimney or vent in a plenum



2012 IMC Update

60

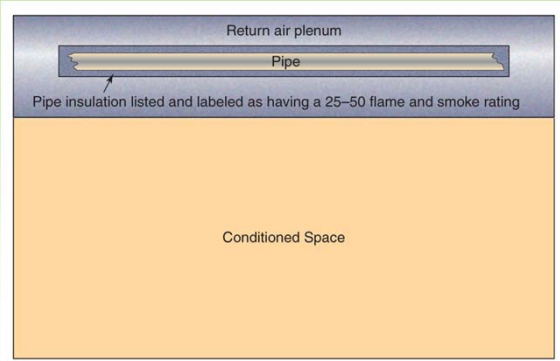
FOR EXAMPLE

602.2.1 Materials within Plenums

- **Clarified:** It has been clarified that any material or assembly that encloses a combustible material in a plenum must be noncombustible, gypsum board or listed and labeled as part of a tested assembly or system.

2012 IMC Update 61

FOR EXAMPLE



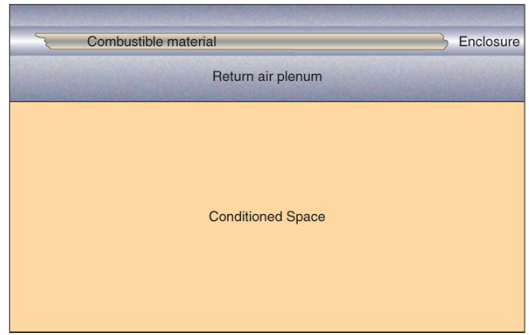
All material within a plenum shall be noncombustible or shall be listed and labeled as having a flame spread rating of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E-84 or UL 728

2012 IMC Update 63

FOR EXAMPLE

Material within a plenum

Enclosure shall be noncombustible, approved gypsum board assembly, or shall be listed and labeled for installation in a plenum



2012 IMC Update 62

Section 603.7

Type of Change:
Modification

- **Rigid duct penetrations**
Ducts in a private garage that **penetrate a wall or ceiling** that separates a dwelling from a private garage must
 - Be continuous.
 - Be constructed of sheet steel having a thickness of not less than 0.0187 inch
 - Not have openings into the garage.

2012 IMC Update 64

FOR EXAMPLE

Duct penetration of a garage/dwelling separation

Ducts A - 0.019 inch galvanized steel with no openings into garage.

Ducts B - Any duct approved by the Mechanical Code.

65

Section 603.17

Type of Change: **New**

- **Air dispersion systems**
Air dispersion systems as defined in Section 202 and recognized in UL 2518 are now permitted to be installed.
- **Definition:** Any diffuser system designed to both convey air within a room, space or area and diffuse air into that space while operating under positive pressure. Systems are commonly constructed of, but not limited to, fabric or plastic film.

67

Section 603.9

Type of Change: **Modification**

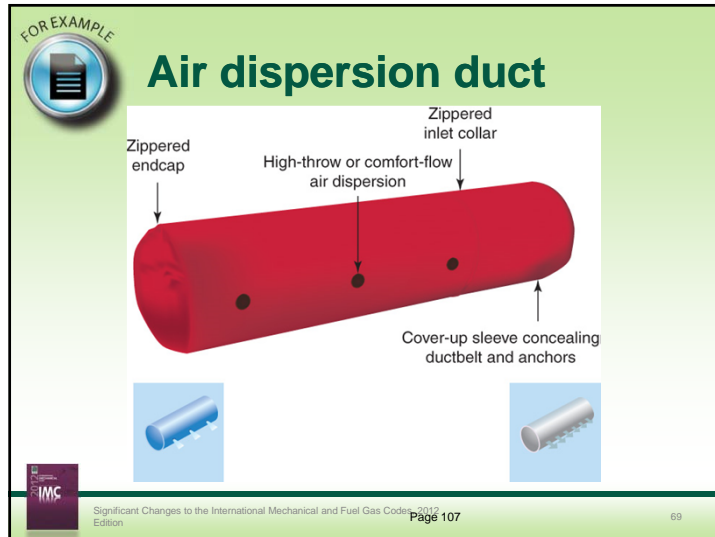
- **Joints, seams and connections**
Clarifies that **unlisted** duct tape is not allowed as a sealant on **any type** of a duct system.
- The previous limitation only applied to metal ducts.

66

Figure 603.17 Air Dispersion System

Photo courtesy of DuctSox

68



Section 805.3

Type of Change:
New

- **Factory-built chimney offsets**
 - Limitations are based on UL 103 Factory-built chimneys.
 - New requirements specify the maximum permitted vertical offset (30 degrees) in a factory-built chimney, as well as the maximum number of offsets that are allowed (two).

2012 IMC Update

71

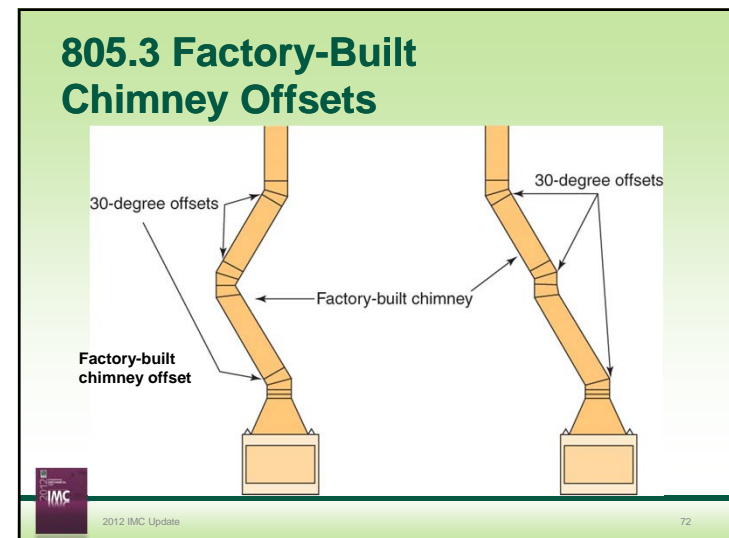
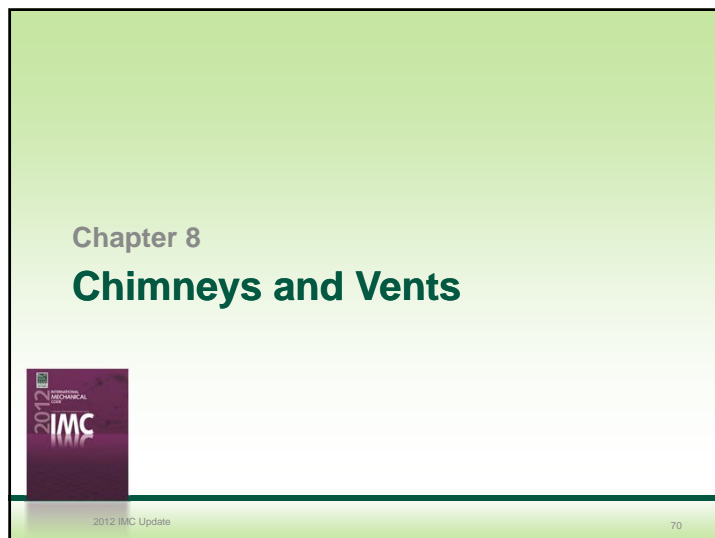
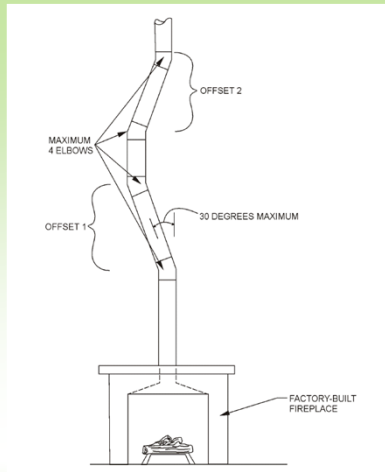


Figure 805.3

The requirement in Section 805.3 was always a part of the chimney's listing and was brought into the IMC to prevent it from being overlooked.

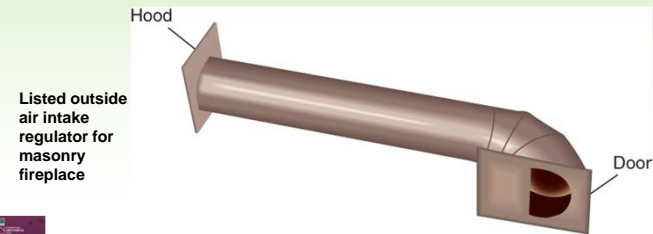


2012 IMC Update

73

901.4 Fireplace Accessories

- **Added:** Fireplace accessories must now comply with UL 907, which has been added to Chapter 15.



2012 IMC Update

75

Chapter 9

Specific Appliances, Fireplaces and Solid Fuel-Burning Equipment



2012 IMC Update

74

Section 918.6

Type of Change:
Modification

Forced-Air Warm-Air Furnaces Prohibited sources

Modified the list of locations from which outdoor or return air for forced-air heating and cooling systems must not be taken:

- Mechanical rooms were removed from the list of prohibited spaces.
- Dedicated forced-air systems serving only a garage are not to be prohibited from obtaining return air from the garage.



2012 IMC Update

76

Section 928

Type of Change:
New

▪ Evaporative Cooling Equipment: General

Evaporative coolers have not been addressed in previous editions of the IMC.

Requirements now address such issues as backflow, air intake location openings in roofs and exterior walls, and manufacturers' installation instructions.



2012 IMC Update

77

1101.10 Locking Access Port Caps

- **Modified:** Locking caps are no longer required on refrigerant access ports if the refrigeration equipment is located in a secured location.

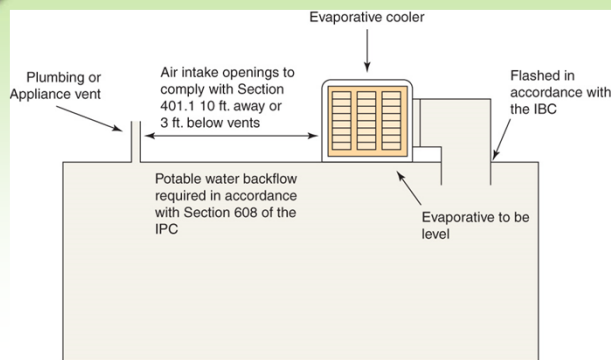


2012 IMC Update

79



Evaporative cooler on roof

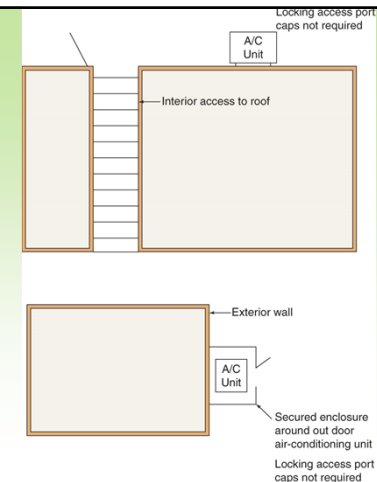


2012 IMC Update

78



Air-conditioning unit in a secured location



2012 IMC Update

80

1105.6, 1105.6.3 Machinery Room Ventilation

- **Modified:** The minimum ventilation rates in an ammonia machinery room must now be in accordance with IIAR2.



2012 IMC Update

81

1106.4 Flammable Refrigerants

- **Modified:** The ventilation requirements of Section 1106.3 for ammonia machinery rooms are now mandatory in order to be exempted from the Class 1, Division 2 hazardous locations requirements of NFPA 70.

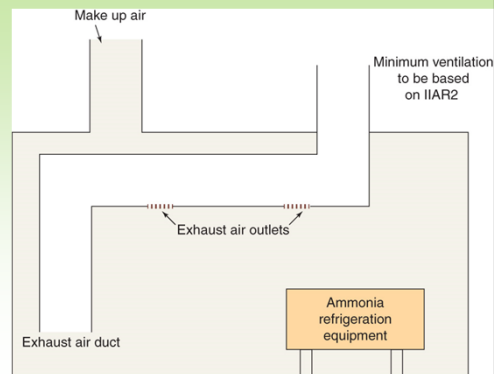


2012 IMC Update

83



Ammonia machinery room



2012 IMC Update

82

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 2011



85

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



2012 IMC Update

86