

## 1301:7-7-06 Building services and systems.

### (A) Section 601 General

(1) **601.1 Scope.** The provisions of this *rule* shall apply to the installation, operation and maintenance of fuel-fired appliances and heating systems, emergency and standby power systems, electrical systems and equipment, mechanical refrigeration systems, elevator recall, stationary storage battery systems and commercial kitchen ~~hoods~~ equipment.

(2) **601.2 Permits.** Permits shall be obtained for refrigeration systems, ~~and~~ battery systems and solar photovoltaic power systems as set forth in *rule 1301:7-7-01 of the Administrative Code*.

### (B) Section 602 Definitions

(1) **602.1 Definitions.** The following words and terms shall, for the purposes of this *rule* and as used elsewhere in this code, have the meanings shown herein are defined in rule 1301:7-7-02 of the Administrative Code.

**"Battery system, stationary lead acid."** ~~A system which consists of three interconnected subsystems:~~

- ~~1. A lead-acid battery.~~
- ~~2. A battery charger.~~
- ~~3. A collection of rectifiers, inverters, converters and associated electrical equipment as required for a particular application.~~

**"Battery types."**

~~**"Lithium ion battery."** A storage battery that consists of lithium ions imbedded in a carbon graphite or nickel metal oxide substrate. The electrolyte is carbonate mixture or a gelled polymer. The lithium ions are the charge carriers of the battery.~~

~~**"Lithium metal polymer battery."** A storage battery that is comprised of nonaqueous liquid or polymerized electrolytes, which provide ionic conductivity between lithiated positive active material electrically separated from metallic lithium or lithiated negative active material.~~

~~**"Nickel cadmium (Ni-Cd) battery."** An alkaline storage battery in which the positive active material is nickel oxide, the negative contains cadmium and the electrolyte is potassium hydroxide.~~

~~**"Nonrecombinant battery."** A storage battery in which, under conditions of normal use, hydrogen and oxygen gases created by electrolysis are vented into the air outside of the battery.~~

~~**"Recombinant battery."** A storage battery in which, under conditions of normal use, hydrogen and oxygen gases created by electrolysis are converted back into water inside the battery instead of venting into the air outside of the battery.~~

~~**"Stationary storage battery."** A group of electrochemical cells interconnected to supply a nominal voltage of DC power to a suitably connected electrical load, designed for service in a permanent location. The number of cells connected in a series determines the nominal voltage rating of the battery. The size of the cells determines the discharge capacity of the entire battery. After discharge, it may be restored to a fully charged condition by an electric current flowing in a direction opposite to the flow of current when the battery is discharged.~~

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**“Valve-regulated lead-acid (VRLA) battery.”** A lead-acid battery consisting of sealed cells furnished with a valve that opens to vent the battery whenever the internal pressure of the battery exceeds the ambient pressure by a set amount. In VRLA batteries, the liquid electrolyte in the cells is immobilized in an absorptive glass mat (AGM cells or batteries) or by the addition of a gelling agent (gel cells or gelled batteries).

**“Vented (Flooded) lead-acid battery.”** A lead-acid battery consisting of cells that have electrodes immersed in liquid electrolyte. Flooded lead-acid batteries have a provision for the user to add water to the cell and are equipped with a flame-arresting vent which permits the escape of hydrogen and oxygen gas from the cell in a diffused manner such that a spark, or other ignition source, outside the cell will not ignite the gases inside the cell.

**[M] “Commercial cooking appliances.”** Appliances used in a commercial food service establishment for heating or cooking food and which produce grease vapors, steam, fumes, smoke or odors that are required to be removed through a local exhaust ventilation system. Such appliances include deep fat fryers; upright broilers; griddles; broilers; steam-jacketed kettles; hot top ranges; under-fired broilers (charbroilers); ovens; barbecues; rotisseries; and similar appliances. For the purpose of this definition, a food service establishment shall include any building or a portion thereof used for the preparation and serving of food.

**“Critical circuit.”**

**“Emergency power system.”**

**[M] “Hood.”** An air intake device used to capture by entrapment, impingement, adhesion or similar means, grease and similar contaminants before they enter a duct system.

**“Type I.”** A kitchen hood for collecting and removing grease vapors and smoke.

**“Type II.”**

**“Refrigerant.”** The fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a change of state.

**“Refrigerant system.”** A combination of interconnected refrigerant-containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat.

**“Standby power system.”**

### (C) Section 603 Fuel-fired appliances

(1) **603.1 Installation.** The installation of nonportable fuel gas appliances and systems shall comply with the International Fuel Gas Code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code. The installation of all other fuel-fired appliances, other than internal combustion engines, oil lamps and portable devices such as blow torches, melting pots and weed burners, shall comply with this paragraph and the mechanical code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

(a) **603.1.1 Manufacturer’s instructions.** The installation shall be made in accordance with the manufacturer’s instructions and applicable federal, state and local rules and regulations. Where it becomes necessary to change, modify or alter a manufacturer’s instructions in any way, written approval shall first be obtained from the manufacturer.

(b) **603.1.2 Approval.** The design, construction and installation of fuel-fired appliances shall be in accordance with the International Fuel Gas Code and the mechanical code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

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(c) **603.1.3 Electrical wiring and equipment.** Electrical wiring and equipment used in connection with oil-burning equipment shall be installed and maintained in accordance with *paragraph (E)(605) of this rule* and NFPA 70 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

(d) **603.1.4 Fuel oil.** The grade of fuel oil used in a burner shall be that for which the burner is approved and as stipulated by the burner manufacturer. Oil containing gasoline shall not be used. Waste crankcase oil shall be an acceptable fuel in Group F, M and S occupancies, ~~when~~where utilized in equipment listed for use with waste oil and ~~when~~where such equipment is installed in accordance with the manufacturer's instructions and the terms of its listing.

(e) **603.1.5 Access.** The installation shall be readily accessible for cleaning hot surfaces; removing burners; replacing motors, controls, air filters, chimney connectors, draft regulators and other working parts; and for adjusting, cleaning and lubricating parts.

(f) **603.1.6 Testing, diagrams and instructions.** After installation of the oil-burning equipment, operation and combustion performance tests shall be conducted to determine that the burner is in proper operating condition and that all accessory equipment, controls, and safety devices function properly.

(i) **603.1.6.1 Diagrams.** Contractors installing industrial oil-burning systems shall furnish not less than two copies of diagrams showing the main oil lines and controlling valves, one copy of which shall be posted at the oil-burning equipment and another at an approved location that will be accessible in case of emergency.

(ii) **603.1.6.2 Instructions.** After completing the installation, the installer shall instruct the owner or operator in the proper operation of the equipment. The installer shall ~~also~~ furnish the owner or operator with the name and telephone number of persons to contact for technical information or assistance and routine or emergency services.

(g) **603.1.7 Clearances.** Working clearances between oil-fired appliances and electrical panelboards and equipment shall be in accordance with NFPA 70 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code. Clearances between oil-fired equipment and oil supply tanks shall be in accordance with NFPA 31 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

(2) ~~[B, M, FG]~~ **603.2 Chimneys.** Masonry chimneys shall be constructed in accordance with the *building code* as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code. Factory-built chimneys shall be installed in accordance with the *mechanical code* as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code. Metal chimneys shall be constructed and installed in accordance with NFPA 211 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

(3) **603.3 Fuel oil storage systems.** Fuel oil storage systems shall be installed in accordance with this code. Fuel oil piping systems shall be installed in accordance with the *mechanical code* as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

(a) **603.3.1 Permits.** *Permits shall be required as set forth in rule 1301:7-7-01 of the Administrative Code for fuel oil storage systems exceeding 60 gallons in storage capacity.*

**Exception:** *Fuel oil storage tanks with a capacity of less than 1,100 gallons and utilized for residential purposes.*

(b) **603.3.2 Fuel oil storage in outside, aboveground tanks.** Where connected to a fuel-oil piping system, the maximum amount of fuel oil storage allowed outside above ground without additional protection shall be 660 gallons (2498 L). The storage of fuel oil above ground in quantities exceeding 660 gallons (2498 L) shall comply with NFPA 31 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

(c) **603.3.3 Fuel oil storage inside buildings.** Fuel oil storage inside buildings shall comply with *paragraphs (C)(3)(c)(i)(603.3.3.1) to (C)(3)(c)(v)(603.3.3.5) of this rule* or rule ~~1301:7-7-34~~1301:7-7-57 of the Administrative Code.

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(i) **603.3.3.1 Quantity limits.** One or more fuel oil storage tanks containing Class II or III combustible liquid shall be permitted in a building. The aggregate capacity of all such tanks shall not exceed 660 gallons (2498 L).

**Exception:** The aggregate capacity limit shall be permitted to be increased to 3,000 gallons (11 356 L) of Class II or III liquid for storage in protected aboveground tanks complying with *paragraph (D)(2)(i)(vi)(3404.2.9.6)(D)(2)(i)(vii)(5704.2.9.7) of rule 1301:7-7-341301:7-7-57 of the Administrative Code, when* where all of the following conditions are met:

1. The entire 3,000 gallon (11 356 L) quantity shall be stored in protected aboveground tanks.
2. The 3,000 gallon (11 356 L) capacity shall be permitted to be stored in a single tank or multiple smaller tanks, ~~and~~
3. Normal and emergency venting shall be provided in accordance with NFPA 30 as listed in rule 1301:7-7-80 of the Administrative Code except that the vent capacity reduction factors shall not be allowed. Normal vent shall terminate to the outside of the building.
4. Flame arrestors or pressure vacuum breather valves shall be installed in normal vents.
5. Secondary containment, drainage control or diking shall be provided in accordance with paragraph (D)(2)(5004.2) of rule 1301:7-7-50 of the Administrative Code.
6. An overflow prevention system that prevents the tank from being filled in excess of 95 per cent of its capacity shall be provided for each tank. Filling procedure information shall be available accessible to the person filling the tanks.
7. The fill pipe shall be provided with a means of making a direct connection to the fuel delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. The fill line shall terminate to the outside.
8. A noncombustible fixed spill container having a capacity of not less than 5 gallons (19 L) shall be provided for each fill connection. The spill container shall be equipped with a manual drain valve that drains into the primary tank.
9. Approved anti-siphon devices shall be installed in each external pipe connected to the protected above-ground tank when the pipe extends below the level of the top of the tank; and
- ~~3-10.~~ The tanks shall be located in a room protected by an automatic sprinkler system complying with *paragraph (C)(3)(a)(i)(903.3.1.1) of rule 1301:7-7-09 of the Administrative Code.*

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(ii) **603.3.3.2 Restricted use and connection.** Tanks installed in accordance with *paragraph (C)(3)(b)(603.3.2)(C)(3)(c)(603.3.3) of this rule* shall be used only to supply fuel oil to fuel-burning or generator equipment installed in accordance with *paragraph (C)(3)(c)(iv)(603.3.3.4) of this rule.* Connections between tanks and equipment supplied by such tanks shall be made using closed piping systems.

(iii) **603.3.3.3 Applicability of maximum allowable quantity and control area requirements.** The quantity of combustible liquid stored in tanks complying with *paragraph (C)(3)(c)(603.3.3) of this rule* shall not be counted towards the maximum allowable quantity set forth in Table ~~2703.1.1(4)5003.1.1(1)~~ *of rule 1301:7-7-271301:7-7-50 of the Administrative Code,* and such tanks shall not be required to be located in a control area.

(iv) **603.3.3.4 Installation.** Tanks and piping systems shall be installed and separated from other uses in accordance with section 915 and chapter 13 both of the *mechanical code as listed in rule 1301:7-7-471301:7-7-80 of the Administrative Code,* as applicable.

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**Exception:** Protected aboveground tanks complying with paragraph ~~(D)(2)(i)(vii)(3404.2.9.7)~~~~(D)(2)(i)(vii)(5704.2.9.7)~~ of rule ~~1301:7-7-34~~~~1301:7-7-57~~ of the Administrative Code shall not be required to be separated from surrounding areas.

(v) **603.3.3.5 Tanks in basements.** Tanks in basements shall be located not more than two stories below grade plane.

(d) **603.3.4 Additional protection.** Aboveground tanks for the storage of fuel oil shall be safeguarded from public access or unauthorized entry. Additional protection meeting the requirements of paragraph (D)(1)(b)(3404.1.2) of rule 1301:7-7-34 of the Administrative Code shall be provided.

**Exceptions:**

1. Facilities enclosed by a perimeter security fence where the public is prohibited from accessing the fuel oil storage area.

2. Tanks enclosed in vaults.

3. Fuel oil storage tanks with a capacity of less than 660 gallons and utilized for residential purposes.

(e) **603.3.5 Underground storage of fuel oil.** The storage of fuel oil in underground storage tanks shall comply with NFPA 31 as listed in rule ~~1301:7-7-47~~~~1301:7-7-80~~ of the Administrative Code.

(4) **603.4 Portable unvented heaters.** Portable unvented fuel-fired heating equipment shall be prohibited in occupancies in Groups A, E, I, R-1, R-2, R-3 and R-4. *Portable kerosene-fired space or room heaters shall be equipped with an automatic extinguishing tip-over device. Any natural gas-fired or liquid petroleum gas-fired space or room heater shall be equipped with an oxygen depletion safety shutoff system and the source of fuel shall be piped from a location outside the building. All unvented heaters shall be marked by the manufacturer in some conspicuous manner that the heater has been approved and listed by one of the authoritative sources listed in rule 1301:7-7-01 of the Administrative Code.*

**Exceptions:**

1. Listed and approved unvented fuel-fired heaters, including portable outdoor gas-fired heating appliances, in one- and two-family dwellings.

2. Portable outdoor gas-fired heating appliances shall be allowed in accordance with paragraph (C)(5)(b)(603.5.2) of this rule.

(a) **603.4.1 Prohibited locations.** Unvented fuel-fired heating equipment shall not be located in, or obtain combustion air from, any of the following rooms or spaces: sleeping rooms, bathrooms, toilet rooms or storage closets. *No unvented kerosene heater shall be located in any building means of egress.*

(b) **603.4.2 Elevation not permitted.** *No unvented kerosene heater shall be elevated by being placed upon a stand or otherwise placed or suspended above the floor.*

(c) **603.4.3 Placement restrictions.** *No unvented kerosene heater shall be placed within three feet of any furniture, drapery, curtain, decorative material, accessory, appliance, equipment, merchandise, goods, or fixture, or any other thing, which is or may be combustible.*

(d) **603.4.4 Must be attended.** *No unvented kerosene heater shall be left unattended while it is operating.*

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(e) **603.4.5 Non-combustible mat required.** Every unvented kerosene heater shall be set and centered upon a noncombustible mat or shallow base, the dimensions of which shall be sufficient to allow at least three feet of the mat or base to extend outward in any direction from any part of the unvented kerosene heater.

(f) **603.4.6 Ventilation required.** Every unvented kerosene heater shall be used in an area where there is adequate ventilation, as recommended by the manufacturer of such heater.

(g) **603.4.7 Cool-down required.** No unvented kerosene heater shall be fueled or refueled while it is operating or within ten minutes of flame extinguishment, or contrary to the instructions of its manufacturer.

(h) **603.4.8 Fueling prohibited.** No unvented kerosene heater or its fuel reservoir shall be fueled or refueled inside a building. All such fueling operations shall be performed outdoors.

(i) **603.4.9 Fueling guidelines.** Every unvented kerosene heater shall be fueled or refueled strictly in accordance with the instructions of its manufacturer.

(j) **603.4.10 Fuel requirements.** The fuel in every unvented kerosene heater shall be only No. 1-K kerosene as prescribed in paragraph (F)(9)(3406.9) of rule 1301:7-7-34 of the Administrative Code.

(k) **603.4.11 Fuel storage.** The fuel used in every unvented kerosene heater shall be stored away from occupied areas and in an approved container which shall be marked or labeled in a conspicuous manner to read: "1-K kerosene."

(l) **603.4.12 Fire extinguisher requirements.** At least one fire extinguisher with a minimum 2-A, 20-B:C rating and capacity shall be provided and available for use within twenty-five feet of every unvented kerosene heater during its operation.

(m) **603.4.13 Manufacturer's instructions.** No persons shall sell or offer for sale any kerosene heater in this state unless the manufacturer has provided instructions for operating the heater and certain information about its use, which shall include the following:

(i) All pertinent information bearing upon the assembly and installation of the heater.

(ii) All pertinent information bearing upon the proper operation, maintenance, and storage of the heater.

(iii) All pertinent information which might reasonably bear upon the health or life safety of persons in the vicinity of the heater if recommended assembly, installation, operational, or maintenance procedures are not respected.

(iv) All safety features incorporated in the heater shall be described.

(v) Instructions for starting or lighting the heater, regulating its flame or heat, and turning it off or extinguishing its flame.

(vi) Proper fueling procedures shall be set forth.

(vii) A cautionary warning that the heater may be extremely hot while in operation; that, therefore, it may burn, injure, or damage any person or thing contacting it; and that, in particular, infants, children, physically or mentally incompetent persons, and pets should be kept away from the unit.

(viii) A cautionary warning that the heater may be extremely hot while in operation; that, therefore, the heat radiating from it may ignite any combustible thing in close proximity; that it should not be placed within three feet of any furniture, drapery, curtain, clothing, or other thing which is or may be combustible; that, however, the heater may be placed against or within three feet of a combustible wall, provided the heater is specifically designed for such installation or placement.

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(ix) A cautionary warning that the heater may be extremely hot while in operation; that, therefore, no fueling procedure, including the removal of the fuel reservoir, should be carried out while the unit is operating and until it has cooled down.

(x) A cautionary warning that the heater should not be moved while it is in operation.

(xi) A cautionary warning that neither the heater nor any surface of the heater should be used for the purpose of cooking or warming food, unless the heater is specifically designed for cooking and warming food.

(xii) A cautionary warning that no additive for the heater's fuel with a flashpoint below 100°F shall be used.

(xiii) The recommended minimum room size for the Btu output of the heater shall be set forth.

(xiv) The type and grade of fuel the heater is designed to use shall be set forth, together with any safety or fire hazard which might be involved if improper fuel is used.

(xv) A cautionary warning for every unvented kerosene heater, warning that when the heater is in operation the combustion process uses oxygen from the space being heated and returns carbon monoxide to the atmosphere as a product of combustion; that, without adequate ventilation, the depletion of oxygen may present a risk of asphyxiation; and that carbon monoxide is a colorless, odorless, highly poisonous gas which, without adequate ventilation, may cause headaches, dizziness, and nausea, or even be fatal.

(xvi) The ventilation requirements necessary for the safe operation of every unvented kerosene heater shall be set forth.

(xvii) A cautionary warning for every unvented kerosene heater, warning that the fuel used in such heater should be restricted to No. 1-K kerosene, as prescribed in this code, or "Fresh, High Quality, Crystal Clear Kerosene."

(n) **603.4.14 Issuance of citation.** If the state fire marshal, his authorized representative, or a certified fire safety inspector finds that the use of an unvented kerosene heater or the storage of its fuel is not in compliance with the provisions of this rule, the state fire marshal, his authorized representative, or a certified fire safety inspector shall issue a citation to the responsible person as authorized by section 3737.42 of the Revised Code.

(5) **603.5 Portable outdoor gas-fired heating appliances.** Portable gas-fired heating appliances located outdoors shall be in accordance with paragraphs (C)(5)(a)(603.5.1) to (C)(5)(c)(iv)(603.5.3.4) of this rule.

(a) **603.5.1 Location.** Portable outdoor gas-fired heating appliances shall be located in accordance with paragraphs (C)(5)(a)(i)(603.5.1.1) to (C)(5)(b)(iv)(603.5.2.4) of this rule.

(i) **603.5.1.1 Prohibited locations.** The storage or use of portable outdoor gas-fired heating appliances is prohibited in any of the following locations:

(a) Inside any occupancy when connected to the fuel gas container.

(b) Inside of tents, canopies and membrane structures.

(c) On exterior balconies.

**Exception:** As allowed in section ~~6-476.20~~ of NFPA 58 as listed in rule ~~1301:7-7-471301:7-7-80~~ of the Administrative Code.

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(ii) **603.5.1.2 Clearance to buildings.** Portable outdoor gas-fired heating appliances shall be located ~~at least~~not less than 5 feet (1524 mm) from buildings.

(iii) **603.5.1.3 Clearance to combustible materials.** Portable outdoor gas-fired heating appliances shall not be located beneath, or closer than 5 feet (1524 mm) to combustible decorations and combustible overhangs, awnings, sunshades or similar combustible attachments to buildings.

(iv) **603.5.1.4 Proximity to exits.** Portable outdoor gas-fired heating appliances shall not be located within 5 feet (1524 mm) of exits or exit discharges.

(b) **603.5.2 Installation and operation.** Portable outdoor gas-fired heating appliances shall be installed and operated in accordance with *paragraphs (C)(5)(b)(i)(603.5.2.1) to (C)(5)(b)(iv)(603.5.2.4) of this rule.*

(i) **603.5.2.1 Listing and approval.** Only listed and approved portable outdoor gas-fired heating appliances utilizing a fuel gas container that is integral to the appliance shall be used.

(ii) **603.5.2.2 Installation and maintenance.** Portable outdoor gas-fired heating appliances shall be installed and maintained in accordance with the manufacturer's instructions.

(iii) **603.5.2.3 Tip-over switch.** Portable outdoor gas-fired heating appliances shall be equipped with a tilt or tip-over switch that automatically shuts off the flow of gas if the appliance is tilted more than 15 degrees (0.26 rad) from the vertical.

(iv) **603.5.2.4 Guard against contact.** The heating element or combustion chamber of portable outdoor gas-fired heating appliances shall be permanently guarded so as to prevent accidental contact by persons or material.

(c) **603.5.3 Gas containers.** Fuel gas containers for portable outdoor gas-fired heating appliances shall comply with *paragraphs (C)(5)(c)(i)(603.5.3.1) to (C)(5)(c)(iv)(603.5.3.4) of this rule.*

(i) **603.5.3.1 Approved containers.** Only approved DOTn or ASME gas containers shall be used.

(ii) **603.5.3.2 Container replacement.** Replacement of fuel gas containers in portable outdoor gas-fired heating appliances shall not be conducted while the public is present.

(iii) **603.5.3.3 Container capacity.** The maximum individual capacity of gas containers used in connection with portable outdoor gas-fired heating appliances shall not exceed 20 pounds (9 kg).

(iv) **603.5.3.4 Indoor storage prohibited.** Gas containers shall not be stored inside of buildings except in accordance with *paragraph ~~(H)(9)(3809.9)(I)(9)(6109.9)~~ of rule ~~1301:7-7-38~~1301:7-7-61 of the Administrative Code.*

(6) **603.6 Heating appliances.** Heating appliances shall be listed and shall comply with ~~this paragraph~~paragraphs (C)(6)(a)(603.6.1) to (C)(6)(b)(603.6.2) of this rule.

(a) **603.6.1 Guard against contact.** The heating element or combustion chamber shall be permanently guarded so as to prevent accidental contact by persons or material.

(b) **603.6.2 Heating appliance installation and maintenance.** Heating appliances shall be installed and maintained in accordance with the manufacturer's instructions, the building code, the *mechanical code*, the International Fuel Gas Code and NFPA 70 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

(7) **603.7 Chimneys and appliances.** Chimneys, incinerators, smokestacks or similar devices for conveying smoke or hot gases to the outer air and the stoves, furnaces, fireboxes or boilers to which such devices are connected, shall be maintained so as not to create a fire hazard.

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(a) **603.7.1 Masonry chimneys.** Masonry chimneys that, upon inspection, are found to be without a flue liner and that have open mortar joints which will permit smoke or gases to be discharged into the building, or which are cracked as to be dangerous, shall be repaired or relined with a listed chimney liner system installed in accordance with the manufacturer's ~~installation~~ instructions or a flue lining system installed in accordance with the requirements of the *building code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code* and appropriate for the intended class of chimney service.

(b) **603.7.2 Metal chimneys.** Metal chimneys which are corroded or improperly supported shall be repaired or replaced.

(c) **603.7.3 Decorative shrouds.** Decorative shrouds installed at the termination of factory-built chimneys shall be removed except where such shrouds are listed and labeled for use with the specific factory-built chimney system and are installed in accordance with the chimney manufacturer's ~~installation~~ instructions.

(d) **603.7.4 Factory-built chimneys.** Existing factory-built chimneys that are damaged, corroded or improperly supported shall be repaired or replaced.

(e) **603.7.5 Connectors.** Existing chimney and vent connectors that are damaged, corroded or improperly supported shall be repaired or replaced.

(8) **603.8 Discontinuing operation of unsafe heating appliances.** The fire code official is authorized to order that measures be taken to prevent the operation of any existing stove, oven, furnace, incinerator, boiler or any other heat-producing device or appliance found to be defective or in violation of code requirements for existing appliances after giving notice to this effect to any person, owner, firm or agent or operator in charge of the same. The fire code official is authorized to take measures to prevent the operation of any device or appliance without notice when inspection shows the existence of an immediate fire hazard or when imperiling human life. The defective device shall remain withdrawn from service until all necessary repairs or alterations have been made.

(a) **603.8.1 Unauthorized operation.** It shall be a violation of this code for any person, user, firm or agent to continue the utilization of any device or appliance (the operation of which has been discontinued or ordered discontinued in accordance with *paragraph (C)(8)(603.8) of this rule*), unless written authority to resume operation is given by the fire code official. Removing or breaking the means by which operation of the device is prevented shall be a violation of this code.

(9) **603.9 Incinerators.** Commercial, industrial and residential-type incinerators and chimneys shall be constructed in accordance with the *building code*, the *mechanical code*, and the International Fuel Gas Code *as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code*.

(a) **603.9.1 Residential incinerators.** Residential incinerators shall be of an approved type.

(b) **603.9.2 Spark arrestor.** Incinerators shall be equipped with an effective means of arresting sparks.

(c) **603.9.3 Restrictions.** Where the fire code official determines that burning in incinerators located within 500 feet (152 m) of mountainous, brush or grass-covered areas will create an undue fire hazard because of atmospheric conditions, such burning shall be prohibited.

(d) **603.9.4 Time of burning.** Burning shall take place only during approved hours.

(e) **603.9.5 Discontinuance.** The fire code official is authorized to require incinerator use to be discontinued immediately if the fire code official determines that smoke emissions are offensive to occupants of surrounding property or if the use of the incinerators is determined by the fire code official to constitute a hazardous condition.

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(f) 603.9.6 Flue-fed incinerators in Group I-2. In Group I-2 occupancies, the continued use of existing flue-fed incinerators is prohibited.

(g) 603.9.7 Incinerator inspection in Group I-2. Incinerators in Group I-2 occupancies shall be inspected not less than annually in accordance with the manufacturer's instructions. Inspection records shall be maintained on the premises and made available to the fire code official upon request.

(10) **603.10 Gas meters.** Above-ground gas meters, regulators and piping subject to damage shall be protected by a barrier complying with *paragraph (L)(312) of rule 1301:7-7-03 of the Administrative Code* or otherwise protected in an approved manner.

**(D) Section 604 Emergency and standby power systems**

(1) 604.1 General. Emergency power systems and standby power systems required by this code or the *building code as listed in rule 1301:7-7-80 of the Administrative Code* shall comply with *paragraphs (D)(1)(a)(604.1.1) to (D)(1)(h)(604.1.8) of this rule.*

~~(1) 604.1 Installation.~~ Emergency and standby power systems required by this code or the *building code as listed in rule 1301:7-7-471301:7-7-80 of the Administrative Code* shall be installed in accordance with this code, NFPA 110 and NFPA 111 as listed in ~~rule 1301:7-7-471301:7-7-80 of the Administrative Code.~~ Existing installations shall be maintained in accordance with the original approval.

(a) **604.1.1 Stationary generators.** Stationary emergency and standby power generators required by this code shall be listed in accordance with UL 2200 as listed in ~~rule 1301:7-7-471301:7-7-80 of the Administrative Code.~~

(b) 604.1.2 Installation. Emergency power systems and standby power systems shall be installed in accordance with the *building code*, NFPA 70, NFPA 110 and NFPA 111 as listed in *rule 1301:7-7-80 of the Administrative Code.*

(c) 604.1.3 Load transfer. Emergency power systems shall automatically provide secondary power within 10 seconds after primary power is lost, unless specified otherwise in this code. Standby power systems shall automatically provide secondary power within 60 seconds after primary power is lost unless specified otherwise in this code.

(d) 604.1.4 Load duration. Emergency power systems and standby power systems shall be designed to provide the required power for a minimum duration of 2 hours without being refueled or recharged, unless specified otherwise in this code.

(e) 604.1.5 Uninterruptable power source. An uninterrupted source of power shall be provided for equipment where required by the manufacturer's instructions, the listing, this code or applicable referenced standards.

(f) 604.1.6 Interchangeability. Emergency power systems shall be an acceptable alternative for installations that require standby power systems.

(g) 604.1.7 Group I-2 occupancies. In Group I-2 occupancies, where an essential electrical system is located in flood hazard areas established in section 1612.3 of the *building code as listed in rule 1301:7-7-80 of the Administrative Code* and where new or replacement essential electrical system generators are installed, the system shall be located and installed in accordance with ASCE 24 as listed in *rule 1301:7-7-80 of the Administrative Code.*

(h) 604.1.8 Maintenance. Existing installations shall be maintained in accordance with the original approval and *paragraph (D)(4)(604.4) of this rule.*

(2) **604.2 Where required.** Emergency and standby power systems shall be provided where required by *paragraphs (D)(2)(a)(604.2.1) to ~~(D)(2)(r)(604.2.18.4)(D)(2)(p)(604.2.16)~~ of this rule.*

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~~(a) 604.2.1 Group A occupancies.~~ Emergency power shall be provided for emergency voice/alarm communication systems in Group A occupancies in accordance with ~~paragraph (G)(2)(a)(i)(907.2.1.1) of rule 1301:7-7-09 of the Administrative Code.~~

~~(b) 604.2.2 Smoke control systems.~~ Standby power shall be provided for smoke control systems in accordance with ~~paragraph (I)(11)(909.11) of rule 1301:7-7-09 of the Administrative Code.~~

~~(a) 604.2.1 Elevators and platform lifts.~~ Standby power shall be provided for elevators and platform lifts as required by ~~paragraph (G)(2)(607.2) of this rule, paragraphs (I)(4)(1009.4) and (I)(5)(1009.5) of rule 1301:7-7-10 of the Administrative Code.~~

~~(b) 604.2.2 Emergency alarm systems.~~ Emergency power shall be provided for emergency alarm systems as required by ~~section 414 of the building code as listed in rule 1301:7-7-80 of the Administrative Code.~~

~~(c) 604.2.3 Emergency responder radio coverage systems.~~ Standby power shall be provided for emergency responder radio coverage systems as required in ~~paragraph (J)(4)(b)(iii)(510.4.2.3) of rule 1301:7-7-05 of the Administrative Code.~~ The standby power supply shall be capable of operating the emergency responder radio coverage system for a duration of not less than 24 hours.

~~(d) 604.2.4 Emergency voice/alarm communication systems.~~ Emergency power shall be provided for emergency voice/alarm communication systems as required in ~~paragraph (G)(5)(b)(ii)(e)(907.5.2.2.5) of rule 1301:7-7-09 of the Administrative Code.~~ The system shall be capable of powering the required load for a duration of not less than 24 hours, as required in NFPA 72 as listed in ~~rule 1301:7-7-80 of the Administrative Code.~~

~~(e) 604.2.3604.2.5 Exit signs.~~ Emergency power shall be provided for exit signs ~~in accordance with~~ as required in ~~paragraph (K)(5)(e)(1011.5.3)(M)(6)(c)(1013.6.3) of rule 1301:7-7-10 of the Administrative Code.~~ The system shall be capable of powering the required load for a duration of not less than 90 minutes.

~~(f) 604.2.6 Group I-2 occupancies.~~ Essential electrical systems for Group I-2 occupancies shall be in accordance with ~~section 407.10 of the building code as listed in rule 1301:7-7-80 of the Administrative Code.~~

~~(g) 604.2.16604.2.7 Group I-3 occupancies.~~ Power-operated sliding doors or power-operated locks for swinging doors in Group I-3 occupancies shall be operable by a manual release mechanism at the door, ~~and either emergency power or a remote mechanical operating release shall be provided.~~ Emergency power shall be provided for the doors and locks in accordance with ~~paragraph (D)(604) of this rule.~~

**ExceptionExceptions:**

1. Emergency power is not required in facilities where provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required as set forth in the *building code as listed in rule 1301:7-7-80 of the Administrative Code.*

2. Emergency power is not required where remote mechanical operating releases are provided.

~~(h) 604.2.10604.2.8 Hazardous materials.~~ Emergency ~~er~~and standby power shall be provided in occupancies with hazardous materials ~~in accordance with paragraphs (D)(7)(2704.7) and (E)(1)(e)(2705.1.5) of rule 1301:7-7-27 of the Administrative Code.~~ as required in the following *paragraphs:*

~~(i) Paragraphs (D)(7)(5004.7) and (E)(1)(e)(5005.1.5) of rule 1301:7-7-50 of the Administrative Code for hazardous materials.~~

~~(ii) Paragraphs (D)(2)(b)(viii)(6004.2.2.8) and (D)(3)(d)(ii)(6004.3.4.2) of rule 1301:7-7-60 of the Administrative Code for highly toxic and toxic gases.~~

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(iii) Paragraph (D)(1)(k)(6204.1.11) of rule 1301:7-7-62 of the Administrative Code for organic peroxides.

~~(ni) 604.2.14604.2.9 High-rise buildings. Standby power, light and emergency systems in power shall be provided for high-rise buildings shall comply with the requirements of paragraphs (D)(2)(n)(i)(604.2.14.1) to (D)(2)(n)(iii)(604.2.14.3) of this rule as required in Section 403 of the building code as listed in rule 1301:7-7-80 of the Administrative Code, and shall be in accordance with paragraph (D)(604) of this rule.~~

~~(ej) 604.2.7604.2.10 Horizontal sliding doors. Standby power shall be provided for horizontal sliding doors in accordance with as required in paragraph (H)(1)(d)(iii)(1008.1.4.3)(J)(1)(d)(iii)(1010.1.4.3) of rule 1301:7-7-10 of the Administrative Code. The standby power supply shall have a capacity to operate not fewer than 50 closing cycles of the door.~~

~~(k) 604.2.11 Hydrogen fuel gas rooms. Standby power shall be provided for hydrogen fuel gas rooms as required by paragraph (H)(7)(5808.7) of rule 1301:7-7-58 of the Administrative Code.~~

~~(el) 604.2.4604.2.12 Means of egress illumination. Emergency power shall be provided for means of egress illumination in accordance with paragraph (F)(3)(1006.3) paragraphs (H)(3)(1008.3) of rule 1301:7-7-10 of the Administrative Code and (D)(5)(a)(1104.5.1) of rule 1301:7-7-11 of the Administrative Code.~~

~~(im) 604.2.9604.2.13 Membrane structures. Emergency power shall be provided for exit signs in temporary tents and membrane structures in accordance with paragraph (C)(12)(f)(i)(2403.12.6.1) of rule 1301:7-7-24 of the Administrative Code. Standby power shall be provided for auxiliary inflation systems in permanent membrane structures in accordance with section 2702 of the building code as listed in rule 1301:7-7-80 of the Administrative Code. Auxiliary inflation systems shall be provided in temporary air-supported and air-inflated membrane structures in accordance with paragraph (C)(10)(d)(3103.10.4) of rule 1301:7-7-31 of the Administrative Code.~~

~~(e) 604.2.5 Accessible means of egress elevators. Standby power shall be provided for elevators that are part of an accessible means of egress in accordance with paragraph (G)(4)(1007.4) of rule 1301:7-7-10 of the Administrative Code.~~

~~(f) 604.2.6 Accessible means of egress platform lifts. Standby power in accordance with this paragraph or ASME A18.1 as listed in rule 1301:7-7-471301:7-7-80 of the Administrative Code shall be provided for platform lifts that are part of an accessible means of egress in accordance with paragraph (G)(5)(1007.5) of rule 1301:7-7-10 of the Administrative Code.~~

~~(g) 604.2.7 Horizontal sliding doors. Standby power shall be provided for horizontal sliding doors in accordance with paragraph (H)(1)(d)(iii)(1008.1.4.3) of rule 1301:7-7-10 of the Administrative Code.~~

~~(hn) 604.2.8604.2.14 Semiconductor fabrication facilities. Emergency power shall be provided for semiconductor fabrication facilities in accordance with as required in paragraph (C)(15)(1803.15) of rule 1301:7-7-18(C)(15)(2703.15) of rule 1301:7-7-27 of the Administrative Code.~~

~~(i) 604.2.9 Membrane structures. Emergency power shall be provided for exit signs in temporary tents and membrane structures in accordance with paragraph (C)(12)(f)(i)(2403.12.6.1) of rule 1301:7-7-24 of the Administrative Code. Standby power shall be provided for auxiliary inflation systems in permanent membrane structures in accordance with the building code as listed in rule 1301:7-7-471301:7-7-80 of the Administrative Code.~~

~~(j) 604.2.10 Hazardous materials. Emergency or standby power shall be provided in occupancies with hazardous materials in accordance with paragraphs (D)(7)(2704.7) and (E)(1)(e)(2705.1.5) of rule 1301:7-7-27 of the Administrative Code.~~

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~~(k) 604.2.11 Highly toxic and toxic materials.~~ Emergency power shall be provided for occupancies with highly toxic or toxic materials in accordance with paragraphs (D)(2)(b)(viii)(3704.2.2.8) and (D)(2)(d)(iii)(3704.3.4.2) of rule 1301:7-7-37 of the Administrative Code.

~~(l) 604.2.12 Organic peroxides.~~ Standby power shall be provided for occupancies with organic peroxides in accordance with paragraph (D)(1)(k)(3904.1.11) of rule 1301:7-7-39 of the Administrative Code.

~~(m) 604.2.13 Covered and open mall buildings.~~ Covered mall buildings exceeding 50,000 square feet (4645 m<sup>2</sup>) and open mall buildings exceeding 50,000 square feet (4645 m<sup>2</sup>) within the established perimeter line shall be provided with standby power systems which are capable of operating the emergency voice/alarm communication.

~~(n) 604.2.14 High-rise buildings.~~ Standby power, light and emergency systems in high rise buildings shall comply with the requirements of paragraphs (D)(2)(n)(i)(604.2.14.1) to (D)(2)(n)(iii)(604.2.14.3) of this rule.

~~(i) 604.2.14.1 Standby power.~~ A standby power system shall be provided. Where the standby system is a generator set inside a building, the system shall be located in a separate room enclosed with 2-hour fire barriers constructed in accordance with section 707 of the building code as listed in rule 1301:7-7-47 1301:7-7-80 of the Administrative Code or horizontal assemblies constructed in accordance with section 712 of the building code as listed in rule 1301:7-7-47 1301:7-7-80 of the Administrative Code, or both. System supervision with manual start and transfer features shall be provided at the fire command center.

~~(a) 604.2.14.1.1 Fuel supply.~~ An on-premises fuel supply, sufficient for not less than 2-hour full demand operation of the system, shall be provided.

**Exception:** When approved, the system shall be supplied by natural gas pipelines.

~~(b) 604.2.14.1.2 Capacity.~~ The standby system shall have a capacity and rating that supplies all equipment required to be operational at the same time. The generating capacity is not required to be sized to operate all of the connected electrical equipment simultaneously.

~~(c) 604.2.14.1.3 Connected facilities.~~ Power and lighting facilities for the fire command center and elevators specified in sections 403.9 and 403.10 of the building code as listed in rule 1301:7-7-47 1301:7-7-80 of the Administrative Code, as applicable, shall be transferable to the standby source. Standby power shall be provided for at least one elevator to serve all floors and be transferable to any elevator.

~~(ii) 604.2.14.2 Separate circuits and luminaires.~~ Separate lighting circuits and luminaires shall be required to provide sufficient light with an intensity of not less than 1 foot candle (11 lux) measured at floor level in all means of egress corridors, stairways, smokeproof enclosures, elevator cars and lobbies, and other areas that are clearly a part of the escape route.

~~(a) 604.2.14.2.1 Other circuits.~~ Circuits supplying lighting for the fire command center and mechanical equipment rooms shall be transferable to the standby source.

~~(iii) 604.2.14.3 Emergency systems.~~ Exit signs, exit illumination as required by rule 1301:7-7-10 of the Administrative Code, electrically powered fire pumps required to maintain pressure, and the elevator car lighting are classified as emergency systems and shall operate within 10 seconds of failure of the normal power supply and shall be capable of being transferred to the standby source.

**Exception:** Exit sign, exit and means of egress illumination are permitted to be powered by a standby source in buildings of Group F and S occupancies.

~~(b) 604.2.2 604.2.15 Smoke control systems.~~ Standby power shall be provided for smoke control systems in accordance with as required in paragraph (l)(11)(909.11) of rule 1301:7-7-09 of the Administrative Code.

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~~(e)~~ **604.2.15.16 Underground buildings.** Emergency and standby power systems in underground buildings covered in chapter 4 of the building code as listed in rule 1301:7-7-47 of the Administrative Code shall comply with paragraphs (D)(2)(e)(i)(604.2.15.1) and (D)(2)(e)(ii)(604.2.15.2) of this rule shall be provided in underground buildings as required in section 405 of the building code as listed in rule 1301:7-7-80 of the Administrative Code and shall be in accordance with paragraph (D)(604) of this rule.

~~(i)~~ **604.2.15.1 Standby power.** A standby power system complying with this paragraph and NFPA 70 as listed in rule 1301:7-7-47 1301:7-7-80 of the Administrative Code shall be provided for standby power loads as specified in paragraph (D)(2)(e)(i)(a)(604.2.15.1.1) of this rule.

~~(a)~~ **604.2.15.1.1 Standby power loads.** The following loads are classified as standby power loads:

~~(i)~~ Smoke control system.

~~(ii)~~ Ventilation and automatic fire detection equipment for smokeproof enclosures.

~~(iii)~~ Fire pumps.

~~(iv)~~ Standby power shall be provided for elevators in accordance with section 3003 of the building code as listed in rule 1301:7-7-47 1301:7-7-80 of the Administrative Code.

~~(b)~~ **[B] 604.2.15.1.2 Pick up time.** The standby power system shall pick up its connected loads within 60 seconds of failure of the normal power supply

~~(ii)~~ **604.2.15.2 Emergency power.** An emergency power system complying with this code and NFPA 70 as listed in rule 1301:7-7-47 1301:7-7-80 of the Administrative Code shall be provided for emergency power loads as specified in paragraph (D)(2)(e)(iii)(a)(604.2.16.2.1) of this rule.

~~(a)~~ **604.2.15.2.1 Emergency power loads.** The following loads are classified as emergency power loads:

~~(i)~~ Emergency voice/alarm communication systems.

~~(ii)~~ Fire alarm systems.

~~(iii)~~ Automatic fire detection systems.

~~(iv)~~ Elevator car lighting.

~~(v)~~ Means of egress lighting and exit sign illumination as required by rule 1301:7-7-10 of the Administrative Code.

~~(p)~~ **604.2.16 Group I-3 occupancies.** Power operated sliding doors or power operated locks for swinging doors in Group I-3 occupancies shall be operable by a manual release mechanism at the door, and either emergency power or a remote mechanical operating release shall be provided.

**Exception:** Emergency power is not required in facilities where provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required as set forth in the building code as listed in rule 1301:7-7-47 1301:7-7-80 of the Administrative Code.

~~(q)~~ **604.2.17 Airport traffic control towers.** A standby power system shall be provided in airport traffic control towers more than 65 feet (19 812 mm) in height. Power shall be provided to the following equipment:

~~(i)~~ Pressurization equipment, mechanical equipment and lighting.

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~~(ii) Elevator operating equipment.~~

~~(iii) Fire alarm and smoke detection systems.~~

~~(r) **604.2.18 Elevators.** In buildings and structures where standby power is required or furnished to operate an elevator, the operation shall be in accordance with paragraphs (D)(2)(r)(i)(604.2.18.1) to (D)(2)(r)(iv)(604.2.18.4) of this rule.~~

~~(i) **604.2.18.1 Manual transfer.** Standby power shall be manually transferable to all elevators in each bank.~~

~~(ii) **604.2.18.2 One elevator.** Where only one elevator is installed, the elevator shall automatically transfer to standby power within 60 seconds after failure of normal power.~~

~~(iii) **604.2.18.3 Two or more elevators.** Where two or more elevators are controlled by a common operating system, all elevators shall automatically transfer to standby power within 60 seconds after failure of normal power where the standby power source is of sufficient capacity to operate all elevators at the same time. Where the standby power source is not of sufficient capacity to operate all elevators at the same time, all elevators shall transfer to standby power in sequence, return to the designated landing and disconnect from the standby power source. After all elevators have been returned to the designated level, at least one elevator shall remain operable from the standby power source.~~

~~(iv) **604.2.18.4 Venting.** Where standby power is connected to elevators, the machine room ventilation or air conditioning shall be connected to the standby power source.~~

~~(3) **604.3 Critical circuits.** Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 as listed in rule 1301:7-7-80 of the Administrative Code. Electrical circuit protective systems shall be installed in accordance with their listing requirements.~~

~~(34) **604.3604.4 Maintenance.** Emergency and standby power systems shall be maintained in accordance with NFPA 110 and NFPA 111 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code such that the system is capable of supplying service within the time specified for the type and duration required.~~

~~(a) **604.3.1604.4.1 Schedule.** Inspection, testing and maintenance of emergency and standby power systems shall be in accordance with an approved schedule established upon completion and approval of the system installation.~~

~~(b) **604.3.2604.4.2 Written recordRecords.** Written recordsRecords of the inspection, testing and maintenance of emergency and standby power systems shall include the date of service, name of the servicing technician, a summary of conditions noted and a detailed description of any conditions requiring correction and what corrective action was taken. Such records shall be ~~kept on the premises served by the emergency or standby power system and be available for inspection by the fire code official~~ maintained.~~

~~(c) **604.3.3604.4.3 Switch maintenance.** Emergency and standby power system transfer switches shall be included in the inspection, testing and maintenance schedule required by paragraph ~~(D)(3)(a)(604.3.4)(D)(4)(a)(604.4.1)~~ of this rule. Transfer switches shall be maintained free from accumulated dust and dirt. Inspection shall include examination of the transfer switch contacts for evidence of deterioration. When evidence of contact deterioration is detected, the contacts shall be replaced in accordance with the transfer switch manufacturer's instructions.~~

~~(45) **604.4604.5 Operational inspection and testing.** Emergency power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.~~

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**Exception:** Where the emergency power system is used for standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

(a) ~~604.4.1604.5.1~~ **Transfer switch test.** The test of the transfer switch shall consist of electrically operating the transfer switch from the normal position to the alternate position and then return to the normal position.

(6) 604.6 Emergency lighting equipment. Emergency lighting shall be inspected and tested in accordance with paragraphs (D)(6)(a)(604.6.1) to (D)(6)(b)(i)(604.6.2.1) of this rule.

(a) 604.6.1 Activation test. An activation test of the emergency lighting equipment shall be completed monthly. The activation test shall ensure the emergency lighting activates automatically upon normal electrical disconnect and stays sufficiently illuminated for **not less than 30 seconds**.

(i) 604.6.1.1 Activation test record. Records of tests shall be maintained. The record shall include the location of the emergency lighting tested, whether the unit passed or failed, the date of the test and the person completing the test.

(b) 604.6.2 Power test. For battery-powered emergency lighting, a power test of the emergency lighting equipment shall be completed annually. The power test shall operate the emergency lighting for **not less than 90 minutes** and shall remain sufficiently illuminated for the duration of the test.

(i) 604.6.2.1 Power test record. Records of tests shall be maintained. The record shall include the location of the emergency lighting tested, whether the unit passed or failed, the date of the test and the person completing the test.

~~(57)~~ ~~604.5~~ **604.7 Supervision of maintenance and testing.** Routine maintenance, inspection and operational testing shall be overseen by a properly instructed individual.

~~(68)~~ ~~604.6604.8~~ **Exit and emergency lighting equipment.** Exit and emergency lighting equipment with self contained battery back-up power shall be inspected and tested in accordance with paragraphs (D)(6)(a)(604.6.1) to (D)(6)(c)(604.6.3) of this rule.

(a) ~~604.6.1604.8.1~~ **Activation test.** An activation test of the exit and emergency lighting equipment with self contained battery back-up power shall be performed monthly for a period of not less than 30 seconds.

(b) ~~604.6.2604.8.2~~ **Duration test.** To insure continued illumination for a duration of not less than 90 minutes as listed in paragraph (K)(5)(c)(1011.5.3) of rule 1301:7-7-10 of the Administrative Code, exit and emergency lights equipped with self contained battery back-up power shall be tested annually for a period of not less than 90 minutes.

(c) ~~604.6.3604.8.3~~ **Test records.** A written record of all inspection, testing and maintenance of exit and emergency lighting equipment shall be documented and available for review by the fire code official.

**(E) Section 605 Electrical equipment, wiring and hazards**

(1) **605.1 Abatement of electrical hazards.** Identified electrical hazards shall be abated. Identified hazardous electrical conditions in permanent wiring shall be brought to the attention of the responsible code official. Electrical wiring, devices, appliances and other equipment that is modified or damaged and constitutes an electrical shock or fire hazard shall not be used.

(2) **605.2 Illumination.** Illumination shall be provided for service equipment areas, motor control centers and electrical panelboards.

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(3) **605.3 Working space and clearance.** A working space of not less than 30 inches (762 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided in front of electrical service equipment. Where the electrical service equipment is wider than 30 inches (762 mm), the working space shall ~~be not be~~ be less than the width of the equipment. ~~No storage~~Storage of any materials shall not be located within the designated working space.

**Exceptions:**

1. Where other dimensions are required or allowed by NFPA 70 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

2. Access openings into attics or under-floor areas which provide a minimum clear opening of 22 inches (559 mm) by 30 inches (762 mm).

(a) **605.3.1 Labeling.** Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating "ELECTRICAL ROOM" or similar approved wording. The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident.

(4) **605.4 Multiplug adapters.** Multiplug adapters, such as cube adapters, unfused plug strips or any other device not complying with NFPA 70 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code shall be prohibited.

(a) **605.4.1 Power tap design.** Relocatable power taps shall be of the polarized or grounded type, equipped with overcurrent protection, and shall be listed in accordance with UL 1363 as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.

(b) **605.4.2 Power supply.** Relocatable power taps shall be directly connected to a permanently installed receptacle.

(c) **605.4.3 Installation.** Relocatable power tap cords shall not extend through walls, ceilings, floors, under doors or floor coverings, or be subject to environmental or physical damage.

(5) **605.5 Extension cords.** Extension cords and flexible cords shall not be a substitute for permanent wiring. Extension cords and flexible cords shall not be affixed to structures, extended through walls, ceilings or floors, or under doors or floor coverings, nor shall such cords be subject to environmental damage or physical impact. Extension cords shall be used only with portable appliances.

(a) **605.5.1 Power supply.** Extension cords shall be plugged directly into an approved receptacle, power tap or multiplug adapter and, except for approved multiplug extension cords, shall serve only one portable appliance.

(b) **605.5.2 Ampacity.** The ampacity of the extension cords shall ~~be not be~~ be less than the rated capacity of the portable appliance supplied by the cord.

(c) **605.5.3 Maintenance.** Extension cords shall be maintained in good condition without splices, deterioration or damage.

(d) **605.5.4 Grounding.** Extension cords shall be grounded when serving grounded portable appliances.

(6) **605.6 Unapproved conditions.** Open junction boxes and open-wiring splices shall be prohibited. Approved covers shall be provided for all switch and electrical outlet boxes.

(7) **605.7 Appliances.** Electrical appliances and fixtures shall be tested and listed in published reports of inspected electrical equipment by an approved agency and installed and maintained in accordance with all instructions included as part of such listing.

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(8) **605.8 Electrical motors.** Electrical motors shall be maintained free from excessive accumulations of oil, dirt, waste and debris.

(9) **605.9 Temporary wiring.** Temporary wiring for electrical power and lighting installations is allowed for a period not to exceed 90 days. Temporary wiring methods shall meet the applicable provisions of NFPA 70 *as listed in rule 1301:7-7-47* 1301:7-7-80 of the Administrative Code.

**Exception:** Temporary wiring for electrical power and lighting installations is allowed during periods of construction, remodeling, repair or demolition of buildings, structures, equipment or similar activities.

(a) **605.9.1 Attachment to structures.** Temporary wiring attached to a structure shall be attached in an approved manner.

(10) **605.10 Portable, electric space heaters.** Where not prohibited by other *paragraphs* of this code, portable, electric space heaters shall be permitted to be used in all occupancies other than Group I-2 and in accordance with *paragraphs* (E)(10)(a)(605.10.1) to (E)(10)(d)(605.10.4) of this rule.

**Exception:** The use of portable, electric space heaters in which the heating element cannot exceed a temperature of 212° F (100° C) shall be permitted in nonsleeping staff and employee areas in Group I-2 occupancies.

(a) **605.10.1 Listed and labeled.** Only listed and labeled portable, electric space heaters shall be used.

(b) **605.10.2 Power supply.** Portable, electric space heaters shall be plugged directly into an approved receptacle.

(c) **605.10.3 Extension cords.** Portable, electric space heaters shall not be plugged into extension cords.

(d) **605.10.4 Prohibited areas.** Portable, electric space heaters shall not be operated within 3 feet (914 mm) of any combustible materials. Portable, electric space heaters shall be operated only in locations for which they are listed.

(11) **605.11 Solar photovoltaic power systems.** Solar photovoltaic power systems shall be installed in accordance with *paragraphs* (E)(11)(a)(605.11.1) to (E)(11)(b)(605.11.2) of this rule, the building code or residential code and NFPA 70 *as listed in rule 1301:7-7-80* of the Administrative Code.

(a) **605.11.1 Access and pathways.** Roof access, pathways, and spacing requirements shall be provided in accordance with *paragraphs* (E)(11)(a)(i)(605.11.1.1) to (E)(11)(a)(iii)(c)(605.11.1.3.3) of this rule.

**Exceptions:**

1. Detached, nonhabitable Group U structures including, but not limited to, parking shade structures, carports, solar trellises and similar structures.

2. Roof access, pathways and spacing requirements need not be provided where the fire chief has determined that rooftop operations will not be employed.

(i) **605.11.1.1 Roof access points.** Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows or doors, and located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires, or signs.

(ii) **605.11.1.2 Solar photovoltaic systems for Group R-3 buildings.** Solar photovoltaic systems for Group R-3 buildings shall comply with *paragraphs* (E)(11)(a)(ii)(a)(605.11.1.2.1) to (E)(11)(a)(ii)(e)(605.11.1.2.5) of this rule.

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**Exception:** These requirements shall not apply to structures designed and constructed in accordance with the residential code as listed in rule 1301:7-7-80 of the Administrative Code.

**(a) 605.11.1.2.1 Size of solar photovoltaic array.** Each photovoltaic array shall be limited to 150 feet (45 720 mm) by 150 feet (45 720 mm). Multiple arrays shall be separated by a 3-foot-wide (914 mm) clear access pathway.

**(b) 605.11.1.2.2 Hip roof layouts.** Panels and modules installed on Group R-3 buildings with hip roof layouts shall be located in a manner that provides a 3-foot-wide (914 mm) clear access pathway from the eave to the ridge on each roof slope where panels and modules are located. The access pathway shall be at a location on the building capable of supporting the fire fighters accessing the roof.

**Exception:** These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**(c) 605.11.1.2.3 Single-ridge roofs.** Panels and modules installed on Group R-3 buildings with a single ridge shall be located in a manner that provides two, 3-foot-wide (914 mm) access pathways from the eave to the ridge on each roof slope where panels and modules are located.

**Exception:** This requirement shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**(d) 605.11.1.2.4 Roofs with hips and valleys.** Panels and modules installed on Group R-3 buildings with roof hips and valleys shall not be located closer than 18 inches (457 mm) to a hip or a valley where panels/modules are to be placed on both side of a hip or valley. Where panels are to be located on only one side of a hip or valley that is of equal length, the panels shall be permitted to be placed directly adjacent to the hip or valley.

**Exception:** These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**(e) 605.11.1.2.5 Allowance for smoke ventilation operations.** Panels and modules installed on Group R-3 buildings shall be located not less than 3 feet (914 mm) from the ridge in order to allow for fire department smoke ventilation operations.

**Exception:** Panels and modules shall be permitted to be located up to the roof ridge where an alternative ventilation method approved by the fire chief has been provided or where the fire chief has determined vertical ventilation techniques will not be employed.

**(iii) 605.11.1.3 Other than Group R-3 buildings.** Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with paragraphs (E)(11)(a)(iii)(a)(605.11.1.3.1) to (E)(11)(a)(iii)(c)(605.11.1.3.3) of this rule.

**Exception:** Where it is determined by the fire code official that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in paragraphs (E)(11)(a)(ii)(a)(605.11.1.2.1) to (E)(11)(a)(ii)(e)(605.11.1.2.5) of this rule shall be permitted to be used.

**(a) 605.11.1.3.1 Access.** There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

**Exception:** Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum 4 foot wide (1290 mm).

**(b) 605.11.1.3.2 Pathways.** The solar installation shall be designed to provide designated pathways. The pathways shall meet the following requirements:

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(i) The pathway shall be over areas capable of supporting fire fighters accessing the roof.

(ii) The centerline axis pathways shall be provided in both axes of the roof. Centerline axis pathways shall run where the roof structure is capable of supporting fire fighters accessing the roof.

(iii) Pathways shall be a straight line not less than 4 feet (1290 mm) clear to roof standpipes or ventilation hatches.

(iv) Pathways shall provide not less than 4 feet (1290 mm) clear around roof access hatch with not less than one singular pathway not less than 4 feet (1290 mm) clear to a parapet or roof edge.

**(c) 605.11.1.3.3 Smoke ventilation.** The solar installation shall be designed to meet the following requirements:

(i) Arrays shall be not greater than 150 feet (45 720 mm) by 150 feet (45720 mm) in distance in either axis in order to create opportunities for fire department smoke ventilation operations.

(ii) Smoke ventilation options between array sections shall be one of the following:

(A) A pathway 8 feet (2438 mm) or greater in width.

(B) A 4-foot (1290 mm) or greater in width pathway and bordering roof skylights or gravity-operated dropout smoke and heat vents on not less than one side.

(C) A 4-foot (1290 mm) or greater in width pathway and bordering all sides of nongravity-operated dropout smoke and heat vents.

(D) A 4-foot (1290 mm) or greater in width pathway and bordering 4-foot by 8-foot (1290 mm by 2438 mm) "venting cutouts" every 20 feet (6096 mm) on alternating sides of the pathway.

**(b) 605.11.2 Ground-mounted photovoltaic arrays.** Ground-mounted photovoltaic arrays shall comply with paragraph (E)(1)(605.11) of this rule and this paragraph. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays. A clear, brush-free area of 10 feet (3048 mm) shall be required for ground-mounted photovoltaic arrays.

**(12) 605.12 Abandoned wiring in plenums.** Accessible portions of abandoned cables in air-handling plenums shall be removed. Cables that are unused and have not been tagged for future use shall be considered abandoned.

**(F) Section 606 Mechanical refrigeration**

**(1) [M] 606.1 Scope.** Refrigeration systems shall be installed in accordance with the *mechanical code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.*

**(2) [M] 606.2 Refrigerants.** The use and purity of new, recovered and reclaimed refrigerants shall be in accordance with the *mechanical code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.*

**(3) [M] 606.3 Refrigerant classification.** Refrigerants shall be classified in accordance with the *mechanical code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.*

**(4) [M] 606.4 Change in refrigerant type.** A change in the type of refrigerant in a refrigeration system shall be in accordance with the *mechanical code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code.*

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(5) **606.5 Access.** Refrigeration systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be accessible to the fire department at all times as required by the fire code official.

(6) **606.6 Testing of equipment.** Refrigeration equipment and systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be subject to periodic testing in accordance with *paragraph (F)(6)(a)(606.6.1) of this rule*. ~~A written record of required testing shall be maintained on the premises. Records of tests shall be maintained.~~ Tests of emergency devices or systems required by this rule shall be conducted by persons trained and qualified in refrigeration systems.

(a) **606.6.1 Periodic testing.** The following emergency devices or systems shall be periodically tested in accordance with the manufacturer's instructions and as required by the fire code official.

(i) Treatment and flaring systems.

(ii) Valves and appurtenances necessary to the operation of emergency refrigeration control boxes.

(iii) Fans and associated equipment intended to operate emergency ventilation systems.

(iv) Detection and alarm systems.

(7) **606.7 Emergency signs.** Refrigeration units or systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be provided with approved emergency signs, charts and labels in accordance with NFPA 704 *as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code*. Hazard signs shall be in accordance with the *mechanical code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code* for the classification of refrigerants listed therein.

(8) **606.8 Refrigerant detector.** Machinery rooms shall contain a refrigerant detector with an audible and visual alarm. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The alarm shall be actuated at a value not greater than the corresponding TLV-TWA values shown in the *mechanical code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code* for the refrigerant classification. Detectors and alarms shall be placed in approved locations. The detector shall transmit a signal to an approved location.

(9) **606.9 Remote controls.** ~~Where flammable refrigerants are used and compliance with section 1106 of the mechanical code as listed in rule 1301:7-7-80 of the Administrative Code is required, remote control of the mechanical equipment and appliances located in the machinery room as required by paragraphs (F)(9)(a)(606.9.1) and (F)(9)(b)(606.9.2) of this rule shall be provided at an approved location immediately outside the machinery room and adjacent to its principal entrance.~~

(a) **606.9.1 Refrigeration system emergency shutoff.** A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide off-only control of refrigerant compressors, refrigerant pumps and normally closed automatic refrigerant valves located in the machinery room. Additionally, this equipment shall be automatically shut off ~~whenever when~~ the refrigerant vapor concentration in the machinery room exceeds the vapor detector's upper detection limit or 25 per cent of the LEL, whichever is lower.

~~Exception: In machinery rooms where only nonflammable refrigerants are used, only compressors are required to be stopped by vapor detection or the cut-off switch.~~

(b) **606.9.2 Ventilation system.** A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide on-only control of the machinery room ventilation fans.

(10) **606.10 Emergency pressure control system.** ~~Refrigeration~~Permanently installed refrigeration systems containing more than 6.6 pounds (3 kg) of flammable, toxic or highly toxic refrigerant or ammonia shall be provided

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with an emergency pressure control system in accordance with *paragraphs* (F)(10)(a)(606.10.1) and (F)(10)(b)(606.10.2) *of this rule*.

(a) **606.10.1 Automatic crossover valves.** Each high- and intermediate-pressure zone in a refrigeration system shall be provided with a single automatic valve providing a crossover connection to a lower pressure zone. Automatic crossover valves shall comply with *paragraphs* (F)(10)(a)(i)(606.10.1.1) to (F)(10)(a)(iii)(606.10.1.3) *of this rule*.

(i) **606.10.1.1 Overpressure limit set point.** Automatic crossover valves shall be arranged to automatically relieve excess system pressure to a lower pressure zone if the pressure in a high- or intermediate-pressure zone rises to within 90 per cent of the set point for emergency pressure relief devices.

(ii) **606.10.1.2 Manual operation.** ~~When~~Where required by the fire code official, automatic crossover valves shall be capable of manual operation.

(iii) **606.10.1.3 System design pressure.** Refrigeration system zones that are connected to a higher pressure zone by an automatic crossover valve shall be designed to safely contain the maximum pressure that can be achieved by interconnection of the two zones.

(b) **606.10.2 Automatic emergency stop.** An automatic emergency stop feature shall be provided in accordance with *paragraphs* (F)(10)(b)(i)(606.10.2.1) and (F)(10)(b)(ii)(606.10.2.2) *of this rule*.

(i) **606.10.2.1 Operation of an automatic crossover valve.** Operation of an automatic crossover valve shall cause all compressors on the affected system to immediately stop. Dedicated pressure-sensing devices located immediately adjacent to crossover valves shall be permitted as a means for determining operation of a valve. To ensure that the automatic crossover valve system provides a redundant means of stopping compressors in an overpressure condition, high-pressure cutout sensors associated with compressors shall not be used as a basis for determining operation of a crossover valve.

(ii) **606.10.2.2 Overpressure in low-pressure zone.** The lowest pressure zone in a refrigeration system shall be provided with a dedicated means of determining a rise in system pressure to within 90 per cent of the ~~setpoint~~set point for emergency pressure relief devices. Activation of the overpressure sensing device shall cause all compressors on the affected system to immediately stop.

(11) **606.11 Storage, use and handling.** Flammable and combustible materials shall not be stored in machinery rooms for refrigeration systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant. Storage, use or handling of extra refrigerant or refrigerant oils shall be as required by ~~rule 1301:7-7-27~~rule 1301:7-7-50, ~~rule 1301:7-7-30~~rule 1301:7-7-53, ~~rule 1301:7-7-32~~rule 1301:7-7-55 and ~~rule 1301:7-7-34~~rule 1301:7-7-57 *of the Administrative Code*.

**Exception:** This provision shall not apply to spare parts, tools and incidental materials necessary for the safe and proper operation and maintenance of the system.

(12) **606.12 ~~Termination of relief devices~~Discharge and termination of pressure relief and purge systems.** Pressure relief devices, fusible plugs and purge systems ~~for discharging to the atmosphere from~~ refrigeration systems containing more than 6.6 pounds (3 kg) of flammable, toxic or highly toxic refrigerants ~~or ammonia shall be provided with an approved discharge system as required by~~ comply with paragraphs (F)(12)(a)(606.12.1), (F)(12)(b)(606.12.2) and (F)(12)(c)(606.12.3) (F)(12)(c)(606.12.3) to (F)(12)(e)(606.12.5) of this rule. ~~Discharge piping and devices connected to the discharge side of a fusible plug or rupture member shall have provisions to prevent plugging the pipe in the event of the fusible plug or rupture member functions.~~

(a) 606.12.1 Standards. Refrigeration systems and the buildings in which such systems are installed shall be in accordance with ASHRAE 15 as listed in rule 1301:7-7-80 of the Administrative Code.

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(i) 606.12.1.1 Ammonia refrigeration. Refrigeration systems using ammonia refrigerant and the buildings in which such systems are installed shall comply with IIAR-2 as listed in rule 1301:7-7-80 of the Administrative Code for system design and installation and IIAR-7 as listed in rule 1301:7-7-80 of the Administrative Code for operating procedures.

(b) 606.12.2 Fusible plugs and rupture members. Discharge piping and devices connected to the discharge side of a fusible plug or rupture member shall have provisions to prevent plugging the pipe in the event the fusible plug or rupture member functions.

(ac) 606.12.1606.12.3 Flammable refrigerants. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density equal to or greater than the density of air shall discharge vapor to the atmosphere only through an approved treatment system in accordance with paragraph (F)(12)(d)(606.12.4)(F)(12)(f)(606.12.6) of this rule or a flaring system in accordance with paragraph (F)(12)(e)(606.12.5)(F)(12)(g)(606.12.7) of this rule. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density of less than the density of air shall be permitted to discharge vapor to the atmosphere provided that the point of discharge is located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

(bd) 606.12.2606.12.4 Toxic and highly toxic refrigerants. Systems containing more than 6.6 pounds (3 kg) of toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with paragraph (F)(12)(d)(606.12.4)(F)(12)(f)(606.12.6) of this rule or a flaring system in accordance with paragraph (F)(12)(e)(606.12.5)(F)(12)(g)(606.12.7) of this rule.

(ee) 606.12.3606.12.5 Ammonia refrigerant. Systems containing more than 6.6 pounds (3 kg) of ammonia refrigerant shall discharge vapor to the atmosphere ~~through an approved treatment system in accordance with paragraph (F)(12)(d)(606.12.4) of this rule, a flaring system in accordance with paragraph (F)(12)(e)(606.12.5) of this rule, or through an approved ammonia diffusion system in accordance with paragraph (F)(12)(f)(606.12.6) of this rule, or by other approved means in accordance with one of the following methods:~~

(i) Directly to atmosphere where the fire code official determines, on review of an engineering analysis prepared in accordance with paragraph (D)(7)(b)(104.7.2) of rule 1301:7-7-01 of the Administrative Code, that a fire, health or environmental hazard would not result from atmospheric discharge of ammonia.

(ii) Through an approved treatment system in accordance with paragraph (F)(12)(f)(606.12.6) of this rule.

(iii) Through a flaring system in accordance with paragraph (F)(12)(g)(606.12.7) of this rule.

(iv) Through an approved ammonia diffusion system in accordance with paragraph (F)(12)(h)(606.12.8) of this rule.

(v) By other approved means.

**Exceptions:**

1-Exception: Ammonia/water absorption systems containing less than 22 pounds (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.

2- When the fire code official determines, on review of an engineering analysis prepared in accordance with paragraph (D)(7)(b)(104.7.2) of rule 1301:7-7-01 of the Administrative Code, that a fire, health or environmental hazard would not result from discharging ammonia directly to the atmosphere.

(df) 606.12.4606.12.6 Treatment systems. Treatment systems shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50 per cent of the IDLH at the point of exhaust. Treatment systems shall be in accordance with rule ~~1301:7-7-37~~1301:7-7-60 of the Administrative Code.

(eg) 606.12.5606.12.7 Flaring systems. Flaring systems for incineration of flammable refrigerants shall be designed to incinerate the entire discharge. The products of refrigerant incineration shall not pose health or environmental

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hazards. Incineration shall be automatic upon initiation of discharge, shall be designed to prevent blowback and shall not expose structures or materials to threat of fire. Standby fuel, such as LP gas, and standby power shall have the capacity to operate for one and one-half the required time for complete incineration of refrigerant in the system. Standby electrical power, where required to complete the incineration process, shall be in accordance with paragraph (D)(604) of this rule.

~~(#h)~~ **606.12.6606.12.8 Ammonia diffusion systems.** Ammonia diffusion systems shall include a tank containing 1 gallon of water for each pound of ammonia (48.3 L of water for each 1 kg of ammonia) that will be released in 1 hour from the largest relief device connected to the discharge pipe. The water shall be prevented from freezing. The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but no lower than 33 feet (10 058 mm) below the maximum liquid level. The tank shall contain the volume of water and ammonia without overflowing.

(13) **606.13 Discharge location for refrigeration machinery room ventilation.** Exhaust from mechanical ventilation systems serving refrigeration machinery rooms containing flammable, toxic or highly toxic refrigerants, other than ammonia, capable of exceeding 25 per cent of the LFL or 50 per cent of the IDLH shall be equipped with approved treatment systems to reduce the discharge concentrations to those values or lower.

(14) **606.14 Notification of refrigerant discharges.** The fire code official shall be notified immediately when a discharge becomes reportable under state, federal or local regulations in accordance with paragraph (C)(2)(a)(2703.3.1)(C)(3)(a)(5003.3.1) of rule 1301:7-7-271301:7-7-50 of the Administrative Code.

(15) **606.15 Records.** A written record shall be kept of refrigerant quantities brought into and removed from the premises shall be maintained. Such records shall be available to the fire code official.

(16) **606.16 Electrical equipment.** Where refrigerants of Groups A2, A3, B2 and B3, as defined in the *mechanical code as listed in rule 1301:7-7-471301:7-7-80 of the Administrative Code*, are used, refrigeration machinery rooms shall conform to the Class I, Division 2 hazardous location classification requirements of NFPA 70 *as listed in rule 1301:7-7-471301:7-7-80 of the Administrative Code.*

**Exception:** Ammonia machinery rooms that are provided with ventilation in accordance with section 1106.3 of the *mechanical code as listed in rule 1301:7-7-471301:7-7-80 of the Administrative Code.*

**(G) Section 607 Elevator recall and operation, maintenance and fire service keys**

(1) **607.1 Emergency operation.** Existing elevators with a travel distance of 25 feet (7620 mm) or more shall comply with the requirements in rule 1301:7-7-461301:7-7-11 of the Administrative Code. New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1 *as listed in rule 1301:7-7-471301:7-7-80 of the Administrative Code.*

(2) **607.2 Standby power.** In buildings and structures where standby power is required or furnished to operate an elevator, standby power shall be provided in accordance with paragraph (D)(604) of this rule. Operation of the system shall be in accordance with paragraphs (G)(2)(a)(607.2.1) to (G)(2)(d)(607.2.4) of this rule.

~~(ia)~~ **604.2.18.1607.2.1 Manual transfer.** Standby power shall be manually transferable to all elevators in each bank.

~~(#b)~~ **604.2.18.2607.2.2 One elevator.** Where only one elevator is installed, the elevator shall automatically transfer to standby power within 60 seconds after failure of normal power.

~~(#c)~~ **604.2.18.3607.2.3 Two or more elevators.** Where two or more elevators are controlled by a common operating system, all elevators shall automatically transfer to standby power within 60 seconds after failure of normal power where the standby power source is of sufficient capacity to operate all elevators at the same time. Where the standby power source is not of sufficient capacity to operate all elevators at the same time, all elevators shall transfer

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to standby power in sequence, return to the designated landing and disconnect from the standby power source. After all elevators have been returned to the designated level, ~~at least~~not less than one elevator shall remain operable from the standby power source.

~~(ivd)~~ ~~604.2.18.4 Venting~~**607.2.4 Machine room ventilation.** Where standby power is connected to elevators, the machine room ventilation or air conditioning shall be connected to the standby power source.

~~(23)~~ **[BE] 607.2607.3 Emergency signs.** An approved pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. The sign shall read: "IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRS."

**Exceptions:**

1. The emergency sign shall not be required for elevators that are part of an accessible means of egress complying with paragraph ~~(g)(4)(1007.4)~~(l)(1009.4) of rule 1301:7-7-10 of the Administrative Code.

2. The emergency sign shall not be required for elevators that are used for occupant self-evacuation in accordance with section 3008 of the building code as listed in rule 1301:7-7-80 of the Administrative Code.

~~(34)~~ ~~607.3~~**607.4 Fire service access elevator lobbies.** Where fire service access elevators are required by section 3007 of the building code as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code, fire service access elevator lobbies shall be maintained free of storage and furniture.

(5) 607.5 Occupant evacuation elevator lobbies. Where occupant evacuation elevators are provided in accordance with section 3008 of the building code as listed in rule 1301:7-7-80 of the Administrative Code, occupant evacuation elevator lobbies shall be maintained free of storage and furniture.

(6) 607.6 Water protection of hoistway enclosures. Methods to prevent water from infiltrating into a hoistway enclosure required by section 3007.4 and section 3008.4 of the building code as listed in rule 1301:7-7-80 of the Administrative Code shall be maintained.

~~(47)~~ ~~607.4~~**607.7 Elevator keyskey location.** Keys for the elevator car doors and fire-fighter service keys shall be kept in an approved location for immediate use by the fire department.

(8) 607.8 Standardized fire service elevator keys. Buildings with elevators equipped with Phase I emergency recall, Phase II emergency in-car operation, or a fire service access elevator shall be equipped to operate with a standardized fire service elevator key approved by the fire code official.

**Exception:** The owner shall be permitted to place the building's nonstandardized fire service elevator keys in a key box installed in accordance with paragraph (F)(1)(b)(506.1.2) of rule 1301:7-7-05 of the Administrative Code.

(a) 607.8.1 Requirements for standardized fire service elevator keys. Standardized fire service elevator keys shall comply with all of the following:

(i) All fire service elevator keys within the jurisdiction shall be uniform and specific for the jurisdiction. Keys shall be cut to a uniform key code.

(ii) Fire service elevator keys shall be of a patent-protected design to prevent unauthorized duplication.

(iii) Fire service elevator keys shall be factory restricted by the manufacturer to prevent the unauthorized distribution of key blanks. Uncut key blanks shall not be permitted to leave the factory.

(iv) Fire service elevator keys subject to these rules shall be engraved with the words "DO NOT DUPLICATE."

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(b) 607.8.2 Access to standardized fire service keys. Access to standardized fire service elevator keys shall be restricted to the following:

(i) Elevator owners or their authorized agents.

(ii) Elevator contractors.

(iii) Elevator inspectors of the jurisdiction.

(iv) Fire code officials of the jurisdiction.

(v) The fire department and other emergency response agencies designated by the fire code official.

(c) 607.8.3 Duplication or distribution of keys. A person shall not duplicate a standardized fire service elevator key or issue, give, or sell a duplicated key unless in accordance with this code.

(d) 607.8.4 Responsibility to provide keys. The building owner shall provide up to three standardized fire service elevator keys where required by the fire code official, upon installation of a standardized fire service key switch or switches in the building.

**(H) Section 608 Stationary storage battery systems**

**(1) 608.1 Scope.** Stationary storage battery systems having an electrolyte capacity of more than 50 gallons (189 L) for flooded lead acid, nickel cadmium (Ni-Cd) and valve-regulated lead acid (VRLA), or more than 1,000 pounds (454 kg) for lithium-ion and lithium metal polymer, used for facility standby power, emergency power or uninterruptible power supplies shall comply with this paragraph and Table 608.1 of this rule.

**Table 608.1  
Battery requirements**

Requirement	Nonrecombinant batteries		Recombinant batteries		Other batteries
	Vented (flooded) lead acid batteries	Vented (flooded) nickel-cadmium (Ni-Cd) batteries	Valve regulated lead acid (VRLA) batteries cells	Lithium-ion batteries cells	Lithium Metal Polymer cells
Safety caps	Venting caps (paragraph (H)(2)(a)(608.2.1) of this rule)	Venting caps (paragraph (H)(2)(a)(608.2.1) of this rule)	Self-resealing flame-arresting caps (paragraph (H)(2)(b)(608.2.2) of this rule)	No caps	No caps
Thermal runaway management	Not required	Not required	Required (paragraph (H)(3)(608.3) of this rule)	Not required	Required (paragraph (H)(3)(608.3) of this rule)
Spill control	Required (paragraph (H)(5)(608.5) of this rule)	Required (paragraph (H)(5)(608.5) of this rule)	Not required	Not required	Not required
Neutralization	Required (paragraph	Required (paragraph	Required (paragraph	Not required	Not required

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	(H)(5)(a)(608.5.1) of this rule	(H)(5)(a)(608.5.1) of this rule	(H)(5)(b)(608.5.2) of this rule		
Ventilation	Required (paragraphs (H)(6)(a)(608.6.1); (H)(6)(b)(608.6.2) of this rule)	Required (paragraphs (H)(6)(a)(608.6.1); (H)(6)(b)(608.6.2) of this rule)	Required (paragraphs (H)(6)(a)(608.6.1); (H)(6)(b)(608.6.2) of this rule)	Not required	Not required
Signage	Required (paragraph (H)(7)(608.7) of this rule)	Required (paragraph (H)(7)(608.7) of this rule)	Required (paragraph (H)(7)(608.7) of this rule)	Required (paragraph (H)(7)(608.7) of this rule)	Required (paragraph (H)(7)(608.7) of this rule)
Seismic protection	Required (paragraph (H)(8)(608.8) of this rule)	Required (paragraph (H)(8)(608.8) of this rule)	Required (paragraph (H)(8)(608.8) of this rule)	Required (paragraph (H)(8)(608.8) of this rule)	Required (paragraph (H)(8)(608.8) of this rule)
Smoke detection	Required (paragraph (H)(9)(608.9) of this rule)	Required (paragraph (H)(9)(608.9) of this rule)	Required (paragraph (H)(9)(608.9) of this rule)	Required (paragraph (H)(9)(608.9) of this rule)	Required (paragraph (H)(9)(608.9) of this rule)

(2) **608.2 Safety caps.** Safety caps for stationary storage battery systems shall comply with *paragraphs* (H)(2)(a)(608.2.1) and (H)(2)(b)(608.2.2) of this rule.

(a) **608.2.1 Nonrecombinant batteries.** Vented lead acid, nickel-cadmium or other types of nonrecombinant batteries shall be provided with safety venting caps.

(b) **608.2.2 Recombinant batteries.** VRLA batteries shall be equipped with self-sealing flame-arresting safety vents.

(3) **608.3 Thermal runaway.** VRLA and lithium metal polymer battery systems shall be provided with a listed device or other approved method to preclude, detect and control thermal runaway.

(4) **608.4 Room design and construction.** Enclosure of stationary battery systems shall comply with the *building code* as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the Administrative Code. Battery systems shall be allowed to be in the same room with the equipment they support.

(a) **608.4.1 Separate rooms.** ~~When~~Where stationary batteries are installed in a separate equipment room accessible only to authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.

(b) **608.4.2 Occupied work centers.** ~~When~~Where a system of VRLA, lithium-ion, or other type of sealed, nonventing batteries is situated in an occupied work center, it shall be allowed to be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.

(c) **608.4.3 Cabinets.** When stationary batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet (3048 mm) of the equipment that they support.

(5) **608.5 Spill control and neutralization.** An approved method and materials for the control and neutralization of a spill of electrolyte shall be provided in areas containing lead-acid, nickel-cadmium or other types of batteries with free-flowing liquid electrolyte. For purposes of this *paragraph*, a "spill" is defined as any unintentional release of electrolyte.

**Exception:** VRLA, lithium-ion, lithium metal polymer or other types of sealed batteries with immobilized electrolyte shall not require spill control.

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(a) **608.5.1 Nonrecombinant battery neutralization.** For battery systems containing lead-acid, nickel-cadmium or other types of batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.

(b) **608.5.2 Recombinant battery neutralization.** For VRLA or other types of ~~sealed~~ batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 *per cent* of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

**Exception:** Lithium-ion and lithium metal polymer batteries shall not require neutralization.

(6) **608.6 Ventilation.** Ventilation of stationary and storage battery systems shall comply with *paragraphs* (H)(6)(a)(608.6.1) and (H)(6)(b)(608.6.2) *of this rule*.

(a) **608.6.1 Room ventilation.** Ventilation shall be provided in accordance with the *mechanical code as listed in rule 1301:7-7-47* ~~1301:7-7-80~~ *of the Administrative Code* and the following:

(i) For flooded lead acid, flooded Ni-CadCd and VRLA batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 *per cent* of the total volume of the room; or

(ii) Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (1 ft<sup>3</sup>/min/ft<sup>2</sup>) [0.0051 m<sup>3</sup>/(s•m<sup>2</sup>)] of floor area of the room.

**Exception:** Lithium-ion and lithium metal polymer batteries shall not require additional ventilation beyond that which would normally be required for human occupancy of the space in accordance with the mechanical code as listed in rule 1301:7-7-80 of the Administrative Code.

(b) **608.6.2 Cabinet ventilation.** When VRLA batteries are installed inside a cabinet, the cabinet shall be approved for use in occupied spaces and shall be mechanically or naturally vented by one of the following methods:

(i) The cabinet ventilation shall limit the maximum concentration of hydrogen to 1 *per cent* of the total volume of the cabinet during the worst-case event of simultaneous “boost” charging of all the batteries in the cabinet; ~~or.~~

(ii) When calculations are not available to substantiate the ventilation rate, continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot [1 ft<sup>3</sup>/min/ft<sup>2</sup> or 0.0051 m<sup>3</sup>/(s•m<sup>2</sup>)] of the floor area covered by the cabinet. The room in which the cabinet is installed shall also be ventilated as required in *paragraph* (H)(6)(a)(608.6.1) *of this rule*.

(c) **608.6.3 Supervision.** Mechanical ventilation systems where required by *paragraphs* (H)(6)(a)(608.6.1) and (H)(6)(b)(608.6.2) *of this rule* 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.

(7) **608.7 Signage.** Signs shall comply with *paragraphs* (H)(7)(a)(608.7.1) and (H)(7)(b)(608.7.2) *of this rule*.

(a) **608.7.1 Equipment room and building signage.** Doors into electrical equipment rooms or buildings containing stationary battery systems shall be provided with approved signs. The signs shall state that:

(i) The room contains energized battery systems.

(ii) The room contains energized electrical circuits.

(iii) The battery electrolyte solutions, where present, are corrosive liquids.

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(b) **608.7.2 Cabinet signage.** Cabinets shall have exterior labels that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained battery system. There shall be signs within the cabinet that indicate the relevant electrical, chemical and fire hazards.

(8) **608.8 Seismic protection.** The battery systems shall be seismically braced in accordance with the *building code* as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the *Administrative Code*.

(9) **608.9 Smoke detection.** An approved automatic smoke detection system shall be installed in accordance with paragraph (G)(2)(907.2) of rule 1301:7-7-09 of the *Administrative Code* in rooms containing stationary battery systems.

(l) **Section 609 Commercial kitchen hoods**

(1) **[M] 609.1 General.** Commercial kitchen exhaust hoods shall comply with the requirements of the *mechanical code* as listed in rule ~~1301:7-7-47~~1301:7-7-80 of the *Administrative Code*.

(2) **[M] 609.2 Where required.** A Type I hood shall be installed at or above all commercial cooking appliances and domestic cooking appliances used for commercial purposes that produce grease vapors.

**Exception:** A Type I hood shall not be required for an electric cooking appliance where an approved testing agency provides documentation that the appliance effluent contains 5 mg/m<sup>3</sup> or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m<sup>3</sup>/s) in accordance with UL 710B as listed in rule 1301:7-7-80 of the *Administrative Code*.

(3) **609.3 Operations and maintenance.** Commercial cooking systems shall be operated and maintained in accordance with paragraphs (l)(3)(a)(609.3.1) to (l)(3)(d)(609.3.4) of this rule.

(a) **609.3.1 Ventilation system.** The ventilation system in connection with hoods shall be operated at the required rate of air movement, and classified grease filters shall be in place when equipment under a kitchen grease hood is used.

(b) **609.3.2 Grease extractors.** Where grease extractors are installed, they shall be operated when the commercial-type cooking equipment is used.

(c) **609.3.3 Cleaning.** Hoods, grease-removal devices, fans, ducts and other appurtenances shall be cleaned at intervals as required by paragraphs (l)(3)(c)(i)(609.3.3.1) to (l)(3)(c)(iii)(609.3.3.3) of this rule.

(i) **609.3.3.1 Inspection.** Hoods, grease-removal devices, fans, ducts, and other appurtenances shall be inspected at intervals specified in Table 609.3.3.1 of this rule or as approved by the fire code official. Inspections shall be completed by qualified individuals.

**Table 609.3.3.1**  
**Commercial cooking system inspection frequency**

Type of cooking operations	Frequency of inspection
High-volume cooking operations such as 24-hour cooking, charbroiling or wok cooking	3 months
Low-volume cooking operations such as places of religious worship, seasonal	12 months

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businesses and senior centers	
Cooking operations utilizing solid-fuel burning cooking appliances	1 month
All other cooking operations	6 months

(ii) **609.3.3.2 Grease accumulation.** If during the inspection it is found that hoods, grease-removal devices, fans, ducts or other appurtenances have an accumulation of grease, such components shall be cleaned in accordance with ANSI/IFECA C 10 as listed in rule 1301:7-7-80 of the Administrative Code.

(iii) **609.3.3.3 Records.** Records for inspections shall state the individual and company performing the inspection, a description of the inspection and when the inspection took place. Records for cleanings shall state the individual and company performing the cleaning and when the cleaning took place. Such records shall be completed after each inspection or cleaning, maintained ~~on the premises for a minimum of three years and be copied to the fire code official upon request.~~

(a) 609.3.3.3.1 Tags. When a commercial kitchen hood or duct system is inspected, a tag containing the service provider name, address, telephone number and date of service shall be provided in a conspicuous location. Prior tags shall be covered or removed.

(d) **609.3.4 Extinguishing system service.** Automatic fire-extinguishing systems protecting commercial cooking systems shall be serviced as required in ~~paragraph (D)(11)(f)(904.11.6)(D)(12)(f)(904.12.6)~~ of rule 1301:7-7-09 of the Administrative Code.

(4) 609.4 Appliance connection to building piping. Gas-fired commercial cooking appliances installed on casters and appliances that are moved for cleaning and sanitation purposes shall be connected to the piping system with an appliance connector listed as complying with ANSI Z21.69 as listed in rule 1301:7-7-80 of the Administrative Code. The commercial cooking appliance connector installation shall be configured in accordance with the manufacturer's installation instructions. Movement of appliances with casters shall be limited by a restraining device installed in accordance with the connector and appliance manufacturer's instructions.

(J) Section 610 Commercial kitchen cooking oil storage

(1) 610.1 General. Storage of cooking oil (grease) in commercial cooking operations utilizing above-ground tanks with a capacity greater than 60 gal (227 L) installed within a building shall comply with paragraphs (J)(2)(610.2) to (J)(7)(610.7) of this rule and NFPA 30 as listed in rule 1301:7-7-80 of the Administrative Code. For purposes of this paragraph, cooking oil shall be classified as a Class IIIB liquid unless otherwise determined by testing.

(2) 610.2 Metallic storage tanks. Metallic cooking oil storage tanks shall be listed in accordance with UL 142 or UL 80 as listed in rule 1301:7-7-80 of the Administrative Code, and shall be installed in accordance with the tank manufacturer's instructions.

(3) 610.3 Nonmetallic storage tanks. Nonmetallic cooking oil storage tanks shall be installed in accordance with the tank manufacturer's instructions and shall also comply with all of the following:

(a) Tanks shall be listed for use with cooking oil, including maximum temperature to which the tank will be exposed during use.

(b) Tank capacity shall not exceed 200 gallons (757 L) per tank.

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(4) 610.4 Cooking oil storage system components. Cooking oil storage system components shall include but are not limited to piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil, and are permitted to be of either metallic or non-metallic construction.

(a) 610.4.1 Design standards. The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.

(b) 610.4.2 Components in contact with heated oil. System components that come in contact with heated cooking oil shall be rated for the maximum operating temperatures expected in the system.

(5) 610.5 Tank venting. Normal and emergency venting shall be provided for cooking oil storage tanks.

(a) 610.5.1 Normal vents. Normal vents shall be located above the maximum normal liquid line, and shall have a minimum effective area not smaller than the largest filling or withdrawal connection. Normal vents shall be permitted to vent inside the building.

(b) 610.5.2 Emergency vents. Emergency relief vents shall be located above the maximum normal liquid line, and shall be in the form of a device or devices that will relieve excessive internal pressure caused by an exposure fire. For nonmetallic tanks, the emergency relief vent shall be allowed to be in the form of construction. Emergency vents shall be permitted to vent inside the building.

(6) 610.6 Heating of cooking oil. Electrical equipment used for heating cooking oil in cooking oil storage systems shall be listed to UL 499 as listed in rule 1301:7-7-80 of the Administrative Code and shall comply with NFPA 70 as listed in rule 1301:7-7-80 of the Administrative Code. Use of electrical immersion heaters shall be prohibited in nonmetallic tanks.

(7) 610.7 Electrical equipment. Electrical equipment used for the operation of cooking oil storage systems shall comply with NFPA 70 as listed in rule 1301:7-7-80 of the Administrative Code.

(K) Section 611 Hyperbaric facilities

(1) 611.1 General. Hyperbaric facilities shall be inspected, tested and maintained in accordance with NFPA 99 as listed in rule 1301:7-7-80 of the Administrative Code.

(2) 611.2 Records. Records shall be maintained of all testing and repair conducted on the hyperbaric chamber and associated devices and equipment. Records shall be available to the fire code official.