

V14 - CSA B149.1 - 2025 PUBLISHED CODE
NATURAL GAS AND PROPANE INSTALLATION CODE

CSA B149.1 – 2025 PUBLISHED CODE	CSA - B149.1 - 2020	RATIONALE
<p>Preface The major changes from the previous edition include the following:</p> <p>a) updated Code Scope inclusions to clarify the threshold for propane systems between CSA B149.1 and CSA B149.2 [Clause 1.1 b)];</p> <p>b) corrected terminology to “vehicle-fuelling appliance” to align with other CSA standards [Clause 1.1 c)];</p> <p>c) clarified exclusion of “vehicle-refuelling stations as defined by CSA B108.1” [Clause 1.2 g)];</p> <p>d) added hydrogen-natural gas blends to the list of gases included in this Code (Clause 1.3) and added reference to hydrogen-natural gas blends to applicable clauses (Clauses 4.5.4, 4.24.1, 5.5.1.4, 6.2.3.1, 6.2.3.2, 6.3.2 to 6.3.5, 6.3.8.1, and 6.9.6 and Tables 5.3 and 6.1);</p> <p>e) updated or added the following definitions: i) updated definition of “high pressure regulator” to “industrial regulator” (Clause 3); ii) updated definition of “line pressure regulator” (Clause 3); iii) added definition for “manual shut-off valve” (Clause 3); and iv) added definition for “vent limiter” and sub-definition “limiting orifice type” (Clause 3);</p> <p>f) added reference to CSA B149.3 for field-approved appliances and equipment installation (Clause 4.1.4);</p> <p>g) added reference to CSA B149.6 for biogas use (Clause 4.2.4);</p> <p>h) updated rating plate requirements to show maximum percentage of hydrogen for blends with natural gas (Clause 4.5.4);</p> <p>i) updated bonding requirements to align with the <i>Canadian Electrical Code, Part I</i> (Clauses 4.7.3, 4.7.4, and 4.7.5);</p> <p>j) hydrogen-natural gas blends as a fuel gas to be odourized or monitored by a detection system (Clause 4.24.1);</p>	<p><u>New</u></p>	<p>Provides the user of this Code an overview of editorial and technical changes.</p> <p>In addition, CSA has added subclause titles and captions to figures for accessibility readers.</p>



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<p>k) restructured Clause 5 as follows:</p> <ul style="list-style-type: none"> i) consolidated exemptions for outdoor gas vent terminations accounting for vent limiters, indoor ventilated spaces; ii) clarified overpressure protection devices used with certified line pressure regulators must be factory pre-assembled and shipped as a unit with the regulator; and iii) added the ability to use industrial regulators when flows/pressures are outside the scope of certified line pressure regulators, and must be interlocked with a high/low gas pressure device that serves the same appliance; <p>l) updated clearances for gas vent terminations (Table 5.3), now based on relief capacity and aligned with CSA Z662:23 (Annex D);</p> <p>m) prohibited the use of hoses certified to CSA 8.3 for liquid propane systems (Clause 6.2.12);</p> <p>n) updated requirements to permit the use of press-connect fittings certified to CSA/ANSI LC 4/CSA 6.32 for piping of NPS 2-1/2 to 4 (Clause 6.9.2);</p> <p>o) prohibited the use of tape as a sealant for pipe sizes larger than NPS 1-1/2 for hydrogen-natural gas blends (Clause 6.9.6);</p> <p>p) added minimum separation requirements between the gas system and the electrical system sharing a common trench (Clause 6.15.15);</p> <p>q) added sleeve requirements for piping or tubing that passes through an exterior wall (Clauses 6.16.9 and 6.16.10);</p> <p>r) added requirements for a manual shutoff valve and signage for underground propane storage tanks (Clause 6.18.10);</p> <p>s) clarified leakage test requirements and allowable leakage rates (Clauses 6.22.2, 6.22.3, and 6.22.4 and Annex K);</p> <p>t) added requirements for monitoring by a combustible gas indicator during purging (Clauses 6.23.4 and 6.23.7);</p>		

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<p>u) stationary engine generator assemblies must be certified to ANSI/CAN UL/ULC 2200 (Clause 7.2.4.1);</p> <p>v) aligned venting requirements for engine or turbine fuel trains with other appliances (Clause 7.2.4.4);</p> <p>w) flexible foil non-combustible ducts on commercial-type clothes dryers must be certified to UL 2158A (Clause 7.4.3);</p> <p>x) permitted approved engineering designs for the installation of direct-fired makeup air heaters where food preparation areas are interconnected to areas frequented by the public (Clauses 7.20.14 and 7.21.13);</p> <p>y) added the ability to install recirculating direct gas-fired industrial air heaters and amended requirements accordingly (Clause 7.21);</p> <p>z) added method for safe interlocking of an appliance to exhaust fans (Clause 7.21.9);</p> <p>aa) added requirements for overpressure protection for engine venting systems (Clause 8.32);</p> <p>ab) clarified RFA and VFA requirements (Clause 10);</p> <p>ac) updated customer's meter and service regulator installations based on the latest edition of CSA Z662 (Annex D);</p> <p>ad) removed informative Annex for pressure regulators and overpressure protection devices;</p> <p>ae) added informative Annex for allowable leakage of gas appliance valve train components (Annex K); and</p> <p>af) added informative Annex for special considerations for industrial occupancy (Annex O).</p>		

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<p><u>Sustainable Development Goals (SDG)</u> <u>Forward</u></p> <p><u>Through a robust mapping process, connections between CSA B149.1:25 and the following SDGs have been identified:</u></p>  <p><u>CSA B149.1:25 has notable linkages with the following SDGs:</u></p> <ul style="list-style-type: none"> • <u>SDG 7: Affordable and Clean Energy</u> • <u>SDG 11: Sustainable Cities and Communities</u> 	<p><u>New</u></p>	<p>CSA Group develops and maintains standards-based solutions across a broad range of topics, most of which support the United Nations Sustainable Development Goals (UN SDGs) towards shaping a sustainable and resilient future.</p> 
<p>Scope</p> <p><u>1.1 Inclusions</u> This Code applies to the installation of</p> <ol style="list-style-type: none"> appliances, equipment, components, and accessories where gas is to be used for fuel purposes; pipng and tubing systems extending <u>downstream</u> from the termination of the utility installation or from the distributor's propane tank<u>any equipment extending downstream from the outlet of any propane container pressure regulator (commonly referred to as "first-stage regulator")</u>; vehicle-refuelling appliances and associated equipment meeting the requirements of a general purpose an <u>appliance or the intended use of the appliance</u> to fill a natural-gas-fuelled vehicle; and stationary gas engines and turbines. 	<p><u>Revised</u></p> <p>This Code applies to the installation of</p> <ol style="list-style-type: none"> appliances, equipment, components, and accessories where gas is to be used for fuel purposes; pipng and tubing systems extending from the termination of the utility installation or from the distributor's propane tank; vehicle-refuelling appliances and associated equipment meeting the requirements of a general purpose appliance to fill a natural-gas-fuelled vehicle; and stationary gas engines and turbines. 	<ol style="list-style-type: none"> clarification, the intent of this Code includes any equipment connected the outlet of a pressure regulator installed on a propane tank or cylinder. removed "general purpose" the "intended use" of the fuelling appliances that are specifically addressed by the individual appliance standards (CSA/ANSI NGV 5.1 and CSA/ANSI NGV 5.2).

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<p>1.2 Exclusions</p> <p>a) marine or pipeline terminals;</p> <p>b) gas where used as a feedstock in petroleum refineries or chemical plants;</p> <p>c) utility pipeline distribution and transmission pipelines;</p> <p>d) storage and handling of liquefied natural gas or underground formations for natural gas;</p> <p>e) the installation of natural gas vehicle (NGV) fuel systems, containers, and refuelling stations;</p> <p>f) the storage and utilization of compressed natural gas on boats;</p> <p>g) the installation of vehicle-refuelling stations as defined by CSA B108.1 appliances when NGV storage containers are installed as part of the system;</p> <p>h) refrigerated storage or underground formations for propane;</p> <p>i) propane used on boats;</p> <p>j) propane used as a propellant in aerosol containers;</p> <p>k) butane fuel cylinders of 6.2 oz (175 g) capacity or less;</p> <p>l) the installation of containers and equipment to be used for propane in distribution locations and filling plants and on tank trucks, tank trailers, and cargo liners; and</p> <p>m) propane used as refrigerant.</p>	<p>Revised</p> <p>a) marine or pipeline terminals;</p> <p>b) gas where used as a feedstock in petroleum refineries or chemical plants;</p> <p>c) utility pipeline distribution and transmission pipelines;</p> <p>d) storage and handling of liquefied natural gas or underground formations for natural gas;</p> <p>e) the installation of NGV fuel systems, containers, and refuelling stations;</p> <p>f) the storage and utilization of compressed natural gas on boats;</p> <p>g) the installation of vehicle-refuelling appliances when NGV storage containers are installed as part of the system;</p> <p>h) refrigerated storage or underground formations for propane;</p> <p>i) propane used on boats;</p> <p>j) propane used as a propellant in aerosol containers;</p> <p>k) butane fuel cylinders of 6.2 oz (175 g) capacity or less;</p> <p>l) the installation of containers and equipment to be used for propane in distribution locations and filling plants and on tank trucks, tank trailers, and cargo liners; and</p> <p>m) propane used as refrigerant.</p>	<p>e) Editorial, added natural gas vehicle</p> <p>g) CSA B108.1 Compressed natural gas refuelling stations installation code includes NGV storage containers when installed as part of a system.</p>
<p>1.3 Fuel</p> <p>Where the term “gas” is used, the requirements of this Code include, and apply equally to, any of the following gases or mixtures of them: natural gas, manufactured gas, hydrogen-natural gas blends or mixtures of propane gas and air, propane, propylene, butanes (normal butane or isobutane), and butylenes.</p>	<p>Revised</p> <p>Where the term “gas” is used, the requirements of this Code include, and apply equally to, any of the following gases or mixtures of them: natural gas, manufactured gas, or mixtures of propane gas and air, propane, propylene, butanes (normal butane or isobutane), and butylenes.</p>	<p>Harmonize with CSA B149.3 Code for the field approval of fuel-burning appliances and equipment.</p>
<p>Reference publications</p>	<p>Reference publications</p>	
<p>CSA 3.11:15 (R2020) Lever operated pressure lubricated plug type gas shut-off valves</p>	<p>New</p>	<p>Referenced in Clause 6.18.1 of this Code</p>
<p>CSA 3.16:21 Lever operated pressure lubricated plug type gas shut-off valves</p>	<p>New</p>	<p>Referenced in Clause 6.18.1 of this Code</p>

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CSA 12.6-04 (R2014) Vehicle Refuelling Appliances	New	Referenced in Clause 10.1.1 of this Code
CSA/ANSI Z21.15:21/CSA 9.1:21 Manually operated gas valves for appliances, appliance connector valves and hose-end valves	New	Referenced in Clause 6.18.1 of this Code
CSA/ANSI B149.6:25 Code for biogas generation and utilization	New	Referenced in Clause 4.2.4 of this Code
ANSI Z21.78-2010 (R2020)/CSA 6.20-2010 (R2020) Combination Gas Controls For Gas Appliances	New	Referenced in Clause 5.3.2 and Annex K of this Code
2158A-2013 Clothes Dryer Transition Duct	New	Referenced in Clause 7.4.3 of this Code
ANSI/CAN UL/ULC 2200:2022 Stationary Engine Generator Assemblies	New	Referenced in Clause 7.2.4.1 of this Code
A312/A312M-22a Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	New	Referenced in Clause 8.32.2 of this Code.
NFPA (National Fire Protection Association) 211-2024 Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances	New	Referenced in Clause 8.32.2 of this Code
CSA 12.6-04 (R2014) Vehicle Refuelling Appliances	New	Referenced in Clause 10.1.1 of this Code

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ANSI/CAN/UL 536:2021 Flexible Metallic Hose	New	Referenced in Clauses 6.2.10, 6.20.5, 6.20.6, of this Code
3 Definitions	3 Definitions	
<p>Industrial High pressure regulator— a line pressure regulator installed downstream of the service regulator and upstream of utilization equipment or another pressure regulator and that is either not certified or certified but used in an application different than the scope of its certification except with inlet gas pressures greater than 10 psig (70 kPa) and outlet pressures greater than 2 psig (14 kPa).</p> <p><u><i>Note: An example of an industrial pressure regulator is one that is not certified to UL 144, CSA 6.3 or CSA 6.22. Another example is a pressure regulator that is certified to UL 144, CSA 6.3 or CSA 6.22, but it is installed in an application that is outside of the scope of its certification.</i></u></p>	<p>Revised High pressure regulator — a line pressure regulator except with inlet gas pressures greater than 10 psig (70 kPa) and outlet pressures greater than 2 psig (14 kPa).</p>	<p>The previous defined term High pressure regulator was changed to an Industrial regulator.</p> <p>Clarification of intent, to reinforce the distinction between (certified) line pressure regulators and (uncertified) industrial pressure regulators.</p> <p>Note: was added to further explain the definition by providing an example.</p>
<p>Line pressure regulator — a pressure regulator intended for installation in a building gas distribution system between the building installed downstream of the service regulator or LP-gas 2 psi (13.8 kPa) second stage propane service regulator and upstream of gas utilization equipment, and certified to ANSI Z21.80/CSA 6.22 or UL 144.</p> <p>For purposes of this Standard, a line pressure regulator is rated for an inlet gas pressure of 2, 5, or 10 psi (13.8, 34.5, or 68.9 kPa) and is designed as either Class I or Class II as follows:</p> <p>Class I — maximum outlet pressure of 1/2 psi (3.5 kPa). Class II — maximum outlet pressure of 2 psi (13.8 kPa).</p>	<p>Revised Line pressure regulator — a pressure regulator intended for installation in a building gas distribution system between the building service regulator or LP-gas 2 psi (13.8 kPa) service regulator and gas utilization equipment.</p> <p>For purposes of this Standard, a line pressure regulator is rated for an inlet gas pressure of 2, 5, or 10 psi (13.8, 34.5, or 68.9 kPa) and is designed as either Class I or Class II as follows:</p> <p>Class I — maximum outlet pressure of 1/2 psi (3.5 kPa). Class II — maximum outlet pressure of 2 psi (13.8 kPa).</p>	<p>Clarification of intent, to reinforce the distinction between (certified) line pressure regulators and (uncertified) industrial pressure regulators.</p> <p>A line pressure regulator can be further described as a pressure regulator that has been evaluated by a certification agency, as conforming to the prescriptive/performance requirements of a Standard(s) such as ANSI Z21.80/CSA 6.22 or UL144.</p>

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Manual shut-off valve — a manually operated valve in a gas piping system or a valve train for shutting off the fuel for maintenance, testing and safety purposes.	New	Added for clarity, the term is used throughout this Code and is referenced as the demarcation point for the scope of CSA B149.3 Code for the field approval of fuel-burning appliances and equipment.
Vent limiter — a means that limits the flow of gas from a pressure regulator’s atmospheric diaphragm chamber to the atmosphere in the event of a diaphragm rupture. This may be either a limiting orifice or a limiting device. Limiting orifice type — a vent limiter where the flow through the limiter is the same in both directions	New	Vent limiter - Added for clarification, as defined in ANSI Z21.80/CSA 6.22 Line Pressure Regulators, and ANSI Z21.18/CSA 6.3 Gas Appliance Regulators Limiting orifice type – added to replace the term “leak limiting system” previously used in several Clauses in Section 5, which is not referenced in any product certification standard.
4 General	4 General	
4.1 Application	4.1 Application	
4.1.3 Installation instructions Except as required by Clause 4.1.4. An appliance, accessory, component, equipment, or any other item shall be installed in accordance with the manufacturer’s certified instructions and this Code.	Revised An appliance, accessory, component, equipment, or any other item shall be installed in accordance with the manufacturer’s certified instructions and this Code.	The exemption to Clause 4.1.3 supports field approved appliances, and the requirements under the new Clause 4.1.4 Field approved appliance installation.
4.1.4 Field-approved appliance installation A field-approved appliance or equipment shall be installed in accordance with the Clause 10.1 of CSA B149.3 and this Code.	New	Clause 10.1 of B149.3 Code for the field approval of fuel-burning appliances and equipment requires documentation as to the design specifications, installation, operation and maintenance instructions.

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<p>4.2.4 Biogas When using biogas, this Code shall be used in conjunction with CSA/ANSI B149.6</p>	New	CSA/ANSI B149.6 Code for biogas generation and utilization, addresses the installation requirements for digester gas, landfill gas, and biogas generation and utilization
4.5 Suitability of use	4.5 Suitability of use	
<p>4.5.1 Type of gas and pressure An appliance shall not be installed unless it is designed for use with the type of gas to which it is to be connected and is suitable for the pressure supplied.</p> <p><i>Note: When considering fuels that contain hydrogen-natural gas blends, caution should be taken to ensure that all appliances, accessories, components, equipment, and material are suitable for the fuel application and that the impacts from the introduction of hydrogen into the fuel, such as hydrogen embrittlement, are taken into consideration.</i></p>	<p>Revised An appliance shall not be installed unless it is designed for use with the type of gas to which it is to be connected and is suitable for the pressure supplied.</p>	The note was added to provide additional information related to hydrogen – natural gas blends.
<p>4.5.4 Rating plate conversion If an appliance is converted from one gas to another, the gas to which it is converted shall be marked on the appliance rating plate by the fitter making the conversion. For hydrogen-natural gas blends, the maximum percentage of hydrogen shall be marked.</p>	<p>Revised If an appliance is converted from one gas to another, the gas to which it is converted shall be marked on the appliance rating plate by the fitter making the conversion.</p>	Additional information now required when hydrogen-natural gas blends are utilized as a fuel.

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<p>4.7.3 Equipotential Bonding All building metal gas piping systems connected to one or more gas-fired appliances, shall be made electrically continuous and shall be equipotentially bonded as follows:</p> <ul style="list-style-type: none"> a) using a conductor not smaller than a No. 6 AWG copper or No. 4 AWG aluminum, with a connection that is accessible after installation. b) meeting the requirements of the local electrical code or, in the absence of such, the Canadian Electrical Code, Part I; or c) as permitted in Clause 4.7.4 <p>All interior metal gas piping connected to a gas-fired appliance with an electrical connection shall be made electrically continuous and shall be bonded to the electrical system by a #6 copper or a #4 aluminum bonding conductor with the connection made accessible after the installation and in accordance with the requirements of the local electrical code or, in the absence of such, the Canadian Electrical Code, Part I, except where any of the following conditions are met:</p> <ul style="list-style-type: none"> a) Gas piping and tubing shall be considered to be bonded to the electrical system when it is connected to an appliance connected to a bonding conductor of the circuit supplying the appliances. b) Bonding of piping other than CSST (requiring bonding per Clause 4.7.4) is not required where a gas appliance is not connected to an electrical circuit breaker supplying the appliances. 	<p>Deleted/Revised</p> <p>All interior metal gas piping connected to a gas-fired appliance with an electrical connection shall be made electrically continuous and shall be bonded to the electrical system by a #6 copper or a #4 aluminum bonding conductor with the connection made accessible after the installation and in accordance with the requirements of the local electrical code or, in the absence of such, the <i>Canadian Electrical Code, Part I</i>, except where any of the following conditions are met:</p> <ul style="list-style-type: none"> a) Gas piping and tubing shall be considered to be bonded to the electrical system when it is connected to an appliance connected to a bonding conductor of the circuit supplying the appliances. b) Bonding of piping other than CSST (requiring bonding per Clause 4.7.4) is not required where a gas appliance is not connected to an electrical circuit breaker supplying the appliances. 	<p>The Canadian Electrical Code, C22 Part 1 has similar requirements to the revisions made in Clauses 4.7.3. and 4.7.4.</p>

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<p>4.7.4 Appliance Bonding Gas piping systems shall be considered to be bonded to the electrical system when the metal gas piping system or CSST certified with an arc-resistant jacket or coating system in compliance with CSA/ANSI LC 1/ CSA 6.26 used in a gas piping system is connected to one or more appliances permanently connected to the bonding conductor of the circuit supplying the appliance.</p> <p>Unless otherwise certified to protect from the effects of lightning strikes, CSST systems or CSST contained within a piping system shall be bonded in accordance with the manufacturer's installation instructions and:</p> <p>a) a bonding conductor shall be</p> <p>i) connected to each end of the CSST tubing; or</p> <p>ii) connected to the inlet end of the CSST tubing with the other end of the bonding conductor connected to the appliance disconnect switch or the electrical distribution panel; and</p> <p>b) the bonding connection point at the CSST shall be to the rigid pipe or tubing connected to the CSST and not to the CSST itself.</p>	<p>Deleted/Revised Unless otherwise certified to protect from the effects of lightning strikes, CSST systems or CSST contained within a piping system shall be bonded in accordance with the manufacturer's installation instructions and:</p> <p>a) a bonding conductor shall be</p> <p>i) connected to each end of the CSST tubing; or</p> <p>ii) connected to the inlet end of the CSST tubing with the other end of the bonding conductor connected to the appliance disconnect switch or the electrical distribution panel; and</p> <p>b) the bonding connection point at the CSST shall be to the rigid pipe or tubing connected to the CSST and not to the CSST itself.</p>	<p>The Canadian Electrical Code, C22 Part 1 has similar requirements to the revisions made in Clauses 4.7.3. and 4.7.4.</p>
<p>4.7.5 CSST Bonding In addition to the requirements of Clause 4.7.3, CSST that does not have an arc-resistant jacket or coating system in compliance with CSA/ANSI LC 1/CSA 6.26 used in a gas piping system shall be bonded according to the CSST manufacturer's installation instructions.</p>	<p>New</p>	<p>The prescribed method of bonding an accepted practice in the electrical community as well as written in the CSST manufacturer's installation instructions.</p>
<p>4.24 Odourization</p>	<p>4.24 Odourization</p>	
<p>4.24.1 Natural gas odourization Natural gas or hydrogen-natural gas blends used for fuel purposes supplying an occupied building shall be odorized in accordance with CSA Z662 or be otherwise readily detectable, or the building shall be equipped with an approved means of gas detection.</p>	<p>Revised Natural gas used for fuel purposes supplying an occupied building shall be odorized in accordance with CSA Z662 or be otherwise readily detectable, or the building shall be equipped with an approved means of gas detection.</p>	<p>Odourization requirements are inclusive to all percentages of hydrogen-natural gas blends.</p>

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5 Pressure controls	5 Pressure controls	
5.1 Delivery pressure	5.1 Delivery pressure	
5.1.7 <u>Line pressure regulator location</u> For applications using propane, a second stage propane line pressure regulator installed within a one- or two-family dwelling or row housing shall not be located more than 3 ft (1 m) from the point where the propane supply enters the dwelling.	Revised For applications using propane, a line pressure regulator installed within a one- or two-family dwelling or row housing shall not be located more than 3 ft (1 m) from the point where the propane supply enters the dwelling.	Clarification, the application is for propane installations.
Pressure regulators	Pressure regulators	
5.2.1 General	5.2.1 General	
5.2.1.2 <u>Pressure regulators and overprotection devices</u> <u>To meet Clause 5.2.1.1, when the delivery pressure is greater than the maximum rated pressure of the downstream valve train, appliances, or equipment, one or more or a combination of the following shall be installed:</u> <u>a) a line pressure regulator, or</u> <u>b) an industrial pressure regulator</u> One or more pressure regulators in conjunction with any required overpressure protection devices shall be installed if required to meet Clause 5.2.1.1.	Revised/Relocated 5.2.1.2 One or more pressure regulators in conjunction with any required overpressure protection devices shall be installed if required to meet Clause 5.2.1.1. 5.2.2.2 A line pressure regulator shall be provided when the delivery pressure is greater than the maximum rated pressure of the appliance or equipment and shall be a) installed upstream of the appliance or equipment; and b) certified to either i) ANSI Z21.80/CSA 6.22; or ii) UL 144. Note: ANSI Z21.80/CSA 6.22 applies to both natural gas and propane, while UL 144 applies only to propane.	Clarifies when an additional protection is required from pressures greater than the maximum rated pressure. Provides the installer with the option to use an uncertified regulator (industrial pressure regulator). Some of the requirements from Clause 5.2.2.2 have been moved into this Clause.

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<p>5.2.1.3 Pressure regulator features Every pressure regulator shall be</p> <ul style="list-style-type: none"> a) suitable for the gas; b) of sufficient size to provide the required flow of gas; c) factory set or field-adjusted to provide, under normal operating conditions, an outlet pressure required for the gas piping system at the extremes of inlet pressures to which the regulator can be exposed; and d) capable of supplying the gas pressure as required by Clause 5.2.1.1. e) installed in accordance with the manufacturer's instruction and ratings; and f) be constructed so that the outlet pressure does not exceed 150% of the normal outlet operating pressure under no flow conditions when the downstream appliance or equipment is shut down. 	<p>Revised/Relocated Every pressure regulator shall be</p> <ul style="list-style-type: none"> a) suitable for the gas; b) of sufficient size to provide the required flow of gas; c) factory set or field-adjusted to provide, under normal operating conditions, an outlet pressure required for the gas piping system at the extremes of inlet pressures to which the regulator can be exposed; and d) capable of supplying the gas pressure as required by Clause 5.2.1.1. 	<p>Moved wording from existing Clause 5.2.3.4 into this Clause as general requirements items e) and f).</p>
<p>5.2.1.5 Bypassing pressure regulators A pressure regulator shall not be bypassed, and a safety limit or a safety relief device shall not be isolated, bypassed, or in any way made ineffective by a valve or other device.</p>	<p>Revised/Relocated A pressure regulator shall not be bypassed.</p>	<p>Additional wording from existing Clause 5.6.3 as general requirements.</p>
<p>5.2.1.7 Manual shut-off valves and overpressure protection devices A pressure regulator shall have</p> <ul style="list-style-type: none"> a) a manual shut-off valve installed upstream of the pressure regulator; and b) an overpressure protection device in accordance with Clause 5.3. <p>Note: Refer to Annex K regarding certified line pressure regulators and overpressure protection devices.</p>	<p>Revised A pressure regulator shall have</p> <ul style="list-style-type: none"> a) a manual shut-off valve installed upstream of the pressure regulator; and b) an overpressure protection device in accordance with Clause 5.3. <p>Note: Refer to Annex K regarding certified line pressure regulators and overpressure protection devices.</p>	<p>All previous Clauses with a Note or reference to Annex K were deleted as this Annex is no longer is aligned with the current changes to Clause 5.</p> <p>Annex K has been changed to read,</p> <p>Annex K (informative) Allowable leakage of gas appliance valve train components</p>
<p>5.2.1.8 Except as permitted by Clause 5.5.4, a pressure regulator vent and any line relief valve vent shall terminate outdoors.</p> <p>Note: The word "vent" means either a vent for an internal relief valve or the breather vent on the regulator casing.</p>	<p>Relocated/Deleted Except as permitted by Clause 5.5.4, a pressure regulator vent and any line relief valve vent shall terminate outdoors.</p> <p>Note: The word "vent" means either a vent for an internal relief valve or the breather vent on the regulator casing.</p>	<p>The requirement to terminate outdoors have been moved into Clause 5.6.</p>

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<p>5.2.1.9 Outdoor installations and unheated areas A pressure regulator installed outdoors or in an unheated area shall be positioned so that the bonnet vent opening discharges vertically downward, except that a) when installed within a container dome, the vent opening shall be positioned downward not less than 15° from the horizontal; and b) a single-stage pressure regulator of a capacity not exceeding 150 000 Btu/h (45 kW) may be installed in a horizontal position, provided that it is protected from inclement weather.</p>	<p>Relocated</p>	<p>The requirements in the current Clauses 5.2.2.4, 5.2.2.6 and 5.2.2.7 are repeated in Clauses 5.2.4.3, 5.2.4.4, and 5.2.4.5.</p> <p>They have been relocated here to become new Clauses 5.2.1.9, 5.2.1.10 and 5.2.1.11.</p>
<p>5.2.1.10 Pressure regulators installed on vehicles A pressure regulator shall be installed on a vehicle in such a manner that its safe operation will not be impeded by weather conditions, and it shall be protected by a substantial metal or plastic hood of the enclosed style.</p>	<p>Relocated</p>	<p>The requirements in the current Clauses 5.2.2.4, 5.2.2.6 and 5.2.2.7 are repeated in Clauses 5.2.4.3, 5.2.4.4, and 5.2.4.5.</p> <p>They have been relocated here to become new Clauses 5.2.1.9, 5.2.1.10 and 5.2.1.11.</p>
<p>5.2.1.11 Mounting cylinders on A-frames When provision is made for mounting a cylinder on the A-frame of a vehicle, a rigidly mounted support bracket for mounting the pressure regulator shall be provided. The pressure regulator shall be protected in accordance with Clause 5.2.1.10.</p>	<p>Relocated</p>	<p>The requirements in the current Clauses 5.2.2.4, 5.2.2.6 and 5.2.2.7 are repeated in Clauses 5.2.4.3, 5.2.4.4, and 5.2.4.5.</p> <p>Clauses have been relocated to become new Clauses 5.2.1.9, 5.2.1.10 and 5.2.1.11.</p>
<p>5.2.2 Additional requirements for line pressure regulators delivery pressures of 2 psig (14 kPa) or less</p>	<p>Revised 5.2.2 Additional requirements for delivery pressures of 2 psig (14 kPa) or less</p>	<p>Changes made in Clause 5.2.1.2 prompted a revisions of the context of Clause 5.2.2 to streamline requirements in subsequent subclauses and in other Clauses.</p>
<p>5.2.2.1 The requirements of Clause 5.2.2 shall apply to natural gas and propane installations where the delivery pressure is 2 psig (14 kPa) or less.</p>	<p>Deleted The requirements of Clause 5.2.2 shall apply to natural gas and propane installations where the delivery pressure is 2 psig (14 kPa) or less.</p>	<p>Clause 5.2.2.1 is no longer needed, as a result of the revised context and the revised title of Clause 5.2.2.</p>

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<p>5.2.2.12 Line pressure regulator A line pressure regulator <u>where installed</u> shall be provided when the delivery pressure is greater than the maximum rated pressure of the appliance or equipment and shall be a) installed upstream of the appliance or equipment; and b) certified to either i) CSA/ANSI Z21.80/CSA 6.22; or ii) UL 144. Note: CSA/ANSI Z21.80/CSA 6.22 applies to both natural gas and propane, while UL 144 applies only to propane.</p>	<p>Revised/Relocated A line pressure regulator shall be provided when the delivery pressure is greater than the maximum rated pressure of the appliance or equipment and shall be a) installed upstream of the appliance or equipment; and b) certified to either i) ANSI Z21.80/CSA 6.22; or ii) UL 144. Note: <i>ANSI Z21.80/CSA 6.22 applies to both natural gas and propane, while UL 144 applies only to propane.</i></p>	<p>The deleted requirements in this Clause have been added into Clause 5.2.1.2. CSA editorial changes to the referenced standard.</p>
<p>5.2.2.4 A pressure regulator installed outdoors or in an unheated area shall be positioned so that the bonnet vent opening discharges vertically downward, except that a) when installed within a container dome, the vent opening shall be positioned downward not less than 15° from the horizontal; and b) a single-stage pressure regulator of a capacity not exceeding 150 000 Btu/h (45 kW) may be installed in a horizontal position, provided that it is protected from inclement weather.</p>	<p>Deleted/Relocated A pressure regulator installed outdoors or in an unheated area shall be positioned so that the bonnet vent opening discharges vertically downward, except that a) when installed within a container dome, the vent opening shall be positioned downward not less than 15° from the horizontal; and b) a single-stage pressure regulator of a capacity not exceeding 150 000 Btu/h (45 kW) may be installed in a horizontal position, provided that it is protected from inclement weather.</p>	<p>This requirement was repeated in Clause 5.2.4.3. This Clause has been relocated to become new Clause 5.2.1.9.</p>
<p>5.2.2.5 When used on a system operating at 2 psig (14 kPa) or less, a line pressure regulator equipped with a leak limiting system orificed for 1 ft³/h (0.0283 m³/h) of a gas having a specific gravity of 1.53 shall be exempt from the requirement of Clause 5.2.1.7 b). A pressure regulator with vent limiting means shall be installed in a ventilated space only.</p>	<p>Deleted/Relocated When used on a system operating at 2 psig (14 kPa) or less, a line pressure regulator equipped with a leak limiting system orificed for 1 ft³/h (0.0283 m³/h) of a gas having a specific gravity of 1.53 shall be exempt from the requirement of Clause 5.2.1.7 b). A pressure regulator with vent limiting means shall be installed in a ventilated space only.</p>	<p>The content in this Clause is now covered in the new Clauses 5.5.4.1 and 5.5.4.2.</p>
<p>5.2.2.6 A pressure regulator shall be installed on the vehicle in such a manner that its safe operation will not be impeded by weather conditions, and it shall be protected by a substantial metal or plastic hood of the enclosed style.</p>	<p>Deleted/Relocated A pressure regulator shall be installed on the vehicle in such a manner that its safe operation will not be impeded by weather conditions, and it shall be protected by a substantial metal or plastic hood of the enclosed style.</p>	<p>The requirements in this Clause was also repeated in Clause 5.2.4.4. This Clause has been relocated to become new Clause 5.2.1.10.</p>

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<p>5.2.2.7 When provision is made for mounting a cylinder on the A-frame of a vehicle, a rigidly mounted support bracket for mounting the pressure regulator shall be provided. The pressure regulator shall be protected in accordance with Clause 5.2.2.6.</p>	<p>Deleted/Relocated When provision is made for mounting a cylinder on the A-frame of a vehicle, a rigidly mounted support bracket for mounting the pressure regulator shall be provided. The pressure regulator shall be protected in accordance with Clause 5.2.2.6.</p>	<p>The requirements in this Clause was also repeated in Clause 5.2.4.5. This Clause has been relocated to become new Clause 5.2.1.11.</p>
<p>5.2.3 Additional requirements for industrial pressure regulators delivery pressures greater than 2 psig (14 kPa)</p>	<p>Revised 5.2.3 Additional requirements for delivery pressures greater than 2 psig (14 kPa)</p>	<p>Clause title changed to included an industrial pressure regulator.</p>
<p>5.2.3.1 Industrial pressure regulator An industrial pressure regulator, where installed, shall directly serve any of the following in the downstream gas piping system:</p> <ul style="list-style-type: none"> a) a line pressure regulator that complies with 5.2.2 and mounted upstream of the appliance, equipment, or valve train; b) another industrial pressure regulator; or c) a high and a low gas pressure device installed on the valve train of the appliance or in the downstream piping system upstream of the valve train of the appliance. 	<p>New/Deleted The requirements of Clause 5.2.3 shall apply to natural gas and propane installations where the delivery pressure is greater than 2 psig (14 kPa).</p>	<p>Specifies additional requirements when installing an industrial pressure regulator.</p>
<p>5.2.3.2 High and low gas pressure devices Where high and low gas pressure devices are required in 5.2.3.1, they shall be interlocked into the downstream appliance(s) to cause safety shut down when either device detects a fault condition.</p>	<p>New/Deleted One or more pressure regulators shall be installed in the gas piping system when the delivery pressure exceeds the maximum rated pressure of the downstream valve train, appliance, or equipment.</p> <p>When a gas piping system needs its pressure regulator set to an operating pressure greater than 2 psi, a high pressure regulator shall be used.</p>	<p>Specifies an additional requirement when a high and low gas pressure devices is installed in conjunction with an industrial pressure regulator specified in Clause 5.2.3.1 c).</p>
<p>5.2.3.3 Where the maximum rated pressure of the valve train, appliance or equipment is 2 psig (14 kPa) or less, the final pressure regulator shall be a line pressure regulator certified to ANSI Z21.80/CSA 6.22 or UL 144 as applicable to the type of gas.</p>	<p>Relocated/Deleted Where the maximum rated pressure of the valve train, appliance or equipment is 2 psig (14 kPa) or less, the final pressure regulator shall be a line pressure regulator certified to ANSI Z21.80/CSA 6.22 or UL 144 as applicable to the type of gas.</p>	<p>Pressure regulator requirements are in Clause 5.2.1.2, allowing this Clause to be deleted.</p>

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<p>5.2.3.4 Where a high pressure regulator operates with outlet pressures greater than 2 psig (14kPa), it shall be</p> <ul style="list-style-type: none"> a) of suitable construction for the gas being conveyed; b) of suitable capacity to provide the gas flows and pressures required by the downstream piping system, valve train(s), appliance(s), or equipment; c) installed in accordance with the manufacturer's instructions and ratings; and d) be constructed so that the outlet pressure does not exceed 150% of the normal outlet operating pressure under no flow conditions when the downstream appliance or equipment is shut down. 	<p>Relocated/Deleted Where a high pressure regulator operates with outlet pressures greater than 2 psig (14kPa), it shall be</p> <ul style="list-style-type: none"> a) of suitable construction for the gas being conveyed; b) of suitable capacity to provide the gas flows and pressures required by the downstream piping system, valve train(s), appliance(s), or equipment; c) installed in accordance with the manufacturer's instructions and ratings; and d) be constructed so that the outlet pressure does not exceed 150% of the normal outlet operating pressure under no flow conditions when the downstream appliance or equipment is shut down. 	<p>The content in Items a) and b) are already covered in Clause 5.2.1.3.</p> <p>Items c) and d) are moved into Clause 5.2.1.3 as items e) and f), allowing this Clause to be deleted.</p>
<p>5.2.4 Additional requirements for pressure regulators for natural gas applications</p>	<p>Deleted 5.2.4 Additional requirements for pressure regulators for natural gas applications</p>	<p>Deleted title as it is no longer required as the supporting Clauses have either been relocated or deleted.</p>
<p>5.2.4.1 When used on a system operating at an inlet pressure of 2 psig (14 kPa) or less, a line pressure regulator equipped with a leak limiting system orificed for 2.5 ft³/h (0.0706 m³/h) of a gas having a specific gravity of 0.6 shall be exempt from the requirement of Clause 5.2.1.7 b). A line pressure regulator with vent limiting means shall be installed in a ventilated space only.</p>	<p>Deleted When used on a system operating at an inlet pressure of 2 psig (14 kPa) or less, a line pressure regulator equipped with a leak limiting system orificed for 2.5 ft³/h (0.0706 m³/h) of a gas having a specific gravity of 0.6 shall be exempt from the requirement of Clause 5.2.1.7 b). A line pressure regulator with vent limiting means shall be installed in a ventilated space only.</p>	<p>The content in this Clause is now covered in Clauses 5.5.4.1 and 5.5.4.2, allowing this Clause to be deleted.</p>
<p>5.2.4.2 For systems with inlet pressures above 2 psig (14 kPa), a pressure regulator shall be exempt from compliance with Clause 5.2.1.7 b) of this Code, provided that it is equipped to limit the escape of gas from the vent openings, even in the event of a main diaphragm failure, to less than 2.5 ft³/h (0.0706 m³/h), that it has an overpressure protection device set to a pressure either below 2 psig (14 kPa) or 2 times the delivery pressure on the system, and that it is certified to ANSI Z21.80/CSA 6.22.</p>	<p>Deleted For systems with inlet pressures above 2 psig (14 kPa), a pressure regulator shall be exempt from compliance with Clause 5.2.1.7 b) of this Code, provided that it is equipped to limit the escape of gas from the vent openings, even in the event of a main diaphragm failure, to less than 2.5 ft³/h (0.0706 m³/h), that it has an overpressure protection device set to a pressure either below 2 psig (14 kPa) or 2 times the delivery pressure on the system, and that it is certified to ANSI Z21.80/CSA 6.22.</p>	<p>Exemptions are now covered in Clauses 5.5.1.2, 5.5.4.1 and 5.5.4.2, allowing this Clause to be deleted.</p>

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<p>5.2.4.3 A pressure regulator installed outdoors or in an unheated area shall be positioned so that the bonnet vent opening discharges vertically downward, except that a) when installed within a container dome, the vent opening shall be positioned downward not less than 15° from the horizontal; and b) a single-stage pressure regulator of a capacity not exceeding 150 000 Btu/h (45 kW) may be installed in a horizontal position, provided that it is protected from inclement weather.</p>	<p><u>Relocated/Deleted</u> A pressure regulator installed outdoors or in an unheated area shall be positioned so that the bonnet vent opening discharges vertically downward, except that a) when installed within a container dome, the vent opening shall be positioned downward not less than 15° from the horizontal; and b) a single-stage pressure regulator of a capacity not exceeding 150 000 Btu/h (45 kW) may be installed in a horizontal position, provided that it is protected from inclement weather.</p>	<p>The requirements in this Clause were also repeated in Clause 5.2.2.4. Relocated this Clause to 5.2.1.9, allowing this Clause to be deleted.</p>
<p>5.2.4.4 A pressure regulator shall be installed on the vehicle in such a manner that its safe operation will not be impeded by weather conditions, and it shall be protected by a substantial metal or plastic hood of the enclosed style.</p>	<p><u>Relocated/Deleted</u> A pressure regulator shall be installed on the vehicle in such a manner that its safe operation will not be impeded by weather conditions, and it shall be protected by a substantial metal or plastic hood of the enclosed style.</p>	<p>The requirements in this Clause were also repeated verbatim in Clause 5.2.2.6. Relocated this Clause to 5.2.1.10, allowing this Clause to be deleted.</p>
<p>5.2.4.5 When provision is made for mounting a cylinder on the A-frame of a vehicle, a rigidly mounted support bracket for mounting the pressure regulator shall be provided. The pressure regulator shall be protected in accordance with Clause 5.2.4.4.</p>	<p><u>Relocated/Deleted</u> When provision is made for mounting a cylinder on the A-frame of a vehicle, a rigidly mounted support bracket for mounting the pressure regulator shall be provided. The pressure regulator shall be protected in accordance with Clause 5.2.4.4.</p>	<p>The requirements in this Clause were also repeated verbatim in Clauses 5.2.2.7. Relocated this Clause to 5.2.1.11, allowing this Clause to be deleted.</p>
<p>5.3 Overpressure protection devices</p>	<p>5.3 Overpressure protection devices</p>	

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<p>5.3.1 <u>Overpressure protection</u> Except as permitted in Clause 5.3.2, a line pressure regulator or an high-pressure industrial pressure regulator shall be provided with an overpressure protection device, <u>and based on its intended outlet pressure, set to not exceed the maximum allowable downstream pressures shown in Table 5.2.</u></p> <p>Note: Class I line pressure regulators certified to ANSI Z21.80/CSA 6.22, and rated for inlet pressures of either 5 psig (35 kPa) or 10 psig (70 kPa), are supplied with factory-installed overpressure protection devices to limit the downstream pressure to 2 psig (13.8 kPa) in the event of failure of the regulating mechanism, which is acceptable for certified appliances with a maximum inlet gas pressure of 14 in w.c. See Annex K.</p>	<p>Revised Except as permitted in Clause 5.3.2, a line pressure regulator or a high pressure regulator shall be provided with an overpressure protection device.</p> <p>Note: <i>Class I line pressure regulators certified to ANSI Z21.80/CSA 6.22, and rated for inlet pressures of either 5 psig (35 kPa) or 10 psig (70 kPa), are supplied with factory-installed overpressure protection devices to limit the downstream pressure to 2 psig (13.8 kPa) in the event of failure of the regulating mechanism, which is acceptable for certified appliances with a maximum inlet gas pressure of 14 in w.c. See Annex K.</i></p>	<p>Changed reference to pressure regulator definition and added reference to Table 5.2 from existing Clauses 5.3.3 and 5.3.4.</p> <p>This Note was deleted and revised into the new Note in Clause 5.3.3.</p>
<p>5.3.2 <u>Overpressure protection devices</u> Where <u>An overpressure protection device shall not be required for a Class I line pressure regulator is certified to CSA/ANSI Z21.80/CSA 6.22 and if the inlet pressure to the line pressure regulator is rated for an inlet pressure of 2 psig (14 kPa), or less, an overpressure protection device shall not be required</u> <u>provided every appliance it directly serves is equipped with either an appliance regulator certified to CSA/ANSI Z21.18/CSA 6.3, an automatic gas valve certified to CSA/ANSI 721.21/CSA 6.5, or a combination control valve certified to CSA/ANSI Z21.78/CSA 6.20.</u></p>	<p>Revised Where a line pressure regulator is certified to ANSI Z21.80/CSA 6.22 and if the inlet pressure to the line pressure regulator is 2 psig (14 kPa) or less, an overpressure protection device shall not be required.</p>	<p>Clarifies when an overpressure protection device is not required, based on the type of certified component/device on the appliance.</p>

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<p>5.3.3 Class I line pressure regulator A Class I line pressure regulator certified to CSA/ANSI Z21.80/CSA 6.22 with a rated inlet pressure of more than 2 psig (14 kPa) shall be installed only with the factory pre-assembled or supplied overpressure protection device with which the regulator is certified.</p> <p><i>Note: Class I line pressure regulators certified to CSA/ANSI Z21.80/CSA 6.22, (i.e., capable of being adjusted to deliver an outlet pressure of ½ psig (3.5 kPa) or less), and rated for inlet pressures of either 5 psig (35 kPa) or 10 psig (70 kPa), must be supplied with an independent means to limit the downstream pressure to 2 psig (14 kPa) in the event of failure of the regulating mechanism, which is acceptable for certified appliances with a maximum inlet gas pressure of 14 in w.c. Line pressure regulators with separate overpressure protection devices must be factory pre-assembled, and supplied to the field as a unit.</i></p>	<u>New</u>	<p>Harmonizes with the requirements in CSA/ANSI Z21.80/CSA 6.22-19, Line pressure regulators.</p> <p>The Note was added / revised from previous Clause 5.3.1.</p>
<p>5.3.4 Internal relief valve or line relief valve An overpressure protection device shall be set to operate at the pressures specified in Table 5.2. Additionally, if an internal relief valve or line relief valve is used as the overpressure protection device, it shall be sized to fully relieve the rated capacity of the line pressure regulator when in the wide-open position.</p>	<u>Revised/Relocated</u> An overpressure protection device shall be set to operate at the pressures specified in Table 5.2. Additionally, if an internal relief valve or line relief valve is used as the overpressure protection device, it shall be sized to fully relieve the rated capacity of the line pressure regulator.	<p>Relocated first sentence into Clause 5.3.1</p> <p>Additional wording to clarify the intended position of the regulator’s internal valve.</p> <p>The internal valve is the movable member that, in conjunction with the valve seat, controls flow.</p>

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Table 5.2 Overpressure protection device setpoint requirements (See Clauses 5.3.1 3 and 5.3.4 and Figure 8.2.)		Revised Table 5.2 Overpressure protection device setpoint requirements (See Clauses 5.3.3 and 5.3.4 and Figure 8.2.)		Added notation in second column to direct the user to the requirements in Clause 5.3.2. The previous Note: 1) is no longer required as the Table applies in all cases except as permitted in Clause 5.3.2.
Appliance or equipment maximum rated inlet gas pressure	Maximum allowable downstream pressure	Appliance or equipment maximum rated inlet gas pressure	Maximum allowable downstream pressure	
14 in w.c. (3.5 kPa) or less	2 psig (14 kPa) (see Clause 5.3.2 for limitation; use manufacturer's specification otherwise)	14 in w.c. (3.5 kPa) or less	2 psi (14 kPa)	
Greater than 14 in w.c. (3.5 kPa) up and including 2 psig (14 kPa)	5 psig (35 kPa)	Greater than 14 in w.c. (3.5 kPa) up and including 2 psi (14 kPa)	5 psi (35 kPa)	
Greater than 2 psi (14 kPa) up to and including 10 psig (70 kPa)	5 psig (35 kPa) or 2 times maximum rated inlet pressure, whichever is greater	Greater than 2 psi (14 kPa) up to and including 10 psi (70 kPa)	5 psi (35 kPa) or 2 times maximum rated inlet pressure, whichever is greater	
Greater than 10 psig (70 kPa)	10 psig (70 kPa) over maximum rated inlet pressure	Greater than 10 psi (70 kPa)	10 psi (70 kPa) over maximum rated inlet pressure	
Notes: 1) The requirements of this Table shall apply to Class 2 line pressure regulators certified to ANSI Z21.80/CSA 6.22 (i.e., those with a maximum outlet pressure of 2 psi). 2) The installer might need to consult with pressure regulator manufacturers to determine how best to remain within the maximum allowable downstream pressures.		Notes: 1) The requirements of this Table shall apply to Class 2 line pressure regulators certified to ANSI Z21.80/CSA 6.22 (i.e., those with a maximum outlet pressure of 2 psi). 2) The installer might need to consult with pressure regulator manufacturers to determine how best to remain within the maximum allowable downstream pressures.		

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5.5 Venting of pressure control devices	5.5 Venting of pressure control devices	
5.5.1 Construction of Venting of piping for pressure control devices other than overpressure relief devices	<u>REVISED</u> Venting of pressure control devices other than overpressure relief devices	Content focuses on the allowable materials, sizing, and configuration of the vent line construction.
<u>5.5.1.1 Inclusions</u> <u>The requirements in Clause 5.5.1 apply to bleed vents from pressure control devices including but not limited to,</u> a) <u>automatic valves;</u> b) <u>diaphragm valves; and</u> c) <u>combination controls.</u>	<u>New</u>	Provides examples of the types of pressure control devices required to conform to the requirements in Clause 5.5.1.
<u>5.5.1.2 Exceptions</u> <u>The requirements in Clause 5.5.1 do not apply to</u> a) <u>pressure regulators (including monitoring regulators) equipped with internal relief valves; and</u> b) <u>line overpressure relief valves.</u> <u>Note: For the venting requirement of overpressure protection devices, including line relief valves and internal relief valves on pressure regulators, refer to Clause 5.5.2.</u>	<u>New</u>	Provides examples of the types of devices that Clause 5.5.1 does not apply to. Note: provides additional information related to the venting requirements for overpressure protection devices.

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<p>5.5.1.34 Venting Except as specified <u>permitted</u> in Clauses 5.5.1.42, 5.5.1.53, and 5.7.2 for natural gas and Clauses 5.5.1.53, and 5.5.3.1, and 5.7.1.3 for propane, when an automatic valve, diaphragm valve, combination control, pressure regulator without internal relief, or other control device (excluding a gas overpressure relief valve) that requires venting is installed, it shall be vented separately to a safe location outdoors by a the bleed vent line <u>from a pressure control device shall be</u></p> <ul style="list-style-type: none"> a) <u>constructed</u> of steel pipe, copper, seamless aluminum, or steel tubing that complies with Clause 6.2; and b) of a size at least equal to the nominal pipe size of the vent outlet of the valve, combination control, pressure regulator, or control device, but <u>and</u> in no case shall the inside diameter be less than 0.25 in (6 mm). c) <u>connected to any other bleed vent only as permitted in Clause 5.5.1.5; and</u> d) <u>terminate in accordance with Clause 5.6</u> 	<p>REVISED Except as specified in Clauses 5.5.1.2, 5.5.1.3, and 5.7.2 for natural gas and Clauses 5.5.1.3, 5.5.3.1, and 5.7.1.3 for propane, when an automatic valve, diaphragm valve, combination control, pressure regulator without internal relief, or other control device (excluding a gas overpressure relief valve) that requires venting is installed, it shall be vented separately to a safe location outdoors by a bleed vent line</p> <ul style="list-style-type: none"> a) of steel pipe, copper, seamless aluminum, or steel tubing that complies with Clause 6.2; and b) of a size at least equal to the nominal pipe size of the vent outlet of the valve, combination control, pressure regulator, or control device, but in no case shall the inside diameter be less than 0.25 in (6 mm). 	<p>Removes the lists of eligible and ineligible devices as they are referenced in new Clause 5.5.1.1 and 5.5.1.2.</p> <p>Restructured wording, to bleed vent(s) from a pressure control device.</p> <p>The connection to other bleed vents may be permitted.</p> <p>Vent termination requirements moved to d).</p>
<p>5.5.1.42 Natural gas and hydrogen-natural gas blend applications For natural gas <u>and hydrogen-natural gas blend</u> applications, when a the bleed vent line from a diaphragm valve or combination control <u>that</u> is installed on an appliance that has an <u>rated</u> inlet supply pressure not in excess of 0.5 psig (3.5 kPa) and that uses a gas lighter than air, it may be vented into <u>terminate in</u> the appliance combustion chamber adjacent to the <u>a</u> continuous pilot, provided that the terminus of the bleed vent is in a burner tip having a melting point in excess of 1450°F (790 °C) and <u>that</u> is securely held in a fixed position relative to the pilot flame and that will not adversely affect the operation of the thermal element.</p>	<p>REVISED For natural gas applications, when a diaphragm valve or combination control is installed on an appliance that has an inlet supply pressure not in excess of 0.5 psig (3.5 kPa) and that uses a gas lighter than air, it may be vented into the appliance combustion chamber adjacent to the continuous pilot, provided that the terminus of the bleed vent is in a burner tip having a melting point in excess of 1450°F (790 °C) that is securely held in a fixed position relative to the pilot flame and that will not adversely affect the operation of the thermal element.</p>	<p>Introduces coverage for hydrogen-natural gas blend applications.</p> <p>Additional clarity by improving the sentence structure.</p>

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<p>5.5.1.53 Bleed vents When The bleed vents of any two or more pressure control devices of any type, or any combination thereof, pressure regulators, automatic valves, diaphragm valves, combination controls, or other control devices (excluding gas overpressure relief valves, or pressure regulators with an internal relief valve) that are provided with a bleed vent, the bleed vent may be connected into a single, common bleed vent, provided that</p> <ul style="list-style-type: none"> a) there is compliance with <ul style="list-style-type: none"> i) Clause 5.5.1.34 a) and b) for inlet pressure not in excess of 0.5 psig (3.5 kPa); or ii) Clause 5.5.2.54 a) and b) for inlet pressure in excess of 0.5 psig (3.5 kPa); and b) the single, common bleed vent line has an area of not less than twice the total area of the connected bleed vents upstream of the connection. 	<p>REVISED When two or more, or any combination of, pressure regulators, automatic valves, diaphragm valves, combination controls, or other control devices (excluding gas overpressure relief valves, or pressure regulators with an internal relief valve) that are provided with a bleed vent, the bleed vent may be connected into a single vent, provided that</p> <ul style="list-style-type: none"> a) there is compliance with <ul style="list-style-type: none"> i) Clause 5.5.1.1 a) and b) for inlet pressure not in excess of 0.5 psig (3.5 kPa); or ii) Clause 5.5.2.1 a) and b) for inlet pressure in excess of 0.5 psig (3.5 kPa); and b) the single vent line has an area of not less than twice the total area of the connected bleed vents. 	<p>Clarification the intent of this Clause is common bleed vent(s).</p> <p>Clause 5.5.1.1 Inclusions and 5.5.1.2 Exclusion provides examples of eligible and ineligible devices, allowing the list of devices in this Clause to be deleted.</p>
<p>5.5.2 Construction of Vventing lines for of overpressure relief devices</p>	<p>REVISED 5.5.2 Venting of overpressure relief devices</p>	<p>Content focuses on allowable materials, sizing, and configuration of vent line construction.</p>
<p>5.5.2.1 Inclusions The requirements in Clause 5.5.2 apply to vent lines originating from</p> <ul style="list-style-type: none"> a) pressure regulators (including monitoring regulators) equipped with internal relief valves, and b) line overpressure relief valves 	<p>New</p>	<p>Provides examples of the type of devices required to conform to the vent line requirements in Clause 5.5.2.</p>

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<p>5.5.2.2 Exceptions The requirements in Clause 5.5.2 do not apply to bleed vents from pressure control devices, including but not limited to: a) automatic valves b) diaphragm valves c) combination controls,</p> <p>Note: For the venting requirement of pressure control devices, refer to Clause 5.5.1.</p>	<u>New</u>	<p>Provides examples of devices that Clause 5.5.2 does not apply to.</p> <p>The Note: provides additional information related to the venting requirements for pressure control devices.</p>
<p>5.5.2.51 Venting pressure regulators Except as specified in Clause 5.5.2.62, when a pressure regulator with internal relief valve or a line relief valve is installed, it shall be vented separately to a safe location outdoors and terminate in accordance with Clause 5.6 by a vent line a) of steel pipe, or of seamless steel tubing or copper tubing or corrugated stainless steel tubing (CSST) that complies with Clause 6.2; and b) of a size i) at least equal to the nominal pipe size of the vent outlet of the valve or regulator increased as specified by the manufacturer's instructions and for CSST increased by one pipe size diameter; or ii) in the absence of manufacturer's instructions, increased by one pipe size diameter for every 50 ft (15 m) or part thereof that the vent line extends beyond the initial 50 ft (15 m). This increase shall be made at the connection on the device.</p>	<u>REVISED</u> Except as specified in Clause 5.5.2.2, when a pressure regulator with internal relief valve or a line relief valve is installed, it shall be vented separately to a safe location outdoors by a vent line a) of steel pipe, or of seamless steel tubing or copper tubing or corrugated stainless steel tubing (CSST) that complies with Clause 6.2; and b) of a size i) at least equal to the nominal pipe size of the vent outlet of the valve or regulator increased as specified by the manufacturer's instructions and for CSST increased by one pipe size diameter; or ii) in the absence of manufacturer's instructions, increased by one pipe size diameter for every 50 ft (15 m) or part thereof that the vent line extends beyond the initial 50 ft (15 m). This increase shall be made at the connection on the device.	<p>Clause 5.6 specifies the clearance requirements from a vent line and bleed vent terminations.</p>

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<p>5.5.2.62 Two or more relief valves Except as required by Clause 5.5.2.7 When two or more gas overpressure relief valves are installed, they may be connected into a single vent line, provided that</p> <ul style="list-style-type: none"> a) there is compliance with Clause 5.5.2.54; b) the single vent line has an area equal to the largest relief valve opening plus 50% of the total area of the other relief valve openings; c) the highest inlet pressure of any one line relief valve does not exceed 1.1 times the lowest inlet pressure of any other line relief valve, based on manufacturer's product literature; and d) the highest start-to-discharge pressure of one line relief valve does not exceed 1.1 times the lowest start-to-discharge pressure of any of the other line relief valves, based on manufacturer's product literature. 	<p><u>REVISED</u> When two or more gas overpressure relief valves are installed, they may be connected into a single vent line, provided that</p> <ul style="list-style-type: none"> a) there is compliance with Clause 5.5.2.1; b) the single vent line has an area equal to the largest relief valve opening plus 50% of the total area of the other relief valve openings; c) the highest inlet pressure of any one line relief valve does not exceed 1.1 times the lowest inlet pressure of any other line relief valve, based on manufacturer's product literature; and d) the highest start-to-discharge pressure of one line relief valve does not exceed 1.1 times the lowest start-to-discharge pressure of any of the other line relief valves, based on manufacturer's product literature. 	<p>Adds clarity, Clause 5.5.2.7 specifies the requirements for a vent line from the internal relief valve, (pressure regulator).</p>
<p>5.5.4 Venting exemptions for line-pressure regulators</p>	<p><u>REVISED</u> 5.5.4 Venting exemptions for line pressure regulators</p>	<p>New exemptions are not specific to line pressure regulators (See Clause 5.5.4.1)</p>

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<p>5.5.4.1 Exemptions The following shall be exempt from Clause 5.6, provided the conditions in Clause 5.5.4.2 are also met: a) a line pressure regulator certified to CSA/ANSI Z21.80/ CSA 6.22 that incorporates a vent limiter. b) an appliance pressure regulator certified to CSA/ANSI Z21.18 / CSA 6.3 that incorporates a vent limiter, and with a rated pressure no higher than 2 psig (14 kPa), or c) an industrial pressure regulator equipped with a safety diaphragm if installed on a fuel train of a CSA B149.3 approved appliance having a capacity greater than 400,000 btu/h (120 kW).</p>	<p>Deleted/New A line pressure regulator shall be exempt from the requirements of Clause 5.2.1.8 provided that a) the inlet pressure the pressure regulator is 2 psig (14 kPa) or less; b) the pressure regulator is equipped with a leak limiting system orificed to limit the escape of gas from the vent openings, even in the event of a main diaphragm failure, to less than i) 1 ft³/h (0.0283 m³/h) of a gas having a specific gravity of 1.53; or ii) 2.5 ft³/h (0.0706 m³/h) of a gas having a specific gravity of 0.6; c) the pressure regulator is certified to ANSI Z21.80/CSA 6.22; and d) the pressure regulator is installed in a ventilated space.</p>	<p>Simplifies previous requirements and allows for the exemption for a line pressure regulator and an appliance regulator (see existing Clause 5.7).</p> <p>streamlining the previous requirements in Clauses 5.2.2.5, 5.2.4.1, 5.2.4.2, 5.7.1.3, and 5.7.2, allows them to be eliminated.</p> <p>Replace terminology “leak limiting system” with “vent limiter”.</p>

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<p>5.5.4.2 Exemption conditions</p> <p>The conditions for exemption from Clause 5.6 shall be</p> <ul style="list-style-type: none"> a) The vent limiter limits the escape of gas to <ul style="list-style-type: none"> i. not more than 2.5ft³/h (0.0706 m³/h) for natural gas ii. not more than 1 ft³/h (0.0283 m³/h) for LP gases; and subject to the limitation in Clause 5.5.4.3, b) The pressure regulator is installed in a ventilated space and to where the accumulation of fuel gas from the vent limiter does not exceed 25% of the gas's lower explosive limit, and c) the clearance from the vent limiter to any source of ignition is met, as listed in Table 5.3 <p>Note: <i>Examples of unventilated spaces include but are not limited to:</i></p> <ul style="list-style-type: none"> a) a closet, b) the space between a suspended ceiling and the underside of above flooring, c) a room having no openings (e.g., a hole in a door or wall) to an adjacent, ventilated room or to the outdoors. 	<p>Deleted/New</p> <p>For line pressure regulators with inlet pressure of 5 or 10 psig (35 or 70 kPa), a line pressure regulator shall be exempt from compliance with Clause 5.2.1.8 provided that</p> <ul style="list-style-type: none"> a) the pressure regulator is equipped with a leak limiting system orifice to limit the escape of gas from the vent openings, even in the event of a main diaphragm failure, to less than 2.5 ft³/h (0.0706 m³/h) of a gas having a specific gravity of 0.6; b) the pressure regulator is equipped with an overpressure protection device consisting of either a monitoring regulator or an overpressure shut-off device, which is <ul style="list-style-type: none"> i) set to limit the downstream pressure to 2 psig (14 kPa) or less; and ii) supplied as a complete unit with the line pressure regulator; c) the pressure regulator and its overpressure protection device are certified to ANSI Z21.80/CSA 6.22; and d) the pressure regulator is installed in a ventilated space. 	<p>As referenced in Clause 5.5.4.1 this Clause States the conditions for the exemption from Clause 5.6</p> <p>The Note was added to provide examples of unventilated spaces.</p>

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<p><u>5.5.4.3 Line pressure regulator rated for 5 psig (35 kPa) or 10 psig (70 kPa)</u> The exemption permitted in Clause 5.5.4.1 shall not apply to a line pressure regulator rated for 5 psig (35 kPa) or 10 psig (70 kPa) when the fuel is propane.</p> <p><i>Note: This Clause imposes the limitation to propane systems because it describes installation of regulators certified to ANSI Z21.80/CSA 6.22 on piping systems operating at either 5 psig (35 kPa) or 10 psig (70 kPa), and, by definition, a line pressure regulator certified to ANSI Z21.80/CSA 6.22 on propane systems is intended to be used between the propane 2 psig (14 kPa) service regulator and the gas utilization equipment</i></p>	<p><u>Deleted/New</u> For the purpose of Clause 5.5.4, a space shall be considered to be a ventilated space where the accumulation of gas in the space does not exceed 25% of the lower explosion limit of the gas.</p>	<p>Specifies limitations applied to the exemption in Clause 5.5.4.1 related to propane systems utilizing line pressure regulators at 5 and 10 psig.</p> <p>Note provides detailed explanation.</p>
<p><u>5.6 Termination of vents</u></p>	<p><u>5.6 Termination of vents</u></p>	
<p><u>5.56.2.4 Outdoor vent line termination</u> The outdoor vent termination of a pressure regulator or a line relief device shall be equipped with a means to prevent the entry of water, insects, or foreign material.</p>	<p><u>Relocated</u> The outdoor vent termination of a pressure regulator or a line relief device shall be equipped with a means to prevent the entry of water, insects, or foreign material.</p>	
<p><u>5.56.2.3 Vent line</u> A vent line shall be of sufficient size and configuration to prevent impedance upon a regulator.</p>	<p><u>Relocated</u> A vent line shall be of sufficient size and configuration to prevent impedance upon a regulator.</p>	
<p><u>5.6.3</u> A safety limit or a safety relief device shall not be isolated, bypassed, or in any way made ineffective by a valve or other device.</p>	<p><u>Deleted</u> A safety limit or a safety relief device shall not be isolated, bypassed, or in any way made ineffective by a valve or other device.</p>	<p>Included in Clause 5.2.1.5 Bypassing pressure regulators.</p>

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<p>5.6-4 Termination of vent lines Except where permitted by Clauses 5.5.1.4 and 5.5.4 The the vent line discharge from overpressure protection devices, relief devices, and internal relief valves, and the termination of any other vent not eligible to be vented into a ventilated space shall terminate outdoors with the clearances specified in Table 5.3.</p> <p>The clearances in Table 5.3 may be reduced for natural gas in accordance with the second column of the Table where a pressure regulator meets the following requirements:</p> <p>a) the service regulator is certified to CSA 6.18 and equipped with an overpressure shut-off device;</p> <p>b) the pressure regulator is certified to ANSI Z21.80/CSA 6.22 and equipped with a vent limiting device that vents gas at a rate not exceeding 2.5 ft³/h (0.0706 m³/h); or</p> <p>c) the pressure regulator is equipped with an overpressure shut-off device that vents gas at a rate not exceeding 2.5 ft³/h (0.0706 m³/h).</p>	<p>Revised</p> <p>The discharge from overpressure protection devices, relief devices, and internal relief valves, and the termination of any other vent not eligible to be vented into a ventilated space shall terminate outdoors with the clearances specified in Table 5.3.</p> <p>The clearances in Table 5.3 may be reduced for natural gas in accordance with the second column of the Table where a pressure regulator meets the following requirements:</p> <p>a) the service regulator is certified to CSA 6.18 and equipped with an overpressure shut-off device;</p> <p>b) the pressure regulator is certified to ANSI Z21.80/CSA 6.22 and equipped with a vent limiting device that vents gas at a rate not exceeding 2.5 ft³/h (0.0706 m³/h); or</p> <p>c) the pressure regulator is equipped with an overpressure shut-off device that vents gas at a rate not exceeding 2.5 ft³/h (0.0706 m³/h).</p>	<p>Clause 5.5.1.4 allows the bleed vent to terminate in the appliance combustion chamber.</p> <p>Clause 5.5.4 Venting exemptions for pressure regulators.</p> <p>The revisions to the column titles in Table 5.3 allows the removal of items a), b), and c).</p>

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<p align="center">Table 5.3</p> <p align="center">Clearance from <u>gas vent terminations</u> discharge, ft (m)</p> <p align="center">(See Clause 5.5.4.2, 5.6.4, 8.14.8, and 10.1.8.)</p> <table border="1"> <thead> <tr> <th></th> <th>Natural gas and hydrogen-natural gas blend</th> <th>Natural gas and hydrogen-natural gas blend</th> <th>Natural gas and hydrogen-natural gas blend</th> <th>Propane</th> </tr> </thead> <tbody> <tr> <td>Building opening*</td> <td>1 (0.3)</td> <td>3 (4.0.9)</td> <td>3 (0.9)</td> <td>3 (4.0.9)</td> </tr> <tr> <td>Appliance vent outlet†</td> <td>1 (0.3) Dimension A</td> <td>3 (4.0.9)</td> <td>Dimension B</td> <td>3 (4) Dimension B</td> </tr> <tr> <td>Moisture exhaust duct‡</td> <td>3 (4.0.9)</td> <td>3 (4.0.9)</td> <td>3 (0.9)</td> <td>3 (4.0.9)</td> </tr> <tr> <td>Mechanical air intake</td> <td>3 (4.0.9)</td> <td>10 (3)</td> <td>10 (3)</td> <td>10 (3)</td> </tr> <tr> <td>Appliance air intake</td> <td>1 (0.3)</td> <td>3 (4.0.9)</td> <td>10 (3)</td> <td>10 (3)</td> </tr> <tr> <td>Source of ignition</td> <td>1 (0.3)</td> <td>3 (4.0.9)</td> <td>3 (0.9)</td> <td>4 (1) 5 (1.5)</td> </tr> </tbody> </table> <p>Notes:</p> <p>Dimension A = 1 ft (0.3 m) in any direction from the vent termination of a gas appliance, and additionally 3 ft (0.9 m) horizontally when within a vertical distance of 15 ft (4.6 m) between the appliance vent termination and the gas vent termination.</p>		Natural gas and hydrogen-natural gas blend	Natural gas and hydrogen-natural gas blend	Natural gas and hydrogen-natural gas blend	Propane	Building opening*	1 (0.3)	3 (4.0 .9)	3 (0.9)	3 (4.0 .9)	Appliance vent outlet†	1 (0.3) Dimension A	3 (4.0 .9)	Dimension B	3 (4) Dimension B	Moisture exhaust duct‡	3 (4.0 .9)	3 (4.0 .9)	3 (0.9)	3 (4.0 .9)	Mechanical air intake	3 (4.0 .9)	10 (3)	10 (3)	10 (3)	Appliance air intake	1 (0.3)	3 (4.0 .9)	10 (3)	10 (3)	Source of ignition	1 (0.3)	3 (4.0 .9)	3 (0.9)	4 (1) 5 (1.5)	<p>REVISED</p> <p align="center">Table 5.3</p> <p align="center">Clearance from discharge, ft (m)</p> <p align="center">(See Clause 5.6.4, 8.14.8, and 10.1.9.)</p> <table border="1"> <thead> <tr> <th></th> <th>Reduced clearance for natural gas as permitted in Clause 5.6.4</th> <th>Natural gas</th> <th>Propane</th> </tr> </thead> <tbody> <tr> <td>Building opening*</td> <td>1 (0.3)</td> <td>3 (1)</td> <td>3 (1)</td> </tr> <tr> <td>Appliance vent outlet†</td> <td>1 (0.3)</td> <td>3 (1)</td> <td>3 (1)</td> </tr> <tr> <td>Moisture exhaust duct‡</td> <td>3 (1)</td> <td>3 (1)</td> <td>3 (1)</td> </tr> <tr> <td>Mechanical air intake</td> <td>3 (1)</td> <td>10 (3)</td> <td>10 (3)</td> </tr> <tr> <td>Appliance air intake</td> <td>1 (0.3)</td> <td>3 (1)</td> <td>10 (3)</td> </tr> <tr> <td>Source of ignition</td> <td>1 (0.3)</td> <td>3 (1)</td> <td>10 (3)</td> </tr> </tbody> </table> <p>* <i>Outdoor air intakes that are less than 8 in (200 mm) in diameter or equivalent area shall be considered a building opening in using this Table.</i></p> <p>† <i>See also Clause 8.14.8.</i></p> <p>‡ <i>Applies to gas or electric dryer termination.</i></p> <p>Note: <i>The outdoor air intake referred to in this Table is the ducting that goes from the outside of the structure and terminates into the return air plenum before the appliance, sometimes referred to as a fresh-air intake.</i></p>		Reduced clearance for natural gas as permitted in Clause 5.6.4	Natural gas	Propane	Building opening*	1 (0.3)	3 (1)	3 (1)	Appliance vent outlet†	1 (0.3)	3 (1)	3 (1)	Moisture exhaust duct‡	3 (1)	3 (1)	3 (1)	Mechanical air intake	3 (1)	10 (3)	10 (3)	Appliance air intake	1 (0.3)	3 (1)	10 (3)	Source of ignition	1 (0.3)	3 (1)	10 (3)	<p>Table includes:</p> <ul style="list-style-type: none"> hydrogen-natural gas blends, gas vent terminations relief vents or bleed vents in specified volumes / volume ranges expanded in the additional columns. <p>This change recaptures the intent of Clause 5.5.9 and Table 5-2 from CSA B149.1-2007 supplement to CSA B149.1-2005. <u>Notably</u> the reintroduction of the column for relief capacities > 1900 ft³/h.</p> <p>The Table from CSA B149.1- 2007 now appears in CSA Z662-23, and therefore; this Table no longer contains requirements related to Service regulators.</p> <p>Since the reduced clearances as shown in the 2007 supplement were applied to venting capacities as high as 50 ft³/h (1.5 m³/h) and intended for natural gas service regulators equipped with an OPCO (i.e., the vent capacity on the OPCO once it closes), the same capacity are applied to column 2 in this Table.</p> <p>Revising the column titles in this Tables allows the remove of items a), b), c) from the previous Code Clause 5.6.4.</p>
	Natural gas and hydrogen-natural gas blend	Natural gas and hydrogen-natural gas blend	Natural gas and hydrogen-natural gas blend	Propane																																																													
Building opening*	1 (0.3)	3 (4.0 .9)	3 (0.9)	3 (4.0 .9)																																																													
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Source of ignition	1 (0.3)	3 (4.0 .9)	3 (0.9)	4 (1) 5 (1.5)																																																													
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Building opening*	1 (0.3)	3 (1)	3 (1)																																																														
Appliance vent outlet†	1 (0.3)	3 (1)	3 (1)																																																														
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<p>Dimension B = 3 ft (0.9 m) in any direction from the vent termination of a gas appliance, and additionally 0.9 m (3 ft) horizontally when within a vertical distance of 15 ft (4.6 m) between the appliance vent termination and the gas vent termination.</p> <p>* Outdoor air intakes that are less than 8 in (200 mm) in diameter or equivalent area shall be considered a building opening in using this Table.</p> <p>† See also Clause 8.14.8.</p> <p>‡ Applies to gas or electric dryer termination.</p> <p>Note: The outdoor air intake referred to in this Table is the ducting that goes from the outside of the structure and terminates into the return air plenum before the appliance, sometimes referred to as a fresh-air intake.</p> <p>Note: CSA Z662 specifies the necessary minimum clearances from the vent of a regulator or an associated overpressure relief device that belongs to a utility or propane supplier is required to building features similar to those shown in this table. Annex D contains a reprinting of the mandated clearances specified in CSA Z662. Piping and appliance installers and repairers and other construction trades are reminded to maintain these clearances when planning and executing work</p> <p>Note: CSA B149.2 specifies the minimum clearances from the propane containers to a source of ignition.</p>		<p>The inclusion of the “Dimension A” and “Dimension B” consistent with Clause 8.14.8.</p> <p>Note: directs the reader to Annex D, service regulator clearance requirements from CSA Z662-23, reprinted here since installers and service personal may not have access to CSA Z662.</p> <p>Note: directs the reader to the appropriate Code.</p>
<p>5.7 Appliance and pilot pressure regulators on appliances using propane</p>	<p>Revised 5.7 Appliance and pilot pressure regulators</p>	
<p>5.7.1 Appliance and pilot pressure regulators in propane applications</p>	<p>Deleted 5.7.1 Appliance and pilot pressure regulators in propane applications</p>	<p>Deleted title as repetitive in Clause 5.7.</p>

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<p>5.7.4.2 Pilots When an appliance pressure regulator is required by Clause 5.7.1.4, the propane supply to the pilot or group of pilots shall be regulated by an approved pressure regulator independent of the main burner propane supply.</p>	<p>5.7.1.2 When an appliance pressure regulator is required by Clause 5.7.1.1, the propane supply to the pilot or group of pilots shall be regulated by an approved pressure regulator independent of the main burner propane supply.</p>	<p>The requirement for when an “appliance” pressure regulator is required is specified in Clause 5.7.1</p>
<p>5.7.1.3 When an appliance pressure regulator without internal relief having an inlet pressure not in excess of 2 psig (14 kPa) is installed on an appliance, it shall be vented to the outdoors unless it is constructed or equipped with a device to limit the escape of gas from the vent opening in the event of diaphragm failure. In addition, the opening in the device shall restrict the escape of gas to not more than 1 ft³/h (0.0283 m³/h) of a gas having a specific gravity of 1.53. A regulator with vent limiting means shall be installed in a ventilated space only.</p>	<p>Deleted When an appliance pressure regulator without internal relief having an inlet pressure not in excess of 2 psig (14 kPa) is installed on an appliance, it shall be vented to the outdoors unless it is constructed or equipped with a device to limit the escape of gas from the vent opening in the event of diaphragm failure. In addition, the opening in the device shall restrict the escape of gas to not more than 1 ft³/h (0.0283 m³/h) of a gas having a specific gravity of 1.53. A regulator with vent limiting means shall be installed in a ventilated space only.</p>	<p>These requirements from this Clause were moved into Clauses 5.5.4.1 and 5.5.4.2.</p>

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<p><u>5.7.2 Appliance and pilot pressure regulators in natural gas applications</u> When an appliance pressure regulator without internal relief having an inlet pressure not in excess of 2 psig (14 kPa) is installed on an appliance, it shall be vented to the outdoors unless it is constructed or equipped with a device to limit the escape of gas from the vent opening in the event of diaphragm failure. In addition, the opening in the device shall restrict the escape of gas to not more than 2.5 ft³/h (0.0706 m³/h) of a gas having a specific gravity of 0.6. A regulator with vent limiting means shall be installed in a ventilated space only.</p>	<p><u>Deleted</u> When an appliance pressure regulator without internal relief having an inlet pressure not in excess of 2 psig (14 kPa) is installed on an appliance, it shall be vented to the outdoors unless it is constructed or equipped with a device to limit the escape of gas from the vent opening in the event of diaphragm failure. In addition, the opening in the device shall restrict the escape of gas to not more than 2.5 ft³/h (0.0706 m³/h) of a gas having a specific gravity of 0.6. A regulator with vent limiting means shall be installed in a ventilated space only.</p>	<p>The requirements from this Clause were moved into Clauses 5.5.4.1 and 5.5.4.2.</p>
6 Gas piping systems	6 Gas piping systems	
6.2 Material	6.2 Material	
6.2.3 <u>Piping schedule</u>	6.2.3	
<p>6.2.3.1 <u>Operating pressure equal to or less than 125 psig (860 kPa)</u> A gas piping system using natural gas, <u>hydrogen-natural gas blends</u>, or propane vapour phase with operating pressures up to and including 125 psig (860 kPa) shall comply with the following as applicable: a) Piping shall be at least Schedule 10 for NPS 1/2 to 2. When using Schedule 10 to less than Schedule 40, piping shall be located indoors, and joints shall use fittings certified to <u>CSA/ANSI LC-4/CSA 6.32</u>. b) Piping shall be at least Schedule 40 for NPS 2-1/2 to 10. c) Pipe larger than NPS 10 shall be at least standard weight.</p>	<p><u>Revised</u> A gas piping system using natural gas or propane vapour phase with operating pressures up to and including 125 psig (860 kPa) shall comply with the following as applicable: a) Piping shall be at least Schedule 10 for NPS 1/2 to 2. When using Schedule 10 to less than Schedule 40, piping shall be located indoors, and joints shall use fittings certified to ANSI LC-4/CSA 6.32. b) Piping shall be at least Schedule 40 for NPS 2-1/2 to 10. c) Pipe larger than NPS 10 shall be at least standard weight.</p>	<p>Includes hydrogen-natural gas blends.</p>

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<p>6.2.3.2 <u>Operating pressure exceeding 125 psig (860 kPa)</u> A gas piping system using natural gas, hydrogen-natural gas blends, or propane vapour phase with operating pressures exceeding 125 psig (860 kPa) and all liquid piping systems shall comply with either of the following:</p> <p>a) For pipe sizes up to and including NPS 10</p> <p style="padding-left: 20px;">i) piping shall be at least Schedule 40 when using welded or flanged joints; or</p> <p style="padding-left: 20px;">ii) piping shall be at least Schedule 80 when using threaded joints. Threaded joints shall be threaded or threaded and back welded.</p> <p>b) Pipe larger than NPS 10 shall be at least standard weight.</p>	<p><u>Revised</u> A gas piping system using natural gas or propane vapour phase with operating pressures exceeding 125 psig (860 kPa) and all liquid piping systems shall comply with either of the following:</p> <p>a) For pipe sizes up to and including NPS 10</p> <p style="padding-left: 20px;">i) piping shall be at least Schedule 40 when using welded or flanged joints; or</p> <p style="padding-left: 20px;">ii) piping shall be at least Schedule 80 when using threaded joints. Threaded joints shall be threaded or threaded and back welded.</p> <p>b) Pipe larger than NPS 10 shall be at least standard weight.</p>	<p>Includes hydrogen-natural gas blends.</p>
<p>6.2.10 <u>Minimum working pressure</u> Except as required in Clauses 6.2.11 and 6.2.12, every non-metallic hose and hose fitting shall have a minimum working pressure of 350 psig (2400 kPa) and shall comply with CSA 8.1 or CSA 8.3. Note: Refer to Clause 6.20.5 for metallic hoses.</p>	<p><u>Revised</u> Except as required in Clause 6.2.11 every hose and hose fitting shall have a minimum working pressure of 350 psig (2400 kPa) and shall comply with CSA 8.1 or CSA 8.3.</p>	<p>Added reference to Clause 6.2.12 Seamless steel tubing.</p> <p>The Note: provides additional information.</p>
<p>6.2.12 <u>Liquid propane hose prohibition</u> Hoses certified to CSA 8.3 shall not be used in a liquid propane system.</p>	<p><u>New</u></p>	<p>CSA 8.3 committee reported these types of hoses are not suited for liquid propane.</p>
<p>6.3 Size</p>	<p>6.3 Size</p>	

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<p>6.3.2 Pressure equal to or less than 14 in w.c. (3.5 kPa) A gas piping system supplied at pressures up to and including 14 in w.c. (3.5 kPa) shall be designed to prevent the loss in pressure between the appliance and either the termination of the utility installation or the last-stage regulator from exceeding the maximum allowable pressure drop specified in Table 6.1. The minimum size of piping, tubing, and fittings shall be determined in accordance with good engineering practice, such as</p> <ul style="list-style-type: none"> a) by the use of Tables A.1 and A.8 of Annex A for natural gas or hydrogen-natural gas blends, which include allowance for a reasonable number of fittings, when the maximum allowable pressure drop is 0.5 in w.c. (0.125 kPa); b) by the use of Tables A.2 and A.9 in Annex A for natural gas or hydrogen-natural gas blends or Tables B.1 and B.6 in Annex B for propane, which include allowance for a reasonable number of fittings, when the maximum allowable pressure drop is 1 in w.c. (0.25 kPa); c) by the method of calculation outlined in Annex A for natural gas or hydrogen-natural gas blends or Annex B for propane; or d) for CSST, by the use of sizing methods and tables supplied by the manufacturer. 	<p>Revised A gas piping system supplied at pressures up to and including 14 in w.c. (3.5 kPa) shall be designed to prevent the loss in pressure between the appliance and either the termination of the utility installation or the last-stage regulator from exceeding the maximum allowable pressure drop specified in Table 6.1. The minimum size of piping, tubing, and fittings shall be determined in accordance with good engineering practice, such as</p> <ul style="list-style-type: none"> a) by the use of Tables A.1 and A.8 of Annex A for natural gas, which include allowance for a reasonable number of fittings, when the maximum allowable pressure drop is 0.5 in w.c. (0.125 kPa); b) by the use of Tables A.2 and A.9 in Annex A for natural gas or Tables B.1 and B.6 in Annex B for propane, which include allowance for a reasonable number of fittings, when the maximum allowable pressure drop is 1 in w.c. (0.25 kPa); c) by the method of calculation outlined in Annex A for natural gas or Annex B for propane; or d) for CSST, by the use of sizing methods and tables supplied by the manufacturer. 	<p>Includes hydrogen-natural gas blends.</p>

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Table 6.1 Maximum allowable pressure drop (See Clause 6.3.2.)			<u>Revised</u> Table 6.1 Maximum allowable pressure drop (See Clause 6.3.2.)			Includes hydrogen-natural gas blends.
	Piping and tubing system supply pressure	Maximum allowable pressure drop		Piping and tubing system supply pressure	Maximum allowable pressure drop	
Natural gas/ hydrogen natural gas blends	< 7 in w.c. (1.75 kPa)	0.5 in w.c. (0.125 kPa)	Natural gas	< 7 in w.c. (1.75 kPa)	0.5 in w.c. (0.125 kPa)	
Natural gas/ hydrogen natural gas blends /propane	7 in w.c. (1.75 kPa) up to 14 in w.c. (3.5 kPa)	1 in w.c. (0.25 kPa)	Natural gas/propane	7 in w.c. (1.75 kPa) up to 14 in w.c. (3.5 kPa)	1 in w.c. (0.25 kPa)	Includes hydrogen-natural gas blends.
6.3.3 Pressure exceeding 14 in w.c. (3.5 kPa) A gas piping system operating at a pressure exceeding 14 in w.c. (3.5 kPa) shall be designed to ensure an adequate supply of gas to each appliance served at the respective designated pressure rating, and to ensure that the appliance will not be overpressured under conditions of no flow. The minimum size of piping, tubing, and fittings shall be determined in accordance with Clause 6.3.4 for 2 psig (14 kPa) systems or good engineering practice, such as a) by the use of the applicable tables in Annex A for natural gas or hydrogen-natural gas blends or Annex B for propane, making allowance for fittings as necessary; b) by the method of calculation outlined in Annex A for natural gas or hydrogen-natural gas blends or Annex B for propane, or c) for CSST, by the use of sizing methods and tables supplied by the manufacturer.			<u>Revised</u> A gas piping system operating at a pressure exceeding 14 in w.c. (3.5 kPa) shall be designed to ensure an adequate supply of gas to each appliance served at the respective designated pressure rating, and to ensure that the appliance will not be overpressured under conditions of no flow. The minimum size of piping, tubing, and fittings shall be determined in accordance with Clause 6.3.4 for 2 psig (14 kPa) systems or good engineering practice, such as a) by the use of the applicable tables in Annex A for natural gas or Annex B for propane, making allowance for fittings as necessary; b) by the method of calculation outlined in Annex A for natural gas or Annex B for propane, or c) for CSST, by the use of sizing methods and tables supplied by the manufacturer.			

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<p>6.3.4 Pressure regulator The gas piping system shall be designed to provide adequate gas pressure to the 2 psig (14 kPa) pressure regulator to match downstream load requirements. Pressure regulator sizing shall be subject to the minimum available inlet supply pressure. See Tables A.2, A.3, A.4, A.10, and A.11 in Annex A for natural gas or hydrogen-natural gas blends or Tables B.2 and B.7 in Annex B for propane, which include allowance for a reasonable number of fittings.</p>	<p>Revised The gas piping system shall be designed to provide adequate gas pressure to the 2 psig (14 kPa) pressure regulator to match downstream load requirements. Pressure regulator sizing shall be subject to the minimum available inlet supply pressure. See Tables A.2, A.3, A.4, A.10, and A.11 in Annex A for natural gas or Tables B.2 and B.7 in Annex B for propane, which include allowance for a reasonable number of fittings.</p>	Includes hydrogen-natural gas blends.
<p>6.3.5 Plastic piping Plastic piping shall be sized a) by the use of Table A.7 in Annex A for natural gas or hydrogen-natural gas blends or Tables B.1 to B.5 in Annex B for propane; or b) by the method of calculation outlined in Annex A for natural gas or hydrogen-natural gas blends or Annex B for propane. Note: See Table A.17 for natural gas or hydrogen-natural gas blends and Table B.12 for propane.</p>	<p>Revised Plastic piping shall be sized a) by the use of Table A.7 in Annex A for natural gas or Tables B.1 to B.5 in Annex B for propane; or b) by the method of calculation outlined in Annex A for natural gas or Annex B for propane. Note: See Table A.17 for natural gas and Table B.12 for propane.</p>	Includes hydrogen-natural gas blends.
<p>6.3.8.1 Natural gas and hydrogen-natural gas blends threaded pipe and fittings For natural gas or hydrogen-natural gas blends, threaded pipe and fittings less than NPS 1/2 used in a piping system shall be Schedule 80.</p>	<p>Revised For natural gas, threaded pipe and fittings less than NPS 1/2 used in a piping system shall be Schedule 80.</p>	Includes hydrogen-natural gas blends.
6.8 Piping practices	6.8 Piping practices	

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<p>6.8.10 Test ports A test port shall be installed immediately downstream of a line pressure regulator or an high industrial pressure regulator except where the pressure regulator can be adjusted while measuring and observing the supply pressure at any appliance being served by the pressure regulator. Where opening the test port could create an uncontrolled release of gas, the test port shall be equipped with a manual shut-off valve that is either capped or plugged.</p>	<p>6.8.10 A test port shall be installed immediately downstream of a line pressure regulator or a high pressure regulator except where the pressure regulator can be adjusted while measuring and observing the supply pressure at any appliance being served by the pressure regulator. Where opening the test port could create an uncontrolled release of gas, the test port shall be equipped with a manual shut-off valve that is either capped or plugged.</p>	<p>Updated terminology to align with new defined term.</p>
<p>6.9 Joints and connections</p>	<p>6.9 Joints and connections</p>	
<p>6.9.2 Type Piping of NPS 2-1/2 to 4 and over shall have <u>either press-connect fittings certified to CSA/ANSI LC 4/CSA 6.32 or welded pipe joints.</u> <u>Piping greater than NPS 4 shall be welded pipe joints.</u></p>	<p>Revised Piping of NPS 2 ½ and over shall have welded pipe joints.</p>	<p>In 2012 the referenced standard for Press-connect metallic fittings for use in fuel gas distribution systems was revised to include fittings for use with fuel gas systems 3/8 inch through 4 inch nominal size. Additional sentence was added to specify requirements or pipe greater than NPS 4.</p>
<p>6.9.6 When a jointing sealant is used, it shall be certified to CAN/ULC-S642 and shall be applied to the male threads of a metal pipe. Tape shall be stretched and applied in a clockwise direction, with a 50% overlap leaving the first two starter threads bare. <u>Tape shall not be used for pipe sizes larger than 1-1/2 (38 mm) nominal pipe size for hydrogen-natural gas blends.</u></p>	<p>Revised When a jointing sealant is used, it shall be certified to CAN/ULC-S642 and shall be applied to the male threads of a metal pipe. Tape shall be stretched and applied in a clockwise direction, with a 50% overlap leaving the first two starter threads bare.</p>	<p>The use of pipe tape on fuel gas pipe systems utilizing a hydrogen – natural gas blend is restricted to pipe sizes 1-1/2 (38 mm) and smaller.</p>

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6.15 Underground piping and tubing	Underground piping and tubing	
<p><u>6.15.15 Common trench</u> When underground piping or tubing share a common trench with underground electrical systems, a minimum separation of 12 in (300 mm) shall be maintained between the gas system and the electrical system.</p>	<u>New</u>	Aligns with the Canadian Electrical Code (CEC) and referenced standard for underground electrical systems - CEC 22.1 Part 1 Clause 12-012 (13), and CSA C22.3 Underground systems.
6.16 Protection of piping and tubing	6.16 Protection of piping and tubing	
<p><u>6.16.9 Sleeve use</u> A sleeve shall enclose the entire length of piping or tubing that passes through an exterior wall to an unheated, inaccessible building element, sealed watertight and the portion of piping or tubing that runs through the sleeve shall be double wrapped with a pipe wrap tape.</p>	<u>NEW</u>	Provides clarity as to where a sleeve shall be installed, and a greater degree of assurance that piping will be adequately protected against corrosion when it passes through a sleeve.
<p><u>6.16.10 Sleeve material</u> When piping or tubing is run in a sleeve, the sleeve shall be of such material and so installed as to protect the piping or tubing from damage and galvanic action.</p>	<u>NEW</u>	Provides clarity as to where a sleeve shall be installed, and a greater degree of assurance that piping will be adequately protected against corrosion when it passes through a sleeve.
<p><u>6.16.154 Vehicle protection</u> Piping or tubing entering a buildingThe portions of gas piping systems installed above grade in locations that do not afford protection from damage from vehicles on any street, highway, avenue, alley, or a parking lot shall be protected by posts or guardrails in compliance with Clause 6.16.65 unless otherwise approved by the authority having jurisdiction.</p>	<p><u>Revised</u> Piping or tubing entering a building above grade in locations that do not afford protection from damage from vehicles on any street, highway, avenue, alley, or a parking lot shall be protected by posts or guardrails in compliance with Clause 6.16.5 unless otherwise approved by the authority having jurisdiction.</p>	<p>Change “piping or tubing” to “gas piping systems” as defined term, to capture all piping, tubing, hoses, valves and fittings, which are subject to vehicular damage, must be protected.</p> <p>Only the “portion” of the gas piping system which is subject to damage is in need of protection, not the entire gas piping system.</p>

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<p>6.16.165 <u>Vehicle protection requirements</u> The piping or tubing entering a building Gas piping systems shall be protected from vehicular damage by one of the following means:</p> <p>a) posts that</p> <ul style="list-style-type: none"> i) are not less than 12 in (300 mm) from the riser, regulator, or equipment; ii) are spaced not more than 42 in (1050 mm) apart; iii) are buried not less than 36 in (900 mm) below grade; iv) extend at least 30 in (760 mm) above grade; and v) are one of the following: <ul style="list-style-type: none"> 1) 4 in (100 mm) capped steel pipe; 2) 4 in (100 mm) tubing filled with concrete; 3) 8 in (200 mm) pressure-treated wood, either square or round; or 4) 6 in (150 mm) minimum dimension reinforced concrete; or <p>b) guardrails that are</p> <ul style="list-style-type: none"> i) not less than 12 in (300 mm) from the riser, regulator, or equipment; ii) of the steel deep beam type, 12 in (300 mm); iii) supported by 6 in (150 mm) minimum pressure-treated wooden posts, either square or round, located not more than 42 in (1050 mm) apart, centre to centre, and buried not less than 36 in (900 mm) below grade; and iv) located so that the top of the beam is not less than 24 in (610 mm) nor more than 30 in (760 mm) above grade. 	<p>Revised The piping or tubing entering a building shall be protected from vehicular damage by one of the following means:</p> <p>a) posts that</p> <ul style="list-style-type: none"> i) are not less than 12 in (300 mm) from the riser, regulator, or equipment; ii) are spaced not more than 42 in (1050 mm) apart; iii) are buried not less than 36 in (900 mm) below grade; iv) extend at least 30 in (760 mm) above grade; and v) are one of the following: <ul style="list-style-type: none"> 1) 4 in (100 mm) capped steel pipe; 2) 4 in (100 mm) tubing filled with concrete; 3) 8 in (200 mm) pressure-treated wood, either square or round; or 4) 6 in (150 mm) minimum dimension reinforced concrete; or <p>b) guardrails that are</p> <ul style="list-style-type: none"> i) not less than 12 in (300 mm) from the riser, regulator, or equipment; ii) of the steel deep beam type, 12 in (300 mm); iii) supported by 6 in (150 mm) minimum pressure-treated wooden posts, either square or round, located not more than 42 in (1050 mm) apart, centre to centre, and buried not less than 36 in (900 mm) below grade; and iv) located so that the top of the beam is not less than 24 in (610 mm) nor more than 30 in (760 mm) above grade. 	<p>Previous restriction to “piping or tubing entering a building” was restrictive to where protection from vehicular damage may be required.</p> <p>The change to “gas piping systems” provides a greater level of safety to the installation. (see definition)</p>

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6.18 Manual shut-off valves	6.18 Manual shut-off valves	
<p>6.18.10 <u>Underground propane storage tank</u> Where a building is supplied from an underground propane storage tank, a manual gas shutoff valve shall be installed and readily accessible in the gas supply piping system or riser before it enters the building(s). It shall be identified on the piping or tubing to its use “Propane” by a prominent displayed sign immediately visible upstream of the valve and having red lettering of a minimum 1 in. (25 mm) high on a white background.</p>	<p><u>New</u></p>	<p>Provides information for first responders and others of a combustible gas “Propane” and a means to shut off the supply from the underground propane storage tank.</p>
<p>6.20.5 <u>Metallic gas hose</u> A metallic gas hose a) may be used to connect an appliance in commercial, industrial, or process applications when vibration, expansion, contraction, or other circumstances of an appliance installation warrant its use; b) shall not be used in a concealed location; c) shall neither extend from one room to another nor pass through any wall, partition, ceiling, or floor; and d) when used to connect an appliance to rigid supply piping, shall have a shut-off valve in the piping immediately upstream of the metallic gas hose; and e) shall comply with CGA CR96-001 or ANSI/CAN/UL 536.</p>	<p><u>Revised</u> A metallic gas hose a) may be used to connect an appliance in commercial, industrial, or process applications when vibration, expansion, contraction, or other circumstances of an appliance installation warrant its use; b) shall not be used in a concealed location; c) shall neither extend from one room to another nor pass through any wall, partition, ceiling, or floor; and d) when used to connect an appliance to rigid supply piping, shall have a shut-off valve in the piping immediately upstream of the metallic gas hose.</p>	<p>Harmonize with CSA B149.3 Code for the field approval of fuel-burning appliances and equipment.</p>
<p>6.21.1 <u>Certification for gas connectors</u> A gas connector shall be certified to CSA/ANSI Z21.24/CSA 6.10, ANSI Z21.69/CSA 6.16, ANSI Z21.75/CSA 6.27, CSA/ANSI Z21.54/CSA 8.4, or CSA/ANSI Z21.101/CSA 8.5.</p>	<p><u>Revised</u> A gas connector shall be certified to CSA/ANSI Z21.24/CSA 6.10, ANSI Z21.69/CSA 6.16, ANSI Z21.75/CSA 6.27, or CSA/ANSI Z21.101/CSA 8.5.</p>	<p>CSA/ANSI Z21.54/CSA 8.4 certified gas hose connectors are designed for use on portable appliances that are for use in unconcealed outdoors locations.</p>

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<p>6.22 Testing of piping, tubing, hose, and fittings</p> <p>6.22.2 Before connection requirements Except as required in Clause 6.22.5, Before an appliance is connected to, and before fuel gas is introduced to, a new gas piping system or a replacement, modification, or addition to an in-service gas piping system, the new, replacement, or modified-a gas piping and tubing system that contains fittings or joints not yet introduced to the fuel gas shall be pressure tested using either air, inert gas, or carbon dioxide in the following manner:</p> <ul style="list-style-type: none"> a) Appliance shut-off valves not rated for the test pressure being used and meters and pressure regulators shall not be connected to the piping or tubing system under test. b) The test pressure shall be measured by either a pressure gauge or equivalent device and, if a gauge is used, the minimum diameter shall be 3 in (75 mm) and the maximum range shall exceed the test pressure by at least 15% but not more than 300%. The pressure gauge or equivalent device shall be calibrated to read in increments of not more than 2 psig (14 kPa) or 2% of the maximum dial reading of the pressure gauge, whichever is less. c) A pressure recorder when used for this test shall be calibrated to the requirements of Item b). d) The pressure and duration of the test shall be in accordance with Table 6.3. 	<p>6.22 Testing of piping, tubing, hose, and fittings</p> <p>Revised Before an appliance is connected, a piping and tubing system that contains fittings or joints shall be pressure tested using either air, inert gas, or carbon dioxide in the following manner:</p> <ul style="list-style-type: none"> a) Appliance shut-off valves not rated for the test pressure being used and meters and pressure regulators shall not be connected to the piping or tubing system under test. b) The test pressure shall be measured by either a pressure gauge or equivalent device and, if a gauge is used, the minimum diameter shall be 3 in (75 mm) and the maximum range shall exceed the test pressure by at least 15% but not more than 300%. The pressure gauge or equivalent device shall be calibrated to read in increments of not more than 2 psig (14 kPa) or 2% of the maximum dial reading of the pressure gauge, whichever is less. c) A pressure recorder when used for this test shall be calibrated to the requirements of Item b). d) The pressure and duration of the test shall be in accordance with Table 6.3. 	<p>Requirement is specific to testing of the gas piping system, and does not include the appliance.</p>

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<p>6.22.3 After connection requirements After<u>Before</u> an appliance is connected,<u>first activated after its installation or after gas is reintroduced to part or all of a gas piping system after an interruption of service, one or more valves shall be selected to isolate the necessary portion of the gas piping system and all of the gas piping system downstream of these valves, through to the inlet of the appliance's valve train,</u> shall be tested <u>for leakage</u> in the following manner:</p> <p>a) Before turning on the gas for the test, a check shall be made to ensure that any opening from which gas can escape is closed.</p> <p>b) Immediately after allowing the gas into the piping or tubing system, a test shall be made to determine that no gas is escaping by carefully watching the test dial of the meter or by using a manometer<u>pressure gauge or equivalent device</u>.</p> <p>c) Where a meter is not provided, the pressure shall be measured with either a pressure gauge or equivalent device calibrated to read in increments not greater than those specified in Clause 6.22.2 b), with the following exceptions:</p> <p>i) for a system where the working pressure is 0.5 psig (3.5 kPa) or less, the pressure gauge or equivalent device shall be calibrated to read in increments of not greater than 1 in w.c. (250 Pa); and</p> <p>ii) for a system where the working pressure exceeds 0.5 psig (3.5 kPa) but does not exceed 5 psig (35 kPa), the pressure gauge or equivalent device shall be calibrated to read in increments of not greater than 2 in w.c. of pressure (0.5 kPa).</p> <p>d) The test described in Item b) shall be of a 10 min duration.</p> <p>e) Each appliance connection, valve, valve train, and system component shall be checked while under normal operating</p>	<p>Revised After an appliance is connected, the system shall be tested in the following manner:</p> <p>a) Before turning on the gas for the test, a check shall be made to ensure that any opening from which gas can escape is closed.</p> <p>b) Immediately after allowing the gas into the piping or tubing system, a test shall be made to determine that no gas is escaping by carefully watching the test dial of the meter or by using a manometer.</p> <p>c) Where a meter is not provided, the pressure shall be measured with either a pressure gauge or equivalent device calibrated to read in increments not greater than those specified in Clause 6.22.2 b), with the following exceptions:</p> <p>i) for a system where the working pressure is 0.5 psig (3.5 kPa) or less, the pressure gauge or equivalent device shall be calibrated to read in increments of not greater than 1 in w.c. (250 Pa); and</p> <p>ii) for a system where the working pressure exceeds 0.5 psig (3.5 kPa) but does not exceed 5 psig (35 kPa), the pressure gauge or equivalent device shall be calibrated to read in increments of not greater than 2 in w.c. of pressure (0.5 kPa).</p> <p>d) The test described in Item b) shall be of a 10 min duration.</p> <p>e) Each appliance connection, valve, valve train, and system component shall be checked while under normal operating pressure with either a liquid solution or a leak-detection device to locate any source of a leak.</p>	<p>Clauses 6.22.3 and 6.22.4: During the valve train leakage test, the use of a leak-detection device may detect a very minuet leak in a valve train component and interpret this as a safety hazard, prompting unnecessary repairs or replacement of valve train components.</p> <p>Changes harmonizes with the intent of NFPA 54/ANSI Z223.1 (US) National Fuel Gas Code.</p> <p>The NFPA 54 Handbook provides commentary that leakage testing is not intended to detect extremely small leaks such as those that might be present on appliance combination control valves. A maximum external leakage of 200 cubic centimeters per/hour is allowed for combination gas control valves certified to ANSI Z21.78•CSA 6.20 Combination Gas Controls for Gas Appliances.</p> <p>This has been allowed for many years, and incidentally, the same maximum external leakage is allowed for</p> <ul style="list-style-type: none"> - automatic gas valves certified to CSA: ANSI Z21.21•CSA 6.5 Automatic Valves for Gas Appliances - gas appliance regulators certified to CSA: ANSI Z21.18•CSA 6.3 Gas Appliance Pressure Regulators

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<p>pressure with either a liquid solution or a leak-detection device to locate any source of a leak.</p> <p><u>When leakage is observed, the gas supply to the appliance shall be shut off until the necessary repairs have been made.</u></p>		
<p><u>6.22.4 Valve train leak test</u></p> <p><u>Subsequent to a leak test prescribed in Clause 6.22.3, Each appliance connection, valve, valve train, and system component shall be checked for leaks at the threaded or flanged connection to gas piping, tubing, or hose, while under normal operating pressure with either a liquid solution or a leak-detection device. to locate any source of a leak. See Annex K.</u></p>	<p><u>New/Revised</u></p> <p>Each appliance connection, valve, valve train, and system component shall be checked while under normal operating pressure with either a liquid solution or a leak-detection device to locate any source of a leak.</p>	<p>See Clause 6.22.3 for rational.</p> <p>Additionally, Annex K has been rewritten <i>Annex K (informative)</i> <i>Allowable leakage of gas appliance valve train components</i> <i>Note: This annex is not a mandatory part of this Code.</i></p>
<p>6.23 Purging of gas piping systems after leak testing</p>	<p>6.23 Purging of gas piping systems after leak testing</p>	<p>The phrase “after leak testing” in the title was deleted as the requirements apply to any purging operation.</p>

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Table 6.4 Gas piping systems which require purging (See Clauses 6.23.1 to 6.23.3)		<u>Revised</u> Table 6.4 Gas piping systems which require purging (See Clauses 6.23.1 to 6.23.3)		Table revised to include a requirement for nominal piping, tubing, or gas hose size 8 in.																								
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<p>Note: Corrugated stainless steel tubing of size 2 in or less are to be sized accordingly to the same as piping.</p>		<p>Note: Corrugated stainless steel tubing of size 2 in or less are to be sized accordingly to the same as piping.</p>																										

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<p>6.23.4 Purge discharging and operations The open end of a gas piping system being purged shall be discharged directly to an outdoor location. Purging operations shall comply with all of the following requirements:</p> <p>a) During purging operations, the open point of discharge shall be continuously attended by a qualified person.</p> <p>b) The point of discharge shall be directly controlled during the purging operation by means of a quarter-turn shut-off valve having an attached operating handle within 5 ft (1.5 m) of the open end. No other valve shall be used to control or terminate the purge. The person doing the purging shall be in direct control of the purging gas supply by means of this valve, <u>and the point of discharge shall be monitored by a combustible gas indicator</u>. The purge line shall not be smaller than NPS ½.</p> <p>c) The point of discharge shall be located</p> <ul style="list-style-type: none"> i) at least 10 ft (3 m) from a source of ignition, and maximum precautions shall be taken to either remove or shut off any source of ignition prior to commencing the purge; ii) at least 10 ft (3 m) from a building or a building opening; and iii) at least 25 ft (7.5 m) from a mechanical air intake opening. <p>d) Purging operations introducing fuel gas shall be maintained by a continuously burning flame at the burner port(s) until a stable gas flame is established.</p> <p>e) The device used to ignite the pressure vented or purged gas shall be as follows:</p> <ul style="list-style-type: none"> i) a burner, not located in a combustion chamber, with a continuous or intermittent pilot; ii) two independent burners, not located in a combustion chamber, which reliably ignite one from the other; or iii) an approved burner for such purpose. 	<p>REVISED The open end of a gas piping system being purged shall be discharged directly to an outdoor location. Purging operations shall comply with all of the following requirements:</p> <p>a) During purging operations, the open point of discharge shall be continuously attended by a qualified person.</p> <p>b) The point of discharge shall be directly controlled during the purging operation by means of a quarter-turn shut-off valve having an attached operating handle within 5 ft (1.5 m) of the open end. No other valve shall be used to control or terminate the purge. The person doing the purging shall be in direct control of the purging gas supply by means of this valve. The purge line shall not be smaller than NPS ½.</p> <p>c) The point of discharge shall be located</p> <ul style="list-style-type: none"> i) at least 10 ft (3 m) from a source of ignition, and maximum precautions shall be taken to either remove or shut off any source of ignition prior to commencing the purge; ii) at least 10 ft (3 m) from a building or a building opening; and iii) at least 25 ft (7.5 m) from a mechanical air intake opening. <p>d) Purging operations introducing fuel gas shall be maintained by a continuously burning flame at the burner port(s) until a stable gas flame is established.</p> <p>e) The device used to ignite the pressure vented or purged gas shall be as follows:</p> <ul style="list-style-type: none"> i) a burner, not located in a combustion chamber, with a continuous or intermittent pilot; ii) two independent burners, not located in a combustion chamber, which reliably ignite one from the other; or iii) an approved burner for such purpose. 	<p>The purging operation must be monitored by the use of a combustible gas indicator to verify the gas concentration at the open purge points.</p>

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f) Persons not involved in the purging operations and persons smoking shall be prohibited from all areas within 10 ft (3 m) of the point of discharge.	f) Persons not involved in the purging operations and smoking shall be prohibited from all areas within 10 ft (3 m) of the point of discharge.	
<p>6.23.7 Purging indoors</p> <p>When the conditions in Clause 6.23.6 allow it, a gas piping system shall be purged in an indoor space only in accordance with one of the following options:</p> <p>a) the gas in the piping system shall be ignited at an appliance having an input rating up to and including 400 000 Btu/h (120 kW) with a readily accessible burner not located in a combustion chamber. Such burner shall be provided with a continuous source of ignition and a continuously burning flame shall be maintained at the burner port(s) until a stable gas flame is established; or</p> <p>b) for an appliance not equipped with a continuous pilot, in accordance with the procedure described in Annex H.</p> <p>When there is an open point of discharge during the purge, it shall be continuously attended by a qualified person, and the point of discharge shall be monitored by a combustible gas indicator.</p>	<p>REVISED</p> <p>When the conditions in Clause 6.23.6 allow it, a gas piping system shall be purged in an indoor space only in accordance with one of the following options:</p> <p>a) the gas in the piping system shall be ignited at an appliance having an input rating up to and including 400 000 Btu/h (120 kW) with a readily accessible burner not located in a combustion chamber. Such burner shall be provided with a continuous source of ignition and a continuously burning flame shall be maintained at the burner port(s) until a stable gas flame is established; or</p> <p>b) for an appliance not equipped with a continuous pilot, in accordance with the procedure described in Annex H.</p> <p>When there is an open point of discharge during the purge, it shall be continuously attended by a qualified person.</p>	The purging operation must be monitored by the use of a combustible gas indicator to verify the gas concentration at the open purge point.
6.25 Rooftop gas piping systems	6.25 Rooftop gas piping systems	
<p>6.25.1 Piping support</p> <p>Piping on a rooftop may be supported with treated wood blocks or material having characteristics at least equivalent to treated wood blocks and protection against outdoor exposure. The support spacing of P piping NPS 1 and greater shall comply with Table 6.2, and support shall be provided for every threaded fitting. Piping less than NPS 1 shall be supported</p> <p>a) vertically according to Table 6.2; and</p> <p>b) horizontally every 4 ft (1.2 m).</p>	<p>Revised</p> <p>Piping on a rooftop may be supported with treated wood blocks or material having characteristics at least equivalent to treated wood blocks and protection against outdoor exposure. The support spacing. Piping NPS 1 and greater shall comply with Table 6.2, and support shall be provided for every threaded fitting. Piping less than NPS 1 shall be supported</p> <p>a) vertically according to Table 6.2; and</p> <p>b) horizontally every 4 ft (1.2 m).</p>	Previous Clause was restrictive by only requiring threaded fittings to be supported.

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7 Installation of specific types of appliances	7 Installation of specific types of appliances	
7.2.4 Non-motive engines and turbines	7.2.4 Non-motive engines and turbines	
7.2.4.1 Certification An engine or turbine shall be certified to ANSI/CAN UL/ULC 2200 or comply with Clause 17.3 of CSA B149.3	REVISED An engine or turbine shall be certified or comply with Clause 17.3 of CSA B149.3	The ANSI/CAN UL/ULC 2200 Stationary Engine Generator Assemblies is now a referenced standard by the Standards Council of Canada and this Code.
7.2.4.4 Venting A regulator and relief valve installed in a gas supply system of an engine or turbine shall relieve to the outdoors, and the discharge shall terminate not less than a) 5 ft (2 m) from any opening in a building; and b) 10 ft (3 m) from any air-handling direct-vent appliance or source of ignition. Pressure regulators and overpressure relief devices installed in the valve train of an engine or turbine shall be vented in accordance with Clause 5.5, with outdoor termination in accordance with Clause 5.6. The venting of combination regulating and vaporizing equipment shall not be required where a solenoid valve is installed upstream of this equipment.	REVISED A regulator and relief valve installed in a gas supply system of an engine or turbine shall relieve to the outdoors, and the discharge shall terminate not less than a) 5 ft (2 m) from any opening in a building; and b) 10 ft (3 m) from any air-handling direct-vent appliance or source of ignition. The venting of combination regulating and vaporizing equipment shall not be required where a solenoid valve is installed upstream of this equipment.	Pressure control devices and overpressure relief devices installed in the valve train of an engine or turbine now have similar vent termination requirements as pressure control devices and overpressure relief devices installed in a gas piping system.
7.4 Commercial-type clothes dryers	7.4 Commercial-type clothes dryers	
7.4.3 Flexible exhaust ducting A UL 2158A certified flexible foil noncombustible-type duct may be used as a transition connection between the dryer exhaust and a rigid moisture duct if there is no requirement in the dryer installation instructions as for which type of duct material is to be used.	Revised A certified flexible foil noncombustible-type duct may be used as a transition connection between the dryer exhaust and a rigid moisture duct.	The UL 2158A Clothes Dryer Transition Duct standard has been published since 2013, and is now a referenced standard within this Code.
7.20 Direct-fired make-up air heaters (DFMAH) Note: This Clause is for direct-fired make-up air heaters (DFMAHs) that were certified to CGA 3.7 or CAN1-3.7-77R or earlier editions.	7.20 Direct-fired make-up air heaters (DFMAH) Note: This Clause is for direct-fired make-up air heaters (DFMAH) that were certified to CGA 3.7 or CAN1-3.7-77R or earlier editions.	Editorial

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<p>7.20.14 Kitchens When a DFMAH is either installed in or ducted to a kitchen, it shall be installed in accordance with the following procedure:</p> <p>a) Where the food preparation area and the area frequented by the public is interconnected by means</p> <ul style="list-style-type: none"> i) of either normally closed doors or a permanent opening(s) and the total free area of the opening(s) does not exceed 16 ft² (1.5 m²), the DFMAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust system shall not be less than 90% of the make-up air supply; or ii) other than those indicated in Item i), the DFMAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust system shall in no case be less than 100% or more than 105% of the make-up air supply. iii) of an approved engineering design. <p>b) All the other requirements of Clause 7.20 shall apply, where applicable.</p>	<p>Revised When a DFMAH is either installed in or ducted to a kitchen, it shall be installed in accordance with the following procedure:</p> <p>a) Where the food preparation area and the area frequented by the public is interconnected by means</p> <ul style="list-style-type: none"> i) of either normally closed doors or a permanent opening(s) and the total free area of the opening(s) does not exceed 16 ft² (1.5 m²), the DFMAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust system shall not be less than 90% of the make-up air supply; or ii) other than those indicated in Item i), the DFMAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust system shall in no case be less than 100% or more than 105% of the make-up air supply. <p>b) All the other requirements of Clause 7.20 shall apply, where applicable.</p>	<p>Provides for approved engineering design for pressurization of the kitchen area.</p> <p>By having a prescribed make-up air rate that is close to the set exhaust set rate there is an increased concern that products of combustion in the airstream may spill over to adjacent areas.</p> <p>As the kitchen exhaust hood air filters load up with grease-laden vapours, the exhaust rate decreases over time, causing the direct fired make-up air stream to enter into other areas which is undesirable.</p>
<p>7.21 Non-recirculating and recirculating direct gas-fired industrial air heaters (DFIAH)</p>	<p>7.21 Non-recirculating direct gas-fired industrial air heaters (DFIAH)</p>	<p>Revisions to Clauses 7.21.1 to 7.21.14 support the installation of recirculating direct gas-fired industrial air heaters (DFIAH).</p>
<p>7.21.4 A non-recirculating DFIAH shall be certified to be in compliance with ANSI Z83.4/CSA 3.7.</p>	<p>Deleted A non-recirculating DFIAH shall be certified to be in compliance with ANSI Z83.4/CSA 3.7.</p>	
<p>7.21.12 Installation limitations A non-recirculating DFIAH shall be installed only in industrial buildings, except as specified in Clauses 7.21.11 to 7.21.13.</p>	<p>Revised A non-recirculating DFIAH shall be installed only in industrial buildings, except as specified in Clauses 7.21.11 to 7.21.13.</p>	

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<p>7.21.23 Sleeping areas A non-recirculating DFIAH shall not supply air to an area where sleeping accommodation is provided.</p>	<p>Revised A non-recirculating DFIAH shall not supply air to an area where sleeping accommodation is provided.</p>	
<p>7.21.34 Functionality references A non-recirculating DFIAH may be used as a door air heater, a make-up air heater, or a space heater, or for a combination of these functions. When a non-recirculating DFIAH is used as a door air heater, or a make-up air heater, <u>or space heater</u>, the requirements of Clause 7.21 shall supersede the requirements of Clause 7.19 for door air heaters and Clause 7.20 for make-up heaters.</p>	<p>Revised A non-recirculating DFIAH may be used as a door air heater, a make-up air heater, or a space heater, or for a combination of these functions. When a non-recirculating DFIAH is used as a door air heater or a make-up air heater, the requirements of Clause 7.21 shall supersede the requirements of Clause 7.19 for door air heaters and Clause 7.20 for make-up heaters.</p>	
<p>7.21.45 Clearance to combustibles A non-recirculating DFIAH shall be installed with a clearance from combustible material not less than that marked on the rating plate. See also Clause 4.14.2.</p>	<p>Revised A non-recirculating DFIAH shall be installed with a clearance from combustible material not less than that marked on the rating plate. See also Clause 4.14.2.</p>	
<p>7.21.56 Supply air All supply air to a</p> <p>a) non-recirculating DFIAH shall be ducted directly from outdoors.</p> <p>b) <u>recirculating DFIAH shall be ducted directly from outdoors or from a combination of outdoor and return air from the space served by the recirculating DFIAH. The minimum ventilation rate (percent of outdoor air) shall be as indicated on the recirculating DFIAH rating plate.</u></p>	<p>Revised All supply air to a non-recirculating DFIAH shall be ducted directly from outdoors.</p>	

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<p>7.21.89 Exhaust options and exfiltration</p> <p>The design of the installation shall include adequate provisions to permit a non-recirculating DFIAH to operate at its rated capacity, taking into account the structure’s designed exfiltration rate, by providing properly designed relief openings or an interlocked powered exhaust system, or a combination of these methods.</p> <p>Where the installation is dependent upon exfiltration through the building envelope or through relief openings, the structure’s designed exfiltration rate and the size of relief openings shall be determined by a professional engineer.</p> <p>Relief openings shall be louvres or counterbalanced gravity dampers. Motorized dampers or closable louvres may be used, provided that they are interlocked so that the main burners do not operate until the air dampers are fully open.</p>	<p>Revised</p> <p>The design of the installation shall include adequate provisions to permit a non-recirculating DFIAH to operate at its rated capacity, taking into account the structure’s designed exfiltration rate, by providing properly designed relief openings or an interlocked powered exhaust system, or a combination of these methods.</p> <p>Where the installation is dependent upon exfiltration through the building envelope or through relief openings, the structure’s designed exfiltration rate and the size of relief openings shall be determined by a professional engineer.</p> <p>Relief openings shall be louvres or counterbalanced gravity dampers. Motorized dampers or closable louvres may be used, provided that they are interlocked so that the main burners do not operate until the air dampers are fully open.</p>	

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<p>7.21.910 Exhaust interlocking When a DFIAH is interlocked with a powered exhaust system, it shall be installed in accordance with Clause 7.21.13 where applicable or to the following:</p> <p>a) At start-up, the DFIAH and powered exhaust system shall have their fans powered simultaneously.</p> <p>b) Subject to compliance with Clause 7.21.7, the DFIAH's integral airflow proving system must prove sufficient airflow before the burner can be enabled.</p> <p>c) The powered exhaust system operation shall be proven within 2 min of the DFIAH fan start. Failure to prove operation of the powered exhaust system shall disable the heating; and</p> <p>d) When a variable air volume (VAV) DFIAH is interlocked to multiple powered exhaust air fans, the operating airflow capacity of the DFIAH and powered exhaust air shall be matched to provide satisfactory venting of other gas fired appliances.</p> <p><i>Note: For VAV systems, a space static pressure sensing system that controls the system and the space served is an acceptable interlock.</i></p>	<p><u>New</u></p>	<p>Provides the installer a method of interlocking a DFIAH with a powered exhaust system.</p>
<p>7.21.104 Intake location A non-recirculating DFIAH shall be located not less than 20 ft (6 m) horizontally from a vertical plane in which combustible gas, vapour, or dust is present.</p>	<p><u>Revised</u> A non-recirculating DFIAH shall be located not less than 20 ft (6 m) horizontally from a vertical plane in which combustible gas, vapour, or dust is present.</p>	

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<p>7.21.112 Fire alarm A DFIAH, when installed for the purpose of ventilating or pressurizing an elevator shaft or stairwell, shall be</p> <p>a) activated only by a fire alarm system under normal operation; and b) of the non-recirculating type DFIAH; and c) equipped with a normally open momentary manual switch that will permit testing of the DFIAH without activating the fire alarm system. This switch shall be either installed on or located directly adjacent to the DFIAH and shall be identified as to its function.</p>	<p>Revised A DFIAH, when installed for the purpose of ventilating or pressurizing an elevator shaft or stairwell, shall be</p> <p>a) activated only by a fire alarm system under normal operation; and b) equipped with a normally open momentary manual switch that will permit testing of the DFIAH without activating the fire alarm system. This switch shall be either installed on or located directly adjacent to the DFIAH and shall be identified as to its function.</p>	
<p>7.21.123 Storage garages a) when a DFIAH is installed for the ventilation of a storage garage and the DFIAH is solely actuated by a carbon monoxide sensor, the DFIAH shall be installed with a normally open momentary manual switch to permit testing of the DFIAH. This switch shall be located either on or directly adjacent to the DFIAH and shall be identified as to its function; and b) DFIAH shall provide adequate outside air to positively pressurize the storage space.</p>	<p>Revised When a DFIAH is installed for the ventilation of a storage garage and the DFIAH is solely actuated by a carbon monoxide sensor, the DFIAH shall be installed with a normally open momentary manual switch to permit testing of the DFIAH. This switch shall be located either on or directly adjacent to the DFIAH and shall be identified as to its function.</p>	

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<p>7.21.134 Kitchens When a DFIAH is either installed in or ducted to a kitchen, it shall be installed in accordance with the following procedure:</p> <p>a) Where the food preparation area and the area frequented by the public is interconnected by means</p> <ul style="list-style-type: none"> i) of either normally closed doors or a permanent opening(s) and the total free area of the opening(s) does not exceed 16 ft² (1.5 m²), the DFIAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust system shall not be less than 90% of the make-up air supply; or ii) other than those indicated in Item a) i), the DFIAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust system shall in no case be less than 100% or more than 105% of the make-up air supply; <u>or</u> iii) <u>of an approved engineering design.</u> <p>b) All the other requirements of Clause 7.21 shall apply, where applicable.</p>	<p>Revised When a DFIAH is either installed in or ducted to a kitchen, it shall be installed in accordance with the following procedure:</p> <p>a) Where the food preparation area and the area frequented by the public is interconnected by means</p> <ul style="list-style-type: none"> i) of either normally closed doors or a permanent opening(s) and the total free area of the opening(s) does not exceed 16 ft² (1.5 m²), the DFIAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust system shall not be less than 90% of the make-up air supply; or ii) other than those indicated in Item a) i), the DFIAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust system shall in no case be less than 100% or more than 105% of the make-up air supply. <p>b) All the other requirements of Clause 7.21 shall apply, where applicable.</p>	<p>Provides for approved engineering design for pressurization of the kitchen area.</p> <p>By having a prescribed make-up air rate that is close to the set exhaust set rate there is an increased concern that products of combustion in the airstream may spill over to adjacent areas.</p> <p>As the kitchen exhaust hood air filters load up with grease-laden vapours, the exhaust rate decreases over time, causing the direct fired make-up air stream to enter into other areas which is undesirable.</p>
<p>8 Venting systems and air supply for appliances</p>	<p>8 Venting systems and air supply for appliances</p>	
<p>8.32 <u>Overpressure protection for engine venting systems</u></p>	<p>New</p>	<p>The new Clauses are similar to those which have been approved for the CSA B139 Installation Code for Oil-Burning Equipment 2024 edition.</p>

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<p><u>8.32.1 Overpressure forces</u> <u>Combustion exhaust systems for engine-driven appliances shall be designed and constructed to withstand forces caused by the ignition of unburned fuel or shall have provisions to relieve those forces without damaging the exhaust system.</u></p>	<p><u>New</u></p>	<p>Listed sectional chimneys for engines, including generators, typically require an overpressure relief device to protect the exhaust system from engine backfires causing excess over-pressurization of the exhaust system. Depending on the complexity (number of elbows, total length), there have been incidents where engine backfires has caused failure of the listed chimney system.</p>
<p><u>8.32.2 Protection of fabricated venting systems</u> <u>Unlisted exhaust venting systems are deemed to meet the requirements of Clause 8.32.1 provided that</u></p> <p>a) <u>the unlisted chimney conform to Clause 8.18.2 and NFPA 211; and</u></p> <p>b) <u>are constructed of material that is at least equivalent to Schedule 10 stainless steel pipe*, fabricated with welded joints, and pressure tested to 50 psig (340 kPa).</u></p> <p><i>*Such as stainless steel pipe to ASME A312/312M.</i></p>	<p><u>New</u></p>	<p>The exemption for unlisted chimneys constructed of schedule 10 carbon or stainless steel pipe with welded joints is based on the pressure rating of the piping.</p> <p>For example, when calculated in accordance with ASME B31.1 Power Piping Code, the allowable internal pressure for NPS 24 piping heating to 1000°F is approximately 160 psig compared to a normal engine discharge operating pressure of less than 2 psi – there is a safety factor of 80:1. The internal pressure rating increases for smaller pipe size;</p> <p>For example, a NPS 12 pipe will have an internal working pressure of 212 psig for a safety factory of 100:1.</p>

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<p><u>8.32.3 Commercial or industrial requirements</u></p> <p><u>Where over-pressure relief devices which form part of a certified chimney system are used to meet the requirement of Clause 8.32.1, the over-pressure relief device may terminate inside a dedicated service room containing the engine-driven appliance or engine enclosure provided</u></p> <p><u>a) they are readily visible for inspection; and</u></p> <p><u>b) there is no visual evidence that the relief device is leaking combustion products.</u></p> <p><u>Note: Refer to manufacturer instructions for certified chimneys and vent connectors.</u></p>	<p><u>New</u></p>	<p>For listed sectional chimneys, overpressure relief devices are certified as part of the system however; they are not tested for exposure to ice build-up. For this reason, the CSA B139 technical committee determined that:</p> <ol style="list-style-type: none"> 1. The opening of the overpressure relief devices is a safety limit and not an operating control, and the frequency of operation (valve opening to relief excess gas pressure) is relatively very low. 2. In most of Canada, if installed outdoors the probability of the device being subjected to icing conditions that might impair its operation is high. 3. If operated indoors, it is a momentary operation to relief non-continuous overpressure such as would be exhibited due to engine backfire. As such, the duration of the release of combustion gases through the relief valve is also short. These devices have a spring-loaded guide to reseal the valve disc once the pressure returns to normal. 4. As this proposed change only applies to engine-driven appliances, the risk to occupants of exposure during a relief event is low because: <ol style="list-style-type: none"> (a) The probability of the space having occupants at the time of the release is low because these service rooms are not a normally occupied space, (b) The ventilation rates typically required to provide cooling for such rooms is relatively high,

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10 Residential fuelling appliances (RFAs) and vehicle fueling appliances (VFAs) used for natural gas without storage	10 Residential fuelling appliances (RFAs) and vehicle fueling appliances (VFAs) used for natural gas without storage	
<p>10.1.1 Vehicle refuelling appliance (VRA) installation A VRA that was certified to CSA 12.6 shall be installed in accordance with the manufacturer’s installation instructions and local requirements, including fire regulations, building codes, and zoning requirements.</p> <p>Note: This Clause is for VRA’s that were certified to CGA 12.6 – M94, and CSA 12.6-2004.</p> <p>A VFA shall be certified in compliance with the requirements of CSA/ANSI NGV 5.2.</p>	<p>Revised A VFA shall be certified in compliance with the requirements of CSA/ANSI NGV 5.2.</p>	<p>Previous Code versions identified that a vehicle refuelling appliance (VRA) was required to be certified to CSA 12.6.</p> <p>The Note: adds clarification that allows legacy vehicle refuelling appliances (VRA’s) currently in service may potentially be moved and re-installed.</p>
<p>10.1.4 The installation of a VFA shall comply with local requirements, including fire regulations, building codes, and zoning requirements.</p>	<p>DELETED The installation of a VFA shall comply with local requirements, including fire regulations, building codes, and zoning requirements.</p>	<p>Clause 10.1.4 was deleted as Clause 10.1.3 includes similar requirements.</p>
<p>10.1.54 RFA or VFA exposure A RFA or a VFA shall be installed outdoors unless certified and labelled for indoor installation. An indoor installation of a RFA or a VFA shall be in a non-living space.</p>	<p>Revised A VFA shall be installed outdoors unless certified and labelled for indoor installation.</p>	<p>RFA was added, and includes restriction for indoor installations that is consistent with the manufacturer’s installation instructions. Non-living space e.g., (garage)</p>
<p>10.1.65 RFA or VFA support A RFA or a VFA shall be installed on a firm support to prevent undue stress on the gas piping system and electrical conduits.</p>	<p>Revised A VFA shall be installed on a firm support to prevent undue stress on piping and conduit.</p>	<p>RFA was added, and includes defined term “gas piping system” and electrical conduits.</p>
<p>10.1.76 Protection The outdoor or indoor installation of a RFA or a VFA, and associated equipment shall be protected by approved means against vehicle impact, ice build-up, flooding, and blockage of ventilation, where required.</p>	<p>Revised The installation and associated equipment shall be protected by approved means against vehicle impact, ice build-up, flooding, and blockage of ventilation, where required.</p>	<p>The clarification for outdoor and indoor installations apply to a RFA and a VFA.</p>

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<p>10.1.87 Indoor fuelling When a vehicle is fuelled indoors, a gas detector shall</p> <ul style="list-style-type: none"> a) be installed within 6 in (150 mm) of the ceiling or highest point indoors above the fuelling area; <u>or be supplied by the RFA or VFA as mounted directly to the RFA or VFA;</u> b) be set to activate at natural gas detection levels at and above one-fifth of the lower limit of flammability of natural gas; c) upon activation, produce an audible and visual alarm; d) be interlocked with a mechanical ventilation system (see Clause 10.1.98); and e) be interlocked to shut off the <u>RFA or the VFA.</u> 	<p>Revised When a vehicle is fuelled indoors, a gas detector shall</p> <ul style="list-style-type: none"> a) be installed within 6 in (150 mm) of the ceiling or highest point indoors above the fuelling area; b) be set to activate at natural gas detection levels at and above one-fifth of the lower limit of flammability of natural gas; c) upon activation, produce an audible and visual alarm; d) be interlocked with a mechanical ventilation system (see Clause 10.1.9); and e) be interlocked to shut off the VFA. 	<p>The additional information for indoor fuelling provides an option when a gas detector is supplied by the manufacturer. These requirements applies to a RFA and a VFA.</p>
<p>10.1.93 Ventilation The mechanical ventilation system referred to in Clause 10.1.67 d) shall</p> <ul style="list-style-type: none"> a) vent the fuelling area to the outdoors at a flow rate of 25 times the flow rate of the VFA; and b) provide for minimum clearances from the discharge as specified in Table 5.3 <p><u>Alternatively, the mechanical ventilation system may be determined by the RFA or VFA installation instructions.</u></p>	<p>Revised The mechanical ventilation system referred to in Clause 10.1.6 d) shall</p> <ul style="list-style-type: none"> a) vent the fuelling area to the outdoors at a flow rate of 25 times the flow rate of the VFA; and b) provide for minimum clearances from the discharge as specified in Table 5.3 	<p>The addition provides the installer with the option to follow the installation instructions.</p>
<p>10.2 Pressure relief devices and other vents and vent lines</p>	<p>10.2 Pressure relief devices and other vents and vent lines</p>	
<p>10.2.3 Vent termination The vent piping <u>and tubing</u> shall be sized so that the capacity of the relief device is not restricted more than is allowed in the manufacturer's instructions.</p>	<p>Revised The vent piping shall be sized so that the capacity of the relief device is not restricted more than is allowed in the manufacturer's instructions.</p>	<p>The addition of tubing provides the installer with an option to piping.</p>

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<p>10.3 Piping, tubing, and hose</p> <p>10.3.1 The following requirements shall apply to all <u>gas piping systems and tubing</u> required to install a <u>RFA or a VFA</u> and its associated equipment:</p> <ol style="list-style-type: none"> a) The <u>RFA or VFA</u> and associated equipment shall be installed in accordance with the manufacturer's instructions. b) The gas supply line to the inlet of a <u>the RFA or the VFA</u> shall be installed in accordance with the requirements of Clause 6 of this Code or the authority having jurisdiction. c) Discharge piping <u>or tubing</u>, not connected at the factory, from the outlet of a <u>the RFA or the VFA</u> shall be installed in accordance with the requirements of CSA B108.1. 	<p>10.3 Piping, tubing, and hose</p> <p>Revised The following requirements shall apply to all piping and tubing required to install a VFA and its associated equipment:</p> <ol style="list-style-type: none"> a) The VFA and associated equipment shall be installed in accordance with the manufacturer's instructions. b) The gas supply line to the inlet of a VFA shall be installed in accordance with the requirements of Clause 6 of this Code or the authority having jurisdiction. c) Discharge piping, not connected at the factory, from the outlet of a VFA shall be installed in accordance with the requirements of CSA B108. 	<p>The addition of:</p> <ul style="list-style-type: none"> • gas piping system provides the installer with an option to piping and tubing • RFA is consistent with other changes • tubing provides the installer with an option to piping. • Editorial, title changed CSA B108 was split into two separate codes <ul style="list-style-type: none"> - CSA B108.1 compressed natural gas refuelling station installation code - CSA B108.2 liquified natural gas refuelling station installation code.
<p>10.3.2 Restrictions The use of <u>a gas</u> hose in an installation shall be restricted to the following:</p> <ol style="list-style-type: none"> a) <u>a fuelling hose shall</u> <ol style="list-style-type: none"> i) <u>meet CSA/ANSI NGV 4.2/CSA 12.52;</u> ii) <u>be limited to a maximum length of 25.6 ft (7.68 m); and</u> iii) <u>be supported above the floor or ground level or otherwise protected from mechanical damage from abrasion and being driven over; and</u> iv) <u>be equipped with a breakaway quick closing device; and</u> b) <u>a gas hose installed on the gas supply line to a RFA or VFA limited to a maximum length of 3 ft (1 m) when used to prevent abrasion damage resulting from vibration shall</u> <ol style="list-style-type: none"> i) <u>meet CSA 8.1 or CSA 8.3, and</u> ii) <u>be limited to a maximum length of 3 ft (1m).</u> 	<p>Revised The use of hose in an installation shall be restricted to the following:</p> <ol style="list-style-type: none"> a) a fuelling hose limited to a maximum length of 26 ft (8 m) and supported above the floor or ground level or otherwise protected from mechanical damage from abrasion and being driven over; and b) a hose limited to a maximum length of 3 ft (1 m) when used to prevent abrasion damage resulting from vibration. 	<p>The addition of the requirements in</p> <ol style="list-style-type: none"> a) harmonizes with the requirements with <ul style="list-style-type: none"> • NGV 5.1 and • NGV 5.2. b) i) are also in Clause 6.2.10 Hoses and hose fittings of this Code, and apply to a RFA and a VRA.

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<p>10.3.3 Fittings The number of fittings used in a supply line, discharge line, or gas hose shall be minimized to reduce the possibility of leakage.</p>	<p>Revised The number of fittings used in a supply line, discharge line, or hose shall be minimized to reduce the possibility of leakage.</p>	<p>To use the defined term “gas hose”.</p>
<p>10.4 Testing of piping, tubing, gas hose, and fittings The following requirements shall apply to a gas piping system, tubing, hose, RFA or VFA associated equipment, and components:</p> <p>a) They shall be tested in accordance with the manufacturer’s instructions.</p> <p>b) The supply line to the inlet of a RFA or a VFA shall be tested in accordance with the requirements of Clause 6.22.</p> <p>c) Discharge piping or tubing and gas hose, not connected at the factory, from the outlet of a RFA or a VFA shall be installed in accordance with the test pressure requirement of CSA B108.1.</p>	<p>Revised The following requirements shall apply to gas piping, tubing, hose, VFA equipment, and components:</p> <p>a) They shall be tested in accordance with the manufacturer’s instructions.</p> <p>b) The supply line to the inlet of a VFA shall be tested in accordance with the requirements of Clause 6.22.</p> <p>c) Discharge piping and hose, not connected at the factory, from the outlet of a VFA shall be installed in accordance with the test pressure requirement of CSA B108.</p>	<p>Add “gas” hose, “gas piping system,” and “tubing” as defined terms.</p> <p>This requirement applies to RFA and VFA and includes associated equipment.</p> <p>Editorial, title changed CSA B108 was split into two separate codes</p> <ul style="list-style-type: none"> - CSA B108.1 compressed natural gas refuelling station installation code - CSA B108.2 liquified natural gas refuelling station installation code.

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<p>Annex D (informative)</p> <p>Customer’s meter and service regulator installations</p> <p>Notes:</p> <p>1) This informative (non-mandatory) Annex is written in normative (mandatory) language to facilitate adoption where users of the Code or regulatory authorities wish to adopt it formally as additional requirements to this Code.</p> <p>2) This Annex is an extract from Clause 12.4.15 of CSA Z662.</p>	<p>Revised</p> <p>Customer’s meter and service regulator installations</p> <p>Notes:</p> <p>1) This informative (non-mandatory) Annex is written in normative (mandatory) language to facilitate adoption where users of the Code or regulatory authorities wish to adopt it formally as additional requirements to this Code.</p> <p>2) This Annex is an extract from Clause 12.4.15 of CSA Z662.</p>	<p>CSA Editorial</p>
<p>12.4.15.4</p> <p>Where located outside buildings, meters and regulators shall be installed in readily accessible locations. Where outside meters and regulators are installed in locations that do not afford reasonable protection from damage, such protection shall be provided. Meter protection configurations shall be included in the operating company’s operating and maintenance procedures.</p> <p>Note: The operating company can consider other related industry standards when developing meter protection configurations. In addition, consideration should be given to volume of vehicular traffic and proximity of travel, severity in the event of impact, space availability for installation, accessibility for future meter set work, reflectivity/retroreflectivity/visibility and aesthetics.</p>	<p>Revised</p> <p>Where located outside buildings, meters and regulators shall be installed in readily accessible locations. Where outside meters and regulators are installed in locations that do not afford reasonable protection from damage, such protection shall be provided.</p>	<p>Added to harmonize with CSA Z662:23.</p>

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<p>12.4.15.5 Regulators requiring vents for proper and effective operation, unless manufactured or equipped to limit the escape of gas from their vent opening, even in the event of an operating diaphragm failure, to less than 0.071 m³/h of natural gas or 0.028 m³/h of propane gas, shall be vented to the outside atmosphere and shall terminate in rain- and insect-resistant fittings. A regulator with vent limiting means, up to 0.071 m³/h of natural gas or 0.028 m³/h of propane gas, if installed indoors, shall be installed in a ventilated space only. Note: <i>These venting requirements are in accordance with the pressure regulator requirements for propane and natural gas applications in CSA B149.1.</i></p> <p><u>Notes:</u> 1. These venting requirements are in accordance with the pressure regulator requirements for propane and natural gas applications in CSA B149.1. 2. This is a commentary on Clause 12.4.15.5 of CSA Z662: The term “operating diaphragm” is intended to allow for the use of the T-OPCO (with or without thermal-protection over-pressure cut-off) type of regulators that are designed not to require venting to the outside atmosphere even where an operating diaphragm failure is possible. Since Clause 12.4.15.5 was originally written, there have been ongoing improvements in the technology of natural gas regulators. Between the operating diaphragm and the atmosphere, there is a second diaphragm known as the safety diaphragm. The safety diaphragm limits the escape of gas to the atmosphere to 0.071 m³/h of natural gas or 0.028 m³/h of propane gas in the event of an operating diaphragm failure. When the operating diaphragm fails, the regulator’s OPCO device automatically cuts off supply to the downstream piping, resulting in a service call.</p>	<p>Revised Regulators requiring vents for proper and effective operation, unless manufactured or equipped to limit the escape of gas from their vent opening, even in the event of an operating diaphragm failure, to less than 0.071 m³/h of natural gas or 0.028 m³/h of propane gas, shall be vented to the outside atmosphere and shall terminate in rain- and insect-resistant fittings. A regulator with vent limiting means, up to 0.071 m³/h of natural gas or 0.028 m³/h of propane gas, if installed indoors, shall be installed in a ventilated space only. Note: <i>These venting requirements are in accordance with the pressure regulator requirements for propane and natural gas applications in CSA B149.1.</i></p>	<p>Note 1. supports the revisions made to Clause 5.6 of this Code. Note 2. harmonizes with CSA Z662:23.</p>

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<p>12.4.15.6 Where regulator failure would result in the release of gas, open ends of the vents shall be located where the gas can escape freely into the atmosphere and away from any openings in the buildings. Clearances from building openings shall be commensurate with local conditions and the volume of gas that can be released, but shall not be less than those specified in Clause 12.4.15.7 CSA B149.1. Where regulators can be submerged during floods, either a special anti-flood-type breather vent fitting shall be installed or the vent line shall be extended above the height of the expected flood waters.</p>	<p><u>Revised</u> Where regulator failure would result in the release of gas, open ends of the vents shall be located where the gas can escape freely into the atmosphere and away from any openings in the buildings. Clearances from building openings shall be commensurate with local conditions and the volume of gas that can be released, but shall not be less than those specified in CSA B149.1. Where regulators can be submerged during floods, either a special anti-flood-type breather vent fitting shall be installed or the vent line shall be extended above the height of the expected flood waters.</p>	<p>Editorial update to harmonize with CSA Z662:23.</p>
<p><u>12.4.15.7</u> The discharge from overpressure protection devices, relief devices, internal relief valves, and the termination of any other vent not eligible to be discharged in a ventilated space as per Clause 12.4.15.5, shall terminate outdoors with the clearances specified in Table 12.5.</p>	<p><u>New</u></p>	<p>Added to harmonize with CSA Z662:23.</p>

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<p align="center">Table 12.5 <u>Clearance from centreline of service regulator relief vent discharge applicable for natural gas and propane applications (See Clause 12.4.15.7)</u></p>	<p>New</p>	<p>Added Table 12.5 to harmonize with CSA Z662:23.</p>																																	
<p><u>Clearance in m (ft.) from service regulator vent based on relief capacity</u></p> <table border="1"> <thead> <tr> <th><u>Clearance from</u></th> <th><u>Natural gas (CSA 6.18 certified OPCO (overpressure cut-off) regulators with limited relief of 1.5m³/h (50scf/h) or less)</u></th> <th><u>Natural gas up to an including (55m³/h) 1900 scf/h</u></th> <th><u>Natural gas over (55m³/h) 1900 scf/h</u></th> <th><u>Propane</u></th> </tr> </thead> <tbody> <tr> <td><u>Building Opening*</u></td> <td>0.3 (1 ft)</td> <td>0.9 (3 ft)</td> <td>3.0 (10 ft)</td> <td>0.9 (3 ft)</td> </tr> <tr> <td><u>Appliance Vent Outlet</u></td> <td><u>dimension A</u></td> <td><u>dimension B</u></td> <td><u>dimension B</u></td> <td><u>dimension B</u></td> </tr> <tr> <td><u>Moisture exhaust duct†</u></td> <td>0.9 (3 ft)</td> <td>0.9 (3 ft)</td> <td>0.9 (3 ft)</td> <td>0.9 (3 ft)</td> </tr> <tr> <td><u>Mechanical air intake</u></td> <td>0.9 (3 ft)</td> <td>3.0 (10 ft)</td> <td>3.0 (10 ft)</td> <td>3.0 (10 ft)</td> </tr> <tr> <td><u>Appliance air intake</u></td> <td>0.3 (1 ft)</td> <td>0.9 (3 ft)</td> <td>3.0 (10 ft)</td> <td>3.0 (10 ft)</td> </tr> <tr> <td><u>Source of ignition</u></td> <td>0.3 (1 ft)</td> <td>0.9 (3 ft)</td> <td>0.9 (3 ft)</td> <td>3.0 (10 ft)</td> </tr> </tbody> </table>			<u>Clearance from</u>	<u>Natural gas (CSA 6.18 certified OPCO (overpressure cut-off) regulators with limited relief of 1.5m³/h (50scf/h) or less)</u>	<u>Natural gas up to an including (55m³/h) 1900 scf/h</u>	<u>Natural gas over (55m³/h) 1900 scf/h</u>	<u>Propane</u>	<u>Building Opening*</u>	0.3 (1 ft)	0.9 (3 ft)	3.0 (10 ft)	0.9 (3 ft)	<u>Appliance Vent Outlet</u>	<u>dimension A</u>	<u>dimension B</u>	<u>dimension B</u>	<u>dimension B</u>	<u>Moisture exhaust duct†</u>	0.9 (3 ft)	0.9 (3 ft)	0.9 (3 ft)	0.9 (3 ft)	<u>Mechanical air intake</u>	0.9 (3 ft)	3.0 (10 ft)	3.0 (10 ft)	3.0 (10 ft)	<u>Appliance air intake</u>	0.3 (1 ft)	0.9 (3 ft)	3.0 (10 ft)	3.0 (10 ft)	<u>Source of ignition</u>	0.3 (1 ft)	0.9 (3 ft)
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<p><i><u>* Outdoor air intakes that are less than 8 in (200 mm) in diameter or equivalent area shall be considered a building opening in using the Table.</u></i></p> <p><i><u>† Applies to gas or electric dryer termination.</u></i></p> <p><u>Dimension A = 0.3 m (1 ft) in any direction from the vent termination of a gas appliance, and additionally 0.9 m (3 ft) horizontally when within a vertical distance of 4.6 m (15 ft) between the appliance vent termination and the relief vent termination.</u></p> <p><u>Dimension B = 0.9 m (3 ft) in any direction from the vent termination of a gas appliance, and additionally 0.9 m (3 ft) horizontally when within a vertical distance of 4.6 m (15 ft) between the appliance vent termination and the relief vent termination.</u></p> <p><u>Note: The outdoor air intake referred to in Table 12.5 is the ducting that goes from the outside of the structure and terminates into the return air plenum before the appliance, sometimes referred to as a fresh-air intake.</u></p>		

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<p><i>Annex K (informative)</i> Pressure regulators and overpressure protection devices <i>Note: This Annex is not a mandatory part of this Code.</i></p> <p><u><i>Annex K (informative)</i></u> <u>Allowable leakage of gas appliance valve train components</u></p> <p><u><i>Note: This annex is not a mandatory part of this Code.</i></u></p> <p><u>This annex describes how gas appliance valve train components should be assessed for leakage at time of initial putting into use and reactivating after temporarily discontinuing the fuel supply to the appliance. This applies only to</u></p> <ul style="list-style-type: none"> <u>• automatic gas valves certified to CSA/ANSI Z21.21/CSA 6.5;</u> <u>• gas appliance regulators certified to CSA: ANSI Z21.18/CSA 6.3; and</u> <u>• combination gas control valves certified to ANSI Z21.78/CSA 6.20.</u> <p><u>These devices are used on mass market gas appliances for the residential and small commercial/ industrial markets, and these certification standards allow them to leak as much as 200 cubic centimetres per hour (200 cm³/h and equivalent to 0.00706 ft³/h) through the valve body. This leakage is extremely small and not considered to be a safety hazard.</u></p> <p><u>When using an electronic combustible gas indicator (CGI), this leakage can sometimes be detected when using the most sensitive detection scale on the CGI. To confirm if the condition is potentially hazardous, the technician should switch the detector's scale to the "% LEL scale" (or similar name; the less sensitive scale) and position the sensing probe approximately 2 in (50 mm) from the source. If the detector indicates the presence of gas,</u></p>	<p>Deleted <i>Annex K (informative)</i> <i>Pressure regulators and overpressure protection devices</i> <i>Note: This Annex is not a mandatory part of this Code.</i></p>	<p>Previous Annex K was deleted as the information was no longer aligned with the updated changes made to Clause 5 Pressure controls.</p> <p>Annex K is now titled Allowable leakage of gas appliance valve train components.</p> <p>Supports the changes now referenced in Clause 6.22.4 Valve train leak test in this Code.</p>

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<p>then it should be treated as potentially hazardous; if not, then it should be treated as non-hazardous.</p> <p>This leakage rate is small in relation to the minimum ventilation rates specified in provincial and territorial building codes, so any leakage from these devices will almost certainly dissipate, consistently keeping indoor concentrations much lower than one that could ignite, usually without being detected by smell.</p>		
<p>Annex N (informative) Generators, compressors/pressure boosters, engines, and turbines <i>This informative (non-mandatory) Annex is written in normative (mandatory) language to facilitate adoption where users of the Code or regulatory authorities wish to adopt it formally as additional requirements to this Code.</i></p>	<p>Annex N (informative) Generators, compressors/pressure boosters, engines, and turbines <i>This informative (non-mandatory) Annex is written in normative (mandatory) language to facilitate adoption where users of the Code or regulatory authorities wish to adopt it formally as additional requirements to this Code.</i></p>	CSA Editorial
<p>N.1 Compressors/pressure boosters</p>	<p>N.1 Compressors/pressure boosters</p>	
<p>N.1.2 <u>Vibration isolation</u> A compressor shall be isolated from vibration at the inlet or outlet by a gas hose compliant with Clause 10.10 of CSA B149.3certified to the requirements of CAN/CSA-8.1, CAN/CSA-8.3, ULC/ORD C536, or CGA CR96.</p>	<p><u>Revised</u> A compressor shall be isolated from vibration at the inlet or outlet by a gas hose certified to the requirements of CAN/CSA-8.1, CAN/CSA-8.3, ULC/ORD C536, or CGA CR96.</p>	Reference change
<p>N.2 Engines and turbines</p>	<p>N.2 Engines and turbines</p>	

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<p>N.2.2 Requirements A turbine not falling under Clause 17.3.5 of CSA B149.3N.2.5, or an engine shall be equipped with</p> <ul style="list-style-type: none"> a) a safety shut-off valve or valves as required in Clause 17.3.3 of CSA B149.3N.2.3 that are certified in accordance with the requirements of CSA/ANSI Z21.21/CSA 6.5. It shall be controlled by a vacuum switch, oil pressure switch, or an equivalent device to prevent the flow of gas to the fuel system on the engine or turbine when it is not running; b) an automatic speed governor; c) a vacuum switch or low-oil-pressure switch; d) a zero-governor-type regulator or gas control valve; and e) a gas hose compliant with Clause 10.10 of CSA B149.3certified to the CAN/CSA-8.1, CAN/CSA-8.3, ULC C536, or CGA CR96, not exceeding 6 ft (2 m) in length, where the gas hose is installed downstream of the safety shut-off valve or valves required under Item a). The valve train upstream of the gas hose shall be mounted, anchored, and supported in such a manner as to minimize damage to the valve train from the engine or turbine vibration. 	<p>Revised A turbine not falling under Clause 17.3.5 of CSA B149.3 or engine shall be equipped with</p> <ul style="list-style-type: none"> a) a safety shut-off valve or valves as required in Clause 17.3.3 of CSA B149.3 that are certified in accordance with the requirements of ANSI Z21.21/CSA 6.5. It shall be controlled by a vacuum switch, oil pressure switch, or an equivalent device to prevent the flow of gas to the fuel system on the engine or turbine when it is not running; b) an automatic speed governor; c) a vacuum switch or low-oil-pressure switch; d) a zero-governor-type regulator or gas control valve; and e) a gas hose certified to the CAN/CSA-8.1, CAN/CSA-8.3, ULC C536, or CGA CR96, not exceeding 6 ft (2 m) in length, where the gas hose is installed downstream of the safety shut-off valve or valves required under Item a). The valve train upstream of the gas hose shall be mounted, anchored, and supported in such a manner as to minimize damage to the valve train from the engine or turbine vibration. 	<p>Reference changes</p>

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<p><u>N.2.3 Safety shut-off valves for input up to 12.5 MMBtu/h (3.66 MW) and inlet pressure up to 150 psig (1034 kPa)</u></p> <p>A turbine not falling under Clause 17.3.5 of CSA B149.3<u>N.2.5</u>, or an engine shall comply with the following. Where the input to an engine or turbine is</p> <ul style="list-style-type: none"> a) up to and including 2.5 MMBtu/h (732 kW), one safety shut-off valve marked C/I or two safety shut-off valves. However, if propane-fueled, a minimum of two safety shut-off valves shall be provided; b) over 2.5 MMBtu/h (732 kW), and up to and including 5 MMBtu/h (1464 kW), at least two safety shut-off valves shall be provided, each marked C/I, and shall be piped in series and wired in parallel; c) over 5 MMBtu/h (1464 kW), and up to and including 12.5 MMBtu/h (3660 kW), two safety shut-off valves shall be in series, each marked C/I. At least one safety shut-off valve shall be equipped with a proof of closure switch that is integrated with the start-up circuit; and d) over 12.5 MMBtu/h (3660 kW), at least two safety shut-off valves in series, each marked C/I. Each safety shut-off valve shall be equipped with a proof of closure switch that is integrated with the start-up circuit. The two safety shut-off valves shall be supervised by an approved valve proving system (VPS), which is integrated into the start-up circuit and prevent safety shut-off valves from opening when a leak is detected, or be equipped with an automatic vent valve installed in a vent line that is connected into the valve train immediately downstream of the first automatic safety shut-off valve. 	<p><u>Revised</u></p> <p>A turbine not falling under Clause 17.3.5 of CSA B149.3 or an engine shall comply with the following. Where the input to an engine or turbine is</p> <ul style="list-style-type: none"> a) up to and including 2.5 MMBtu/h (732 kW), one safety shut-off valve marked C/I or two safety shut-off valves. However, if propane-fueled, a minimum of two safety shut-off valves shall be provided; b) over 2.5 MMBtu/h (732 kW), and up to and including 5 MMBtu/h (1464 kW), at least two safety shut-off valves shall be provided, each marked C/I, and shall be piped in series and wired in parallel; c) over 5 MMBtu/h (1464 kW), and up to and including 12.5 MMBtu/h (3660 kW), two safety shut-off valves shall be in series, each marked C/I. At least one safety shut-off valve shall be equipped with a proof of closure switch that is integrated with the start-up circuit; and d) over 12.5 MMBtu/h (3660 kW), at least two safety shut-off valves in series, each marked C/I. Each safety shut-off valve shall be equipped with a proof of closure switch that is integrated with the start-up circuit. The two safety shut-off valves shall be supervised by an approved valve proving system (VPS), which is integrated into the start-up circuit and prevent safety shut-off valves from opening when a leak is detected, or be equipped with an automatic vent valve installed in a vent line that is connected into the valve train immediately downstream of the first automatic safety shut-off valve. 	<p>Reference change</p>

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<p><u>N.2.5 For input greater than 12.5 MMBtu/h (3.66 MW) and inlet pressure greater than 150 psig (1034 kPa)</u> A turbine having capacities greater than 12.5 MMBtu/h (3.66 MW) and inlet pressures greater than 150 psig shall be equipped with</p> <ul style="list-style-type: none"> a) two safety shut-off valves in series, each with proof of closure, and automatic vent valve installed downstream of the first safety shut-off valves. Each safety shutoff valve and the automatic vent valve shall be approved for use in the application; Note: See Annex K of CSA B149.3 for recommended requirements automatic valves to be approved for use. b) a control valve and a turbine controller to maintain proper turbine speed; and c) a gas hose, having a length recommended by the hose manufacturer for the application, shall be installed between the turbine and the control valve or between the turbine and the externally installed safety shutoff valve. 	<p><u>Revised</u> A turbine having capacities greater than 12.5 MMBtu/h (3.66 MW) and inlet pressures greater than 150 psi shall be equipped with</p> <ul style="list-style-type: none"> a) two safety shut-off valves in series, each with proof of closure, and automatic vent valve installed downstream of the first safety shut-off valves. Each safety shutoff valve and the automatic vent valve shall be approved for use in the application; Note: See Annex K for recommended requirements automatic valves to be approved for use. b) a control valve and a turbine controller to maintain proper turbine speed; and c) a gas hose, having a length recommended by the hose manufacturer for the application, shall be installed between the turbine and the control valve or between the turbine and the externally installed safety shutoff valve. 	Reference changes
<p><u>Annex O (informative)</u> <u>Special considerations for industrial occupancy</u></p> <p><u>Note:</u> <i>This informative Annex has been written in mandatory language to facilitate adoption where users of the Code or regulatory authorities wish to adopt it formally as additional requirements to this Code.</i></p>	<u>New</u>	New Annex for industrial occupancy.
<p><u>1.1 Inclusions [Substitution]</u> <u>This annex applies to the installation of appliances, equipment, components, accessories, and piping and tubing systems extending from the termination of the utility installation where gas is to be used for fuel purposes in locations classified as industrial occupancy.</u></p>	<u>New</u>	The content includes prescriptive and performance requirements as an overlay to the main body of this Code, Clauses 1, 4, and 6.

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<p><u>1.7 Application [New]</u> The requirements of the main body of this Standard apply in addition to this Annex. Where a conflict or inconsistency exists between the main body and this Annex, the requirements of this Annex shall take precedence.</p> <p>Note: The clauses in this Annex are one of the following with respect to clauses in the main body of this Standard:</p> <ul style="list-style-type: none"> a) “[Addition]” — supplemental requirements have been added to an existing clause; b) “[Deleted]” — clause deleted; c) “[Modification]” —clarification or rewording has been made to the corresponding clause, but not a substitution invalidating the clause. New words are displayed with underlined text and struck words are shown with strikethrough text; d) “[New]” — a new clause is added; and e) “[Substitution]” — clause supersedes the clause in the main body in its entirety. 	<u>New</u>	
<p><u>2 Reference publications [Modification]</u> ASME International B31.1-2022 <i>Power Piping [New]</i></p>	<u>New</u>	
<p><u>4.3.1 Initial installation [Modification]</u> Before leaving installations, installers, including the professional of record if applicable, shall ensure that the appliance, accessory, component, equipment, or piping and tubing they installed complies with the requirements of this Code, and the person initially activating the appliance shall ensure that the appliance is in safe working order.</p>	<u>New</u>	

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<p><u>4.3.2 User instructions [Modification]</u> Installers, including the professional of record if applicable, shall instruct users in the safe and correct operation of all appliances or equipment that they install.</p>	<u>New</u>	
<p><u>4.3.3 Manufacturer instructions [Modification]</u> The installer, including the professional of record if applicable, shall ensure that the manufacturer's instructions supplied with the appliance are left with the user.</p>	<u>New</u>	
<p><u>4.3.4 Replacement parts [Modification]</u> Before installing any replacement part of an appliance, the installer, including the professional of record if applicable, shall ensure that the replacement part provides operational characteristics at least equivalent to those of the original part.</p>	<u>New</u>	

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<p><u>4.3.5 Appliance conversion [Modification]</u> <u>When the installation or conversion of an appliance constitutes a conversion from another form of energy, the installer, including the professional of record if applicable, shall advise the user of the appliance, at the time of installation or conversion, to have the former form of energy either removed or left safe and secure from accidental activation. For example, the user shall be advised</u></p> <ul style="list-style-type: none"> <u>a) in the case of a fuel oil supply tank</u> <ul style="list-style-type: none"> <u>i) to remove the fill pipe, and cap or plug the exposed fill pipe opening to an inside tank;</u> <u>ii) to shut off the tank outlet valve, remove the filter, and plug or cap the valve outlet; and</u> <u>iii) where the tank is located outdoors, to disconnect all exposed piping or tubing, and cap or plug the piping or tubing as close as practicable to the tank;</u> <u>b) in the case of a fuel oil central distributing system</u> <ul style="list-style-type: none"> <u>i) to shut off the fuel oil supply line valve located within the building; and</u> <u>ii) to disconnect the fuel oil supply line immediately downstream of the meter, and cap or plug the outlet of the meter;</u> <u>c) in the case of a propane system</u> <ul style="list-style-type: none"> <u>i) to shut off the cylinder or tank valve; and</u> <u>ii) to disconnect and cap or plug the propane gas piping system outdoors; and</u> <u>d) in the case of an electrical appliance</u> <ul style="list-style-type: none"> <u>i) to shut off the power supply to the electrical appliance at the switch; and</u> <u>ii) to ensure that the overcurrent protection, fuse, or circuit breaker has been removed or put in the off position.</u> 	<p><u>New</u></p>	

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<p><u>6.1.3 Welding [New]</u> Welded steel piping shall conform with the requirements of CSA Z662, ASME B31.1, or ASME B31.3. Piping systems with design pressure of 100 psig (700 kPa) or less may conform to the requirements of Clause 6.</p>	<u>New</u>	
<p><u>6.2.10 Minimum working pressure [Modification]</u> Except as required in Clauses 6.2.11 and 6.20.5, every hose and hose fitting shall have a minimum working pressure of 350 psig (2400 kPa) and shall comply with CSA 8.1, CSA 8.3, ANSI/CAN/UL 536, or CGA CR96-001.</p>	<u>New</u>	
<p><u>6.4 Volume of gas to be used for sizing gas piping systems [New]</u> The volumetric flow of gas to be used for sizing gas piping systems shall equal the maximum expected system flow for all appliances, except appliances deemed as a spare appliance, plus a 20% margin. Note: <i>The maximum expected system flow may be determined from historical gas flow records for existing facilities or, for new facilities, from the mass and energy balance calculations used to design the facility. [New]</i></p>	<u>New</u>	
<u>6.4.1 Total volume [Deleted]</u>	<u>New</u>	
<u>6.4.2 Volume determination [Deleted]</u>	<u>New</u>	
<u>6.4.3 Diversity load [Deleted]</u>	<u>New</u>	

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<p><u>6.8.3 Piping support [Modification]</u> <u>Piping or tubing shall not be supported by other piping or tubing, and shall be installed with individual supports of sufficient strength and quality. Supports shall be spaced in accordance with one of the following requirements:</u> a) <u>Table 6.2;</u> b) <u>ASME B31.1; or</u> c) <u>ASME B31.3.</u></p>	<u>New</u>	
<p><u>6.8.6 Filter requirements [Modification]</u> <u>When a filter is used in a piping system, a pressure indication device shall be installed to detect excessive pressure drop across the filter. This pressure indication device shall not be used to satisfy the requirements of Clause 6.8.10.</u></p>	<u>New</u>	
<p><u>6.8.10 Test ports [Modification]</u> <u>A test port or pressure indication device shall be installed immediately downstream of a line pressure regulator or an industrial pressure regulator to allow adjustment of the set point of the regulator except where the pressure regulator can be adjusted while measuring and observing the supply pressure at any appliance being served by the pressure regulator. Where opening the test port could create an uncontrolled release of gas, the test port shall be equipped with a manual shut-off valve that is either capped or plugged.</u></p>	<u>New</u>	
<p><u>6.8.11 Air and oxygen [New]</u> <u>Air or oxygen shall not be introduced to the gas supply upstream of the manual shutoff valve specified in Clause 6.18.2.</u></p>	<u>New</u>	

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<p><u>6.9.2 Type [Modification]</u> <u>Piping of NPS 2-1/2 to 4 shall be either press-connect fittings certified to CSA/ANSI LC 4/CSA 6.32 or welded or welded flange pipe joints.</u> <u>Piping greater than NPS 4 shall have welded or welded flanged pipe joints.</u></p>	<p><u>New</u></p>	
<p><u>6.9.4 Welding acceptance criteria [Substitution]</u> <u>The weld acceptance criteria for any steel piping with design pressure of 100 psig (700 kPa) or less may be by visual inspection of the external weld surface, as well as the internal weld surface where accessible without the use of special tools. Acceptance criteria of the weld shall be in accordance with the requirements of Annex J.</u> <u>Note: Hand mirrors and flashlights are not considered to be special tools.</u></p>	<p><u>New</u></p>	
<p><u>6.13.1 Dirt pocket installation [Modification]</u> <u>A dirt pocket shall be installed at the bottom of any piping or tubing on the final drop serving an appliance other than</u> <u>a) an illuminating appliance;</u> <u>b) a range;</u> <u>c) a clothes dryer;</u> <u>d) an outdoor grill;</u> <u>e) a portable appliance or equipment;</u> <u>f) a decorative appliance;</u> <u>g) a gas log;</u> <u>h) a room heater; and</u> <u>i) an appliance incorporating a sediment trap; and</u> <u>j) an appliance where equipment used for sediment removal is installed upstream.</u></p>	<p><u>New</u></p>	

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<p><u>6.13.5 Drip pocket installation [Modification]</u> <u>A drip pocket shall be provided at all points in a piping system where condensation can collect, such as points where the piping is exposed to either wide ranges or sudden changes in temperature, except where other equipment is installed upstream of the appliance for moisture removal.</u></p>	<p><u>New</u></p>	
<p><u>6.18.1 Certification or approval [Addition]</u> <u>A manual shut off valve shall be certified to CSA 3.11, CSA 3.16, or CSA/ANSI Z21.15/CSA 9.1, or approved for use with gas, and it shall not be subjected to either a temperature or a pressure outside of its certified rating range. For manual shut-off valves having a diameter larger than NPS 8, a manual shut- off valve certified by a nationally recognized certification organization acceptable to the authority having jurisdiction may be used.</u></p>	<p><u>New</u></p>	
<p><u>6.18.4 Type and size [Modification]</u> <u>A readily accessible manual shut-off valve shall be of either the ball, butterfly, eccentric, or lubricated- plug-type where</u> <u>a) the piping is larger than NPS 1;</u> <u>b) the tubing is 1 in (25.4 mm) OD or larger; or</u> <u>c) the pressure exceeds 0.5 psig (3.5 kPa).</u></p>	<p><u>New</u></p>	
<p><u>6.18.5 Several piping systems [Modification]</u> <u>When a shut off valve controls several piping systems, it shall be</u> <u>a) readily accessible for operation at all times;</u> <u>b) provided with an installed handle or hand wheel;</u> <u>c) installed to provide protection from damage; and</u> <u>d) clearly marked with an enamelled metal, substantial fibre, or other permanent tag, so that the piping system it controls can be readily identified.</u></p>	<p><u>New</u></p>	

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<p><u>6.20.6 Interconnected equipment [Modification]</u> When tanks or pieces of equipment are interconnected, provisions shall be made to compensate for vibration and differential settling of the tanks, equipment, and interconnecting piping. Where a gas hose is used for this purpose, it shall be a metallic gas hose complying with ULC/ORD 20.6, CGA CR96-001, ANSI/CAN/UL 536, or a Type II or Type III gas hose complying with CSA 8.1.</p>	<p><u>New</u></p>	
<p><u>6.22.1 Requirements [Modification]</u> The source of test pressure shall be isolated while the piping or tubing system is under test, and the system shall retain the test pressure for the minimum duration required in Table 6.3 and Clause 6.22.4 without showing any drop in pressure.</p>	<p><u>New</u></p>	
<p><u>6.22.2 Before connection requirements [Substitution]</u> Before an appliance is connected, a piping and tubing system that contains fittings or joints shall be pressure tested either pneumatically or hydrostatically.</p>	<p><u>New</u></p>	
<p><u>Table 6.3 [Modification]</u> Pressure test requirements (See Clauses 6.22.1 and 6.22.7)</p>	<p><u>New</u></p>	

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<p><u>6.22.7 Pneumatic testing [New]</u> <u>If the system is pressure tested pneumatically either by using air, inert gas or carbon dioxide,</u> <u>a) appliance shut-off valves not rated for the test pressure being used and meters and pressure regulators shall not be connected to the piping or tubing system under test;</u> <u>b) one or more pressure-indicating gauges shall be connected to the piping or tubing system under test in a way in which each gauge shall experience the full test pressure;</u> <u>c) pressure-indicating gauges shall be</u> <u>i) graduated dial indicating pressure gauges with a minimum diameter of 3 in (75 mm) ranged no less than 15% nor more than 300% of the test pressure or test gauges with an accuracy of +/- ¼%;</u> <u>ii) each gauge shall be calibrated against a standard dead weight tester or a calibrated master gauge;</u> <u>iii) the gauge shall have been calibrated within 12 months prior to each test, or any time there is reason to believe the gauge is in error;</u> <u>d) dial increments shall be the lesser of 2 psig (14 kPa) or 2% of the maximum dial reading of the pressure gauge;</u> <u>e) a pressure recorder when used for this test shall be calibrated to the requirements of Item c);</u> <u>f) the possibility of brittle fracture shall be considered when conducting pressure tests at low temperatures;</u> <u>g) all wrapped and/or factory-coated piping and tubing systems (except for CSST and copper) of all sizes and lengths shall be tested at a minimum pressure of 100 psig (700 kPa); and</u> <u>h) the pressure and duration of the test shall be in accordance with Table 6.3.</u> <u>Note: These test pressures and test durations are minimum requirements. Circumstances can require test pressures and test durations in excess of those shown in the Table 6.3.</u></p>	<p><u>New</u></p>	

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<p>6.22.8 Hydrostatic testing [New] <u>If the system is pressure tested hydrostatically,</u> <u>a) appliance shut-off valves not rated for the test pressure being used and meters and pressure regulators shall not be connected to the piping or tubing system under test;</u> <u>b) one or more pressure-indicating gauges shall be connected to the piping or tubing system under test in a way in which each gauge shall experience the full test pressure;</u> <u>c) pressure-indicating gauges shall be</u> <u>i) graduated dial indicating pressure gauges with a minimum diameter of 3 in (75 mm) ranged no less than 1½ nor more than 4 times the test pressure or test gauges with an accuracy of +- ¼%;</u> <u>ii) each gauge shall be calibrated against a standard dead weight tester or a calibrated master gauge;</u> <u>iii) the gauge shall have been calibrated within 12 months prior to each test, or any time there is reason to believe the gauge is in error;</u> <u>d) dial increments shall be the lesser of 2 psig (14 kPa) or 2% of the maximum dial reading of the pressure gauge;</u> <u>e) a pressure recorder when used for this test shall be calibrated to the requirements of Item c);</u> <u>f) the possibility of brittle fracture shall be considered when conducting pressure tests at low temperatures;</u> <u>g) the fluid shall be water unless there is the possibility of damage due to freezing in which case a mixture of water and methanol (or equivalent alternative) shall be used as the medium;</u> <u>h) the hydrostatic test pressure at every point in a piping system shall be not less than 1.5 times the design pressure;</u> <u>i) all wrapped and/or factory-coated piping and tubing systems (except for CSST and copper) of all sizes and lengths shall be tested at a minimum pressure of 100 psig (700 kPa);</u></p>	<p><u>New</u></p>	

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<p>j) the hydrostatic test shall be maintained for at least 30 minutes or whatever time is required to complete the inspection of joints for leakage; and</p> <p>k) once the hydrostatic test is successfully completed, the piping and tubing system shall be fully drained and then dried.</p>		
END.		