



Date: December 7, 2023
To: City of Houston HPW-HPC
Attention: CCM
From: Jensen Hughes
Subject: IFC Fuel Fired Appliances

This technical memo is provided to describe significant changes to the Houston Construction Codes with regard to the requirements for Fuel Fired Appliances.

Chapter 6 of the 2021 International Fire Code has been reformatted and several revisions occurred to address fuel-oil storage for fire-fired appliances in a building. **Section 605** addresses solid-fuel-fired appliances in addition to gaseous-fuel-fired (ex., Propane) and liquid-fuel-fired (ex., Diesel) appliances. The scope of this section now addresses nonportable solid-fuel-fired/ oil-fired appliances and portable fuel-fired appliances not connected to a fixed piping system. The reference to portable appliances is for “fuel-fired” appliances, which includes any fuel, such as solid-fueled (hickory or oak), oil-fueled (diesel or fuel-oil) and gaseous-fueled (propane or butane).

Section 605.4.1.1 requires outside tanks storing fuel oil to comply with UL standards. Similarly, **Section 605.4.2.1** is added to require storage tanks inside a building to comply with any of these same standards.

Section 605.4.2.2 was added to limit the size of tanks storing fuel oil. The allowance in Item 2 has been revised to require a secondary containment tank. Tanks built to UL 142 standards can be constructed as double-wall tanks, which acts as a secondary containment. The UL 2085 tank is designed to withstand a 2-hour fire exposure unlike the UL 142 secondary containment tank. The UL 142 secondary containment tank will have exposed steel providing the secondary containment. If the UL 142 secondary containment tank is utilized, it requires visual monitoring or automatic monitoring of the interstitial space creating the secondary containment. Item 3 has also been revised to increase the quantity up to 3,000 gallons, but the building must now be fully sprinklered and visual or automatic monitoring of the interstitial space on the UL 2085 tank, which is also required.

memo.

2021 Fire Code Changes –**SECTION 603 605
FUEL-FIRED APPLIANCES**

~~603.1.1~~**605.1** **Installation General.** The **design, construction, installation, operation, alteration, repair and maintenance** of nonportable gas-fired appliances and systems shall comply with **the provisions of this section** and the International Fuel Gas Code. The **design, construction, installation, operation, alteration, repair and maintenance** of nonportable **solid fuel-fired and oil-fired** liquid fuel-fired appliances and systems shall comply with **the provisions of this section** and the International Mechanical Code. The **construction and use of portable** ~~installation of all other~~ fuel-fired appliances **not connected to a fixed fuel piping system**, ~~other than portable internal combustion engines, oil lamps and other portable devices such as blow torches, melting pots and weed burners, shall comply with this section and the International Mechanical Code.~~

~~603.1.1~~**605.1.1** **Manufacturer's instructions Installation of Nonportable Fuel-Fired Appliances.** The installation of **nonportable fuel-fired appliances** shall be made in accordance with the manufacturer's **installation** 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.~~

~~603.1.3~~**605.1.2** **Electrical Wiring and Equipment.** Electrical wiring and equipment used in connection with ~~oil-burning fuel-fired appliances and~~ equipment shall be installed and maintained in accordance with Section 603 and NFPA 70.

~~603.1.4~~**605.1.3** **Fuel Oil.** The grade of fuel oil used in ~~an oil a burner~~ shall be that for which the **oil** burner is approved and as stipulated by the **oil burner manufacturer's instructions**. ~~manufacturer.~~ Oil containing gasoline shall not be used. Waste crankcase oil shall be an acceptable fuel in Group F, M and S occupancies where utilized in equipment listed **and labeled** for use with waste oil and where such equipment is installed in accordance with the manufacturer's instructions and the terms of its listing.

~~603.1.5~~**605.1.4** **Access.** The installation of **fuel-fired equipment** shall be provided with access to equipment for cleaning hot surfaces; removing burners; replacing motors, controls, air filters, chimney **and vent** connectors, draft regulators and other working parts; and for adjusting, cleaning and lubricating parts.

~~603.1.6~~**605.1.5** **Testing, Diagrams and Instructions.** After installation of the ~~oil-burning fuel-fired~~ equipment, operation and combustion performance tests shall be conducted to determine that the **burner equipment** is in proper operating condition and that all accessory equipment, controls, and safety devices function properly.

~~603.1.6.1~~**605.1.5.1** **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 available in case of emergency.

~~603.1.6.2~~**605.1.5.2** **Operating Instructions.** After completing the installation, the installer shall instruct the owner or operator in the proper operation of the equipment. The installer shall furnish the owner or operator with the **manufacturer's operating instructions**. ~~name and telephone number of persons to contact for technical information or assistance and routine or emergency services.~~



~~603.1.7~~**605.1.6 Clearances.** Working clearances between oil fuel-fired appliances and electrical panelboards and equipment shall be in accordance with NFPA 70. Clearances between oil-fired equipment and oil supply tanks shall be in accordance with NFPA 31.

~~603.7~~**605.2 Discontinuing Operation Abatement of Unsafe Conditions 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 or replaced in accordance with Section 605.1.

~~603.6~~**605.2.1 Chimneys and Appliances.** Chimneys, vents, incinerators, smokestacks or similar devices for conveying smoke or hot gases to the outer air and the appliances such as stoves, furnaces, fireboxes or boilers to which such devices are connected, shall be maintained so as not to create a fire hazard.

~~603.6.1~~**605.2.1.1 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 instructions and the International Mechanical Code or a flue lining system installed in accordance with the requirements of the International Building Code and appropriate for the intended class of chimney service.

~~603.6.2~~**605.2.1.2 Metal Chimneys.** Metal chimneys that are corroded or improperly supported shall be repaired or replaced in accordance with the International Mechanical Code.

~~603.6.3~~**605.2.1.3 Decorative Shrouds.** Decorative shrouds installed at the termination of factory-built chimneys or vents 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 or vent manufacturer's instructions and the International Mechanical Code or International Fuel Gas Code.

~~603.6.4~~**605.2.1.4 Factory-Built Chimney and Vent Systems. Chimneys.** Existing factory-built chimneys and vent systems that are damaged, corroded or improperly supported shall be repaired or replaced in accordance with the International Mechanical Code.

~~603.6.5~~**605.2.1.5 Connectors.** Existing chimney and vent connectors that are damaged, corroded or improperly supported shall be repaired or replaced in accordance with the International Mechanical Code.

~~603.2~~**605.3 Chimneys and Vents.** Masonry chimneys shall be constructed in accordance with the International Building Code. Factory-built chimneys and vent systems serving solid-fuel-fired appliances or oil-fired appliances shall be installed



in accordance with the International Mechanical Code. Metal chimneys shall be constructed and installed in accordance with ~~NFPA 211~~ **the International Mechanical Code. Factory-built chimneys and vent systems serving gas-fired appliances shall be installed in accordance with the International Fuel Gas Code.**

~~603.3.1~~ **605.4 Fuel Oil Storage Systems.** Fuel oil storage systems **for building heating systems** shall be installed **and maintained** in accordance with this code. **Tanks and fuel-oil piping systems** shall be installed in accordance with **Chapter 13** of the International Mechanical Code.

~~603.3.1~~ **605.4.1 Fuel Oil Storage in Outside, Above-Ground 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.

605.4.1.1 Approval. Outdoor fuel oil storage tanks shall be in accordance with UL 142 or UL 2085.

~~603.3.2~~ **605.4.2 Fuel Oil Storage Inside Buildings.** Fuel oil storage inside buildings shall comply with Sections 605.4.2.2 through 605.4.2.8 or Chapter 57.

605.4.2.1 Approval. Indoor fuel oil storage tanks shall be in accordance with UL 80, UL 142 or UL 2085.

~~603.3.2~~ **605.4.2.2 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 tanks shall not exceed the following:

1. 660 gallons (2498 L) in unsprinklered buildings, where stored in a tank complying with UL 80, UL 142 or UL 2085.
2. 1,320 gallons (4996 L) in buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, where stored in a tank complying with UL 142. **The tank shall be listed as a secondary containment tank, and the secondary containment shall be monitored visually or automatically.**
3. 3,000 gallons (11 356 L) **in buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1,** where stored in protected above-ground tanks complying with UL 2085 and Section 5704.2.9.7 ~~and the room is protected by an automatic sprinkler system in accordance with Section 903.3.1.1.~~ **The tank shall be listed as a secondary containment tank, as required by UL 2085, and the secondary containment shall be monitored visually or automatically.**

~~603.3.2~~ **605.4.2.3 Restricted Use and Connection.** Tanks installed in accordance with Section 605.4.2 shall be used only to supply fuel oil to fuel-burning equipment, generators or fire pumps installed in accordance with Section 605.4.2.5. Connections between tanks and equipment supplied by such tanks shall be made using closed piping systems **in accordance with the International Mechanical Code.**

~~603.3.2~~ **605.4.2.4 Applicability of Maximum Allowable Quantity and Control Area Requirements.** The quantity of combustible liquid stored in tanks complying with Section 605.4.2 shall not be counted towards the maximum allowable quantity set forth in Table 5003.1.1(1), and such tanks shall not be required to be located in a control area.



~~603.3.2.4~~**605.4.2.5 Installation.** Tanks and piping systems shall be installed in accordance with Section 915 and Chapter 13, both of the International Mechanical Code, as applicable.

~~603.3.2.5~~**605.4.2.6 Separation.** Rooms containing fuel oil tanks for internal combustion engines shall be separated from the remainder of the building by fire barriers, horizontal assemblies, or both, with a minimum 1-hour fire-resistance rating with 1-hour fire-protection-rated opening protectives constructed in accordance with the International Building Code.

Exception: Rooms containing protected above-ground tanks complying with Section 5704.2.9.7 shall not be required to be separated from surrounding areas.

~~603.3.2.6~~**605.4.2.7 Spill Containment.** Tanks exceeding ~~5560~~-gallon (~~227208~~ L) capacity or an aggregate capacity of 1,000 gallons (3785 L) that are not provided with integral secondary containment shall be provided with spill containment sized to contain a release from the largest tank.

~~603.3.2.7~~**605.4.2.8 Tanks in Basements.** Tanks in basements shall be located not more than two stories below grade plane.

~~603.3.3~~**605.4.3 Fuel Oil Storage in Underground Tanks** ~~Underground Storage of Fuel Oil.~~ The storage of fuel oil in underground storage tanks shall comply with **UL 58 or UL 1316 and be installed in accordance with** NFPA 31.

~~603.4~~**605.5 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 and ambulatory care facilities.

Exceptions:

1. ~~Portable~~ **In one- and two-family dwellings portable** unvented fuel-fired heaters, ~~where approved and listed in accordance with UL 647~~ **are permitted to be used in one- and two-family dwellings, where operated and maintained in accordance with the manufacturer's instructions.**
2. Portable outdoor gas-fired heating appliances in accordance with Section 605.5.2.

~~603.4.1~~**605.5.1 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.

~~603.4.2~~**605.5.2 Portable Outdoor Gas-Fired Heating Appliances.** Portable gas-fired heating appliances located outdoors shall be in accordance with Sections 605.5.2.1 through 605.5.2.3.4.

~~603.4.2.1~~**605.5.2.1 Location.** Portable outdoor gas-fired heating appliances shall be **used and** located in accordance with Sections 605.5.2.1.1 through 605.5.2.1.4.

~~603.4.2.1.1~~**605.5.2.1.1 Prohibited Locations.** The storage or use of portable outdoor gas-fired heating appliances is prohibited in any of the following locations:

1. Inside of any occupancy where connected to the fuel gas container.



2. Inside of tents, canopies and membrane structures.
3. On exterior balconies.

Exception: As ~~allowed~~ **permitted** in **Chapter 61. Section 6.22 of NFPA 58.**

~~603.4.2.1.2~~605.5.2.1.2 Clearance to Buildings. Portable outdoor gas-fired heating appliances shall be located not less than 5 feet (1524 mm) from buildings.

~~603.4.2.1.3~~605.5.2.1.3 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.

~~603.4.2.1.4~~605.5.2.1.4 Proximity to Exits. Portable outdoor gas-fired heating appliances shall not be located within 5 feet (1524 mm) of exits or exit discharges.

~~603.4.2.2~~605.5.2.2 Installation Use and Operation. Portable outdoor gas-fired heating appliances shall be ~~installed~~ **used** and operated in accordance with Sections 605.5.2.2.1 through 605.5.2.2.4.

~~603.4.2.2.1~~605.5.2.2.1 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. **Portable outdoor gas-fired heating appliances shall be listed and labeled in accordance with ANSI Z83.26/CSA 2.37.**

~~603.4.2.2.2~~605.5.2.2.2 Installation Use and Maintenance. Portable outdoor gas-fired heating appliances shall be ~~installed~~ **used** and maintained in accordance with the manufacturer's instructions.

~~603.4.2.2.3~~605.5.2.2.3 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.

~~603.4.2.2.4~~605.5.2.2.4 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.

~~603.4.2.3~~605.5.2.3 Gas Containers. Fuel gas containers for portable outdoor gas-fired heating appliances shall comply with Sections 605.5.2.3.1 through 605.5.2.3.4.

~~603.4.2.3.1~~605.5.2.3.1 Approved Containers. Only approved DOTn or ASME gas containers shall be used.

~~603.4.2.3.2~~605.5.2.3.2 Container Replacement. Replacement of fuel gas containers in portable outdoor gas-fired heating appliances shall not be conducted while the public is present.



~~603.4.2.3.3~~**605.5.2.3.3 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).

~~603.4.2.3.4~~**605.5.2.3.4 Indoor Storage Prohibited.** Gas containers shall not be stored inside of buildings except in accordance with Section 6109.9.

~~603.5~~**605.6 Heating Appliances.** Heating appliances shall be listed and shall comply with Sections 605.6.1 and 605.6.2.

~~603.5.1~~**605.6.1 Guard Against Contact.** The heating element or combustion chamber shall be permanently guarded so as to prevent accidental contact by persons or material.

~~603.5.2~~**605.6.2 Heating Appliance Installation and Maintenance.** Heating appliances shall be installed and maintained in accordance with the manufacturer's instructions, the International Building Code, the International Fuel Gas Code, the International Mechanical Code and NFPA 70.

~~603.7.1~~**605.7 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 Section 605.2) 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.

~~603.8~~**605.8 Incinerators.** Commercial, industrial and residential-type incinerators and chimneys shall be constructed in accordance with the International Building Code, the International Fuel Gas Code and the International Mechanical Code.

~~603.8.1~~**605.8.1 Residential Incinerators.** Residential incinerators shall be ~~of an approved type~~ **listed and labeled in accordance with UL 791.**

~~603.8.2~~**605.8.2 Spark Arrestor.** Incinerators shall be equipped with an effective means for arresting sparks.

~~603.8.3~~**605.8.3 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.

~~603.8.4~~**605.8.4 Time of Burning.** Burning shall take place only during approved hours.

~~603.8.5~~**605.8.5 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 incinerators is determined by the fire code official to constitute a hazardous condition.



~~603.8.6~~**605.8.6 Flue-Fed Incinerators in Group I-2.** In Group I-2 occupancies, the continued use of existing flue-fed incinerators is prohibited.

~~603.8.7~~**605.8.7 Incinerator Inspections 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.

~~603.9~~**605.9 Gas Meters.** Above-ground gas meters, regulators and piping subject to damage shall be protected by a barrier complying with Section 312 or otherwise protected in an approved manner.

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