Summary of Significant Changes to the 2018 Edition of the International Fuel Gas Code

Description of Change	Change Summary	Change Significance
403.4.2 Steel. Steel, stainless steel and wrought-iron pipe shall be not ~~less~~ lighter than ~~standard weight (Schedule 40)~~ Schedule 10 and shall comply with the dimensional standards of ASME B36.10, 10M and one of the following standards: ~~1. ASME B36.10, 10M.~~ ~~2.~~ 1. ASTM A 53/A53M. ~~3.~~ 2. ASTM A 106. 3. ASTM A312. **403.10.1 Pipe joints.** ~~Pipe~~ Schedule 40 and heavier pipe joints shall be threaded, flanged, brazed, ~~or~~ welded or assembled with press-connect fittings listed in accordance with ANSI LC4/CSA 6.32. Pipe lighter than Schedule 40 shall be connected using press-connect fittings, flanges, brazing or welding. Where nonferrous pipe is brazed, the brazing materials shall have a melting point in excess of 1,000°F (538°C). Brazing alloys shall not contain more than 0.05-percent phosphorus.	The code now allows Schedule 10 steel pipe to be used for fuel gas service.	Previous editions of the code required steel pipe to be schedule 40 or heavier, primarily because steel pipe has traditionally been threaded or welded. Schedule 40 steel pipe is the lightest schedule that can be threaded. The pipe wall thickness decreases as the Schedule number decreases. Schedule 10 steel pipe cannot be threaded because the wall thickness in too thin to accommodate the depth of thread cutting. For example, 1 inch nominal size Schedule 40 steel pipe has a wall thickness of 0.133 inches and 1 inch nominal size Schedule 10 steel pipe has a wall thickness of 0.109 inches, with both pipes having the same outside diameter. Because the outside diameters are the same and the wall thicknesses differ, the inside diameters must therefore differ. Schedule 10 steel was determined to be suitable for fuel gas conveyance because it has a pressure capacity and strength more than sufficient for fuel gas service. Schedule 10 steel piping might fail sooner because of corrosion attacking a thinner pipe wall, however, the code requires all piping to be protected from corrosion, regardless, so this should not be a concern. Schedule 10 steel pipe will have a slightly higher flow capacity because of its larger inside diameter. Schedule 10 steel pipe is commonly joined with mechanical fittings, as is the case with fire sprinkler piping. For fuel gas applications Schedule 10 pipe is allowed to be connected by press-connect fittings listed to ANSI LC4/CSA 6.3.2. Because welding, brazing and the use of flanges is labor intensive and more difficult with thin wall pipe, press-connect mechanical joints could be a practical alternative that may usher in the increased use of Schedule 10 steel pipe. Press-connect joints are permanent mechanical joints that cannot be disassembled and they are pressed by specialized power tools with dies.

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404.11 Protection against corrosion. ~~Metallic~~ Steel pipe or tubing exposed to corrosive action, such as soil conditions or moisture, shall be protected in ~~an approved manner~~ accordance Sections 404.11.1 through 404.11.5. ~~Piping shall not be laid in contact with cinders.~~ **404.11.1 Galvanizing.** Zinc coating ~~(galvanizing)~~ shall not be deemed adequate protection for underground gas piping ~~underground~~. ~~**404.11.2 Protective coatings and wrapping.** Pipe protective coatings and wrappings shall be approved for the application and shall be factory applied. Exception: Where installed in accordance with the manufacturer's instructions, field application of coatings and wrappings shall be permitted for pipe nipples, fittings and locations where the factory coating or wrapping has been damaged or necessarily removed at joints.~~ **404.11.2 Protection methods.** Underground piping shall comply with one or more of the following: 1. The piping shall be made of corrosion-resistant material that is suitable for the environment in which it will be installed. 2. Pipe shall have a factory-applied, electrically-insulating coating. Fittings and joints between sections of coated pipe shall be coated in accordance with the coating manufacturer's instructions. 3. The piping shall have a cathodic protection system installed and the system shall be monitored and maintained in accordance with an approved program.	This section was rewritten for clarity and to include three distinct prescriptive methods for protection from corrosion for steel pipe.	Besides putting the requirements in an improved format, this section now lists the three methods for protecting underground steel piping. The first method might appear to be speaking of polyethylene (PE) piping which is obviously made of a corrosion-resistant material, but Section 404.11 is specific to steel piping. The second method listed is piping having a factory-applied coating for protection against corrosion. This coating is typically a plastic or an epoxy coating. Field-application of a coating or wrapping is not allowed because it is extremely difficult to accomplish without flaws. Flaws in the protective coating can accelerate corrosion at those points. Joints and fittings will, of course, require the field-application of coating materials. Galvanized (zinc coated) steel is not allowed for underground installation. The third method of protection is cathodic protection which will require maintenance and monitoring for the life of the system. Cathodic protection works by pushing the piping to become negatively polarized such that the driving force behind corrosion of the steel is all but eliminated. The steel piping is the cathode, the sacrificial galvanic anode (a more active metal such as magnesium) is the anode and the soil is the electrolyte forming an electrochemical cell, like that in a battery. The flow of electrons to the steel protects the steel and causes the anode to be consumed. Impressed current systems involving electrical power supplies are used for large piping systems such utility transmission pipelines. Most piping systems are protected by the second and third methods in combination. Steel risers are used for transitions from underground to aboveground piping where PE piping is used because plastic pipe is not allowed above ground. Such steel risers must be cathodically protected or must of the specially coated "anodeless" type.

404.11.3 Dissimilar metals. Where dissimilar metals are joined underground, an insulating coupling or fitting shall be used. **404.11.4 Protection of risers.** Steel risers connected to plastic piping shall be cathodically protected by means of a welded anode, except where such risers are anodeless risers. ~~**404.11.1**~~ **404.11.5 Prohibited use.** Uncoated threaded or socket-welded joints shall not be used in piping in contact with soil or where internal or external crevice corrosion is known to occur.		

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404.14 Piping underground beneath buildings. Piping installed underground beneath buildings is prohibited except where the piping is encased in a conduit of wrought iron, plastic pipe, steel pipe, a piping or encasement system listed for installation beneath buildings, or other approved conduit material designed to withstand the superimposed loads. The conduit shall be protected from corrosion in accordance with Section 404.11 and shall be installed in accordance with Section 404.14.1 or 404.14.2.	A listed encasement system instead of a conduit encasement is recognized where plastic piping is installed underground beneath buildings.	Piping is prohibited underground beneath buildings, however the code permits it underground beneath a building if it is encased in conduit made of iron, steel or plastic. Note that plastic pipe is never allowed under a building or in a building. An additional method of encasement is now recognized, that being an encasement system that is listed for the purpose. Figure 404.14 shows a type of CSST with a listed integral encasement system. The CSST is encased in its own integral conduit such that the tubing and its encasement are installed simultaneously as an assembly. This product is not new, but the code now specifically refers to it and would allow similar products with listed integral encasement systems.
409.7 Shutoff valves in tubing systems. Shutoff valves installed in tubing systems shall be rigidly and securely supported independently of the tubing.	New text addresses shutoff valve support for tubing systems.	Shutoff valves at appliances such as furnaces, water heaters and boilers are typically supported by rigid steel piping, where CSST or other tubing connects to the shutoff valve inlet, and the valve is supported on its outlet side by rigid piping. However, if a shutoff valve, such as a concealed T-handle keyed valve for a fireplace, is installed in a run of CSST or other tubing material, the torque applied to the valve rotating member will transfer to the tubing causing stress and possible tubing failure. This new code requirement is consistent with the manufacturer's installation instructions for CSST. The method of support could be a bracket made for the purpose or it could be accomplished with securely anchored rigid steel pipe nipples on the inlet and outlet sides of the valve. The intent is to prevent movement and stressing of the tubing.

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503.4.1 Plastic piping. Where plastic piping is used to vent an appliance, the appliance shall be listed for use with such venting materials and the appliance manufacturer's installation instructions shall identify the specific plastic piping material. The plastic venting materials shall be labeled in accordance with the product standards specified by the appliance manufacturer or shall be listed in accordance with UL 1738. **503.4.1.1 Plastic vent joints.** Plastic pipe and fittings used to vent appliances shall be installed in accordance with the appliance manufacturer's instructions. Plastic pipe venting materials listed and labeled in accordance with UL 1738 shall be installed in accordance with the vent manufacturer's instructions. Where a primer is required, it shall be of a contrasting color. **503.4.2 Special gas vent.** Special gas vent shall be listed and labeled in accordance with UL 1738 and installed in accordance with the special gas vent manufacturer's instructions.	The standards to which plastic pipe venting materials must listed are addressed.	This section addresses plastic pipe used to vent appliances such as high efficiency Category IV furnaces. Commonly the pipe used is plumbing piping that was specified by the appliance manufacturer. The code requires the appliance manufacturer to specify the plastic pipe material to be used to vent the appliance and requires the appliance to be listed for use with such material. The appliance manufacturer dictates what plastic material can and cannot be used and the appliance is tested with that venting material as part of its listing process. The code now goes on to say that the plastic vent pipe material must be labeled as complying with the standards for the specific pipe material as called out by the manufacturer. As an alternative, the plastic pipe can always be listed to UL1738 which is the standard for vents for Category II, III and IV appliances. If the appliance manufacturer specifies pipe that meets ASTM xxxx, then the pipe installed must be listed to that standard, or, UL 1738. Plastic venting materials that are listed to UL 1738 must be installed in accordance with the vent manufacturer's instructions. Special vents are vents designed for and listed for use with Category II, III and IV appliances and the standard to which they must be listed is now specified as UL 1738.

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503.8 Venting system termination location. The location of venting system terminations shall comply with the following (see Appendix C): 1. No change to text 2. A mechanical draft venting system, excluding direct-vent appliances, shall terminate not less than 4 feet (1219 mm) below, 4 feet (1219 mm) horizontally from, or 1 foot (305 mm) above any door, operable window or gravity air inlet into any building. The bottom of the vent terminal shall be located not less than 12 inches (305 mm) above finished ground level. 3. <u>The clearance for though-the-wall direct-vent terminals shall be in accordance with Table 503.8.</u> ~~The vent terminal of a direct-vent appliance with an input of 10,000 Btu per hour (3 kW) or less shall be located not less than 6 inches (152 mm) from any air opening into a building. Such an appliance with an input over 10,000 Btu per hour (3 kW) but not over 50,000 Btu per hour (14.7 kW) shall be installed with a 9-inch (230 mm) vent termination clearance, and an appliance with an input over 50,000 Btu per hour (14.7 kW) shall have not less than a 12-inch (305 mm) vent termination clearance.~~ The bottom of the vent terminal and the air intake shall be located not less than 12 inches (305 mm) above finished ground level. 4. and 5. No change to text	Section 503.8 Item 3 relative to direct-vent appliances was reformatted into table form and a new category was added for direct-vent appliances having higher Btu/hr inputs that are more consistent with non-residential appliances.	The clearances between direct-vent appliance vent terminals and openings in the building exterior that could allow combustion products to enter the building were established based on research that studied the dispersion patterns for combustion gases from such terminals. The appliance input ranges were consistent with the typical residential appliances. The code's coverage for such addressed only appliance input rates of over 50,000 Btu/hr and required a 12 inch clearance. This was reconsidered because the 12-inch clearance would be applied to appliances that had inputs ranging between 50,000 and several hundred thousand Btu/h or perhaps larger. It was determined that the clearance requirement should be increased for the large input appliances because of the greater potential for combustion gases to enter the building. The clearance requirements for appliance vent terminals having inputs greater than 150,000 Btu/hr is now tied to the appliance manufacturer's instructions and item # 2 of Section 503.8, and whichever is the more stringent applies.

Table 503.8 Through-The-Wall Direct-Vent Termination Clearances

(Underline not shown in table for clarity)

Direct-Vent Appliance Input Rating (Btu/hr)	Through-The-Wall Vent Terminal Clearance From Any Air Opening Into The Building (Inches)
< 10,000	6
> 10,000 ≤ 50,000	9
> 50,000 ≤ 150,000	12
> 150,000	In accordance with the appliance manufacturer's instructions and in no case less than the clearances specified in Section 503.8, Item 2

For SI: 1 inch = 25.4mm, 1 Btu/hr = 0.2931 W.