

---

---

---

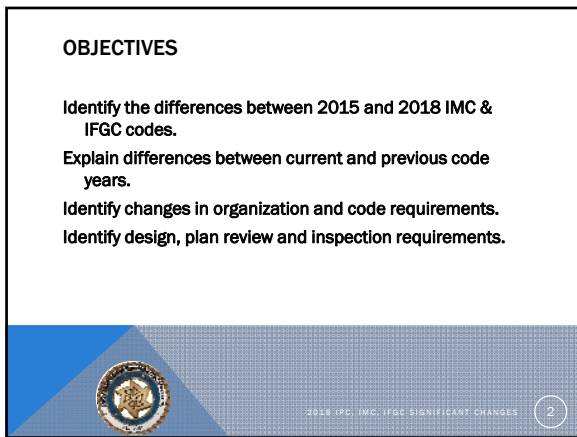
---

---

---

---

---



---

---

---

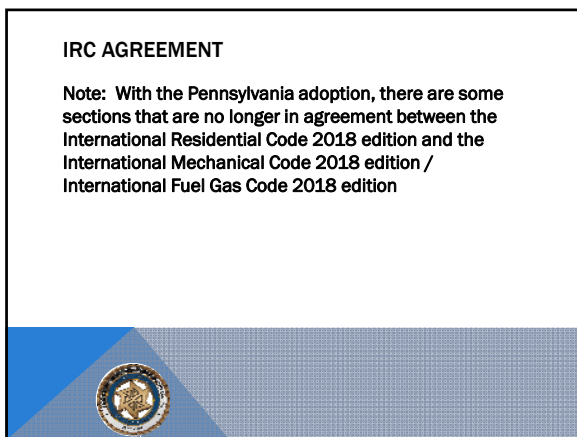
---

---

---

---

---



---

---

---

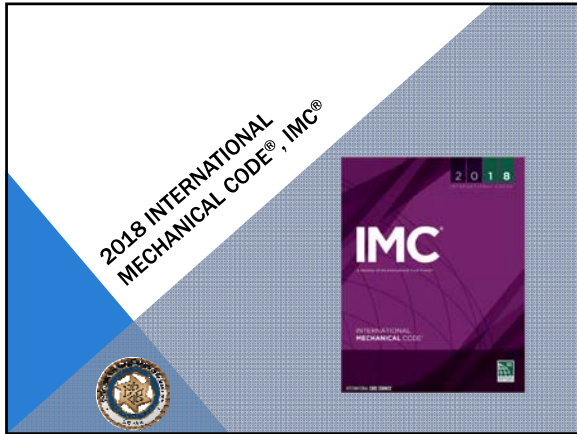
---

---

---

---

---



---

---

---

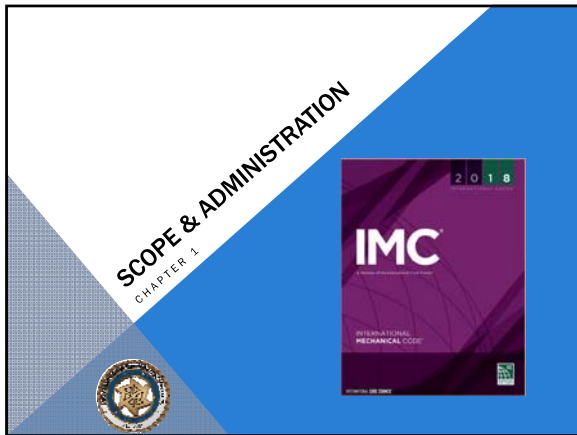
---

---

---

---

---



---

---

---

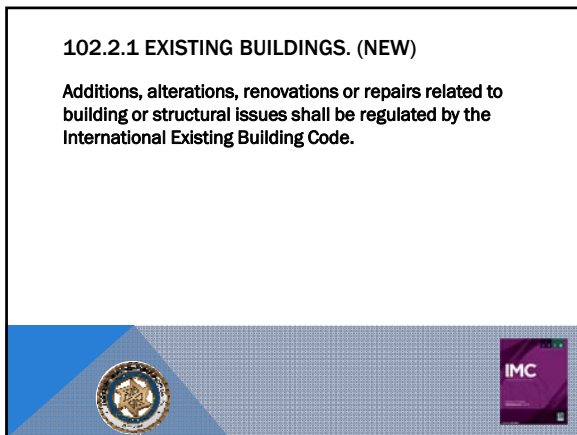
---

---

---

---

---



---

---

---

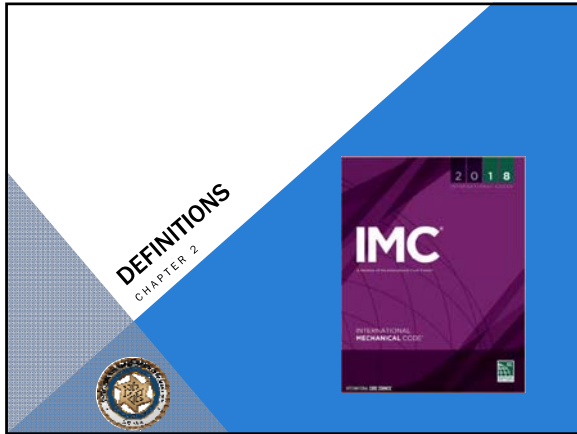
---

---

---

---

---



---

---

---

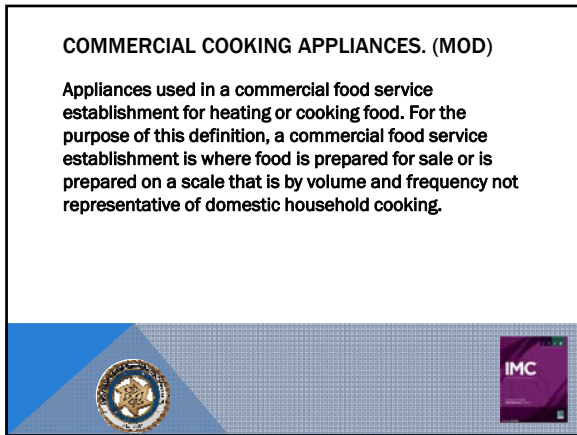
---

---

---

---

---



---

---

---

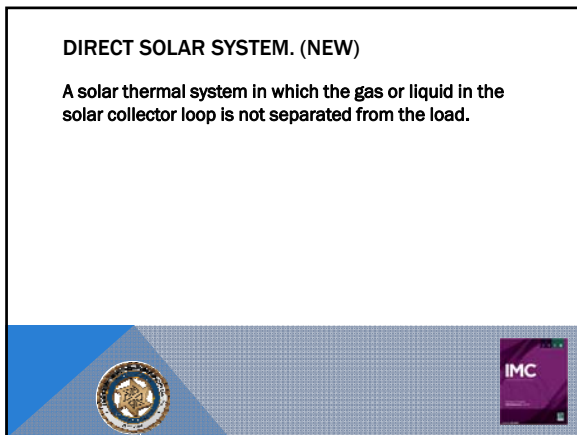
---

---

---

---

---



---

---

---

---

---

---

---

---

**DRAIN-BACK SYSTEM. (NEW)**

A solar thermal system in which the fluid in the solar collector loop is gravity drained from the collector into a holding tank under prescribed circumstances.



---

---

---

---

---

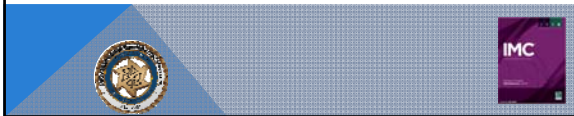
---

---

---

**FOOD-GRADE FLUID. (NEW)**

Potable water or a fluid containing additives listed in accordance with the Code of Federal Regulations, Title 21, Food and Drugs, Chapter 1, Food and Drug Administration, Parts 174-186.



---

---

---

---

---

---

---

---

**HIGH-VOLUME, LARGE-DIAMETER FAN. (NEW)**

A low-speed ceiling fan that circulates large volumes of air and that is greater than 7 feet (2134 mm) in diameter.



---

---

---

---

---

---

---

---

**INDIRECT SOLAR SYSTEM. (NEW)**

A solar thermal system in which the gas or liquid in the solar collector loop circulates between the solar collector and a heat exchanger and such gas or liquid is not drained from the system or supplied to the load during normal operation.



---

---

---

---

---

---

---

---

**LOW-PROBABILITY PUMP. (NEW)**

A pump that does not rely on a dynamic shaft seal as a singular means of containment to prevent atmospheric release of the pumped fluid.



---

---

---

---

---

---

---

---

**MACHINERY ROOM. (MOD)**

An enclosed space that is required by Chapter 11 to contain refrigeration equipment and to comply with Sections 1105 and 1106.



---

---

---

---

---

---

---

---

**NO-FLOW CONDITION (SOLAR). (NEW)**

A condition where thermal energy is not transferred from a solar thermal collector by means of flow of a heat transfer fluid.



---

---

---

---

---

---

---

---

**NONFOOD-GRADE FLUID. (NEW)**

Any fluid that is not designated as a food-grade fluid.



---

---

---

---

---

---

---

---

**OCCUPATIONAL EXPOSURE LIMIT (OEL). (MOD)**

The time-weighted average (TWA) concentration for a normal 8-hour workday and a 40-hour workweek to which nearly all workers can be repeatedly exposed without adverse effect, based on the OSHA PEL, ACGIH TLV-TWA, TERA OARS WEEL, or consistent value.



---

---

---

---

---

---

---

---

**PIPING. (MOD)**

Where used in this code, "piping" refers to either pipe or tubing, or both.

**Pipe.** A rigid conduit of iron, steel, copper, copper-alloy, or plastic.

**Tubing.** Semi-rigid conduit of copper, copper-alloy, aluminum, plastic or steel.



---

---

---

---

---

---

---

---

**POLLUTION-CONTROL UNIT (PCU). (NEW)**

Manufactured equipment that is installed in a grease exhaust duct system for the purpose of extracting smoke, grease particles and odors from the exhaust flow by means of a series of filters.



---

---

---

---

---

---

---

---

**REFRIGERATED ROOM OR SPACE. (DEL)**

A room or space in which an evaporator or brine coil is located for the purpose of reducing or controlling the temperature within the room or space to below 68°F (20°C).



---

---

---

---

---

---

---

---

**SOLAR THERMAL SYSTEM. (NEW)**

A system that converts solar radiation to thermal energy for use in heating or cooling.



---

---

---

---

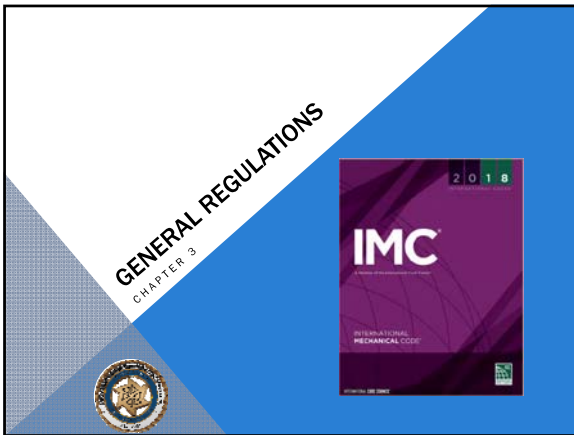
---

---

---

---

**GENERAL REGULATIONS**  
CHAPTER 3



---

---

---

---

---

---

---

---

**303.7 PIT LOCATIONS. (MOD)**

Appliances installed in pits or excavations shall not come in direct contact with the surrounding soil and shall be installed not less than 3 inches (76 mm) above the pit floor. The sides of the pit or excavation shall be held back not less than 12 inches (305 mm) from the appliance. Where the depth exceeds 12 inches (305 mm) below adjoining grade, the walls of the pit or excavation shall be lined with concrete or masonry. Such concrete or masonry shall extend not less than 4 inches (102 mm) above adjoining grade and shall have sufficient lateral load-bearing capacity to resist collapse. Excavation on the control side of the appliance shall extend not less than 30 inches (762 mm) horizontally. The appliance shall be protected from flooding in an approved manner.



---

---

---

---

---

---

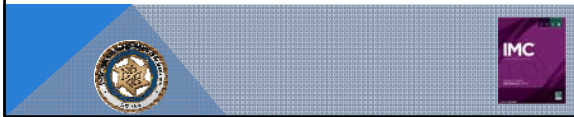
---

---



**303.9 FIREPLACES IN GROUP I-2, CONDITION 2 OCCUPANCIES. (NEW)**

Fuel-burning appliances and fireplaces in Group I-2, Condition 2 occupancies shall be in accordance with Section 901.4.




---

---

---

---

---

---

---

---

---

---

**306.1 ACCESS (DEL)**

**306.1.1 Central furnaces.** Central furnaces within compartments or alcoves shall have a minimum working space clearance of 3 inches (76 mm) along the sides, back and top with a total width of the enclosing space being not less than 12 inches (305 mm) wider than the furnace. Furnaces having a firebox open to the atmosphere shall have not less than 6 inches (152 mm) working space along the front




---

---

---

---

---

---

---

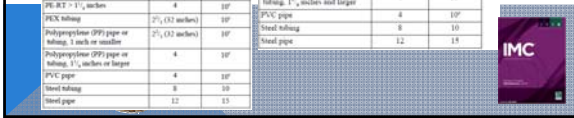
---

---

---

**TABLE 305.4 PIPING SUPPORT SPACING (MOD)**

PIPING MATERIAL	MINIMUM HORIZONTAL SPACING (feet)	MINIMUM VERTICAL SPACING (feet)	PIPING MATERIAL	MINIMUM HORIZONTAL SPACING (feet)	MINIMUM VERTICAL SPACING (feet)
ABS pipe	4	10'	ABS pipe	4	10'
Aluminum pipe and tubing	10	15	Aluminum pipe and tubing	10	15
Bronze pipe	10	10	Cast-iron pipe <sup>a</sup>	5	15
Brass tubing, 1 1/2 inch diameter and smaller	6	10	Copper or copper-alloy pipe	12	10
Brass tubing, 1 1/2 inch diameter and larger	10	10	Copper or copper-alloy tubing	8	10
Cast-iron pipe <sup>a</sup>	5	15	CPVC pipe or tubing, 1 inch and smaller	3	10'
Copper or copper-alloy pipe	12	10	CPVC pipe or tubing, 1 1/2 inches and larger	4	10'
Copper or copper-alloy tubing, 1 1/2 inch diameter and smaller	6	10	Lead pipe	Continuous	4
Copper or copper-alloy tubing, 1 1/2 inch diameter and larger	10	10	PE pipe or tubing	2 1/2 (32 inches)	4
CPVC pipe or tubing, 1 inch and smaller	3	10'	PE-RT 1 inch and smaller	2 1/2 (32 inches)	10'
CPVC pipe or tubing, 1 1/2 inch and larger	4	10'	PE-RT 1 1/2 inches and larger	4	10'
Lead pipe	Continuous	4	PEX tubing 1 inch and smaller	2 1/2 (32 inches)	10'
PE pipe or tubing	2 1/2 (32 inches)	4	PEX tubing 1 1/2 inches and larger	4	10'
PE-RT 1 inch	2 1/2 (32 inches)	10'	Polypropylene (PP) pipe or tubing, 1 inch and smaller	2 1/2 (32 inches)	10'
PE-RT 1 1/2 inches	4	10'	Polypropylene (PP) pipe or tubing, 1 1/2 inches and larger	4	10'
PEX tubing	2 1/2 (32 inches)	10'	PVC pipe	4	10'
Polypropylene (PP) pipe or tubing, 1 inch and smaller	2 1/2 (32 inches)	10'	Steel tubing	8	10
Polypropylene (PP) pipe or tubing, 1 1/2 inches and larger	4	10'	Steel pipe	12	15
PVC pipe	4	10'			
Steel tubing	8	10			
Steel pipe	12	15			




---

---

---

---

---

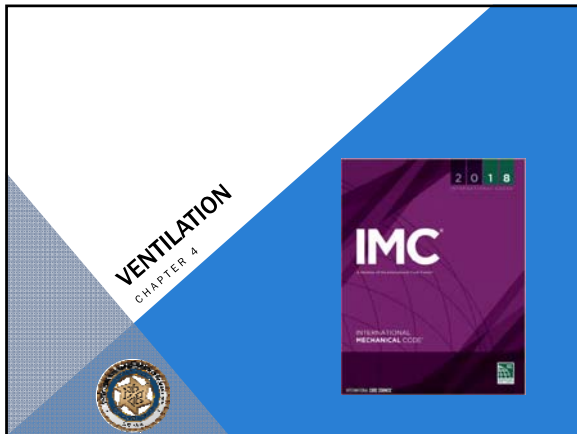
---

---

---

---

---



---

---

---

---

---

---

---

---

**TABLE 401.5 OPENING SIZES IN LOUVERS, GRILLES, AND SCREENS PROTECTING AIR INTAKE OPENINGS (MOD)**

OUTDOOR OPENING TYPE	MINIMUM AND MAXIMUM OPENING SIZES IN LOUVERS, GRILLES AND SCREENS*
Intake openings in residential occupancies	Not < 1/4 inch and not > 1/2 inch
Intake openings in other than residential occupancies	> 1/4 inch and not > 1 inch

For SI: 1 inch = 25.4 mm.

a. For rectangular openings, the table requirements apply to the shortest side. For round openings, the table requirements apply to the diameter. For square openings, the table requirements apply to any side.

---

---

---

---

---

---

---

---

**403.3.2.4 SYSTEM CONTROLS. (NEW)**

Where provided within a dwelling unit, controls for outdoor air ventilation systems shall include text or a symbol indicating the system's function.

---

---

---

---

---

---

---

---

**403.3.2.5 VENTILATING EQUIPMENT. (NEW)**

Exhaust equipment serving single dwelling units shall be listed and labeled to provide the minimum required air flow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.



---

---

---

---

---

---

---

---

**404.1 ENCLOSED PARKING GARAGES. (MOD)**

Mechanical ventilation systems for enclosed parking garages shall operate continuously or shall be automatically operated by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Such detectors shall be listed in accordance with UL 2075 and installed in accordance with their listing and the manufacturers' instructions. Automatic operation shall cycle the ventilation system between the following two modes of operation:

1. Full-on at an airflow rate of not less than 0.75 cfm per square foot [0.0038 m<sup>3</sup>/(s • m<sup>2</sup>)] of the floor area served.
2. Standby at an airflow rate of not less than 0.05 cfm per square foot [0.00025 m<sup>3</sup>/(s • m<sup>2</sup>)] of the floor area served.



---

---

---

---

---

---

---

---

**404.2 MINIMUM VENTILATION. (DEL)**

Automatic operation of the system shall not reduce the ventilation airflow rate below 0.05 cfm per square foot (0.00025 m<sup>3</sup>/s • m<sup>2</sup>) of the floor area and the system shall be capable of producing a ventilation airflow rate of 0.75 cfm per square foot (0.0038 m<sup>3</sup>/s • m<sup>2</sup>) of floor area.



---

---

---

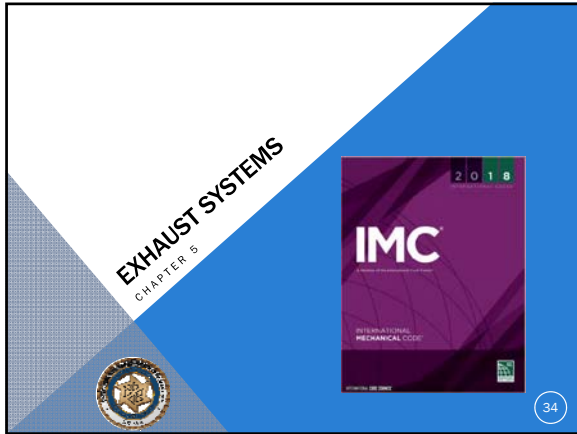
---

---

---

---

---



---

---

---

---

---

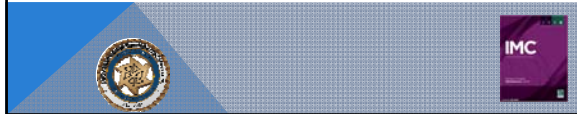
---

---

---

**502.4 STATIONARY STORAGE BATTERY SYSTEMS. (MOD)**

Stationary storage battery systems, as required by Section 1206.2.11.3 of the International Fire Code, shall be provided with ventilation in accordance with this chapter and Section 502.4.1 or 502.4.2. The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the vault ceiling for gases having a vapor density less than air.



---

---

---

---

---


---

---

---

**502.4.1 FLAMMABILITY LIMIT IN ROOMS. (MOD)**

The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammability limit or, for hydrogen, limit the maximum concentration to 1.0 percent of the total volume of the room.



---

---

---

---

---

---

---

---

**502.4.2 VENTILATION RATE IN ROOMS. (MOD)**

Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft<sup>2</sup>) [0.00508 m<sup>3</sup>/(s • m<sup>2</sup>)] of floor area of the room and not less than 150 cfm (4.25 m<sup>3</sup> / min).



---

---

---

---

---

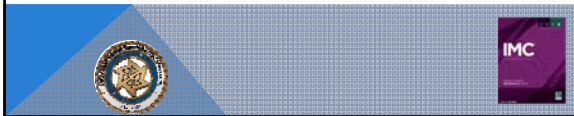
---

---

---

**502.5 VENTILATION OF BATTERY SYSTEMS IN CABINETS. (MOD)**

Stationary storage battery systems installed in cabinets, as regulated by Section 1206.2.11.3.1 of the International Fire Code, shall be provided with ventilation in accordance with Section 502.4.



---

---

---

---

---

---

---

---

**502.5.3 SUPERVISION. (DEL)**

~~Mechanical ventilation systems required by Section 502.5 shall be supervised by an approved central, proprietary or remote station service or shall initiate an audible and visual signal at a constantly attended on-site location.~~



---

---

---

---

---

---

---

---

**502.16 REPAIR GARAGES FOR VEHICLES FUELED BY LIGHTER-THAN-AIR FUELS. (MOD)**

Repair garages used for the conversion and repair of vehicles that use compressed natural gas, liquefied natural gas, hydrogen or other lighter-than-air motor fuels shall be provided with an approved mechanical exhaust ventilation system. The mechanical exhaust ventilation system shall be in accordance with Section 502.16.1 or 502.16.2 as applicable.



---

---

---

---

---

---

---

---

**EXCEPTIONS:**

1. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the compressed natural gas, liquefied natural gas, hydrogen or other lighter-than-air-fueled motor vehicle.
2. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain a quantity of hydrogen that is less than 200 cubic feet (5.6 m3).



---

---

---

---

---

---

---

---

**502.16.1 REPAIR GARAGES FOR HYDROGEN-FUELED VEHICLES. (MOD)**

Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an approved exhaust ventilation system in accordance with this code and Chapter 6 of NFPA 2.



---

---

---

---

---

---


---

---

**502.16.2 EXHAUST VENTILATION SYSTEM. (MOD)**

Repair garages used for the repair of compressed natural gas, liquefied natural gas or other lighter-than-air motor fuel, other than hydrogen, shall be provided with an approved mechanical exhaust ventilation system. The mechanical exhaust ventilation system shall be in accordance with this code and Sections 502.16.2.1 and 502.16.2.2.

Exception: Where approved, natural ventilation shall be an alternative to mechanical exhaust ventilation.



---

---

---

---

---

---

---


---

**502.16.2.1 DESIGN. (MOD)**

For indoor locations, air supply inlets and exhaust outlets for mechanical ventilation shall be arranged to provide uniformly distributed air movement with inlets uniformly arranged on walls near floor level and outlets located at the high point of the room in walls or the roof.

Failure of the exhaust ventilation system shall cause the fueling system to shut down.

The exhaust ventilation rate shall be not less than 1 cubic foot per minute (0.03 m<sup>3</sup>/min) per 12 cubic feet (0.34 m<sup>3</sup>) of room volume.



---

---

---

---

---

---

---


---

**502.16.2.2 OPERATION. (MOD)**

The mechanical exhaust ventilation system shall operate continuously.

Exceptions:

1. Mechanical exhaust ventilation systems that are interlocked with a gas detection system designed in accordance with the International Fire Code.
2. Mechanical exhaust ventilation systems in garages that are used only for the repair of vehicles fueled by liquid fuels or odorized gases, such as compressed natural gas, where the exhaust ventilation system is electrically interlocked with the lighting circuit.



---

---

---

---

---

---

---

---

**504.4 EXHAUST INSTALLATION. (MOD)**

Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Ducts shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the exhaust flow. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or chimney. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums. Clothes dryer exhaust ducts shall be sealed in accordance with Section 603.9.



---

---

---

---

---

---

---

---

**504.4.1 EXHAUST TERMINATION OUTLET AND PASSAGEWAY SIZE. (NEW)**

The passageway of dryer exhaust duct terminals shall be undiminished in size and shall provide an open area of not less than 12.5 square inches (8065 mm<sup>2</sup>).



---

---

---

---

---

---

---

---

**504.8.2 DUCT INSTALLATION. (MOD)**

Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Ducts shall not be joined with screws or similar fasteners that protrude more than 1/8 inch (3.2 mm) into the inside of the duct.

Where dryer exhaust ducts are enclosed in wall or ceiling cavities, such cavities shall allow the installation of the duct without deformation.



---

---

---

---

---

---

---

---



**505.1 GENERAL. (NEW)**

Domestic cooking exhaust equipment shall comply with the requirements of this section.



---

---

---

---

---

---

---

---

**505.2 DOMESTIC COOKING EXHAUST. (NEW)**

Where domestic cooking exhaust equipment is provided, it shall comply with the following as applicable:

1. The fan for overhead range hoods and downdraft exhaust equipment not integral with the cooking appliance shall be listed and labeled in accordance with UL 507.
2. Overhead range hoods and downdraft exhaust equipment with integral fans shall comply with UL 507.
3. Domestic cooking appliances with integral downdraft exhaust equipment shall be listed and labeled in accordance with UL 858 or ANSI Z21.1.
4. Microwave ovens with integral exhaust for installation over the cooking surface shall be listed and labeled in accordance with UL 923.



---

---

---

---

---

---

---

---

**505.3 EXHAUST DUCTS. (NEW)**

Domestic cooking exhaust equipment shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be air tight, shall be equipped with a backdraft damper, and shall be independent of all other exhaust systems. Installations in Group I-1 and I-2 occupancies shall be in accordance with the International Building Code and Section 904.13 of the International Fire Code.



---

---

---

---

---



---

---

---

**505.6 OTHER THAN GROUP R. (NEW)**

In other than Group R occupancies, where domestic cooktops, ranges, and open-top broilers are used for domestic purposes, domestic cooking exhaust systems shall be provided.



---

---

---

---

---

---



---

---

**506.5.2 POLLUTION-CONTROL UNITS. (NEW)**

The installation of pollution-control units shall be in accordance with the manufacturer's installation instructions and all of the following:

1. Pollution-control units shall be listed and labeled in accordance with UL 1978.
2. Fans serving pollution-control units shall be listed and labeled in accordance with UL 762.
3. Pollution-control units shall be mounted and secured in accordance with the manufacturer's installation instructions and the International Building Code.



---

---

---

---

---



---

---

---

**506.5.2 POLLUTION-CONTROL UNITS. (NEW)**

4. Pollution-control units located indoors shall be listed and labeled for such use. Where enclosed duct systems, as required by Section 506.3.11, are connected to a pollution control unit, such unit shall be located in a room or space having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of the unit. The space or enclosure shall be ventilated in accordance with the manufacturer's installation instructions.
5. A clearance of not less than 18 inches (457 mm) shall be maintained between the pollution-control unit and combustible material.
6. Roof-mounted pollution-control units shall be listed for outdoor installation and shall be mounted not less than 18 inches (457 mm) above the roof.
7. Exhaust outlets for pollution-control units shall be in accordance with Section 506.3.13.



---

---

---

---

---

---

---


---

**506.5.2 POLLUTION-CONTROL UNITS. (NEW)**

8. An airflow differential pressure control shall be provided to monitor the pressure drop across the filter sections of a pollution-control unit. When the airflow is reduced below the design velocity, the airflow differential pressure control shall activate a visual alarm located in the area where cooking operations occur.

9. Pollution-control units shall be provided with a factory-installed fire suppression system.

10. Service space shall be provided in accordance with the manufacturer's instructions for the pollution-control unit and the requirements of Section 306.



---

---

---

---

---

---


---

---

**506.5.2 POLLUTION-CONTROL UNITS. (NEW)**

11. Wash-down drains shall discharge through a grease interceptor and shall be sized for the flow. Drains, shall be sealed with a trap or other approved means to prevent air bypass. Where a trap is utilized it shall have a seal depth that accounts for the system pressurization and evaporation between cleanings.

12. Protection from freezing shall be provided for the water supply and fire suppression systems where such systems are subject to freezing.



---

---

---

---

---

---

---


---

**506.5.2 POLLUTION-CONTROL UNITS. (NEW)**

13. Duct connections to pollution-control units shall be in accordance with Section 506.3.2.3. Where water splash or carryover can occur in the transition duct as a result of a washing operation, the transition duct shall slope downward toward the cabinet drain pan for a length not less than 18 inches (457 mm). Ducts shall transition to the full size of the unit's inlet and outlet openings.

14. Extra-heavy-duty appliance exhaust systems shall not be connected to pollution-control units except where such units are specifically designed and listed for use with solid fuels.

15. Pollution-control units shall be maintained in accordance with the manufacturer's instructions.



---

---

---

---

---

---

---

---

**507.2.6 CLEARANCES FOR TYPE I HOOD. (MOD)**

A Type I hood shall be installed with a clearance to combustibles of not less than 18 inches (457 mm).

Exceptions:

1. Clearance shall not be required from gypsum wallboard or 1/2-inch (12.7 mm) or thicker cementitious wallboard attached to noncombustible structures provided that a smooth, cleanable, nonabsorbent and noncombustible material is installed between the hood and the gypsum or cementitious wallboard over an area extending not less than 18 inches (457 mm) in all directions from the hood.
2. Type I hoods listed and labeled for clearances less than 18 inches in accordance with UL 710 shall be installed with the clearances specified by such listings.



---

---

---

---

---

---

---

---

**507.6.1 CAPTURE AND CONTAINMENT TEST. (MOD)**

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, with all sources of outdoor air providing makeup air for the hood operating and with all sources of recirculated air providing conditioning for the space in which the hood is located operating. Capture and containment shall be verified visually by observing smoke or steam produced by actual or simulated cooking, such as that provided by smoke candles and smoke puffers. Smoke bombs shall not be used.



---

---

---

---

---

---

---

---

**509.1 WHERE REQUIRED. (MOD)**

Cooking appliances required by Section 507.2 to have a Type I hood shall be provided with an approved automatic fire suppression system complying with the International Building Code and the International Fire Code.



---

---

---

---

---

---

---

---

**510.8.1 DUCT CLEANOUT. (NEW)**

Ducts conveying combustible dust as part of a dust collection system shall be equipped with cleanouts that are provided with approved access, predesigned to be disassembled for cleaning, or engineered for automatic cleanouts. Where provided, cleanouts shall be located at the base of each vertical duct riser and at intervals not exceeding 20 feet (6096 mm) in horizontal sections of duct.



---

---

---

---

---

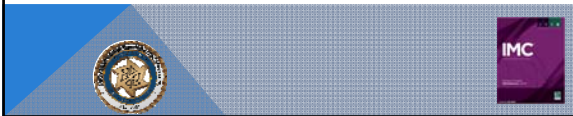
---

---

---

**513.6.1 MINIMUM PRESSURE DIFFERENCE. (MOD)**

The pressure difference across a smoke barrier used to separate smoke zones shall be not less than 0.05-inch water gage (12.4 Pa) in fully sprinklered buildings.



---

---

---

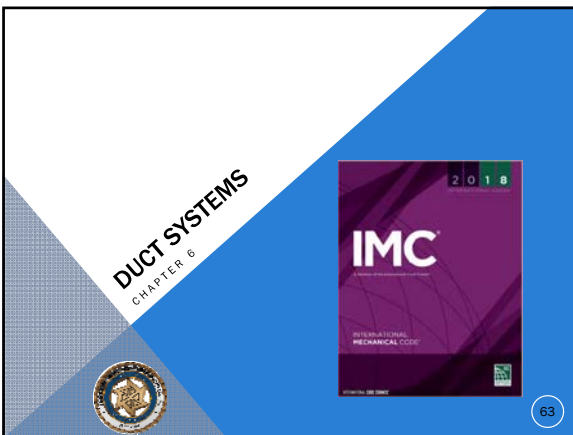
---

---

---

---

---



---

---

---

---

---

---

---

---

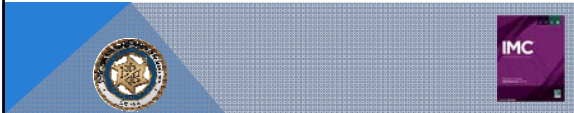
**601.5 RETURN AIR OPENINGS. (MOD)**

Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

8. Return air shall not be taken from indoor swimming pool enclosures and associated deck areas.

Exceptions:

1. Where the air from such spaces is dehumidified in accordance with Section 403.2.1, Item 2.
2. Dedicated HVAC systems serving only such spaces.



---

---

---

---

---

---

---

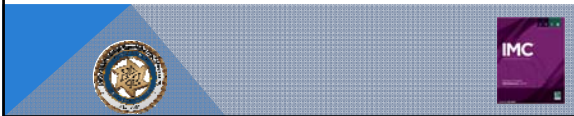
---

**602.2.1 MATERIALS WITHIN PLENUMS. (MOD)**

Exceptions:

5. Combustible materials fully enclosed within one of the following:

5.3. Materials listed and labeled for installation within a plenum and listed for the application.



---

---

---

---

---

---

---

---

**602.2.1.1 WIRING. (MOD)**

Combustible electrical wires and cables and optical fiber cables exposed within a plenum shall be listed and labeled as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm) when tested in accordance with NFPA 262, or shall be installed in metal raceways or metal sheathed cable. Combustible optical fiber and communication raceways exposed within a plenum shall be listed and labeled as having a peak optical density not greater than 0.5, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm) when tested in accordance with UL 2024. Only plenum-rated wires and cables shall be installed in plenum-rated raceways.



---

---

---

---

---

---

---

---

**602.2.1.2 FIRE SPRINKLER PIPING. (MOD)**

Plastic fire sprinkler piping exposed within a plenum shall be used only in wet pipe systems and shall be listed and labeled as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm) when tested in accordance with UL 1887.



---

---

---

---

---

---

---

---

**602.2.1.3 PNEUMATIC TUBING. (MOD)**

Combustible pneumatic tubing exposed within a plenum shall be listed and labeled as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm) when tested in accordance with UL 1820.



---

---

---

---

---

---

---

---

**602.2.1.6 FOAM PLASTIC IN PLENUMS AS INTERIOR FINISH OR INTERIOR TRIM. (MOD)**

Foam plastic in plenums used as interior wall or ceiling finish or interior trim shall exhibit a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, and shall be tested in accordance with NFPA 286 and meet the acceptance criteria of Section 803.1.2 of the International Building Code. As an alternative to testing to NFPA 286, the foam plastic shall be approved based on tests conducted in accordance with Section 2603.9 of the International Building Code.



---

---

---

---

---



---

---

---

**602.2.1.6 EXCEPTIONS: (NEW)**

1. Foam plastic in plenums used as interior wall or ceiling finish or interior trim shall exhibit a flame spread index of 75 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by a thermal barrier complying with Section 2603.4 of the International Building Code.



---

---

---

---

---



---

---

---

**602.2.1.6 EXCEPTIONS: (NEW)**

2. Foam plastic in plenums used as interior wall or ceiling finish or interior trim, shall exhibit a flame spread index of 75 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm).



---

---

---

---

---



---

---

---

**602.2.1.6 EXCEPTIONS: (NEW)**

3. Foam plastic in plenums used as interior wall or ceiling finish or interior trim, shall exhibit a flame spread index of 75 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by not less than a 1-inch (25 mm) thickness of masonry or concrete.



---

---

---

---

---

---

---

---



**602.2.1.7 PLASTIC PLUMBING PIPING AND TUBING. (MOD)**

Plastic piping and tubing used in plumbing systems shall be listed and labeled as having a flame spread index not greater than 25 and a smoke-developed index not greater than 50 when tested in accordance with ASTM E84 or UL 723.



---

---

---

---

---

---

---

---

**602.2.1.7 EXCEPTION: (NEW)**

Plastic water distribution piping and tubing listed and labeled in accordance with UL 2846 as having a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread distance not greater than 5 feet (1524 mm), and installed in accordance with its listing.



---

---

---

---

---

---

---

---

**602.2.1.8 PIPE AND DUCT INSULATION WITHIN PLENUMS. (NEW)**

Pipe and duct insulation contained within plenums, including insulation adhesives, shall have a flame spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Pipe and duct insulation shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Pipe and duct insulation shall be listed and labeled.



---

---

---

---

---

---

---

---

**603.5.2 PHENOLIC DUCTS. (NEW)**

Nonmetallic phenolic ducts shall be constructed and installed in accordance with the SMACNA Phenolic Duct Construction Standards



---

---

---

---

---

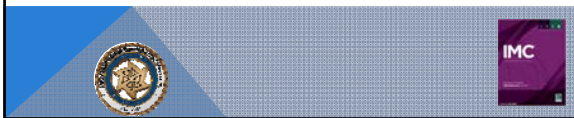
---

---

---

**603.8.2 SEALING. (MOD)**

Ducts shall be sealed, secured and tested prior to concrete encasement or direct burial. Ducts shall be leak tested as required by Section C403 of the International Energy Conservation Code.



---

---

---

---

---

---

---

---

**603.9 JOINTS, SEAMS AND CONNECTIONS. (MOD)**

Exception: For ducts having a static pressure classification of less than 2 inches of water column (500 Pa), additional closure systems shall not be required for continuously welded joints and seams and locking-type joints and seams. This exception shall not apply to snap-lock and button-lock type joints and seams located outside of conditioned spaces.



---

---

---

---

---

---

---

---

**604.11 VAPOR RETARDERS. (MOD)**

Exception: A vapor retarder is not required for spray polyurethane foam insulation having a water vapor permeance of not greater than 3 perms per inch [1722 ng/(s • m<sup>2</sup> • Pa)] at the installed thickness.



---

---

---

---

---

---

---

---

**607.5.5 SHAFT ENCLOSURES. (MOD)**

Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with listed fire and smoke dampers installed in accordance with their listing.



---

---

---

---

---

---

---

---

**607.6.2 MEMBRANE PENETRATIONS. (MOD)**

2. A listed ceiling radiation damper installed at the ceiling line where a duct penetrates the ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly.

Exceptions:

1. A fire-resistance-rated assembly tested in accordance with ASTM E119 or UL 263 showing that ceiling radiation dampers are not required in order to maintain the fire-resistance rating of the assembly.
2. Where exhaust duct or outdoor air duct penetrations are protected in accordance with Section 714.5.1.2 of the International Building Code, are located within the cavity of a wall and do not pass through another dwelling unit or tenant space.
3. Where duct and air transfer openings are protected with a duct outlet penetration system tested as part of a fire-resistance-rated assembly in accordance with ASTM E119 or UL 263.



---

---

---

---

---

---

---

---

**607.6.2.1 CEILING RADIATION DAMPERS TESTING AND INSTALLATION. (MOD)**

Ceiling radiation dampers shall be tested in accordance with Section 607.3.1. Ceiling radiation dampers shall be installed in accordance with the details listed in the fire-resistance-rated assembly and the manufacturer's installation instructions and the listing



---

---

---

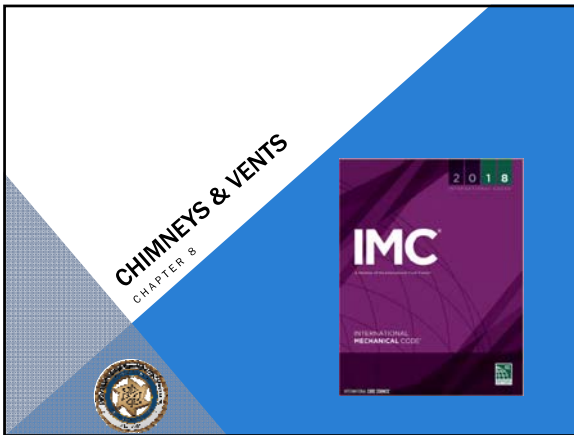
---

---

---

---

---



---

---

---

---

---

---

---

---

**805.7 INSULATION SHIELD. (NEW)**

Where factory-built chimneys pass through insulated assemblies, an insulation shield constructed of steel having a thickness of not less than 0.0187 inch (0.4712 mm) (No. 26 gage) shall be installed to provide clearance between the chimney and the insulation material. The clearance shall be not less than the clearance to combustibles specified by the chimney manufacturer's installation instructions. Where chimneys pass through attic space, the shield shall terminate not less than 2 inches (51 mm) above the insulation materials and shall be secured in place to prevent displacement. Insulation shields provided as part of a listed chimney system shall be installed in accordance with the manufacturer's instructions.



---

---

---

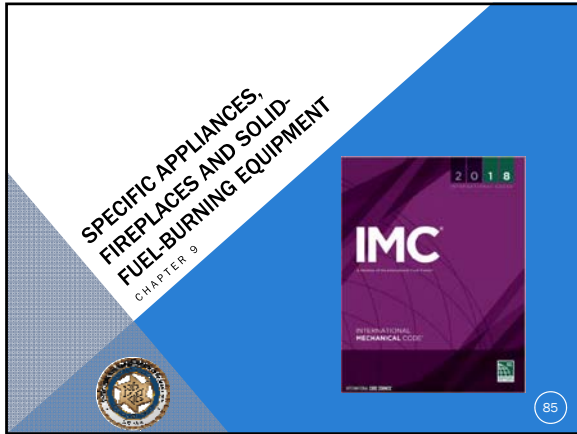
---

---

---

---

---



---

---

---

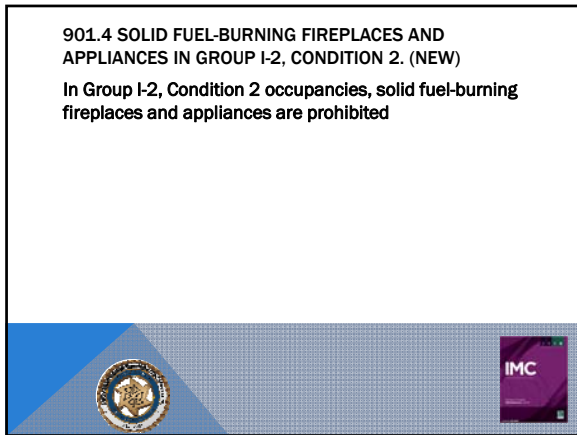
---

---

---

---

---



---

---

---

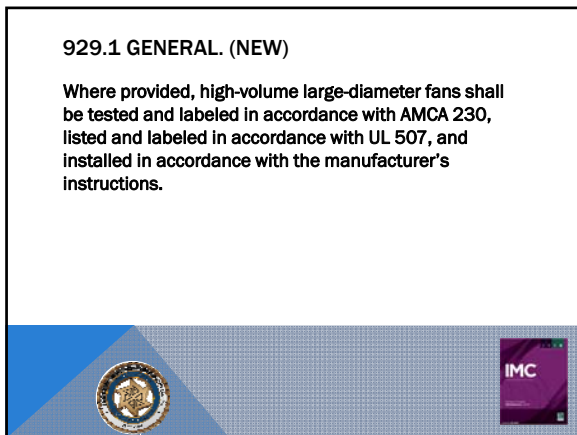
---

---

---

---

---



---

---

---

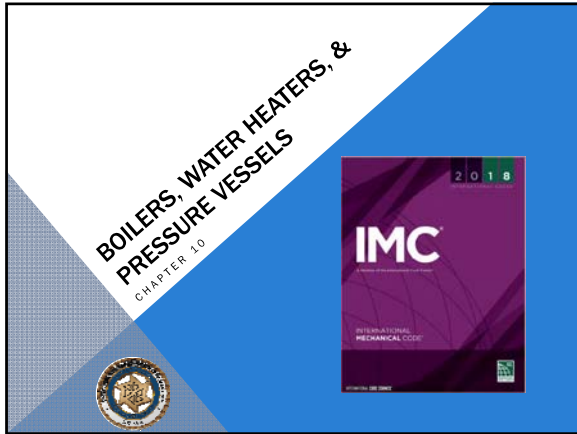
---

---

---

---

---



---

---

---

---

---

---


---

---

**1006.6 SAFETY AND RELIEF VALVE DISCHARGE. (MOD)**

Safety and relief valve discharge pipes shall be of rigid pipe that is approved for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the appliance.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.



---

---

---

---

---


---

---

---

**1006.6 SAFETY AND RELIEF VALVE DISCHARGE. (MOD)**

6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 of the International Plumbing Code or materials tested, rated and approved for such use in accordance with ASME A112.4.1.



---

---

---

---

---

---

---

---

**1009.1 WHERE REQUIRED. (MOD)**

An expansion tank shall be installed in every hot water system. For multiple boiler installations, not less than one expansion tank is required. Expansion tanks shall be of the closed or open type. Tanks shall be rated for the pressure of the hot water system.

Exception: Expansion tanks shall not be required in the collector loop of drain-back systems.



---

---

---

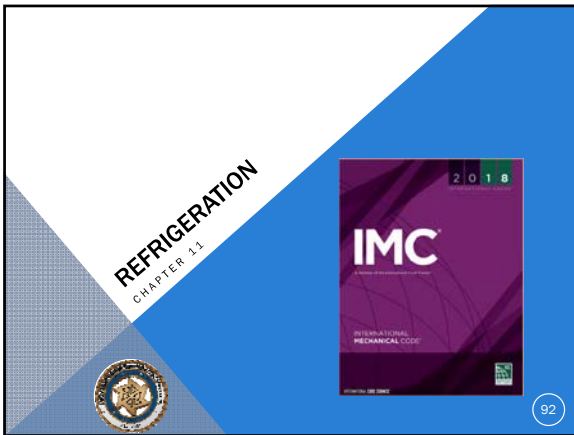
---

---

---

---

---



---

---

---

---

---

---

---

---

**1104.2.2 INDUSTRIAL OCCUPANCIES AND REFRIGERATED ROOMS.(MOD)**

This section applies only to rooms and spaces that: are within industrial occupancies; contain a refrigerant evaporator; are maintained at temperatures below 68°F (20°C); and are used for manufacturing, food and beverage preparation, meat cutting, other processes and storage. Where a machinery room would otherwise be required by Section 1104.2, a machinery room shall not be required where all of the following conditions are met:



---

---

---

---

---


---

---

---

**1104.2.2 INDUSTRIAL OCCUPANCIES AND REFRIGERATED ROOMS. (MOD)**

1. The space containing the machinery is separated from other occupancies by tight construction with tight-fitting doors.
2. Access is restricted to authorized personnel.
3. Refrigerant detectors are installed as required for machinery rooms in accordance with Section 1105.3.  
Exceptions:
  1. Refrigerant detectors are not required in unoccupied areas that contain only continuous piping that does not include valves, valve assemblies, equipment, or equipment connections.
  2. Where approved alternatives are provided, refrigerant detectors for ammonia refrigeration are not required for rooms or areas that are always occupied, and for rooms or areas that have high humidity or other harsh environmental conditions that are incompatible with detection devices.



---

---

---

---

---


---

---

---

**1104.2.2 INDUSTRIAL OCCUPANCIES AND REFRIGERATED ROOMS. (MOD)**

4. Surfaces having temperatures exceeding 800 °F (427 °C) and open flames are not present where any Group A2, B2, A3 or B3 refrigerant is used (see Section 1104.3.4).
5. All electrical equipment and appliances conform to Class 1, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant, other than ammonia, in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.



---

---

---

---

---


---

---

---

**1104.2.2 INDUSTRIAL OCCUPANCIES AND REFRIGERATED ROOMS. (MOD)**

6. All refrigerant-containing parts in systems with a total connected compressor power exceeding 100 horsepower (hp) (74.6 kW)—except evaporators used for refrigeration or dehumidification, condensers used for heating, control and pressure relief valves for either, low-probability pumps and connecting piping—are located either outdoors or in a machinery room.



---

---

---

---

---

---

---

---




**1106.4 FLAMMABLE REFRIGERANTS. (MOD)**

Where refrigerants of Groups A2, A3, B2 and B3 are used, the machinery room shall conform to the Class 1, Division 2, hazardous location classification requirements of NFPA 70.

Exceptions:

1. Ammonia machinery rooms that are provided with ventilation in accordance with Section 1106.3.
2. Machinery rooms for systems containing Group A2L refrigerants that are in accordance with Section 1106.5.



---

---

---

---

---

---


---

---

**1106.5 SPECIAL REQUIREMENTS FOR GROUP A2L REFRIGERANT MACHINERY ROOMS. (NEW)**

Machinery rooms for systems containing Group A2L refrigerants shall comply with Sections 1106.5.1 through 1106.5.3.

Exception: Machinery rooms conforming to the Class I, Division 2, hazardous location classification requirements of NFPA 70 are not required to comply with Sections 1106.5.1 and 1106.5.2.



---

---

---

---

---

---

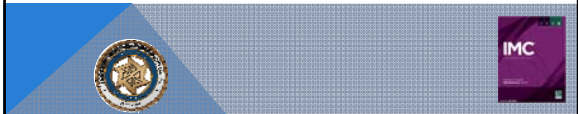
---

---

**1106.5.1 REFRIGERANT DETECTION SYSTEM. (NEW)**

The machinery room shall be provided with a refrigerant detection system. The refrigerant detection system shall be in accordance with Section 605.8 of the International Fire Code and all of the following:

1. The detectors shall activate at or below a refrigerant concentration of 25% of the LFL.
2. Upon activation, the detection system shall activate the emergency ventilation system required by Section 1106.5.2.
3. The detection, signaling and control circuits shall be supervised.



---

---

---

---

---

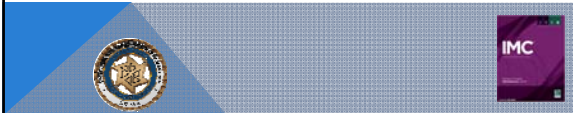
---

---

---

**1106.5.2 EMERGENCY VENTILATION SYSTEM. (NEW)**

An emergency ventilation system shall be provided at the minimum exhaust rate specified in ASHRAE 15 or Table 1106.5.2. Shutdown of the emergency ventilation system shall be by manual means.



---

---

---

---

---

---

---

---

**TABLE 1106.5.2 MINIMUM EXHAUST RATES (NEW)**

REFRIGERANT	Q(m³/sec)	Q(cfm)
R32	15.4	32,600
R143	13.6	28,700
R444A	6.46	13,700
R444B	10.6	22,400
R445A	7.83	16,600
R446A	23.9	50,700
R447A	23.8	50,400
R451A	7.04	15,000
R451B	7.05	15,000
R1234yf	7.80	16,600
R1234ze(E)	5.92	12,600



---

---

---

---

---

---

---

---

**1107.2 PIPING LOCATION. (MOD)**

Refrigerant piping that crosses an open space that affords passageway in any building shall be not less than 7 feet 3 inches (2210 mm) above the floor unless the piping is located against the ceiling of such space. Refrigerant piping shall not be placed in any of the following:

1. A fire-resistance-rated exit access corridor.
2. An interior exit stairway.
3. An interior exit ramp.
4. An exit passageway.
5. An elevator, dumbwaiter or other shaft containing a moving object.
6. A shaft that has one or more openings into a fire-resistance-rated exit access corridor, interior exit stairway or ramp or exit passageway.



---

---

---

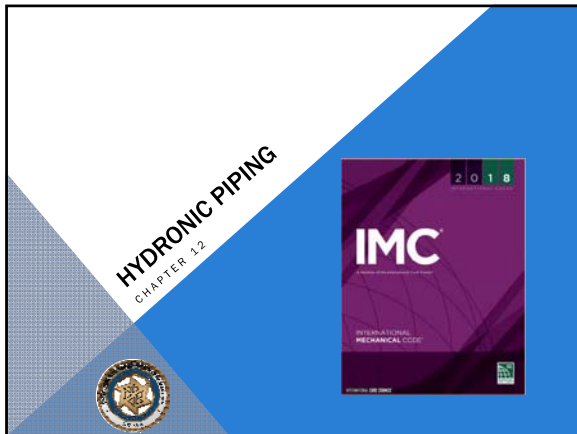
---

---

---

---

---



---

---

---

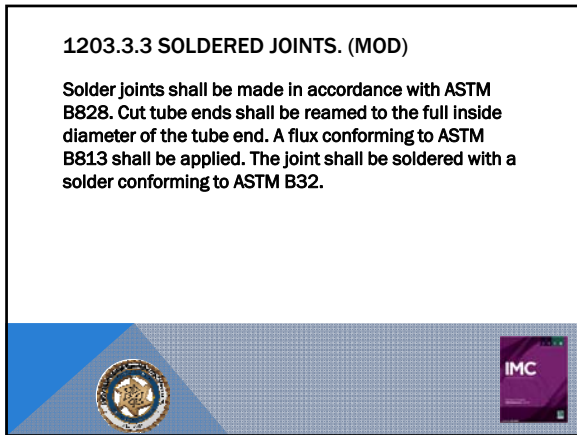
---

---

---

---

---



---

---

---

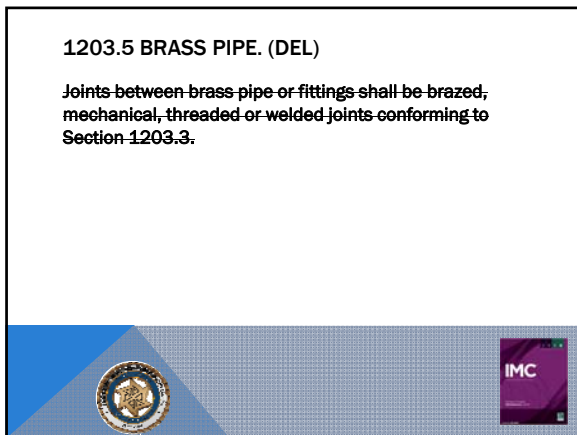
---

---

---

---

---



---

---

---

---

---

---

---

---

**1203.6 COPPER OR COPPER-ALLOY TUBING. (MOD)**

Joints between copper or copper-alloy tubing or fittings shall be brazed, mechanical or soldered joints conforming to Section 1203.3, flared joints conforming to Section 1203.6.1, push-fit joints conforming to Section 1203.6.2 or press-connect joints conforming to Section 1203.6.3.



---

---

---

---

---

---

---

---

**1203.6.3 PRESS-CONNECT JOINTS. (NEW)**

Press-connect joints shall be installed in accordance with the manufacturer's instructions.



---

---

---

---

---

---

---

---

**1203.9 CROSS-LINKED POLYETHYLENE (PEX) PLASTIC TUBING. (MOD)**

Joints between cross-linked polyethylene plastic tubing and fittings shall conform to Sections 1203.9.1 through 1203.9.3. Mechanical joints shall conform to Section 1203.3.



---

---

---

---

---

---

---

---

**1203.9.3 PUSH-FIT JOINTS. (NEW)**

Push-fit joints that create a seal on the outside diameter of the tubing shall not be used with tubing that has an ethylene vinyl alcohol copolymer (EVOH) oxygen barrier layer.



---

---

---

---

---

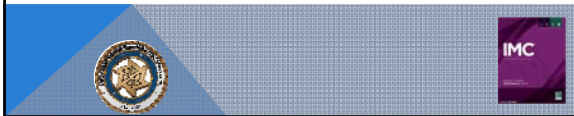
---

---

---

**1203.14 RAISED TEMPERATURE POLYETHYLENE (PE-RT) PLASTIC TUBING. (MOD)**

Joints between raised temperature polyethylene tubing and fittings shall conform to Sections 1203.14.1 through 1203.14.3. Mechanical joints shall conform to Section 1203.3.



---

---

---

---

---

---

---

---

**1203.14.3 PUSH-FIT JOINTS. (NEW)**

Push-fit joints that create a seal on the outside diameter of the tubing shall not be used with tubing that has an ethylene vinyl alcohol copolymer (EVOH) oxygen barrier layer.



---

---

---

---

---

---

---

---

**1208.1 GENERAL. (NEW)**

Exception: For PEX piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by all of the manufacturers' instructions for the PEX pipe and fitting products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.



---

---

---

---

---

---

---

---

**1209.3.5 CROSS-LINKED POLYETHYLENE (PEX) JOINTS. (NEW)**

PEX tubing shall be installed in continuous lengths or shall be joined by hydronic fittings listed in Table 1202.5.



---

---

---

---

---

---

---

---

**1209.5 THERMAL BARRIER REQUIRED. (MOD)**

Radiant floor heating systems shall be provided with a thermal barrier in accordance with Sections 1209.5.1 and 1209.5.2. Insulation R-values for slab-on-grade and suspended floor installation shall be in accordance with the International Energy Conservation Code.



---

---

---

---

---

---

---

---

**1209.5.1 SLAB-ON-GRADE INSTALLATION. (DEL)**

Radiant piping utilized in slab-on-grade applications shall be provided with insulating materials installed beneath the piping having a minimum R-value of 5.



---

---

---

---

---

---

---

---

**1209.5.2 SUSPENDED FLOOR INSTALLATION. (DEL)**

In suspended floor applications, insulation shall be installed in the joist bay cavity serving the heating space above and shall consist of materials having a minimum R-value of 11.



---

---

---

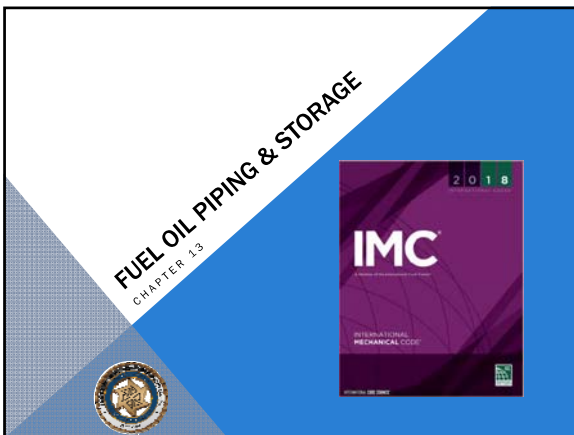
---

---

---

---

---



---

---

---

---

---

---

---

---

**1303.1.1 JOINTS BETWEEN DIFFERENT PIPING MATERIALS. (MOD)**

Joints between different piping materials shall be made with approved adapter fittings. Joints between different metallic piping materials shall be made with approved dielectric fittings or copper-alloy converter fittings.



---

---

---

---

---

---

---

---

**1303.4 BRASS PIPE. (DEL)**

Joints between brass pipe or fittings shall be brazed, mechanical, threaded or welded joints complying with Section 1303.3.



---

---

---

---

---

---

---

---

**1303.5 BRASS TUBING. (DEL)**

Joints between brass tubing or fittings shall be brazed or mechanical joints complying with Section 1303.3.



---

---

---

---

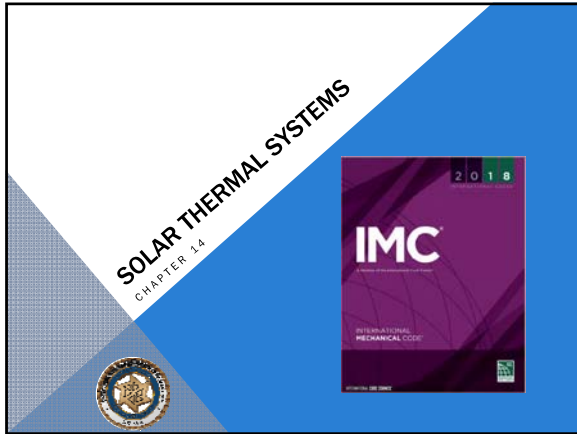
---

---

---

---





---

---

---

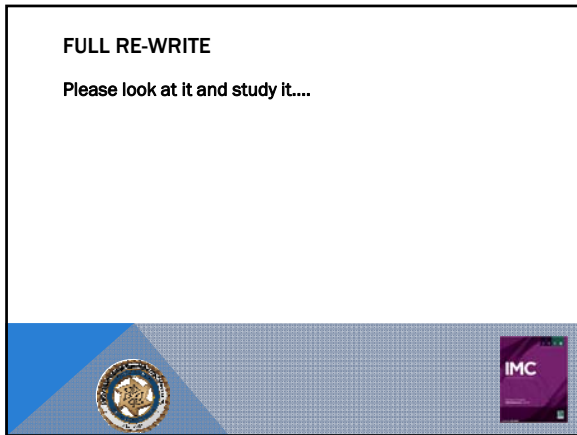
---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---


---

---

---

**APPLIANCE. (MOD)**

Any apparatus or device that utilizes a fuel or a raw material as a fuel to produce light, heat, power, refrigeration or air conditioning. Also, an apparatus that compresses fuel gases.



---

---

---

---

---

---

---


---

**FURNACE, CENTRAL. (DEL)**

**Downflow furnace.** A furnace designed with airflow discharge vertically downward at or near the bottom of the furnace.

**Forced-air furnace with cooling unit.** A single-package unit, consisting of a gas-fired forced-air furnace of one of the types listed below combined with an electrically or fuel gas-powered summer air-conditioning system, contained in a common casing.

**Forced-air type.** A central furnace equipped with a fan or blower that provides the primary means for circulation of air.



---

---

---

---

---

---

---

---

**FURNACE, CENTRAL. (DEL)**

**Gravity furnace with booster fan.** A furnace equipped with a booster fan that does not materially restrict free circulation of air by gravity flow when the fan is not in operation.

**Gravity type.** A central furnace depending primarily on circulation of air by gravity.

**Horizontal forced-air type.** A furnace with airflow through the appliance essentially in a horizontal path.

**Multiple-position furnace.** A furnace designed so that it can be installed with the airflow discharge in the upflow, horizontal or downflow direction.

**Upflow furnace.** A furnace designed with airflow discharge vertically upward or near the top of the furnace. This classification includes "highboy" furnaces with the blower mounted below the heating element and "lowboy" furnaces with the blower mounted beside the heating element.



---

---

---

---

---

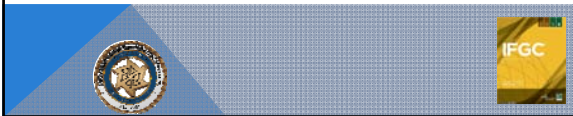
---

---

---

**JOINT, MECHANICAL. (MOD)**

A general form of gas-tight joints obtained by the joining of metal parts through a positive-holding mechanical construction, such as a press joint, flanged joint, threaded joint, flared joint or compression joint.



---

---

---

---

---

---

---

---

**PIPING. (MOD)**

Where used in this code, "piping" refers to either pipe or tubing, or both.

**Pipe.** A rigid conduit of iron, steel, copper, copper-alloy or plastic.

**Tubing.** Semirigid conduit of copper, copper-alloy aluminum, plastic or steel.



---

---

---

---

---

---

---

---

### REGULATOR, GAS APPLIANCE. (MOD)

A pressure regulator for controlling pressure to the manifold of the appliance. Types of appliance regulators are as follows:

**Adjustable.**

1. Spring type, limited adjustment. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is adjustable over a range of not more than 25 percent of the outlet pressure at the midpoint of the adjustment range.

2. Spring type, standard adjustment. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is adjustable. The adjustment means shall be concealed.

**Multistage.** A regulator for use with a single gas whose adjustment means is capable of being positioned manually or automatically to two or more predetermined outlet pressure settings. Each of these settings shall be adjustable or nonadjustable. The regulator may modulate outlet pressure automatically between its maximum and minimum predetermined outlet pressure settings.

**Nonadjustable.**

1. Spring type, nonadjustable. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is not field adjustable.

2. Weight type. A regulator in which the regulating force acting upon the diaphragm is derived from a weight or combination of weights.



---

---

---

---

---

---

---

---

---

---

### REGULATOR, MONITORING. (NEW)

A pressure regulator set in series with another pressure regulator for the purpose of automatically taking control of the pressure downstream of the monitored regulator when that pressure exceeds a set minimum.



---

---

---

---

---

---

---

---

---

---

### REGULATOR, SERIES. (NEW)

A pressure regulator in series with one or more other pressure regulators.



---

---

---

---

---

---

---

---

---

---

**INTEGRAL GAS VALVE TYPE. (DEL)**

An automatic device, actuated by temperature changes, designed to control the gas supply to the burner(s) in order to maintain temperatures between predetermined limits, and in which the thermal-actuating element is an integral part of the device.

1. **Graduating thermostat.** A thermostat in which the motion of the valve is approximately in direct proportion to the effective motion of the thermal element induced by temperature change.
2. **Snap-acting thermostat.** A thermostat in which the thermostatic valve travels instantly from the closed to the open position, and vice versa.



---

---

---

---

---

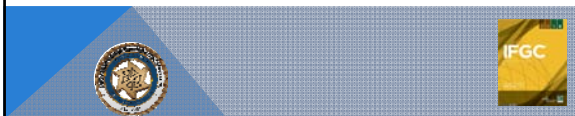
---

---

---

**TOILET, GAS-FIRED. (NEW)**

A packaged and completely assembled appliance containing a toilet that incinerates refuse instead of flushing it away with water.



---

---

---

---

---

---

---

---

**UNIT HEATER. (MOD)**

A self-contained, automatically controlled, vented, fuel-gas-burning, space-heating appliance, intended for installation in the space to be heated without the use of ducts, and having integral means for circulation of air.



---

---

---

---

---

---

---

---



---

---

---

---

---


---

---

---

**303.3 PROHIBITED LOCATIONS. (NEW)**

6. A clothes dryer is installed in a residential bathroom or toilet room having a permanent opening with an area of not less than 100 square inches (0.06 m2) that communicates with a space outside of a sleeping room, bathroom, toilet room or storage closet.



---

---

---

---

---

---

---

---

**303.3.1 FIREPLACES AND DECORATIVE APPLIANCES IN GROUP I-2, CONDITION 2 OCCUPANCIES. (NEW)**

Gas fireplace appliances and decorative gas appliances shall be prohibited in Group I-2, Condition 2 occupancies except where such appliances are direct-vent appliances installed in public lobby and waiting areas that are not within smoke compartments containing patient sleeping areas. The appliance controls shall be located where they can be accessed only by facility staff. Such fireplaces shall comply with Sections 501.2 and 604.1 and Section 915 of the International Fire Code.



---

---

---

---

---

---

---

---

**310.2 CSST. (MOD)**

This section applies to corrugated stainless steel tubing (CSST) that is not listed with an arc-resistant jacket or coating system in accordance with ANSI LC 1/CSA 6.26. CSST gas piping systems and piping systems containing one or more segments of CSST shall be electrically continuous and bonded to the electrical service grounding electrode system or, where provided, the lightning protection grounding electrode system.



---

---

---

---

---

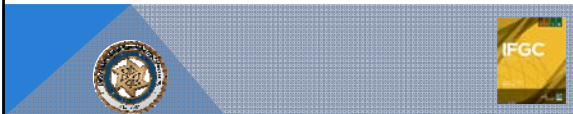
---

---

---

**310.2.3 BONDING JUMPER LENGTH. (MOD)**

The length of the bonding jumper between the connection to a gas piping system and the connection to a grounding electrode system shall not exceed 75 feet (22 860 mm). Any additional grounding electrodes installed to meet this requirement shall be bonded to the electrical service grounding electrode system or, where provided, the lightning protection grounding electrode system.



---

---

---

---

---

---

---

---

**310.3 ARC-RESISTANT CSST. (NEW)**

This section applies to corrugated stainless steel tubing (CSST) that is listed with an arc-resistant jacket or coating system in accordance with ANSI LC 1/CSA 6.26. The CSST shall be electrically continuous and bonded to an effective ground fault current path. Where any CSST component of a piping system does not have an arc-resistant jacket or coating system, the bonding requirements of Section 310.2 shall apply. Arc-resistant-jacketed CSST shall be considered to be bonded where it is connected to an appliance that is connected to the appliance grounding conductor of the circuit that supplies that appliance.



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---


---

**401.9 IDENTIFICATION. (MOD)**

Each length of pipe and tubing and each pipe fitting, utilized in a fuel gas system, shall bear the identification of the manufacturer.

Exceptions:

1. Steel pipe sections that are 2 feet (610 mm) and less in length and are cut from longer sections of pipe.
2. Steel pipe fittings 2 inches and less in size.
3. Where identification is provided on the product packaging or crating.
4. Where other approved documentation is provided.



---

---

---

---

---


---

---

---

**401.10 PIPING MATERIALS STANDARDS. (MOD)**

Piping, tubing and fittings shall be manufactured to the applicable referenced standards, specifications and performance criteria listed in Section 403 and shall be identified in accordance with Section 401.9.



---

---

---

---

---

---

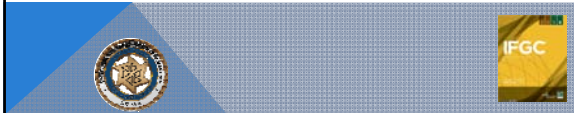
---

---



**402.4 SIZING TABLES AND EQUATIONS. (MOD)**

This section applies to piping materials other than non-corrugated stainless steel tubing. Where Tables 402.4(1) through 402.4(37) are used to size piping or tubing, the pipe length shall be determined in accordance with Section 402.4.1, 402.4.2 or 402.4.3.



---

---

---

---

---

---

---

---

**402.7 MAXIMUM OPERATING PRESSURE. (MOD)**

The maximum operating pressure for piping systems located inside buildings shall not exceed 5 pounds per square inch gauge (psig) (34 kPa gauge) except where one or more of the following conditions are met:

1. The piping joints are welded or brazed.
2. The piping joints are flanged and pipe-to-flange connections are made by welding or brazing.



---

---

---

---

---

---

---

---

**403.4.2 STEEL. (MOD)**

Steel, stainless steel and wrought-iron pipe shall be not lighter than Schedule 10 and shall comply with the dimensional standards of ASME B36.10M and one of the following standards:

1. ASTM A53/A53M.
2. ASTM A106.
3. ASTM A312.



---

---

---

---

---

---

---

---

**403.5.2 STAINLESS STEEL. (NEW)**

Stainless steel tubing shall comply with ASTM A268 or ASTM A269.



---

---

---

---

---

---

---

---

**403.10.1 PIPE JOINTS. (MOD)**

Schedule 40 and heavier pipe joints shall be threaded, flanged, brazed, welded or assembled with press-connect fittings listed in accordance with ANSI LC4/CSA 6.32. Pipe lighter than Schedule 40 shall be connected using press-connect fittings, flanges, brazing or welding. Where nonferrous pipe is brazed, the brazing materials shall have a melting point in excess of 1,000 °F (538 °C). Brazing alloys shall not contain more than 0.05- percent phosphorus.



---

---

---

---

---

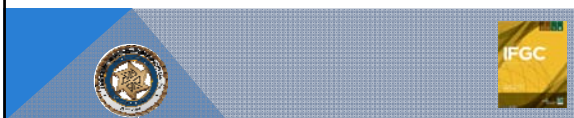
---

---

---

**403.10.3 STAINLESS STEEL TUBING JOINTS. (NEW)**

Stainless steel tubing joints shall be welded, assembled with approved tubing fittings, brazed with a material having a melting point in excess of 1,000 °F (578 °C), or assembled with press-connect fittings listed in accordance with ANSI LC4/CSA 6.32.



---

---

---

---


---

---

---

---

**404.11 PROTECTION AGAINST CORROSION. (MOD)**  
Steel pipe or tubing exposed to corrosive action, such as soil conditions or moisture, shall be protected in accordance Sections 404.11.1 through 404.11.5.



---

---

---

---


---

---

---

---

**404.11.1 GALVANIZING. (NEW)**  
Zinc coating shall not be deemed adequate protection for underground gas piping.



---

---

---

---

---


---

---

---

**404.11.2 PROTECTION METHODS. (NEW)**  
Underground piping shall comply with one or more of the following:

1. The piping shall be made of corrosion-resistant material that is suitable for the environment in which it will be installed.
2. Pipe shall have a factory-applied, electrically-insulating coating. Fittings and joints between sections of coated pipe shall be coated in accordance with the coating manufacturer's instructions.
3. The piping shall have a cathodic protection system installed and the system shall be monitored and maintained in accordance with an approved program.



---

---

---

---

---

---

---

---

**404.11.3 DISSIMILAR METALS. (NEW)**

Where dissimilar metals are joined underground, an insulating coupling or fitting shall be used.



---

---

---

---

---

---

---

---

**404.11.4 PROTECTION OF RISERS. (NEW)**

Steel risers connected to plastic piping shall be cathodically protected by means of a welded anode, except where such risers are anodeless risers.



---

---

---

---

---

---

---

---

**404.11.2 PROTECTIVE COATINGS AND WRAPPING. (DEL)**

~~Pipe protective coatings and wrappings shall be approved for the application and shall be factory applied.~~

~~Exception: Where installed in accordance with the manufacturer's instructions, field application of coatings and wrappings shall be permitted for pipe nipples, fittings and locations where the factory coating or wrapping has been damaged or necessarily removed at joints.~~



---

---

---

---

---

---

---

---

**404.17.3 TRACER. (MOD)**

A yellow insulated copper tracer wire or other approved conductor, or a product specifically designed for that purpose, shall be installed adjacent to underground nonmetallic piping. Access shall be provided to the tracer wire or the tracer wire shall terminate above ground at each end of the nonmetallic piping. The tracer wire size shall be not less than 18 AWG and the insulation type shall be suitable for direct burial.



---

---

---

---

---

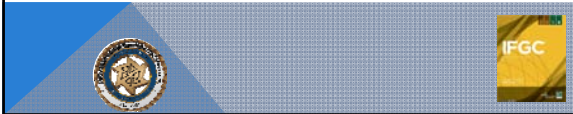
---

---

---

**406.2 TEST MEDIUM. (MOD)**

The test medium shall be air, nitrogen, carbon dioxide or an inert gas. Oxygen shall not be used as a test medium.



---

---

---

---

---

---

---

---

**409.5 APPLIANCE SHUTOFF VALVE. (MOD)**

409.5.1 Located within same room. The shutoff valve shall be located in the same room as the appliance. The shutoff valve shall be within 6 feet (1829 mm) of the appliance, and shall be installed upstream of the union, connector or quick disconnect device it serves. Such shutoff valves shall be provided with access. Shutoff valves serving movable appliances, such as cooking appliances and clothes dryers, shall be considered to be provided with access where installed behind such appliances. Appliance shutoff valves located in the firebox of a fireplace shall be installed in accordance with the appliance manufacturer's instructions.



---

---

---

---


---

---

---

---

**409.7 SHUTOFF VALVES IN TUBING SYSTEMS. (NEW)**  
Shutoff valves installed in tubing systems shall be rigidly and securely supported independently of the tubing.



---

---

---

---

---

---

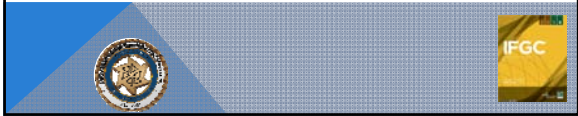
---

---

**413.3 LOCATION OF DISPENSING OPERATIONS AND EQUIPMENT. (MOD)**  
Compression, storage and dispensing equipment shall be located outdoors, above ground.

Exceptions:

1. Compression, storage or dispensing equipment is not prohibited in buildings where such buildings are of noncombustible construction as set forth in the International Building Code and are unenclosed for not less than three-quarters of their perimeter.
2. Compression, storage and dispensing equipment is allowed to be located indoors or in vaults in accordance with the International Fire Code.



---

---

---

---

---

---

---

---

**413.4.1 LISTING AND INSTALLATION. (NEW)**  
Residential fueling appliances shall be listed in accordance with ANSI NGV 5.1. Residential fueling appliances shall be installed in accordance with the appliance manufacturer's installation instructions.



---

---

---

---

---



---

---

---

**413.4.2 GAS CONNECTION. (NEW)**

Residential fueling appliances shall not be rigidly connected to the gas supply piping



---

---

---

---

---

---



---

---

**413.4.3 INDOOR INSTALLATION. (NEW)**

A residential fueling appliance installed indoors or used for indoor fueling shall comply with all of the following:

1. The capacity shall not exceed 5 cubic feet per minute (0.14 m<sup>3</sup>/min) of natural gas.
2. Fuel gas from the pressure relief and blowdown systems shall be vented to the outdoors.
3. A methane gas detector shall be installed in the room or space containing the appliance or where fueling occurs and shall be located not lower than 6 inches (152 mm) from the highest point in the room or space. The detector shall be set to activate at one-fifth of the lower limit of flammability of natural gas and shall be interlocked with the residential fuel appliance to stop or prevent its operation upon activation. The detector shall have an audible or visible alarm.
4. The capacity of a residential fueling appliance installed outdoors for outdoor fueling shall not exceed 10 feet cubic per minute (0.28 m<sup>3</sup>/min) of natural gas. Residential fueling appliances located outdoors shall be installed on a firm, noncombustible base.



---

---

---

---

---

---

---

---

**CHIMNEYS & VENTS**  
CHAPTER 5



---

---

---

---

---

---

---

---

**503.2.1 VENTILATING HOODS. (NEW)**

The use of ventilating hoods and exhaust systems to vent appliances shall be limited to industrial appliances and appliances installed in commercial applications.



---

---

---

---

---

---

---

---

**503.2.2 WELL-VENTILATED SPACES. (NEW)**

The flue gases from industrial-type appliances shall not be required to be vented to the outdoors where such gases are discharged into a large and well-ventilated industrial space.



---

---

---

---

---

---

---

---

**503.4.1 PLASTIC PIPING. (MOD)**

Where plastic piping is used to vent an appliance, the appliance shall be listed for use with such venting materials and the appliance manufacturer's installation instructions shall identify the specific plastic piping material. The plastic pipe venting materials shall be labeled in accordance with the product standards specified by the appliance manufacturer or shall be listed and labeled in accordance with UL 1738.



---

---

---

---

---

---

---

---



**503.4.1.1 PLASTIC VENT JOINTS. (MOD)**

Plastic pipe and fittings used to vent appliances shall be installed in accordance with the appliance manufacturer's instructions. Plastic pipe venting materials listed and labeled in accordance with UL 1738 shall be installed in accordance with the vent manufacturer's instructions. Where a primer is required, it shall be of a contrasting color.



---

---

---

---

---

---

---

---

**503.5.1.1 INSULATION SHIELD. (NEW)**

Where a factory-built chimney passes through insulated assemblies, an insulation shield constructed of steel having a thickness of not less than 0.0187 inch (0.475 mm) shall be installed to provide clearance between the chimney and the insulation material. The clearance shall be not less than the clearance to combustibles specified by the chimney manufacturer's installation instructions. Where chimneys pass through attic space, the shield shall terminate not less than 2 inches (51 mm) above the installation materials and shall be secured in place to prevent displacement. Insulation shields provided as part of a listed chimney system shall be installed in accordance with the manufacturer's installation instructions.



---

---

---

---

---

---

---

---

**503.6.1 MATERIALS. (NEW)**

Type B and BW gas vents shall be listed in accordance with UL 441. Vents for listed combination gas- and oil-burning appliances shall be listed in accordance with UL 641.



---

---

---

---

---

---

---

---

**TABLE 503.8 THROUGH-THE-WALL,  
DIRECT-VENT TERMINATION CLEARANCES (NEW)**

DIRECT-VENT APPLIANCE INPUT RATING (Btu/hr)	THROUGH-THE-WALL VENT TERMINAL CLEARANCE FROM ANY AIR OPENING INTO THE BUILDING (Inches)
< 10,000	6
≥ 10,000 ≤ 50,000	9
> 50,000 ≤ 150,000	12
> 150,000	In accordance with the appliance manufacturer's instructions and not less than the clearances specified in Section 503.8, Item 2



---

---

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

---

---

**614.4 EXHAUST INSTALLATION. (MOD)**

Exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Ducts shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the flow. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or chimney. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums. Clothes dryer exhaust ducts shall be sealed in accordance with Section 603.9 of the International Mechanical Code.



---

---

---

---

---

---

---

---

---

---

**614.4.1 EXHAUST TERMINATION OUTLET AND PASSAGEWAY. (NEW)**

The passageway of dryer exhaust duct terminals shall be undiminished in size and shall provide an open area of not less than 12.5 square inches (8065 mm<sup>2</sup>).



---

---

---

---

---

---

---

---

**614.8.2 DUCT INSTALLATION. (MOD)**

Exhaust ducts shall be supported at 4-foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Ducts shall not be joined with screws or similar fasteners that protrude more than 1/8 inch (3.2 mm) into the inside of the duct. Where dryer exhaust ducts are enclosed in wall or ceiling cavities, such cavities shall allow the installation of the duct without deformation.



---

---

---

---

---

---

---

---

**618.2 FORCED-AIR FURNACES. (DEL)**

The minimum unobstructed total area of outdoor and return air ducts or openings to a forced-air warm-air furnace shall be not less than 2 square inches for each 1,000 Btu/h (4402 mm<sup>2</sup>/W) output rating capacity of the furnace and not less than that specified in the furnace manufacturer's installation instructions. The minimum unobstructed total area of supply ducts from a forced-air warm-air furnace shall be not less than 2 square inches for each 1,000 Btu/h (4402 mm<sup>2</sup>/W) output rating capacity of the furnace and not less than that specified in the furnace manufacturer's installation instructions.

Exception: The total area of supply air ducts and outdoor and return air ducts shall not be required to be larger than the minimum size required by the furnace manufacturer's installation instructions.



---

---

---

---

---

---

---


---

**623.2 PROHIBITED LOCATION. (MOD)**

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.

Exceptions:

1. Appliances that are also listed as domestic cooking appliances.
2. Where the installation is designed by a licensed Professional Engineer, in compliance with the manufacturer's installation instructions.



---

---

---

---

---

---

---

---

**QUESTIONS????**



179

---

---

---

---

---

---

---

---