



Fuels Safety Program	Ref. No.: FS-67-05	Rev. No.:
DIRECTOR'S ORDER	Date: 10/31/05	Date:

***IN THE MATTER OF:
THE TECHNICAL STANDARDS AND SAFETY
ACT, 2000, S.O. 2000, c. 16 ("the Act")***

- and -

**ONTARIO REGULATION 223/01 (Codes and Standards Adopted by Reference)
made under the Act**

- and -

**ONTARIO REGULATION 212/01 (Gaseous Fuels)
made under the Act**

**DIRECTOR'S ORDER OF AMENDMENT TO THE
GASEOUS FUELS CODE ADOPTION DOCUMENT**

Subject: Adoption of the 2005 Natural Gas and Propane Installation Code with Ontario amendments and TSSA's Field Approval Code.

Sent to: All Natural Gas and Propane Contractors, Natural Gas Advisory Council, Propane Industry Advisory Council, Natural Gas RRG CAD, Propane RRG CAD, Field Approval RRG CAD, and the following certificate holders: G1, G2, G3, GP, DA, IMT, FXFT-Q, FXFT-2, COT, SH-01, CH-02, CH-SM1, CH-SM2, RE-0.

The Director of Ontario Regulation 212/01 (Gaseous Fuels) pursuant to section 6 of Ontario Regulation 223/01 (Codes and Standards Adopted by Reference) hereby provides notice of the following:

The Gaseous Fuels Code Adoption Document published by the Technical Standards & Safety Authority and dated June 1, 2001, is amended as follows:

1. Section 1 of the Code Adoption Document is revoked and replaced with the following:

1. The National Standard of Canada CSA-B149.1-05 entitled "NATURAL GAS AND PROPANE INSTALLATION CODE" prepared by the Canadian Standards Association, is adopted with the following amendments:

1.2 Section 1.2 is amended by adding to it the following subclause:
(n) propane used as refrigerant.

1.3 Section 2 is amended by adding the CSA 6.18-02 Service Regulators for Natural Gas Standard and revoking the reference to 6.19-01 Residential Carbon Monoxide Alarming Devices and replace it by CAN/CSA-6.19-01 Residential Carbon Monoxide Alarming Devices.

1.4 Section 3. is amended by revoking the definitions of "Appliance", "Approved" (defined in the O. Reg. 212/01), and "Authority having jurisdiction".

1.5 Section 3 is amended by adding to it the following definitions:
Authority having jurisdiction: means the Director designated for the purposes of the Act .

1.6 Section 4.1.3 is revoked and the following is substituted for it:
4.1.3 An appliance, accessory, component, equipment or any other item shall be installed in accordance with the manufacturer's certified instructions and this Document.

1.7 Section 4.2.3 is revoked and the following is substituted for it:
4.2.3. The approval of the assembly or construction of an appliance is subject to the authority having jurisdiction. (See Section 2 of the Code Adoption Document)

1.8 Section 4.3.5 (a) is revoked and the following is substituted for it:
4.3.5 (a)When the installation or conversion of an appliance constitutes a conversion from another form of energy the installer shall, at the time of installation or conversion,
(a) in the case of a fuel oil tank,
(i) remove the fill pipe and cap or plug the exposed fill pipe opening to an inside tank; however, do not remove the tank vent pipe .
(ii) shut off the tank outlet valve, remove the filter, and plug or cap the valve outlet;
(iii) where the tank is located outdoors, disconnect all exposed piping or tubing as close as practicable to the tank; cap or plug the exposed fill pipe opening to the tank; however, do not remove the tank vent pipe and
(iv) advise the owner/operator of the tank in writing that the tank may be required to be removed in accordance with the Fuel Oil Regulation and the oil shall be removed by a certificate holder trained for the purpose.

1.9 Section 4.5.5 is revoked and the following is substituted for it
4.5.5 An appliance that has been exposed to fire, explosion, flood, or other damage shall not be offered for sale, installed, re-activated or reconnected to the supply, without
a. approval of the authority having jurisdiction or
b. inspection has determined it is fit for continued use by a Gas Technician I or II (as appropriate for the appliance input rating).

1.10 Section 4.16 is amended by adding to it the following

4.16.4 Where a forced air appliance for heating of the attached residential building is installed in a residential garage, no opening shall be located in the portion of the appliance return air system located within the garage and the return air system shall be made air tight to prevent the infiltration of air from inside the garage.

1.11 Clause 5.1.1. is amended by adding to it the following

5.1.5 Installation requiring pressures in excess to those specified in Table 5.1 shall be approved by the Director.

5.1.6 For natural gas only, outdoor installations exceeding 125 psig shall be approved by the Director.

1.12 Clause 5.5.9 is amended by adding a new column in Table 5.2 to read:

“The discharge clearances from relief device openings with capacities under 50 cf/h (1.5 m³/h) will be 1 ft. (.3 m) to a building opening, appliance vent outlet, appliance air intake or source of ignition, and 3 ft. (1 m) to a mechanical air intake”.

1.13 Clause 6.7.2 is amended by adding a note at the end of the clause to read:

Note: The concealed space resulting from installation of a metal liner in a chimney, which has been examined and found to be clear and free of soot and creosote, may be used to install one continuous length of non-coated piping or tubing.

1.14 Clause 6.15.4 is revoked and the following substituted for:

6.15.4 Piping and tubing shall be located;

- a) Neither less than 15 in (400 mm) underground nor less 24 in (600 mm) under a commercial driveway or parking lot, except when it raises above ground at the point of supply to either a building or an outdoor appliance. Additional depth of cover shall be required where the piping is located in areas where physical damage is likely to occur, such as farm operations.
- b) Where, due to rocky terrain, it is impractical to comply with section 6.15.4 a), piping and tubing systems may be installed in accordance with **Annex L**.

1.15 Section 6.22 is amended by adding to it the following subclause:

6.22.6 When the pressure test in 6.22.2 or the leak test in 6.22.4 is completed, a tag stating the following information shall be attached to the piping, tubing system or an appliance in a readily accessible location protected from the environment:

- (i) Address of test;
- (ii) Contractor's name
- (iii) Contractor's registration number
- (iv) Date of test
- (v) Test pressure
- (vi) Test duration
- (vii) Total pipe length

- (viii) Pipe size
- (ix) Gas Technician name
- (x) Gas Technician certificate number and classification
- (xi) Statement: "DO NOT REMOVE"

1.16 Section 7.1 is amended by adding to it the following clauses:

7.1.4 A boiler not covered under 7.1.1 shall conform to the requirements of clauses 7.1.5, 7.1.6, 7.1.7 and 7.1.8 as applicable.

7.1.5 Every steam boiler not under continuous attendance by a certified operator shall be equipped with a low-water fuel cut-off device that serves no other purpose, that cannot be rendered inoperative and can be tested under operational conditions.

7.1.6 Except as permitted under clauses 7.1.7 and 7.1.8 every automatically fired hot-water heating boiler shall be equipped with a low-water cut-off device to shut off the fuel supply in the event of low water when,

- (a) the input to the boiler is in excess of 120 kW (400,000 Btuh); or
- (b) any portion of the circulating system is located below the boiler's lowest safe permissible water level regardless of the input, and the sensing element of the device shall be located above the lowest safe permissible water level established by the boiler manufacturer.

7.1.7 A coil-type boiler or a water tube boiler having an input in excess of 120 kW (400,000 Btuh) requiring forced circulation to prevent overheating of the coils or tubes, shall be equipped with a flow-sensing device installed in the outlet piping in place of the low water fuel cut-off device required in subclause 7.1.6 (a), and the sole function of the device shall be to shut off the fuel supply when the circulating flow is interrupted.

7.1.8 When two or more hot water boilers of the coil or fin-tube type are installed in one system, a low water fuel cut off device shall not be required on each boiler, provided that a low water cut-off device is installed on the main water outlet header and a flow switch is installed in the output piping of each boiler that will cut off the fuel supply to the burner on the boiler. These devices shall be installed so that they cannot be rendered inoperative. The installation of low-water cutoffs shall be such that they can be tested under operating conditions.

Note: The term "tested under operating conditions" is a procedure that ensures closure of the fuel supply valves in response to a simulated low water condition.

1.17 Clause 7.18.10 is amended by deleting the word propane, to read:

7.18.10 A torch intended for manual operation shall not be left unattended while in operation.

1.18 Clause 7.25.7 is revoked and the following is substituted for it

7.25.7 When an existing indoor swimming gas-fired pool heater is being replaced with a new gas heater, the new finned tube type heater shall be of the direct vent type.

1.19 Clause 7.33.2 is amended by adding to it the following sentence at the end of this clause:

A refrigerator shall also comply with the requirements of Branch Standard G/P No.6 Revised "Refrigerators Using Gas or Propane Fuel".

1.20 Clause 7 is amended by adding to it the following clauses:

7.36 Field Approval of Special Effects

Natural gas or propane used in connection to **Field Approval of Special Effects** shall comply with **Annex K**.

7.37 Requirements for the operation of Appliances at shows, exhibitions, or other similar events.

Natural gas or propane used in connection to **Appliances and Cylinders at Shows, Exhibitions, or other Similar Events** shall comply with **Annex J**.

1.21 Clause 8.1.2 is revoked and the following substituted therefore:

8.1.2 The requirements of 8.2 through 8.5 inclusive do not apply to direct vent or Category IV appliances.

Note: When a category IV appliance is installed utilizing indoor combustion air, the requirements of 8.2 through 8.5 apply.

1.22 Subclause 8.2.1 (a) is revoked and the following is substituted for it:

8.2.1 (a) has a vapour or air barrier with joints continuously sealed by taping or caulking in all thermally insulated walls, ceilings and floors, or

1.23 Subclause 8.14.8 (a) is amended by adding the following at the end of the subclause:

This does not apply to direct vent or non-condensing appliances;

1.24 Sub items 8.18.12 a) (i) and (ii) are amended by adding "see clause 7.13.4" after the words "Floor Furnace".

1.25 Annex D is revoked and the following is substituted for it:

See Annex D below.

Section 2 of the Code Adoption Document is revoked and replaced with the following:

2. The TSSA Field Approval Code, TSSA-FA-2005, September 2005 is adopted for the approval of assembly or construction of an appliance.

Section 3 of the Code Adoption Document is revoked and replaced with the following:

3. The terms in this Document have the same meaning as in the Act and the Regulation, unless otherwise specified.

Section 4

4. In the event of conflict between a provision of this Document and any code or standard referred to in this Document, this Document shall prevail.

Section 5

5. (New) This CAD is in effect 60 days after publication.

This Order is effective **January 1, 2006**

Dated at Toronto this 31st day of October, 2005

APPROVED BY:

Roland Hadaller, P. Eng.
Director, Gaseous Fuels Regulation
Technical Standards and Safety Act

ANNEX D (*informative*)

Customer's meter and regulator installations

Note: This informative Annex has been written in normative language to facilitate adoption where users of the Code or regulatory authorities wish to adopt it formally as additional requirements to this Code.

D.1 Location for customer's meter and regulator installations

The following requirements shall apply:

- (a) Customer's meters and *regulators* may be located either inside or outside of *buildings*, depending upon local conditions, except that on service lines requiring series regulation, in accordance with Clause 12.4.8.1 of CSA Z662, the upstream *regulator* shall be located outside of the *building*.
- (b) Where installed within buildings, customers' meters and regulators shall be in readily accessible locations that afford reasonable protection from thermal stresses and sources of heat, mechanical stresses, and chemical deterioration. Service regulators shall be located near the piping entrance and, where practical, the meters shall be installed at the same location. For service lines supplying large industrial customers and installations where gas is used at higher than standard service pressure, it shall be permissible to install the regulators at other readily accessible locations.
- (c) When located outside of *buildings*, meters and *service regulators* shall be installed in *readily accessible* locations. When outside meters and *service regulators* are installed in locations that do not afford reasonable protection from damage, such protection shall be provided.
- (d) 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 diaphragm failure, to less than 0.0283 m³/h), shall be vented to the outside atmosphere and shall terminate in rain- and insect-resistant fittings.

D.2 Operating pressures for customer's meter installations

Iron or aluminum case meters shall not be used at a *maximum operating pressure* higher than the manufacturer's rating for the meter.

D.3 Protection of customer's meter and regulator installations from damage

The following requirements shall apply:

- (a) Meters and *service regulators* shall not be installed where rapid deterioration from corrosion or other causes is likely to occur.
- (b) A suitable protective device, such as a back-pressure *regulator* or a *check valve*, shall be installed downstream of the meter according to the requirements that follow:

- (i) If the nature of the utilization *equipment* is such that it can induce a vacuum at the meter, a back-pressure *regulator* shall be installed downstream from the meter.
- (ii) A check *valve*, or equivalent, shall be installed if
 - (1) the utilization *equipment* can induce a back pressure;
 - (2) the gas utilization *equipment* is connected to a source of oxygen or compressed air; and
 - (3) liquefied petroleum gas or other supplementary gas is used as standby and can flow back into the meter. A three-way *valve* installed to admit the standby supply and at the same time shut off the *regulator* supply may be substituted for a check *valve* if desired.

ANNEX J

REQUIREMENTS FOR OPERATION OF APPLIANCES and CYLINDERS AT SHOWS, EXHIBITIONS, OR OTHER SIMILAR EVENTS

Use of Appliances

1. This Appendix applies to *appliances* that
 - (a) are on display at shows, exhibitions or other similar events; and
 - (b) are designed to be used outdoors or vented to the outdoors.
2. An *appliance* may be operated and vented indoors if it meets the requirements of this Annex;
3. An *appliance* shall only be used for the purpose of demonstrating its operation but shall not be used for heating space, water, or any other thing or for any other purpose.
4. An *appliance approved* for outdoor use being operated indoors for the purpose of demonstration shall be clearly marked that this appliance is for outdoor use only and the sign shall read:

DANGER

THE USE OF THIS TYPE OF APPLIANCE IS PROHIBITED FOR INDOOR USE. FOR YOUR SAFETY THE UNIT YOU ARE VIEWING IN THIS DISPLAY IS CONSTANTLY MONITORED FOR THE PRESENCE OF CARBON MONOXIDE. TO PROTECT YOU AND YOUR FAMILY NEVER USE A (name of the appliance i.e. BBQ, Patio Heater, Fire Pit, etc.) INDOORS, INCLUDING A GARAGE.

The sign shall be located immediately adjacent to the appliance and in clear view of the public, and the letters shall be a minimum 1” high.

5. An **appliance** shall be installed and activated initially by a person holding an appropriate valid certificate under the Technical Standards and Safety Act.
6. A person who has knowledge of the manufacturer’s operating instructions for the **appliance** shall be in constant and immediate control of the operation of the **appliance**. A copy of the manufacturer’s instructions shall be left with the **appliance**.
7. An **appliance** shall be **approved**.
8. (1) The level of carbon monoxide in the vicinity of an **appliance** shall
 - (a) be measured at intervals not exceeding 3 hrs,
 - (b) be measured 4 ft (1.2 m) above the floor and 4 ft (1.2 m) horizontally from the **appliance**, and
 - (c) be recorded with the date and time the measurements were made.(2) The record of levels of carbon monoxide made under sub – item 8 (1) shall be kept where the **appliance** is displayed and for the entire period of its display.
9. An **appliance** shall be shut down if the carbon monoxide level determined under item 8 exceeds 25 ppm.
10. A means shall be provided to physically protect any person from contact with hot surfaces, hot gases or flames resulting from operation of an **appliance**.
11. A **certified** portable fire extinguisher classified in accordance with ULC Standard CAN4-S508 of not less than 10-B,C rating shall be located at each booth or stall displaying **appliances**.

12. Use of Propane Cylinders Indoors

- 12.1 A **cylinder** shall be labelled "Propane", "Liquid Petroleum (LP) Gas" or "Danger: flammable gas". This label shall be easily readable and affixed in a conspicuous location.
- 12.2 A **cylinder** containing a maximum of 20 Lbs (9 kg) of propane and not connected to any other **cylinder** may be used indoors to supply propane to an **appliance**. The total propane capacity of **cylinders** installed indoors shall not exceed 1 Lbs (0.5 kg) per

200 square feet (18 square metres) of floor area.

12.3 A ***cylinder*** in use within a ***building*** shall not be located within 50 ft (15 m) of an exit or stairway.

12.4 A ***cylinder*** valve connection shall be equipped with an excess flow valve that activates at a flow of not more than 100 scfh (2.8 m³/h) at a pressure of 100 psig (690 kPa) or a device that limits the flow equivalent to that through a No. 60 DMS (1 mm) drill orifice at 100 psig (690 kPa). A cylinder shall be equipped with an overflow protection device (OPD) valve.

12.5 A ***certified pressure regulator*** shall be installed on a ***cylinder*** and be suitable for use with the ***appliance*** connected to the ***cylinder***.

12.6 A ***cylinder*** valve shall be closed when the ***appliance*** connected to the ***cylinder*** is not in use.

12.7 A ***cylinder*** connected to an ***appliance*** shall be secured or located in a place to prevent accidental tip over.

12.8 A ***certified*** portable fire extinguisher classified in accordance with ULC Standard CAN4-S508 of at least 10-B.C rating shall be located within 25 ft (7.5m) of a ***cylinder***.

12.9 A ***cylinder*** not connected for use shall be stored outdoors.

12.10 Connections at a ***cylinder*** and at the ***appliance*** connected to the ***cylinder*** shall be tested for leaks with a leak detection solution or any other proven leak detection method at the time the ***cylinder*** is connected. Additionally, this test shall be conducted daily upon activation. A source of ***ignition*** shall not be used to check for leaks.

NOTES FOR ANNEX J

1. Other applicable requirements of this Code shall apply
2. Other authorities such as the local fire department may have additional requirements that apply.

Annex K. Field Approval of Special Effects

The standard, NFPA 160, “Standard for Flame Effects Before an Audience, 2001 Edition” is adopted for use in the province of Ontario with the following amendments:

1. Section 1.1 is revoked and replaced with the following:

1.1.1 This standard shall apply to temporary flame effects using propane or natural gas as the fuel for entertainment, exhibition, demonstration, or simulation, including their design, fabrication, installation, testing, control, operation and maintenance.

1.1.2 This standard shall apply to the following:

- (a) The use of indoor and outdoor flame effects;
- (b) The design, fabrication, installation, testing, control, operation and maintenance of equipment, materials, procedures, and systems used to produce flame effects;
- (c) The rehearsal, videotaping, audiotaping, or filming of any television, radio, or movie production if such production includes the use of flame effects;
- (d) The rehearsal of any production incorporating flame effects.

2. Section 1.4 is amended by adding the following definition:

Deadperson switch. A manually controlled system designed to automatically interrupt the fuel to the flame effect equipment.

3. Section 6.4 is revoked and the following substituted for it:

6.4 All flame effect operators shall have a valid Record of Training (R.O.T.) for the use and handling of natural gas or propane construction heaters or equivalent.

4. Section 7.3.2.5 is revoked.

7.3.2.5 **Fireplace Kits**

Where the special effect is to simulate a flame in a fireplace, the following requirements shall apply.

- a. Where the flame effect is to be installed in an existing fireplace:
 - i) the chimney/vent shall be inspected and adequate draft through the chimney/vent to exhaust combustion products shall be confirmed;
 - ii) the fireplace enclosure shall comply with the Ontario Building Code or be certified by a recognized testing organization;
 - iii) combustible materials shall be shielded from open flames by using fire-rated materials; and
 - iv) except as specified in 7-3.2.6 (iv), a maximum capacity of 20 lbs. of propane for each fireplace kit may be used indoors;
 - v) with multiple fireplace kit installations, an aggregate capacity of more than 100 lbs of propane connected for use shall not be used indoors.
- b. The burner and supports shall be made of non-combustible materials.
- c. At least one portable dry chemical fire extinguisher of a total not less than 20-B,C rating shall be provided in a readily accessible location to the operator.

- d. Piping or tubing shall not be exposed to high temperatures and flame impingement.
- e. The flame effect shall be controlled by a regulator and a quarter turn manual safety shut-off valve.
- f. Where the flame effect will continuously operate for longer than 10 minutes,
 - i) an automatic safety shut-off valve controlled by a deadperson switch shall be installed in the fuel supply line to the burner; or
 - ii) a quarter turn manual valve will be installed as an effect valve and another quarter turn manual valve controlling the fuel supply shall be installed at the fuel supply system. The fuel supply valve will be installed and controlled by a second operator and located not less than 10 feet from the effect valve and primary operator.
- g. Where a cylinder is used indoors with a capacity in excess of 1 lb. of propane,
 - (i) except as provided in (ii) an excess flow valve shall be installed. The excess flow valve shall be either integral with the cylinder valve or in the connection to the cylinder valve outlet. In either case, it shall be installed in such a manner that undue strain will not cause breakage between the cylinder and the valve.
 - (ii) A deadperson switch shall be installed with an automatic safety shut-off valve where an excess flow valve is not installed.
- h. Unless completely separated from the flame with a 2 hour fire rated shield, a cylinder shall not be located less than 10 feet from the flame effect.
- i. When a hose is used, it shall inspected before connection, not exceed 75 feet in length and shall be protected, by location or other means, from impact and excessive heat.
- j. The operator shall remain in constant attendance at the safety shut-off valve during operation and have visual access to the flame effect at all times.
- k. During non-operation times, the operator shall close the quarter turn manual shut-off valve and the cylinder or fuel supply valve.
- l. Cylinders not in use shall be stored in accordance with the Ontario Propane Code.

7.3.2.6 Flame Bars and other Flame Effects.

Where the special effect is to simulate a flame the following shall apply.

- a. Where the input to the flame effect is less than 400 000 BTUH,
 - i) the requirements of section 7.3.2.5 (fireplace kits) shall apply.
 - ii) A pressure indicator shall be installed downstream of the regulator;

- iii) The estimated height of the flame for a specified pressure, burner and pipe/tube size shall be tested and documented prior to installation and operation;
 - iv) It is permissible not to install an excess flow valve provided an automatic shut-off valve controlled by a deadperson switch is installed.
- b. Where the input to the flame effect is 400 000 BTUH or greater,
- i) The system will be controlled by
 - two automatic safety shut-off valves piped in series, wired in parallel and activated by a deadperson switch shall be installed or;
 - a quarter turn manual valve will be installed as an effect valve and another quarter turn manual valve controlling the fuel supply will be installed at the fuel supply system. The fuel supply valve will be installed and manually controlled by a second operator and located not less than 10 feet from the effect valve and primary operator;
 - ii) A pressure indicator shall be installed;
 - iii) The estimated height of the flame for a specified pressure, burner and pipe/tube size shall be tested and documented prior to installation and operation;
 - iv) The total capacity of cylinders used indoors and connected together shall not exceed 300 lbs. of propane and not more than one manifold of cylinders may be located in the same area unless separated by a distance of at least 50 feet;
 - v) When a hose is used, it shall be inspected before connection, shall not exceed 75 feet in length and shall be protected, by location or other means from impact and heat;
 - vi) The burner and supports shall be made of non-combustible materials;
 - vii) Unless completely separated from the flame with a 2 hour fire rated shield, a cylinder shall not be located less than 10 feet from the flame effect; and
 - viii) A cylinder shall not be exposed to temperatures in excess of 125°F (50°C).
- c. At least one portable dry chemical fire extinguisher of a total not less than 20-B,C rating shall be provided in a readily accessible location to the operator.
- d. Where a flame effect is used indoors, the products of combustion shall:
- i) be effectively vented to the outdoors by a chimney, vent or continuously operating exhaust fan; or
 - ii) have the environment around the flame effect monitored for carbon monoxide levels. A carbon monoxide monitoring system shall be set to alarm at a level not greater than 25 ppm carbon monoxide. The flame effect shall be discontinued until the level of carbon monoxide is reduced below 25 ppm.

7.3.2.7 System using Fuel Accumulators (Propane Cannons) for Film

Fuel Accumulators (propane cannons) used in flame effect systems shall meet the following requirements:

- a. An accumulator tank shall be designed, manufactured, and certified as an unfired pressure vessel with a minimum design pressure of not less than 250 psig.
- b. Unless otherwise approved, welding shall not be done to the shell, head, or any other part of an accumulator tank.
- c. Field welding of an accumulator tank shall be made only on saddle plates or brackets.
- d. An accumulator tank shall be equipped with a properly sized, spring loaded relief valve in accordance with section 10.2 of the Ontario Propane Code. The relief valve shall be set at a pressure not exceeding the pressure rating of the lowest rated component.
- e. A pressure gauge shall be provided with each accumulator tank.
- f. A quarter turn manual shut-off valve and a quick disconnect device shall be installed at the connection to the inlet of an accumulator tank. This valve shall remain closed until charging of the accumulator tank.
- g. The outlet of the accumulator tank shall be piped to the effect valve.
- h. Propane shall not be put into an accumulator tank until the air and moisture in the tank has been purged in accordance with the procedures described in Annex A, Section A-4, "Removal of Air and Moisture from Cylinders and Motor Fuel Containers," in the Ontario Propane Code.
- i. An accumulator tank shall be charged as close to the time of the actual arming and firing of the effect as is practical.
- j. Where the fuel supply to an accumulator tank is not disconnected and removed after charging, the supply piping to the accumulator tank shall be equipped with the following:
 - i) A pressure regulator;
 - ii) A manual quarter turn shut-off valve;
 - iii) A pressure gauge;
 - iv) two automatic safety shut-off valves piped in series and wired in parallel through a deadperson switch; and
 - v) A high gas pressure switch with a setting no higher than 10% of the pressure intended for the accumulator tank.
- k. The complete system with all components and accessories in place shall be leak tested at the system operating pressure prior to use.

- l. Fuel accumulators shall have a written record of tests of flame effect size related to accumulator tank pressures and burner types (nozzles) including wind conditions and ignition types at the time of the tests. This written record shall be available upon the request of the authority having jurisdiction.
- m. The mixing of air or any other oxidizing media with fuel in an accumulator tank shall be prohibited. The mixing of an inert gas with fuel in an accumulator tank is permissible.
- n. Where an accumulator tank is used indoors, the products of combustion shall:
 - i) be effectively vented to the outdoors by a chimney, vent or continuously operating exhaust fan; or
 - ii) have the environment around the flame effect monitored for carbon monoxide levels. A carbon monoxide monitoring system shall be set to alarm at a level not greater than 25 ppm carbon monoxide. The flame effect shall be discontinued until the level of carbon monoxide is reduced to below 25 ppm.
- o. Where an accumulator tank is used indoors, means shall be provided to purge gas from the volume of the space to which the flame effect is used:
 - i) at least four times of the entire volume and flue passages; or
 - ii) a combustible gas analyzer in conjunction with a purge system shall be used to confirm that gas has not accumulated beyond 25% of the lower explosive limit throughout the entire volume and flue passages.
- p. At least one portable dry chemical fire extinguisher of not less than 20-B,C rating shall be provided in a readily accessible location to the operator.
- q. Unless completely purged of propane, an accumulator tank shall not be used with any other product and shall be stored outdoors in accordance with section 6.5.2 of the Ontario Propane Code. The person purging the accumulator tank shall be a holder of a Record-of-Training for filling cylinders.
- r. An accumulator tank may be stored indoors when completely purged of propane.

7.3.2.8 Propane cylinders shall be:

- a. in an upright position on a firm footing and secured to prevent them from being accidentally tipped over;
- b. a cylinder in use inside a building shall not be located near an exit, stairway, or an area normally used or intended for safe evacuation of people;

- c. positioned so that the relief valve points away from any sources of ignition.
- 7.3.2.9 Inversion of propane cylinders to supply a propane effect is strictly prohibited.
- 7.3.2.10 When changing cylinders, clear the area within fifteen feet of the cylinder installation of all sources of ignition, use only the proper sized wrench for making connections.
- 7.3.2.11 Where certified appliances are temporarily installed and used, all combustion safety interlocks, combustion safeguards, excess temperature limits, pressure relief valves, lower water cut-outs, and other applicable safety controls shall be tested for proper operation prior to activating the appliance.
- 7.3.2.12 Where liquid propane is used for a flame effect, all applicable requirements of the Ontario Propane Code and the CSA-B149.3 shall apply.

ANNEX L

Installation of piping or tubing in rocky areas

Where, due to rocky terrain, it is impractical to comply with section 6.15.4 (a), tubing systems may be installed in accordance with this annex, the manufacturer's instructions and the authority having jurisdiction.

1. When piping or tubing cannot be buried a minimum of 15 inches due to rocky terrain, Type L polyethylene-coated copper tubing sleeved using high-density polyethylene tubing that contains a minimum 2% UV resistance by weight, may be used in accordance with this document and the Manufacturer's Instructions.
2. Tubing shall be installed without joints unless the required distance is beyond 100 ft. Tubing system shall be joined or connected in accordance with clause 6.15.3 and the sleeve shall be connected in accordance with the manufacturer's instructions.
3. Measures shall be taken to ensure that the pipe or tubing is protected from damage from vehicles, snow machines etc. (see clause 6.16.3)
4. where ground cover is not possible,
 - a) Aboveground sections of the tubing sleeve shall be anchored to the contour of a secure rock surface at minimum 10 feet intervals . The sleeve shall be banded every 3 feet with a high visibility yellow Tape
 - b) Piping shall follow the contour of the terrain without unsupported sections of pipe or tubing occurring above grade
5. PVC tubing sleeve to be sealed at each end to prevent the entrance of dirt and moisture.

6. A trench for underground sections of the tubing shall be in compliance with clause 6.15.5. The backfill, material shall be free of sharp objects, stones larger than 38 mm or any other material that may damage the piping or tubing.
7. Permanent Markers (yellow with black writing) shall be placed along the piping/tubing system every 10 ft. warning that the piping/tubing is part of a natural gas or propane system and when installed on rock, the signs shall be anchored to the rock.
8. Permanent Markers (yellow with black writing) to be placed at the natural gas meter or propane container, and building or outdoor appliance warning of a shallow underground propane/natural gas piping or tubing system.
9. The markers referred to in 7 and 8 shall be of a height above the anticipated snow level for the area.
10. The PE material being used as protective sleeve shall conform the Standard CGSB 41-GP-25M and shall contain a minimum 2% content of carbon black additive, which gives the product essentially a 50 year life cycle for resistance to UV rays from the sun.