Any quotations in this document are taken directly from the CSA – B149.1-2005
NATURAL GAS and PROPANE INSTALLATION CODE
* Summary of Changes – not intended to be all inclusive

Clause in New Edition **Source: Canadian Standards Association (2005), *CSA B149.1-2005,* Mississauga: CSA**	**Clause in previous edition** **Source: Canadian Standards Association (2000), *CSA B149.1-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
NOTE: The B149.1-2005 covers both Natural Gas and Propane Installations. Where a clause is specific to one fuel the wording will specify **"For Natural Gas applications"** or "For **Propane applications"**.		
1. Scope	1. Scope	
1.2 **This Code does not apply to** (l) butane fuel cylinders of 150 g capacity or less; and	**1.2 This Code does not apply to** (l) butane fuel cylinders of 250 g capacity or less; and	Revised – The volume was reduced to 150 g from 250 g. Cylinders of 225 g are being used in restaurants for portable cooking. Incidents have occurred and no one appears to have jurisdiction for these cylinders.
1.4 This Code and any Standard referenced in it do not make or imply any assurance or guarantee with respect to life expectancy, durability, or operating performance of equipment and materials referenced in the Code.	New Clause	This was an amendment to clarify that the Code is intended to address safety performance. It is not intended to guarantee a product's life expectancy, durability, or operating performance.
1.6 In this Code, unless approved otherwise by the authority having jurisdiction, "shall" indicates a mandatory requirement; "should" indicates a recommendation or that which is advised but not mandatory; "may" indicates an advisory or optional statement. Notes to the text do not include mandatory or alternative requirements. The purpose of a note is to separate from the text explanatory or informative material that is not properly a part of this Code. Notes to figures and tables, however, are considered part of the figure or table and are written as mandatory requirements. Legends to figures are also written as mandatory requirements.	**3.1.2** Where the word "shall" is used in this Code, it indicates a requirement unless ***approved*** otherwise by the ***authority having jurisdiction.***	**Revised.**
2. Reference publications	**2.3** Reference publications	
***3 Definitions**	**2.1 Definitions**	

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Heater – **Non-recirculating direct gas-fired industrial air heater –** a heater in which all the products of combustion generated by the gas-burning device are released into the airstream being heated and whose purpose is to offset building heat loss by heating only outside air.	**New definition.**	This definition was required for the new Section 7.21 covering Non-recirculating direct gas-fired industrial air heater (DFIAH) and to maintain continuity with the applicable CSA Standard 3.7 and is considered a subset under heater.
Fitting - an item in a piping or tubing system that is used as a means of connection, such as an elbow, return bend, tee, union, bushing, coupling, or cross, but does not include such functioning items as a valve or pressure regulator.	**Fitting -** an item in a piping or tubing system that is used as a means of connection, such as an elbow, return bend, tee, union, bushing, coupling, cross, or nipple, but does not include such functioning items as a valve or pressure regulator.	Revised by deleting the word nipple. A nipple should not be included in the definition of fitting since a nipple is a type of pipe.
Maximum operating pressure – the maximum pressure to which any component or portion of fuel system can be subjected (Accepted Revisions 2001)	**Maximum Allowable Operating Pressure – the maximum pressure to which any component or portion of the fuel system can be subjected.**	Rationale: The term “Maximum allowable operating pressure” is not used in the Code other than in the “Definitions”. The term “Test pressure” is mentioned in Table 5.22.2.
Overpressure Protection Device – a device that under abnormal conditions will act to reduce, restrict, or shut off the supply of gas flowing into a system to prevent gas pressure in that system from exceeding the rated pressure of the system components. **Monitoring regulator** – an overpressure protection device that functions as a second gas pressure regulator in series with the primary gas pressure regulator. **Overpressure relief device** – an overpressure protection device that functions by discharging gas from the downstream system. **Overpressure shut-off device** – an overpressure protection device that functions by completely shutting off the flow of gas into the downstream systems.	**New definitions.**	These definitions were required for the revisions in Clause 5 covering Pressure Controls and to maintain continuity with CSA Standard 6.22 for Line Pressure Regulator.

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Regulator – **Line Pressure regulator –** a gas pressure regulator intended for installation in a gas distribution system between the utility service regulator or first-stage regulator (propane) and gas utilization equipment. **Lock-up (positive shut-off regulator** – a regulator that is capable of maintaining a reduced outlet pressure when the fuel flow condition is static.	**New definitions.**	These definitions were required for the revisions in Clause 5 covering Pressure Controls and to maintain continuity with CSA Standard 6.22 for Line Presser Regulator. A definition for Line Pressure regulator was included to describe its function A definition for a lock-up regulator was added to be consistent with the B149.3 Code.
4. General	**3. General**	
4.2.11		
4.3 Responsibilities of the installer	**3.3 Responsibilities of the Installer**	
4.3.7 It shall be the responsibility of the installer of a piping or tubing system to perform pressure tests in accordance with Clause 6.22.2 and to ensure that the piping or tubing system is gas-tight at the completion of the tests.	**3.3.7** It shall be the responsibility of the ***installer*** **(a)** of a piping or tubing system to perform pressure tests in accordance with Clause 5.22.2 and to ensure that the piping or tubing is gas tight at the completion of the tests; and	Revised by creating a new Clause for part (b) to clarify the responsibilities for different installers that are inevitably involved in completing a gas installation <see below>. The installer of the piping or tubing is not necessarily the same one who installs any of the gas appliances.
4.3.8 It shall be the responsibility of the installer of an appliance to perform tests in accordance with Clause 6.22.3 and to ensure that the system is gas-tight at the completion of the tests.	**3.3.7** It shall be the responsibility of the ***installer*** (a) <see above> **(b)** of the ***appliance*** to perform tests in accordance with Clause 5.22.3 and to ensure that the system is gas tight at the completion of the tests.	This new Clause was added to increase the awareness that it is the responsibility of the appliance installer to ensure the connection, valve train and system components are gas-tight.
4.17 Appliance ductwork connections		
***4.17.2** Return air ducts in an enclosure shall be in accordance with the provisions set out for duct systems in **The National Building Code of Canada.**	**New Clause**	To clarify that the installation requirements for return air ducts systems are in the Building Code.

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4.22 High-altitude installations	**3.22 High Altitude Installations**	
4.22.1 For high-altitude installations, appliances shall be certified in compliance with CSA CGA 2.17 and shall be adjusted to the high-altitude rating shown on the nameplate when installed at elevations between 2000 ft and 4500 ft (600 m and 1350 m) above sea level. **5.2 Pressure regulators**	**3.22.1** New ***appliances*** with inputs up to and including 400,000 (120 kW) and certified for high altitude operation shall be adjusted to the high altitude rating shown on the nameplate when installed at elevations between 2000 ft and 4500 ft (600 m and 1350 m) above sea level.	Revised – To clarify that all appliances new or used shall be adjusted for high altitude locations in accordance with CSA CGA-2.17 and the manufacturers instructions. The requirements of Clause 4.22.1 should not be restricted to new appliances.
5.2.1 General		
5.2.1.3 A ***pressure regulator*** shall not be bypassed.	4.2.6 A system regulator (propane) or line (natural gas) shall not be bypassed.	Rationale: no regulator should be bypassed
5.2.1.4 When a ***line pressure regulator*** is required and the inlet supply pressure to the ***regulator*** exceeds 0.5 psig (3.5 kPa), it shall be of the positive shut-off type.	New Clause	Rationale: To correct differences in terms between B149 and the standard for line pressure regulators CSA 6.22.
5.2.1.5 A ***line pressure regulator*** shall have: (a) a manual shut-off ***valve*** installed upstream of the ***regulator***; and (b) either a line ***relief device*** or an ***overpressure protection device.*** The ***regulator*** vent and ***relief device*** vent shall terminate outdoors.	**New Clause**	**Rationale: (2003 Accepted Revisions): Moved from 4.2.7. The term "or line pressure regulator (natural gas)" was added to this section by letter ballot 01-02 at the June 2001 B149 meeting to correct differences between B149 and the standard for line pressure regulators which permits overpressure protection devices (overpressure shutoff device, overpressure relief device or monitoring regulator) not just internal relief. The different regulators for propane and natural gas have been revised to only line pressure regulators because the scope of CSA 6.22 Line Pressure Regulators is being revised so that the standard applies to both propane and natural gas.**
5.2.2 Additional requirements for pressure regulators for propane applications	**4.1 Pressure Inside Buildings**	

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5.2.2.4 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) shall be exempt from the requirement of Clause 5.2.1.5(b). A ***regulator*** with vent limiting means shall be installed in a ***ventilated*** space only.	**4.1.4 When used on a 2 psig (14 kPa) system, a** pressure regulator **equipped with a leak limiting system orificed for 1 ft^3/h (0.0283 m^3/h) shall be exempt from the requirement of Clause 4.1.7(b).**	**Clause revised to be specific to propane and to reflect changes in CSA 6.22. The requirements for vent-lined regulators to be installed in a ventilated space only was added for extra safety.**
5.2.3 Additional requirements for pressure regulators for natural gas applications 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 2.5 ft3/h (0.0706 m3/h) shall be exempt from the requirement of Clause 5.2.1.5(b). A ***regulator*** with vent limiting means shall be installed in a ***ventilated*** space only.	**4.1.4 When used on a 2 psig (14 kPa) system, a** pressure regulator **equipped with a leak limiting system orificed for 1 ft^3/h (0.0283 m^3/h) shall be exempt from the requirement of Clause 4.1.7(b).**	**Clause revised to be specific for natural gas . The requirement for vent limiting regulator to be installed in a ventilated space was added for extra safety.**
5.3 Relief devices: Except as specified in Clauses 5.2.2.4 and 5.2.3, when a ***line pressure regulator*** is not equipped with an internal ***relief device***, it shall have immediately downstream an ***overpressure protection device*** or a line ***relief device*** as required in Clause 5.2.1.5(b), with a discharge setting of either (a) not less than 2 times and not more than 3 times the delivery pressure on systems operating up to 5 psig (35 kPa); or (b) not less than 1.5 times and not more than 2 times the delivery pressure on systems operating at more than 5 psig (35 kPa). The relieving pressure setting of the line ***relief device*** shall be not higher than that of the lowest-rated ***component*** or ***accessory*** located downstream.	**4.3 Line Relief Devices** **Except as specified in Clause 4.1.4, when a** *system regulator* **is not equipped with an internal** *relief device***,** it shall have immediately downstream *relief device* as required in Clause 4.1.7(b), with a discharge setting of not less than either: (a) 2 times and not more than 3 times the delivery pressure on systems operating up to 5 psig (35 kPa); or (b) 1.5 times and not more than 2 times the delivery pressure on systems operating at more than 5 psig (35 kPa). The relieving pressure setting of the line ***relief device*** shall be not higher than that of the lowest rated ***component*** or ***accessory*** located downstream.	**Rationale: The term "or line pressure regulator (natural gas)" was added to this section by letter ballot 01-02 at the June 2001 B149 meeting to correct differences between B149 and the standard for line pressure regulators CSA 6.22. This section has been modified so that it is conformance with the standard for line pressure regulators which permits overpressure protection devices (overpressure shutoff device, overpressure relief device or monitoring regulator) not just internal relief. The different regulators for propane and natural gas have been revised to only line pressure regulators because the scope of CSA 6.22 Line Pressure Regulators is being revised so that the standard applies to both propane and natural gas.**

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5.6 Appliance and pilot pressure regulators		
5.6.1 Appliance and pilot pressure regulators in propane applications		
5.6.1.3 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, and the opening in the device shall restrict the escape of gas to not more than 1 ft3 (0.0283 m3) per hour of a gas having a specific gravity of 1.53. A ***regulator*** with a vent limiting means shall not be installed in a ***confined space.***	4.5.2 For Propane: When an **appliance** pressure regulator without internal relief having a diaphragm not in excess of 6 in (150 m) in diameter and 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, and the opening in the device shall restrict the escape of gas to not more than 1 ft^3 (0.0283 m^3) per hour of a gas having a specific gravity of 1.53. A regulator with a vent limiting means shall only be installed in a ventilated location.	**Rationale:** Moved from 4.5.2. The requirement for a diaphragm 6 in. or less is design restrictive. A regulator having a diaphragm 6 in. or larger and certified to operate with the appropriate vent limiter should be permitted. The limiting orifice rate has been revised to 2.5 ft^3/h so that the Btu content of the released gas is the same for natural gas and propane. The requirement to prevent the install of vent limiter equipped regulators in a confined space was added for extra safety. Line pressure regulators for natural gas certified to CSA 6.22 are tested with vent limiters rated at 2.5 ft^3/h.
5.6.2 Appliance and pilot pressure regulators in natural gas applications 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, and the opening in the device shall restrict the escape of gas to not more than 2.5 ft3 (0.0706 m3) per hour of a gas having a specific gravity of 0.6. A ***regulator*** with vent limiting means shall be installed in a ***ventilated*** space only.	**4.5.2 For Natural Gas** When an ***appliance pressure regulator*** without internal relief having a diaphragm not in excess of 6 in (150 mm) in diameter and an inlet pressure not in excess of 2 psig (14 kPa) is installed on an ***appliance***, it may be constructed or equipped with a device to limit the escape of gas from the ***vent*** opening in the event of diaphragm failure and the opening in the device shall restrict the escape of gas to not more than 1 ft^3 (0.0283 m^3) per hour of a gas having a specific gravity of 0.6.	**Rationale:** Moved from 4.5.2. The requirement for a diaphragm 6 in. or less is design restrictive. A regulator having a diaphragm 6 in. or larger and certified to operate with the appropriate vent limiter should be permitted. The limiting orifice rate has been revised to 2.5 ft^3/h so that the Btu content of the released gas is the same for natural gas and propane. The requirement to prevent the install of vent limiter equipped regulators in a confined space was added for extra safety. Line pressure regulators for natural gas certified to CSA 6.22 are tested with vent limiters rated at 2.5 ft^3/h.
6. Piping and tubing systems, hose, and fittings	**5.** Piping and tubing systems, hose, and fittings	
6.2.1 Piping shall comply with ASTM A 53 / A 53M or A 106.	**5.2.1** Piping shall comply with ASTM A 53 or A 106.	**Revised -**
6.2.5 Flared nuts shall be forged.	**New Clause**	Rationale: Flared machined nuts do crack. The intent of the

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		proposal is to ensure that flared nuts are not of machined type.
6.2.8 Tubing shall be one of the following: a) **Corrugated stainless steel tubing (CSST);** b) **Seamless copper; or** **Seamless steel.**	**5.2.7** Tubing shall be of seamless copper or steel.	Revised – To clarify that tubing also includes corrugated stainless steel tubing.
6.2.20 Corrugated stainless steel tubing (CSST) and associated fittings shall comply with ANSI/IAS LC1/CSA 6.26 or CSA CGA Certification Laboratory Requirement LAB-009.	**New Clause**	To clarify that CSST and fittings used for natural gas and propane fuel systems shall certified to applicable CSA Standard or the CGA Lab Requirement.
6.7.4 Piping or tubing in solid flooring, such as concrete, shall be laid in channels and suitably covered to permit access to the piping or tubing. Alternatively, the piping or tubing shall be encased in ducts so that there is free air space around the pipe or tube. Such a duct shall be ventilated. (Accepted Revisions, 2001)	**5.7.4 Piping or tubing in solid flooring, such as concrete, shall be laid in channels and suitably covered to permit access to the piping or tubing. Alternatively, the piping or tubing shall be encased in ducts so that there is a free air space (of not less than 0.5 in (13 mm)) around the pipe or tube. Such a duct shall be ventilated.**	Rationale: The existing requirements of Clause 5.7.4 are design-restrictive with respect to the use Corrugated Stainless Steel Tubing (CSST) and Flexible Copper Tubing (FCT) in new high/low buildings with concrete floor slab applications. The existing requirements would require a thicker concrete slab if tubing were installed in ducts that would normally be required. The intent of this clause was to provide a path or egress for any leaks and protect the tubing from damage. Canadian Gas Research Institute performed a number of tests pulling various diameters of tubing through duct smaller than presently required by Clause 5.7.4. The results of the testing indicated that even pulling large diameter tubing through a smaller duct with 90 degree bends did not generate a force sufficient to damage CSST or FCT. Also the Subcommittee was in the opinion that any space sufficient for pulling tubing through also provides sufficient space for any egress of gas. The use of a smaller clearance is not without precedence. This practice has been employed in the US. NFPA 54 does not require any clearance, but only protection against corrosion.
6.11.3 A gas convenience outlet shall comply with ANSI Z22.99 / CSA 6.24.	**New Clause**	To clarify that gas convenience outlets shall comply with CSA Standard 6.24.

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6.16.12 Corrugated stainless steel tubing (CSST) and fittings shall be protected against physical damage in accordance with the manufacturer's certified installation instructions and with this Code.	**New Clause**	To clarify to installers that the installation of CSST shall comply with the manufacturer's certified installation instructions and with the requirements in the CSA-B149.1 Code.
6.17.2 In every care or detention occupancy, commercial, industrial, and assembly building, piping or tubing where the pressure is in excess of 14 in w.c. (3.5 kPa) shall be identified at the following locations: (a) shut-off valves, and **(b) wall, ceiling, and floor penetrations.**	**New Clause**	The new requirement is to ensure that piping and tubing systems with pressures in excess of 14 in w.c. (3.5 kPa) are identified to advise the user and personnel performing work or maintenance on the system of the supply pressure. This information is necessary for selecting appliances, equipment and components or replacement parts that are suitable for the pressure supplied.
6.17.4 Every piping or tubing system that enters a ***building*** that has two or more gas meters shall be permanently identified with the room number, apartment number, or the area of the ***building*** it serves. (Accepted Revisions, 2001)	**5.17.3** Every piping or tubing that enters a building that has two or more gas meters shall be **clearly** identified with **the number of the room,** apartment number or the area of the building it serves.	Rationale: Note: Commas are inserted after the words "building" and "meters". the intent is to clarify the wording. The word "clearly" is vague and thus it is proposed to replace it with "permanently".
6.20 Hose and hose fittings		
6.20.1 Except as permitted in Clause 7.22.3, a ***hose*** connected to a vented ***appliance*** shall be prohibited.	**5.20.1 A *hose*** connected to a vented ***appliance*** shall be prohibited.	Revision – To clarify that hose may be used for connecting infrared radiant tube heaters to gas piping where breakage is a concern due to expansion and contraction.
6.20.3 When a hose is used **(c) for connecting a construction heater, it shall be neither less that 15 ft (4.6 m) nor more than 75 ft (24 m) in total length;**	**5.20.3 When a hose is used** **(c) for connecting a construction heater, it shall be neither less that 15 ft (4.6 m) nor more than 50 ft (16 m) in total length;**	**Revision - I**n order to allow more hose when connecting a construction heater to a natural gas or propane supply for greater flexibility on larger construction sites.
6.20.6 When tanks or pieces of equipment are interconnected, provision shall be made to compensate for vibration and differential settling of the tanks, equipment, and interconnecting	**New Clause**	Rationale: A major fire resulted from the rupture of a liquid propane hose interconnecting a vaporizer and three tanks. The hose has been cut by a grass cutting tool. The hose met

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piping. Where a flexible hose is used for this purpose, it shall be a flexible metallic hose complying with ULC C536or a hose connector with stainless steel reinforcement complying with CSA CAN/CGA-8.1.		the CAN/CGA-8.1 Standard but was not made with metallic reinforcement. For years, the industry used the metallic reinforcement hose for application with liquid propane. Because of competitive market combined with the efforts to cut installation cost, some supplies promote the type I hose as a replacement for the type II hose for liquid propane. The proposed change will maintain the good practices of the industry. (2003 Accepted Revisions)
6.21 Connectors		
6.21.5 When the connector described in Clause 6.21.4 is used with a commercial cooking appliance installed on wheels or rollers, a noncombustible retraining device shall be provided to protect the connector, and the installation shall be in accordance with Clause 7.31.4.	**5.21.5** When a ***metal*** *connector* is used with a ***commercial cooking appliance*** installed on wheels or rollers, a ***noncombustible*** retraining device shall be provided to protect the ***connector***, and the installation shall be in accordance with Clause 6.30.4.	**Revised – To clarify that the connector shall comply with CSA Standard 6.16 and installation shall maintain the clearances as specified in Clause 7.31.4. The Clause as previously written was ambiguous with respect to which connector was being referred to. This revision clears up that ambiguity.**
Table 6.3 **Pressure test requirements** **(See Clause 6.22.1 and 6.22.2)** *** Propane maximum operating pressure is defined as** **(a) 250 psi (1750 kPa) for piping and tubing operating at container pressure;** **(b) 350 psi (2400 kPa) when connected to the outlet of a pump compressor** **(c) 375 psi (2570 kPa) minimum or the setting of the hydrostatic relief valve in piping that can contain liquid propane, that can be isolated by valves, and that require hydrostatic relief valves as specified in Clause 4.4.1 of this Standard or Clause 4.6.1 of CSA B149.2.** **Notes:** (1) and (2) no changes	**Table 5.22.2** **Pressure test requirements** **(See Clauses 5.22.1 and 5.22.2)** **<No change to text within the Table>** **Notes:** (1) 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. **(2)** All wrapped and/or factory-coated piping systems of all sizes and lengths shall be tested at a minimum pressure of 100 psig (700 kPa) in accordance with the time duration in the table	**Revised –** { See (a) , (b) and (c) } Added information to define operating pressures for propane to clarify the test pressure required for propane piping systems that are exposed to container pressures or that can contain liquid propane.
7. Installation of specific types of appliances	**6. Installation of specific types of appliances**	

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7.4 Commercial Type Clothes Dryers **7.4.3** A *certified* flexible foil *noncombustible*-type duct may be used as a transition connection between the dryer exhaust and a rigid moisture duct.	**New Clause.**	Rationale: Currently, a flexible aluminum duct is being used as a transition duct between dryer and rigid moisture duct. It has been noted that when the machine is moved for servicing or cleaning purposes, the flexible aluminum transition ducts has a tendency to separate. Using an approved flexible foil flexible transition duct will allow for an air tight transition connection, easier installation and movement of appliance for servicing and cleaning in and around the appliance without the possibility of separation causing exhaust and lint leakage into the laundry room. (2003 Accepted Revisions)
7.13 Central Furnaces **7.13.6 Furnace** return-air ducting installed in an ***enclosure*** in which any spillage-susceptible ***appliances*** are located (including the **furnace**) shall be sealed to the ***furnace*** casing, and joints in the ducting shall be sealed to prevent infiltration of air from the ***enclosure*** into the return-air ducting.	**New Clause.**	New requirement to ensure installers pay careful attention to the arrangement of the installation ductwork to prevent contaminated air from entering the return-air system and creating a health hazard. Rationale: The investigation into a CO fatality revealed that a contributing factor in the accident was inadequate sealing of the return air ducting for a furnace. If the portion of the return air ducting in the enclosure was sealed to prevent the infiltration of air from the enclosure into the heating duct system, this problem may have been prevented. A clause should be added to ensure proper sealing of furnace return air ducts. A similar requirement is already in the code for multi-story vent systems (refer to 8.21.4).
7.18 Construction heaters and torches		
7.18.1 A construction heater shall be located to minimize the danger of damage and upset.	**6.18.1** A ***construction heater*** shall (a) be located so as to minimize the danger of mechanical damage and upset	Revised – Mechanical damage was generalized to damage since any damage to the appliance would be a concern.
7.18.2 A construction heater shall be installed on a solid, level, noncombustible base or, where so designed, suspended in accordance with the manufacturer's certified installation	**6.18.1** A ***construction heater*** shall (b) be installed on a solid, level, ***noncombustible*** base.	New – There is now available a construction heater that is approved for use as a suspended heater. The new requirement is to ensure construction heaters are installed in accordance

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instructions.		with the manufacturer's certified installation instructions (i.e. Infra-red heaters certified for use as construction heaters.
7.21 Non-recirculating direct gas-fired industrial air heaters (DFIAH)	**New Section**	In 1998 the Joint ANSI/CGA Heavy Duty Heater Subcommittee voted to provide code coverage for the Non-Recirculating Direct Gas-Fired Industrial Air Heaters (DFIAH) for installation in Canada.
7.21.1 A non-recirculating DFIAH shall be installed only in industrial buildings, except as specified in Clause 7.21.10 to 7.21.12**.**	**New Clause**	The following comments will provide rationale that may pertain to one or more of the new Clauses. 1/ The new harmonized American National Standard Z83.4 / CSA Standard 3.7 covers DFIAH whose purpose is to offset building heat loss only in industrial and commercial applications.
7.21.2 A non-recirculating DFIAH shall not supply air to an area where sleeping accommodation is provided.	**New Clause**	2/ The DFIAH are not permitted to heat or ventilate areas containing sleeping quarters and this is consistent with the past application of direct-fired heaters.
7.21.3 A non-recirculating DFIAH shall be certified to be in compliance with ANZI Z83.4/CSA 3.7. A non-recirculating DFIAH may be used as a door heater, 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 heater or a make-up air heater, the requirements of Clause 7.21 shall supersede the requirements of Clause 7.19 for door heaters and Clause 7.20 for make-up heaters.	**New Clause**	3/ A non-recirculating DFIAH is used extensively to provide fresh air ventilation and/or to purge or dilute contaminants from an occupied space.
7.21.4 A non-recirculating DFIAH shall be installed with a clearance from combustible materials not less than that marked on the rating plate. See also Clause 4.14.2.	**New Clause**	4/ The CSA Standard 3.7 contains test requirements for clearance to combustible materials and the DFIAH shall be installed in accordance with the manufacturer's installation

Clause in New Edition **Source: Canadian Standards Association (2005), *CSA B149.1-2005,* Mississauga: CSA**	**Clause in previous edition** **Source: Canadian Standards Association (2000), *CSA B149.1-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
		instructions and marking on the rating plate.
7.21.5 All supply air to a non-recirculating DFIAH shall be ducted directly from outdoors.	**New Clause**	5/ The DFIAH by the Scope of the CSA Standard 3.7 and by the definition these heaters must have all the air handled by the heater ducted directly from outdoors.
7.21.6 Inlet ducting, when used, shall be purged with at least four air changes prior to an ignition attempt.	**New Clause**	6/ There are installations that have inlet and outlet ducting to locate the DFIAH in a more desired location within a building. The CSA Standard 3.7 requires heater housing to be purged four air changes before the ignition system is activated. This action serves to purge the heater and discharge ducting to remove any flammable vapours that may be present prior to an ignition attempt.
7.21.7 If outside air dampers or closing louvers are used, they shall be interlocked so that the main burners do not operate until the air dampers are fully open.	**New Clause**	7/ The heater operation requires all of its air from outside, any device which serve to close off that air supply are required to provide a signal once they are in a full open position.
7.21.8 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. 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 the relief openings shall be determined by a professional engineer. 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.	**New Clause**	8/ These heaters may be utilized to heat building and to offset heat loss, as such, their installation must be designed to include the air load which infiltrates and exfiltrates the building envelope as a result of local climatic conditions. Therefore, the installations of these heaters are site specific and shall be designed by a professional engineer. 9/ When interlock devices are required to operate a non-circulating DFIAH, a means is necessary to permit testing of the appliance without activating the interlocking source.

Clause in New Edition **Source: Canadian Standards Association (2005), *CSA B149.1-2005,* Mississauga: CSA**	**Clause in previous edition** **Source: Canadian Standards Association (2000), *CSA B149.1-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
7.21.9 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.	**New Clause**	To clarify that a minimum of 20 ft is required between the exposed flame in the DFIAH and any combustible concentration of gas, vapour, or dust.
7.21.10 A DFIAH, when installed for the purpose of ventilating or pressurizing an elevator shaft or stairwell, shall be (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 installed on or located directly adjacent to the DFIAH and shall be identified as to its function.	**New Clause**	To clarify that the DFIAH is interlocked with the fire alarm for the purpose of providing ventilation or pressurization to prevent prolonged exposure to products of combustion.
7.21.11 When a DFIAH is installed for the ventilation of a storage garage and the DFIAH is solely activated by a carbon monoxide senor, 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.	**New Clause**	A DFIAH used solely for this purpose shall be activated by a carbon monoxide (CO) sensor and must be capable of being tested without activating the CO alarm.
7.21.12 When a DFIAH is either installed in or ducted to a kitchen, it shall be installed in accordance with the following procedures: (a) Where the food preparation area and the area frequented by the public is interconnected by means (i) of either normally closed doors or a permanent opening(s) and the total free area of the opening(s) does not exceed 16 ft^2 (1.5 m^2), the DFIAH shall be interlocked with a mechanical exhaust system and the proven airflow capacity of the interlocked exhaust	**New Clause**	To limit the exchange of air between a food preparation area and any area occupied by the public in a building where the kitchen is served by a DFIAH. The designer will ensure proper operation and performance of the DFIAH to prevent an excess air pressure imbalance on the HVAC system serving the public area.

Clause in New Edition **Source: Canadian Standards Association (2005), *CSA B149.1-2005,* Mississauga: CSA**	**Clause in previous edition** **Source: Canadian Standards Association (2000), *CSA B149.1-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
system shall not be less than 90% of the make-up air supply; or (ii) other than those indicated in item (i), the DFIAH shall be interlocked with a mechanical exhaust system 100% or more than 105% of the make-up air supply. (b) All other requirements contained in Clause 7.21, where applicable, shall apply.		
7.22. Infrared heaters **7.22.1** Where an infrared heater is of the unvented type, it shall (a) be protected against physical damage; (b) comply with Clause 4.9.2; (c) not be installed in a residential or care or detention occupancy building; (d) when certified for use as a construction heater, comply with Clause 7.18 and be exempted from item (e) to (g); (e) be provided with mechanical ventilation (i) that is so located that the products of combustion from each heater are effectively removed outdoors; (ii) that has a ventilation volume of at least 300 cfm (142 dm^3 /s) for each 100 000 Btuh (30 kW) input or fraction thereof; and (iii) is sufficient to maintain the level of carbon dioxide at less than 5000 ppm measured 6 ft (2 m) above the work area; (f) have the ventilation system so interlocked that any reduction of the volume of airflow required by Item (e) for a heater or group of heaters will cause the shutdown of the heater or group of heaters;	**6.21. Infrared heaters** **6.21.1** Where an ***infra-red heater*** is of the unvented type, it shall (a) be protected against physical damage; (b) comply with Clause 3.9.2; (c) not be installed in a residential or ***care or detention occupancy building***; (d) when certified for use as a construction heater, comply with Clause 6.18 and be exempted from item (e) , (f), and (g) of this Clause; (e) be provided with mechanical ***ventilation*** so located that the ***products of combustion*** from each ***heater*** are effectively removed outdoors, have a ***ventilation*** volume of at least 300 cfm for each 100 000 Btuh (30 kW) input or fraction thereof; and the mechanical ***ventilation*** is sufficient to maintain the level of carbon dioxide at less than 5000 ppm measured 6 ft (2 m) above the work area; (f) have the ***ventilation*** system so interlocked that any reduction of the volume of air flow required by Item (e) for a ***heater*** or group of ***heaters*** will cause the shutdown of the ***heater*** or group of ***heaters***;	**This Clause was revised in order to clarify the intent of the requirements contained in Item (e).**

Clause in New Edition **Source: Canadian Standards Association (2005), *CSA B149.1-2005,* Mississauga: CSA**	**Clause in previous edition** **Source: Canadian Standards Association (2000), *CSA B149.1-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
(g) be provided with combustion and ventilation air compatible with Item (e); (h) not be installed in an exit passageway or stairway within 8 ft (2.5 m) measured horizontally from an exit door; and (i) be provided with clearance from combustible material as certified and indicted on the appliance.	(g) be provided with ***combustion*** and ***ventilation air*** compatible with Item (e); (h) not be installed in an exit passageway or stairway within 8 ft (2.5 m) measured horizontally from an exit door; and (i) be provided with clearance from ***combustible*** material as certified and indicted on the ***appliance***.	
7.22.3 An infrared heater of the unvented type shall be installed in accordance with the certified marking and the manufacturer's certified installation instructions. It shall be protected against physical damage. A tube-type infrared heater shall only be connected with a Type I hose connector that is (a) certified as being in compliance with CSA CAN/CGA-8.1; and (b) of a length of 36 ± 6 in (90 ± 15 cm).	**7.21.3** An ***infrared heater*** of the unvented type shall be installed in accordance with the certified marking and the manufacturer's certified installation instructions. It shall be protected against physical damage.	This Clause was revised by adding the requirements for the use of a Type I hose to connect to the gas supply due to the extreme expansion and contraction of the tube-type heaters. The metal connectors were failing as the result of stress caused by expansion / contraction that some heater manufactures state can be up to 1 inch per 10 ft of tube
7.32 Residential-type ranges		
7.32.7 When the underside of the combustible material above a residential-type range is protected with insulating millboard at least 0.25 in (6 mm) thick covered with sheet metal not less than 28 MSG (0.3 mm), the clearance above the range as specified in Clause 7.32.4 may be reduced to 24 in (600 mm).	**7.32.7** When the underside of the ***combustible*** material above a residential-type range is protected with ***insulating millboard*** at least 0.25 in (6 mm) thick covered with sheet metal not less than 28 MSG (0.3 mm), the clearance above the range as specified may be reduced to 24 in (600 mm).	Revised by adding reference to Clause 7.32.4 to identify where to find the minimum clearances from combustible materials.
7.32.8 An exhaust hood, an exhaust appliance, or a combination thereof installed above a range shall be installed in accordance with certified installation instructions for such an exhaust hood or appliance.	**New Clause**	This Clause was added to clarify hoods, exhaust appliances or combination units (space saver microwaves) that contain combustible materials or may be affected by moisture generated from cooking shall be installed in accordance with the manufacturer's certified instructions.
8. Venting systems and air supply for appliances	**7. Venting systems and air supply for appliances**	
8.10.13 A ***false ceiling space,*** or a ***confined space*** used for		**Rationale: To allow concentric, balanced flue venting**

Clause in New Edition **Source: Canadian Standards Association (2005), *CSA B149.1-2005,* Mississauga: CSA**	**Clause in previous edition** **Source: Canadian Standards Association (2000), *CSA B149.1-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
return air, shall not contain a ***vent*** or ***vent connector*** that does not have sealed joints or seams.	**New Clause**	**systems and other vent/vent connectors with sealed joints or seams to be installed in false ceiling spaces (2003 Accepted Revisions)**
8.12.11 The venting of a gas-fired appliance into a chimney flue common to both halves of a semi-detached house is prohibited.	**7.12.11** The venting of a gas-fired space-heating ***appliance*** into a ***chimney flue*** common to both halves of a semi-detached house is prohibited.	**Revision accepted 2000, deleted the words space-heating. To avoid spillage of flue gases into the adjacent unit and to clarify that the risk is similar in connecting any appliances other than space heating as well**
8.30.2 An approved appliance not identified in Clause 8.30.1(d) may be installed under a canopy, provided that the appliance is interlocked so that operation is permitted only when exhaust airflow is proven.	**7.30.2** An ***approved appliance*** not identified in Clause 7.30.1(d) may be installed under a canopy, provided that (a) the ***appliance*** is interlocked so that operation is permitted only when exhaust air flow is proven; (b) the ***appliance*** is interlocked through a 4-min time delay manual reset device; and (c) the manual reset device is ***readily accessible*** and its function is identified.	**Revised.** **Rationale: There is no apparent reason as to the need or the function of the 4 minute delay. These 2 provisions are considered out of date, and no longer applicable.**
9. Natural gas compressors and cylinders	**8. Natural Gas Compressors**	
9.2 Requirements for cylinders		
9.2.1 Refillable cylinders shall be manufactured, tested, inspected, and marked in accordance with the requirements of the Transportation of Dangerous Goods Regulation (TDG regulations) of Transport Canada.	**8.2.1** A ***cylinders*** shall be manufactured, tested, inspected, and legibly marked in accordance with Transport Canada requirements.	**Revised.** **The Clause was updated to specify that refillable cylinder shall comply with the TDG regulations of Transport Canada.**
9.3 Cylinder filling and cylinders		
9.3.2 ***Cylinders*** used indoors shall not be filled in excess of 300 psig (2100 kPa) at 59ºF (15 ºC).	**Revised: 8.3.2 Cylinders shall not be filled in excess of 300 psig (2100 kPa).**	**Rationale: It was agreed the reference temperature should be specified. A member stated that the norm is 15 C. Additionally, it was agreed to qualify cl. 9.3.2 because cylinders used indoors should be filled only to 300 psig regardless of where used.**
9.3.3 A ***cylinder*** connected for filling shall be located outdoors, unless indoor filling is ***approved*** by the ***authority having***	**Revised: 8.3.3** A ***cylinder*** connected for filling shall be located outdoors, unless indoor filling is ***approved*** by the	**Accepted revisions from M14.1.3. June 2002 Meeting**

Clause in New Edition **Source: Canadian Standards Association (2005), *CSA B149.1-2005,* Mississauga: CSA**	**Clause in previous edition** **Source: Canadian Standards Association (2000), *CSA B149.1-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
jurisdiction, and shall be (a) filled through (i) an ***approved*** manifold; and (ii) an ***approved connector*** equipped with a ***back check valve*** at the point of ***cylinder*** connection; (b) located not less than 3 ft (1 m) from a ***building opening*** or air intake; and (c) located not less than 10 ft (3 m) from a ***mechanical air intake***.	***authority having jurisdiction***, and shall be (a) filled through (i) an ***approved*** manifold; and (ii) an ***approved connector*** equipped with a ***back check valve*** at the point of ***cylinder*** connection; (b) located not less than 3 ft (1 m) from a ***permanent wall*** or air intake; and (c) located not less than 10 ft (3 m) from a ***mechanical air intake***.	**Rationale: Editorial. It was agreed that the term "permanent wall" should be replaced with the defined term "building opening".**
10. Vehicle refueling appliances (VRA) without storage (for natural gas only)	**8. Vehicle refueling appliances (VRA) without storage (for natural gas only)**	
10.1 Installation		
10.1.1 A ***VRA*** refuelling system shall be ***certified*** in compliance with the requirements of CSA 12.6.	**Revised: 9.1.1 A VRA refuelling system shall be designed and installed to provide NGV at up to the temperature-compensated equivalent of 3000 psig (20 680 kPa) at 70ºF (21ºC). The pressure shall not exceed 3600 psig (24 820 kPa) regardless of the temperature.**	**Rationale: A VRA must meet the certification requirements of CSA 12.6. All of the pressure parameters are defined in 12.6**
10.1.6 When a vehicle is fuelled indoors, a gas detector shall (a) be installed within 6 in (150 mm) of the ceiling or highest point above the refueling 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 10.1.7; and (e) be interlocked to shut off the VRA.	**9.1.6** Where indoor fuelling of a vehicle is acceptable to the ***authority having jurisdiction***, a gas detector shall (a) be installed within 6 in (150 mm) of the ceiling or highest point above the refueling 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, be interlocked with a mechanical ventilation system (see Clause 9.1.7, and be interlocked to shut off the ***VRA(s).***	Revised The VRA's have proven to be reliable for indoor refueling and it is no longer necessary to obtain prior approval from the AHJ. In addition, the previous wording in item (c) was rearranged to clarify the installation requirements for the gas detector.
10.1.7 The mechanical ventilations system referred to in Clause 10.1.6(d) shall a) vent the fuelling area to the outdoors at a flow rate of 25 times the flow rate of the VRA; and	**9.1.7** The mechanical ventilation system referred to in Clause 9.1.6.(c) shall (a) vent the fuelling area to the outdoors at a flow rate of 25 times the flow rate of any ***building*** used in connection with	Revised To clarify that the ventilation rate is 25 times the flow rate of the VRA and not the building.

Clause in New Edition **Source: Canadian Standards Association (2005), *CSA B149.1-2005,* Mississauga: CSA**	**Clause in previous edition** **Source: Canadian Standards Association (2000), *CSA B149.1-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
b) provide for minimum clearance from the discharge as specified in Table 5.2	***VRA(s);*** and (b) provide for minimum clearances from the discharge as outlined in Table 4.5.10.	
10.3 Piping, tubing, and hose		
10.3.1 The following requirements shall apply to all gas piping required to install a VRA and its associated equipment (a) They shall be installed in accordance with the manufacturer's certified instructions. (b) The gas supply line to the inlet of a VRA shall be installed in accordance with the requirements of Clause 6 of this Code or the authority having jurisdiction. (c) Discharge piping, not directly connected by the manufacturer, from the outlet of a VRA shall be installed in accordance with the requirements of CSA B108.	**9.3.1** All gas piping required to install a ***VRA*** and its associated ***equipment*** shall be installed as follows: (a) the gas supply line to the inlet of a ***VRA*** shall be installed in accordance with the requirements of Clause 5 of this Code or the ***authority having jurisdiction***; (b) discharge piping from the outlet of a ***VRA*** not directly connected by the manufacturer shall be installed in accordance with the requirements of GCA Standard CAN/CGA-B108 and pressure tested 1.5 times the working pressure for the duration of 15 min with no evidence of leakage; and (c) in accordance with the manufacturer's ***certified*** instructions.	Revised This Clause was modified to clarify that the installers shall follow the manufacturer's installation instructions, the CSA-B149.1 piping requirements and the CSA B108.

Annex A (informative)	**Appendix A**	
Note: **This informative annex has been written in normative language to facilitate adoption where users of this Code or regulatory authorities wish to adopt it formally as additional requirements to this Code.**	**Note:** **This Appendix is not a mandatory part of this Code. However, it has been written in mandatory terms to facilitate adoption where users of this Code or regulatory authorities wish to formally adopt it as additional requirements to this Code.**	

Annex H – Purging of piping and tubing systems **Re-numbering only**	**Appendix H – Purging of piping and tubing systems**	Note: This annex is a mandatory part of this Standard.
Annex I **General Information Tables for** **1.1 Properties of Propane, Butane and Natural Gas** **1.2 Combustion data** **1.3 Orifice capacity** **1.4 Conversion of volumes of one kind to another**	**New**	

Any quotations in this document are taken directly from the CSA – B149.2-2005
PROPANE STORAGE and HANDLING CODE

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
Note: The CSA B149.2-00 Code covers the Propane Storage and Handling.		
1. Scope	**1. Scope**	
1.2 This Code does not apply to (h) butane fuel ***cylinders*** of 5.3 oz (150 g) capacity or less; and	**1.2** This code does not apply to (h) butane fuel cylinders of 250 g capacity or less; and	Revised – The volume was reduced to 150 g from 250 g. Cylinders of 225 g are being used in restaurants for portable cooking. Incidents have occurred and no one appears to have jurisdiction for these cylinders.
1.4 The valves given in yard/pound units are the standard. This Code contains SI (metric) equivalents to yard/pound units so that the Code can be used in SI (metric) units. SI (metric) equivalents can be approximate.	**3.1.1 This** Code contains SI (metric) equivalents to yard/pound units so that the Code can be used in SI (metric) units. SI (metric) equivalents may be approximate. Yard/pound units shall be regarded as the requirement.	Revised. To clarify the intent and the units that are considered to be the requirement.
1.5 In this Code, unless ***approved*** otherwise by the ***authority having jurisdiction,*** "shall" indicates a mandatory requirement; "should" indicates a recommendation or that which is advised but not mandatory; "may" indicates an advisory or optional statement. Notes to the text do not include mandatory or alternative requirements. The purpose of a note is to separate from the text explanatory or informative material that is not properly a part of this Code. Notes to figures and tables, however, are considered part of the figure or table and are written as mandatory requirements. Legends to figures are also written as mandatory requirements.	**3.1.2** Where the word "shall" is used in this Code, it indicates a requirement unless ***approved*** otherwise by the ***authority having jurisdiction.***	This Clause was revised in order to reflect CSA's policy and terms consistent with other CSA Codes.
***3 Definitions**	**2.1 Definitions**	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
Cylinder – a container designed and manufactured in accordance with a cylinder specification authorized for the containment and transportation of propane under the Transportation of Dangerous Goods (TDG) Regulations of Transport Canada.	**Cylinder –** (with respect to ***NGV***/propane storage) a *container* designed and fabricated in accordance with the specifications of Transport Canada (TC) or the U.S. Department of Transportation for the storage and transportation of propane.	**Revised – To clarify that propane containers shall be designed and manufactured under the TDG Regulations of Transport Canada**
Combustible — material that fails to conform to ULC CAN4-S114 requirements for noncombustibility.	**Combustible** – material that fails to conform to ULC Standard CAN4-S114.	
Flue gas dilution air – see **Air Supply**	**New**	**This was added to be consistent with the CSA-B149.1**
Continuous pilot – a pilot that burns without turndown throughout the entire time the burner is in service, whether the main burner is firing or not.	**New**	**See above**
TC – Transport Canada	**New**	**To clarify that TC means Transport Canada as it was proposed to delete the abbreviations from the Code.**
4. General	**3. General**	
4.3 Responsibilities of the installer	**3.3 Responsibilities of the Installer**	
4.3.5 It shall be the responsibility of the installer of a piping or tubing system to perform pressure tests in accordance with Clause 6.22.2 of CSA B149.1 and to ensure that the piping or tubing system is gas-tight at the completion of the tests.	**3.3.5** It shall be the responsibility of the ***installer*** **(a)** of a piping or tubing system to perform pressure tests in accordance with Clause 5.22.2 of CSA Standard B149.1 and to ensure that the piping or tubing is gas tight at the completion of the tests; and	Revised by creating a new Clause for part (b) to be consistent with the B149.1 and to clarify the responsibilities for different installers <see below>. The installer of the piping or tubing is not necessarily the same one who installs the gas appliances.

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
4.3.6 It shall be the responsibility of the installer of an appliance to perform tests in accordance with Clause 6.22.3 of CSA Standard B149.1 and to ensure that the system is gas-tight at the completion of the tests.	**3.3.5** It shall be the responsibility of the ***installer*** **(a)** <see above> **(b)** of the ***appliance*** to perform tests in accordance with Clause 5.22.3 of the CSA Standard B149.1 and to ensure that the system is gas tight at the completion of the tests.	This new Clause was added to be consistent with the B149.1 and to increase the awareness that it is the responsibility of the appliance installer to ensure the connection, valve train and system components are gas-tight.
4.5 Suitability of use	**3.5 Suitability of Use**	
4.5.4 Before reconnection to the supply piping or tubing, a used appliance shall be inspected and determined by the install to be safe for continued use.	**3.5.4** A used ***appliance*** shall be inspected and determined by the ***installer*** to be safe for continued used before reconnection to supply piping or tubing.	Editorial revision only – No change in the intent of this Clause.
5.3 Protection of containers and equipment	**4.3 Protection of Containers and Equipment**	
5.3.2 When containers are installed in locations that do not afford protection from damage from motor vehicles on any street, highway, avenue, alley, or parking lot, they shall be protected by posts or guardrails in compliance with Clause 7.19.4 unless otherwise approved by the authority having jurisdiction.	**4.3.2** When a container is located in a vehicular traffic area, protection from physical damage shall be provided in compliance with Clause 6.19.4.	Revised to clarify the intent of the Clause by listing specific locations that would require protection from motor vehicles.

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
6. Cylinder systems **6.1.8** A refillable cylinder with a capacity of 45 lb (20 kg) or less shall be equipped with an effective gas-tight seal such as a plug, cap, or other equally effective device. A protective cap for the valve outlet shall be attached to the cylinder connection device. The protective cap shall bear the following marking: "PLACE CAP ON CYLINDER VALVE OUTLET WHENEVER THE CYLINDER IS NOT CONNECTED FOR USE" ***The equivalent French wording is "METTRE LE BOUCHON SUR LA SORTIE DU ROBINET LORSQUE LA BOUTEILLE N'EST PAS UTILISEE".**	**5. Cylinder Systems** **5.18** A refillable cylinder with a capacity of 45 lb (20 kg) or less shall be equipped with an effective gas-tight seal such as a plug, cap, or other equally effective device. A protective cap for the valve outlet shall be attached to the cylinder connection device. The protective cap shall bear the following marking: PLACE CAP ON CYLINDER VALVE OUTLET WHENEVER THE CYLINDER IS NOT CONNECTED FOR USE	Revised only by adding the equivalent French wording for the marking on the cap. To ensure manufacturers provide instruction in both English and French.
6.2 Liquid level gauges on cylinders	**5.2 Liquid level gauges on cylinders**	
6.2.1 A liquid level gauge that requires the bleeding of propane to the atmosphere, such as a rotary, fixed-liquid-level, or slip-tube type, shall be designed so that any bleed valve opening is not larger that a No. 54 drill size (1.4 mm) unless it is provided with a excess-flow valve.	**5.2.1** A liquid level ***gauge*** such as a ***rotary, fixed-liquid-level***, or ***slip-tube*** type that requires the bleeding of propane to the atmosphere shall be designed so that any bleed ***valve*** opening is not larger that a No. 54 drill size (1.4 mm) unless it is provided with an ***excess flow valve***.	Editorial revision only – No change in the intent of this Clause.
6.5 Storage and use of cylinders at locations other than filling plants	**5.5 Storage and Use of Cylinders at Locations Other than Filling Plants**	

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Source: Canadian Standards Association (2005), CSA B149.2-05, Mississauga: CSA</th><th>Clause in previous code
Source: Canadian Standards Association (2000), CSA B149.2-00, Mississauga: CSA</th><th>Recommendations, Interpretations and Rationale</th></tr>
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6.5.1.9
An outdoor ***cylinder*** storage area, special ***cylinder*** storage room, or a ***cylinder*** storage ***building*** described in Clause 6 shall be located in accordance with Table 6.3 with respect to
(a) the nearest ***building*** or group of ***buildings***;
(b) the line of adjoining property that may be built upon;
(c) public thoroughfares or sidewalks; and
(d) the line of adjoining property occupied by schools, churches, hospitals, athletic fields, or other points of public gathering.

Table 6.3
Cylinder storage clearances
(See Clause 6.5.1.9)

Quantity of propane stored, lb (kg)	Distance, ft (m) to Items (a) and (b) of Clause 6.5.1.9	Distance, ft (m) to Items (c) and (d) of Clause 6.5.1.9
Up to and including 500 (225)	0*†	10 (3)
501 (225) to 2500 (1135)‡	15 (4.5)	25 (7.5)
2501 (1135) to 5000 (2270)	25 (7.5)	25 (7.5)
Over 5000 (2270)	25 (7.5)	50 (15)

**3 ft* (1 m) *from any building opening.*
†10 ft (3 m) *from any mechanical air intake.*
‡ *Cylinders that have a maximum capacity of 20 lb* (9 kg) *intended for exchange or sale shall be stored in no more than four adjacent cabinets that may be located against a noncombustible building wall at one retail site. No more than one cabinet may be located against a combustible wall. Each cabinet shall contain no more than 500 lb* (225 kg) *of propane. Cabinets shall be 3 ft* (1 m) *from any building opening and 10 ft* (3 m) *from any mechanical air intake. Cabinets shall be 25 ft* (7.5 m) *from the line of adjoining property occupied by schools, churches, hospitals, athletic fields, or other points of public gathering.*

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5.5.1.9 Except as noted below, an outdoor cylinder storage area, special cylinder storage room, or a cylinder storage building described in Clause 6 shall be located in accordance with Table 6.3 with respect to

(a) the nearest building or group of buildings;
(b) the line of adjoining property that may be built upon;
(c) public thoroughfares or sidewalks; and
(d) the line of adjoining property occupied by schools, churches, hospitals, athletic fields, or other points of public gathering.

Table 5.5.1.9
Cylinder storage clearances
(see Clause 5.5.1.9)

Quantity of propane stored lbs (kg)	Distance ft (m) to Items (a) and (b)	Distance ft (m) to Items (c) and (d)
Up to and including 500 (225)	**0 * †**	**10 (3)**
500 (225) to 2500 (1135)	**15 (4.5)**	**25 (7.5)**
2501 (1135) to 5000 (2270)	**25 (7.5)**	**25 (7.5)**
Over 5000 (2270)	**25 (7.5)**	**50 (15)**

* 3 ft (1 m) from any building opening.
† 10 ft (3 m) from any mechanical air intake.

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Revised by adding a new Note to address the installation of cabinets or cages for exchange or sale of 20 lb (9 kg) propane cylinders at retail sites.

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Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
6.5.6 Storage of non-refillable cylinders in retail outlets and their warehouses (mercantile occupancies)	**5.5.6 Storage of Nonrefillable Cylinders within Retail Outlets and Warehouses**	
6.5.6.1 The requirements of Clause 6.5.6 apply to non-refillable cylinders (TC-39, TC-2P, and TC-2Q) with net capacities of more than 0.36 lb (150 g) and less than 1.05 lb (475 g), commonly referred to as "single-trip" cylinders.	**5.5.6.1** The requirements of this Clause shall apply to cylinders manufactured to TC Specifications 39, 2P, and 2Q and known as "single trip" or "nonrefillable" cylinders	Revision to correctly identify the types and capacities of the "single-trip" cylinders. No change in the intent of this Clause.
6.5.6.2 Cylinders located within the display area of a retail outlet (mercantile occupancy) shall be display ed as follows: (a) Cylinders shall be removed from cartons, or cartons shall be display cut. (b) Cylinders shall be securely stacked to a height of no more than 6 ft (2 m) from the base to the top of the display. Shelves used to display cylinders shall be of a stable construction and shall not exceed 8 ft (2.43 m) in overall height. (c) Display of cylinders shall be in compliance with the clearances, separations, quantities, and other requirements listed in Table 6.4.	**5.5.6.2** ***Cylinders*** located within (a) a retail outlet may be displayed (i) in one area only and limited to a total of 60 ***cylinders*** or a maximum of 60 lbs (27 kg) of propane: or (ii) in not more than two areas and limited to a total of 60 ***cylinders*** or a maximum of 60 lbs (27 kg) of propane for each display area, provided that the retail outlet is sprinklered and the propane display areas are separated from each other by not less than 50 ft (15 m); (b) a storage are for retail outlet shall be (i) limited to a total weight of 300 lbs (135 kg) of propane; or (ii) subject to approval of the ***authority having jurisdiction*** when the total weight of propane is in excess of 300 lbs (135 kg) of propane; and (c) other storage areas used to store ***cylinder*** in excess of 300 lbs (135 kg) shall comply with (i) Clauses 5.5.1 and 5.5.2 for outdoor storage; and (ii) Clauses 5.5.1 and 5.5.8 for indoor storage.	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**

Table 6.4
Storage of non-refillable cylinders in mercantile occupancies
{See Clause 6.5.6.2 (c)}

	For sprinklered* Areas	For areas without sprinklers
Separation from sources of ignition	25 ft (7.6 m)	25 ft (7.6 m)
Separation from marked fire exits	25 ft (7.6 m)	25 ft (7.6 m
Separation between display arrays Cylinders	8 ft (2.5 m)	8 ft (2.5 m)
Separation of display arrays from Class 1 and 2 flammable liquids, Level 2 and 3 aerosols, oxidizers, And highly combustible products made From or using Styrofoam® for packing	8 ft (2.5 m)	8 ft (2.5 m)
Maximum net weight of cylinders In each display	500 lb (227 kg) †	300 lb (135 kg) ‡
Maximum combined net weight of Cylinders, Level 2 and 3 aerosols, Oxidizers, and Class 1 (flammable Liquids) and Class 2 (combustible Liquids) in 20 x 20 ft (6x6 m) area	1000 lb (454 kg)§	300 lb (135 kg) ‡
Total aggregate net weight cylinders In total display area	1000 lb (454 kg)†	300 lb (135 kg) ‡

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	Clause in previous code **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	Recommendations, Interpretations and Rationale
***Sprinklered in accordance with NFPA 13 for at least Ordinary Hazard Occupancies.** **† Quantity shall be reduced to 300 lb (135 kg) when storage above cylinders prevents direct discharge from sprinklers located overhead.** **‡ Cylinders shall be protected on three sides by metal or wire bulkheads.** **§Quantities in excess of 1000 lb (454 kg) shall be relocated to other 20 x 20 (6 x 6 m) areas separated by a minimum distance of 25 ft (7.6 m).**		

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
6.5.6.3 Cylinders located in the backstock (warehouse) area of a retail outlet (mercantile occupancy) shall be stored as follows: (a) Cylinders shall be in packaging approved by, and marked in accordance with, the Transportation of Dangerous Goods Regulations and securely stacked to a height of not more that 6.56 ft (2 m). (b) Storage of cylinders shall be in compliance with the separation, clearances, quantities, and other requirements listed in Table 6.5	**NEW**	

Table 6.5
Storage of non-refillable cylinders in the backstock (warehouse) area of mercantile occupancies
(See Clause 6.5.6.3 (b).)

	For sprinklered* Areas	For areas without sprinklers
Separation from sources of ignition	25 ft (7.6 m)	25 ft (7.6 m)
Separation from marked fire exits	25 ft (7.6 m)	25 ft (7.6 m)
Separation of display arrays from Class 1 flammable liquids, oxidizers Level 2 and 3 aerosols, plastic Packaging, and Styrofoam®	8 ft (2.5 m)	8 ft (2.5 m)
Maximum net weight of cylinders in each storage area	1000 lb (227 kg) †	300 lb (135 kg)
Maximum net weight of cylinders Class 1 (flammable liquids) and Class 2 (combustible liquids), Level 2 and 3 aerosols, and oxidizers in a 20 x 20 ft (6x6 m) area	2000 lb (908 kg) ‡	300 lb (135 kg)
Total aggregate net weight cylinders in entire backstock area	4000 lb (1816 kg)	300 lb (135 kg)
Clearance between sprinkler heads and arrays of cylinders	as required by NFPA 308 for level 3 aerosol products	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
*** Sprinklered in accordance with NFPA 13 for at least Ordinary Hazard Occupancies.** **† Quantity shall be reduced to 300 lb (135 kg) when storage above cylinders prevents direct discharge from sprinklers located overhead.** **‡ Quantities in excess of 2000 lb (908 kg) shall be relocated to other 20 x 20 (6 x 6 m) areas separated by a minimum distance of 25 ft (7.6 m).**		**Rationale**: TC-39M cylinders used for the packaging of propane for use with portable and handheld appliances are, because of their design, construction and safety features, inherently safer as a container for flammable and combustible products that are TC-2P and TC-2Q containers which are not equipped with pressure relief valves. TC-2P and TC-2Q containers are commonly used for Level 2 and Level 3 aerosols. Capacities of Level 3 aerosols {greater than 13,000 Btu/lb (30 kJ/g)} can exceed the caloric capacity of the standard 400 to 455 g TC-39 propane cylinders. The accompanying information supports these proposed new requirements for the handling and storage of propane cylinders in retail premises (occupancies).
6.5 Storage and use of cylinders at locations other than filling plants	**5.5 Storage and use of cylinders at locations other than filling stations**	
6.5.7.3 A sign indicating “NO SMOKING” shall be permanently displayed in the cylinder storage area. The sign shall be in accordance with the requirements for signs in Clause 7.12.3. * The equivalent French wording is “DEFENSE DE FUME”.	**5.5.7.3** A sign indicating “NO SMOKING” shall be permanently displayed in the cylinder storage area. The sign shall be in accordance with the requirements for signs in Clause 6.12.3.	Revised only by adding the equivalent French wording for the signage. To ensure owners provide instruction in both English and French.
6.6 Transportation of cylinders	**5.6 Transportation of cylinders**	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
6.6.7 Every cylinder delivery vehicle shall be marked legibly and conspicuously on both sides and on the rear, in letters not less than 4 in (100 mm) high and of a colour that contrasts sharply with the background, with at least on of the following: (a) the words "COMPRESSED LP GSA"*; (b) the word "FLAMMABLE"†; (c) the word "PROPANE"‡; or (d) the name of the carrier if the name includes the word "PROPANE"‡. *The equivalent French wording is «GAZ PL COMPRIME». †The equivalent French wording is «INFLAMMABLE». ‡The equivalent French wording is «PROPANE».	**5.6.7** Every cylinder delivery vehicle shall be marked legibly and conspicuously on both sides and on the rear, in letters not less than 4 in (100 mm) high and of a colour that contrasts sharply with the background, with at least on of the following: (a) the words COMPRESSED LP GSA; (b) the word FLAMMABLE; (c) the word PROPANE; or (d) the name of the carrier if the name includes the word PROPANE.	Revised only by adding the equivalent French wording for the signage. To ensure owners provide instruction in both English and French.
6.7 Installation of cylinders	**5.7 Installation of cylinders**	
6.7.3 Notwithstanding the requirements in Clause 6.5 and 6.7.2, a cylinder containing a maximum of 5 lb (2.5 kg) of propane, which is not connected to any other cylinder, may be connected for use indoors with the permission of the authority having jurisdiction.	**5.7.3 Except as permitted** in Clause 5.5 and 5.7.2, a ***cylinder*** containing a maximum of 5 lb (2.5 kg) of propane, which is not connected to any other ***cylinder***, may be connected for use indoors with the permission of the ***authority having jurisdiction***.	Editorial only – same intent
7.4 Excess-flow and back check valves	**6.4 Excess Flow and Back Check Valves**	
7.4.4 Instead of using an excess-flow valve, a tank opening may be fitted with a quick-closing internal valve that, except during operating periods, shall remain closed. The internal mechanism for the valve shall be provided with secondary controls consisting of a fusible link or plug with a melting point of not more that 210°F (105°C) that shall cause the internal valve to close in case of fire.	**6.4.4** In place of an ***excess-flow valve***, a ***tank*** opening may be fitted with a quick-closing ***internal valve*** that, except during operating periods, shall remain closed. The internal mechanism for the ***valve*** shall be provided with secondary controls consisting of a fusible link or plug with a melting point of not more that 210°F (105°C) that shall cause the ***internal valve*** to close in case of fire.	Revised only – Same intent.
7.10 Location of consumer tanks	**6.10 Location of Consumer Tanks**	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
7.10.2 Clause references renumbered Table 7.4 **Table 7.4 <New foot note>** **Total aggregate water capacity, USWG (L)** Over 10 000 (38 000) § § § § ***** same † same † same **§** At the discretion of the authority having jurisdiction.	**6.10.2 This Clause references Table 6.10.2** **Table 6.10.2** **Total aggregate water capacity, USWG (L)** Over 10000 At the discretion of the authority having jurisdiction. (38 000)	Revision to Table only – Same intent. To clarify that all clearances for tanks over 10 000 USWG (38 000 L) are at the discretion of the authority having jurisdiction.
7.11 Tank supports	**6.11 Tank Supports**	
7.11.5 Notwithstanding the requirements in Clause 7.11.4, horizontal tanks with a capacity greater than 200 USWG (7500 L) may be mounted on a skid frame, provided that (a) the skid frame assembly is designed to accommodate anticipated loads; (b) the base is designed to accommodate static and dynamic loads imposed by the tank and skid frame; and (c) steps are taken to allow for differential movement between any fixed piping and the skid frame assembly.	**6.11.5** Except as provides in Clause 6.11.4, horizontal tanks with a capacity greater than 200 USWG (7500 L) may be mounted on a skid frame, provided that (a) the skid frame assembly is designed to accommodate anticipated loads; (b) the base is designed to accommodate static and dynamic loads imposed by the tank and skid frame; and (c) steps are taken to allow for differential movement between any fixed piping and the skid frame assembly.	Revised only – Same intent.
7.12 Filling plants and refill centres	**6.12 Filling Plants and Refill Centres**	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
7.12.11 Foot note added	**6.12.11**	Revised only by adding the equivalent French wording for the signage.
7.12.12 Foot note added	**6.12.12**	Revised only by adding the equivalent French wording for the signage.
7.14 Storage of containers at filling plants	**6.14 Storage of Containers at Filling Plants**	
7.14.2 When stored outdoors, a container shall be inside the fenced area of a filling plant and shall (a) be stored 25 ft (7.5 m) or more from the property line; (b) be kept clear of means of access to any storage tank, container storage area, or building; (c) be stored not less than 4 ft (1 m) from the fence when the fence has openings greater than 2 x 2 (50 x 50 mm), but may be stored alongside a fence when the fence has openings 2 x 2 in (50 x 50 mm) or smaller; and (d) not be stored within 25 ft (7.5 m) of the filling plant storage tank.	**6.14.2** A ***container*** when stored outdoors shall be inside the fenced area of a ***filling plant*** and shall (a) be stored 25 ft (7.5 m) or more from the property line; (b) be kept clear of means of access to any storage tank, container storage area, or building; (c) be stored not less than 4 ft (1 m) from the fence when the fence has openings greater than 2 x 2 (50 x 50 mm), but may be stored alongside a fence when the fence has openings 2 x 2 in (50 x 50 mm) or smaller; and (d) not be stored within 10 ft (3 m) of the filling plant storage tank.	Revised item (d). The clearance from the cylinders in storage and the filling plant storage tanks was increase to 25 ft (7.5 m) to provide adequate space for fire suppression in the event if a fire at either location.
7.19.4 Protection against vehicular Traffic (see Annex B)	**6.19.4 Protection against vehicular Traffic (See Append B)**	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
7.19.4.3 Posts or guardrails used for the protection of a ***tank*** shall be located (a) not less than 3.5 ft (1 m) from all sides of the ***tank,*** ventilated cabinet, or enclosure; and (b) to ensure that a minimum of **3.5 ft (1 m)** will be maintained between the point of transfer or cylinder filling scale and any source of ignition, including vehicles.	***6.19.4.3** Posts or guardrails used for the protection of a ***tank*** shall be located (a) not less than 3.5 ft (1 m) from all sides of the ***tank,*** ventilated cabinet, or enclosure; and (b) to ensure that a minimum of **10 ft (3 m)** will be maintained between the point of transfer or cylinder filling scale and any source of ignition, including vehicles.	To provide a closer service access for vehicles to the point of transfer and to minimize the length of transfer hose. **Note:** Vehicles are not normally considered a source of ignition within the dispensing zone providing the engine and any source of ignition is turned off before and during the refueling
7.20 Dispensing devices	**6.20 Dispensing Devices**	
7.20.2 A remote dispensing device shall be protected from damage with the use of posts (a) as stipulated in Clause7.19.4.1, items (b), (c), and (d); and (b) located to provide a minimum of (i) 1 ft (300 mm) of clear space between the posts and the dispenser; and (ii) 3.5 ft (1 m) of clear space between the posts and an island dispenser that incorporates a cylinder filling scale. When purging equipment is provided, a vent pipe shall be installed to discharge the vapours to an ignition-free location at least 10 ft (3.5 m) from the dispenser. **Note:** Vehicles are not normally considered a source of ignition within the dispensing zone. Provided that the engine and any source of ignition is turned off before and during the refueling. The person who is filling or purging any propane container is responsible for ensuring that there is no source of ignition within 10 ft (3.5 m) measured horizontally.	**6.20.2** A ***remote dispensing device*** shall be protected from damage with the use of posts (a) as stipulated in Clause 6.19.4.1(b) to(d); and (b) located to provide a minimum of 1 ft (300 mm) of clear space between the posts and the dispenser.	**Revised.** To provide a protected working space for a person who is filling a cylinder at an island and to ensure a safe location for purging of a propane container from the dispensing zone.

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
7.20.6 Added foot notes * The equivalent French wording is "DEFENSE DE FUMER DANS UN RAYON DE 3 M – COUPER LE MOTEUR PENDANT LE REMPLISSAGE". †The equivalent French wording is "DEFENSE DE FUMER– COUPER LE MOTEUR".	**6.20.6**	Revised only by adding the equivalent French wording for the signage.
8.11 Tank truck and cargo liner lettering	**7.11 Tank truck and cargo liner lettering**	
8.11.1 Added foot note *The equivalent French wording is "GAZ PL COMPRIME". †The equivalent French wording is "INFLAMMABLE". ‡The equivalent French wording is "PROPANE".		Revised only by adding the equivalent French wording for the signage
9.3 Direct-Fired Vaporizers	**8.3 Direct-Fired Vaporizers**	
9.3.3 A direct-fired vaporizer is considered a source of ignition and shall be located at a distance in accordance with the requirements of Table 7.4 from any ***tank*** or from the fill points of any ***tank,*** and at least 25 ft (7.5 m) from a ***building*** or property line.	**8.3.3** A ***direct-fired vaporizer*** shall be located at least 10 ft (3 m) from any ***tank*** or from the fill points of any ***tank,*** and at least 25 ft (7.5 m) from a ***building*** or property line.	This revision clarifies this type of vaporizer is a source of ignition and the minimum clearance requirements are covered under Table 7.4.
11.5 Installation of tanks	**10.5 Installation of Tanks**	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
11.5.9 A label made of durable material that is not adversely affected by water, employing an adhesive that is not water soluble, shall be affixed adjacent to the filling location. The label shall be worded as follows: **"EQUIPPED WITH A STOP-FILL VALVE. USE OF FIXED LIQUID LEVEL GAUGE IS NOT REQUIRED"*.** *** The equivalent French wording is "POURU D'UN ROBINET D'ARRET DE REMPLISSAGE; L'UTILISATION D'UNE JAUGE A TUBE FIXE N'EST PAS REQUISE".**	**10.5.9** A label made of durable material that is not adversely affected by water, employing an adhesive that is not water soluble, shall be affixed adjacent to the filling location. The label shall be worded as follows: **EQUIPPED WITH A STOP-FILL VALVE. USE OF FIXED LIQUID LEVEL GAUGE IS NOT REQUIRED.**	Revised only by adding the equivalent French wording for the marking on the filling location label. To ensure manufacturers provide instruction in both English and French.
11.5.13 A ***tank*** (a) on a vehicle shall be so located as to minimize the possibility of damage; (b) that is located at the rear of a truck and that is protected by a substantial bumper shall be deemed to conform with Item (a); and (c) that is mounted within 8 in (200 mm) of the engine or the exhaust system shall be shielded against heat radiation by the use of a metal shield located not less than 1 in (25 mm) from the ***tank.*** The metal heat shield shall not be attached to the exhaust system.	**10.5.13** A ***tank*** **(a)** on a vehicle shall be so located as to minimize the possibility of damage; **(b)** that is located at the rear of a truck and that is protected by a substantial bumper shall be deemed to conform with Clause 10.5.3(a); and **(c)** that is mounted within 8 in (200 mm) of the engine or the exhaust system shall be shielded against heat radiation by the use of a metal shield located not less than 1 in (25 mm) from the ***tank.*** The metal heat shield shall not be attached to the exhaust system.	Editorial change in item (b) The reference Clause 10.5.3(a) was wrong the correct reference is item (a) within the Clause.
Annex A (informative)		
A.4.4 Vacuum purging	New	

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	**Clause in previous code** **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	**Recommendations, Interpretations and Rationale**
The ***container*** shall be designed for the vacuum to which it will be subjected. To remove air and moisture from a ***container*** being prepared for propane service using vacuum purging, complete the following steps: (a) Connect the suction side of an LP-gas compressor to the ***container*** being ***purged***. Open the ***container valve*** and turn the compressor on. (b) Ensure that any ***container*** opening is capped. (c) Ensure that the outlet of the compressor is venting the air to atmosphere. (d) Using an appropriate manometer, stop the process when the negative pressure reaches the value stated in Table A.2, according to the altitude above sea level of the location where the purging is taking place. (e) Shut the ***container valve*** off. (f) Connect the vapour line from the storage ***tank*** to the ***container***. Open the ***valve*** and allow the flow of propane until a pressure of approximately 15 psig (105 kPa) is reached. (g) Add methanol as required and shut off the ***valve***. The ***container*** is ready to be filled with propane.		

Clause in New Code **Source: Canadian Standards Association (2005), *CSA B149.2-05,* Mississauga: CSA**	Clause in previous code **Source: Canadian Standards Association (2000), *CSA B149.2-00,* Mississauga: CSA**	Recommendations, Interpretations and Rationale
Table A.2 **Negative pressure required for vacuum purging** (See Clause A.4.4.)		

Altitude above sea level, ft	Gauge reading, in Hg
0	25.85
500	25.31
1000	24.78
1500	24.26
2000	23.75
2500	23.24
3000	22.74
3500	22.25
4000	21.77
4500	21.29
5000	20.82
5500	20.35
6000	19.90