

**THE SASKATCHEWAN  
CODES OF PRACTICE  
GAS INSTALLATION SUPPLEMENT  
CSA-B149.1 - 15  
NATURAL GAS AND PROPANE  
INSTALLATION CODE**



January 1, 2016



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The following clauses have been amended, noted, explained or added and is a supplement to the B149.1 Natural Gas and Propane Installation Code.

*Note: The acronym S.C.O.P. refers to The Saskatchewan Codes of Practice.*

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### SECTION 3: DEFINITIONS

***Manufactured or Mobile Home\**** - A transportable, single or multiple section single family dwelling conforming to the CAN/CSA – Z240 MH Series at time of manufacture. It is ready for occupancy upon completion of setup in accordance with required factory recommended installation instructions. These structures are required to have all gas fired appliances installed in accordance with clause 4.1 of the CAN/CSA - Z240 MH. All appliances must be certified for installation in Canada.

***Modular or Ready To Move (RTM) Homes\**** - are constructed to The National Building Code and the installation of the gas appliances conform to the B149.1 Natural Gas and Propane Installation Code. Modular or RTM homes certified through the CAN/CSA - A - 277 covers the installation of hidden or closed-in gas components (gas piping and venting) and require no additional inspection. If the modular or RTM home is not certified to the CAN/CSA- A- 277 the inspection of the hidden or closed-in gas components shall be inspected to conform with the B149.1 Natural Gas and Propane Installation Code. All appliances must be certified for installation in Canada.

*Note: Some modular or RTM homes come with furnaces certified for manufactured or mobile homes. These furnaces typically do not have return air ducting. Usually the central hallway serves as the return air path. Because of this any other gas appliance installed must have its' combustion process separate from the living space.*

**\*Refer to “Public Safety Notice” in the appendix.**

## SECTION 4: GENERAL

### 4.3 RESPONSIBILITIES OF THE INSTALLER

- 4.3.9** Installers activating any appliance shall fill in all information on the appliance activation tag and hang the tag on the gas line in an accessible location proximal to the appliance. Gas appliances that have supply and return duct work attached to them shall have the date tested, the tested temperature rise and manifold pressure recorded. They shall be recorded prominently, either on the supply plenum with a permanent marking device in a legible manner or in the start-up sheet accompanying the installation manual and left on site.

A green rectangular tag with a red circular hole on the left side. The text on the tag is as follows:

**APPLIANCE ACTIVATION**  
**ADDRESS** \_\_\_\_\_  
**CONTRACTOR** \_\_\_\_\_  
**ACTIVATION DATE** \_\_\_\_\_  
*This equipment has been installed & activated in accordance with the manufacturer's instructions & the CAN/CSA - B149.1 Natural Gas & Propane installation code.*  
**GAS FITTER LICENSE #** \_\_\_\_\_  
**GAS FITTER NAME** \_\_\_\_\_  
Print

- 4.3.10 Activations** – Activation of high input equipment 1,000,000 B.T.U.H. (300 kW) and over shall be carried out by the installer in the presence of a gas inspector and a gas utility representative. Activations in high occupancy buildings shall take place when buildings are relatively unoccupied.

*Note: For boiler activations in commercial applications or residential applications in more than a three-family dwelling, you must contact TSASK.*

### 4.5 Suitability of Use

- 4.5.5.1** A Saskatchewan licensed gas fitter is an acceptable person to conduct an inspection pursuant to clause 4.5.5. For appliances, accessories, components, and equipment exposed to flooding, they shall refer to the “Emergency Procedures Guideline - Flooding” in the Appendix.

## **4.9 HAZARDOUS LOCATIONS**

### **4.9.3 Dugouts and Partial Basements - An appliance shall not be installed:**

- (a) on an earth floor; or
- (b) in an area having uncribbed earth walls unless a clearance of 4 ft. (1.2 m) can be maintained around the appliance.

## **4.14 ACCESSIBILITY**

### **4.14.6 -- 4.14.7 Walkways and Working Platforms**

**4.14.6.1** When water stands on the roof, either at the appliance or in the passageways to the appliance, or when the roof is sloped or has a water seal, or the roof surface is metal, a suitable anti-skid walkway shall be provided. The designer must ensure the roof structure has the capability to support the additional load associated by the addition of the walkway and/or working platform structure.

**4.14.8** An example of an acceptable method of access design is as follows:

#### **Walkways**

- The walkway must be raised and securely affixed to the roof.
- The walkway must be a minimum of 24" (610 mm) and constructed and supported to handle the anticipated loads without appreciable material deflection.
- The surface of the walkway must have anti-skid characteristics such as provided with an expanded metal surface.
- When the point of access to the roof is within 6 ft. (1.8 m) of the edge, and the roof slope is 3 in 12 or less pitch, the walkway must be provided with a hand/guard rail starting at the point of access to a distance of 6 ft. (1.8 m) from the roof edge along the walkway.
- When the roof exceeds a 3 in 12 pitch, the hand/guardrail must be continuous along the walkway.
- The hand/guard rail must be constructed in accordance with current OH&S regulations.



### **Working platforms**

- The working platforms must be securely affixed to the roof.
- Level working platforms must be located on all sides of the appliance that requires servicing access.
- The working platforms must be constructed as the walkway, and be a minimum of 30" (762 mm) in width, with a hand/guard rail constructed as required for the walkway.
- The working platform must be installed within 6" (152 mm) horizontally of the unit's edge in a way that does not interfere with any part of the unit that requires removal for servicing purposes.

### **Access to gas appliances installed on building with multiple level roofs**

- A permanent fixed access ladder or suitable step/stairway must be installed on roofs as part of a continuation of the walkway system where passage is obstructed by a pony wall or parapet higher than 3ft (914 mm) in height to allow for safe access to roof top equipment.
- Access ladder design shall be constructed to meet requirements as specified in the Saskatchewan Occupational Health and Safety Regulations.
- Steps/stairs to be designed to the requirements specified in The National Building Code of Canada.

## **SECTION 5: PRESSURE CONTROLS**

### **5.5 VENTING OF PRESSURE CONTROL DEVICES**

- 5.5.1** CSST is not included in the permissible materials listed in 5.5.1(a) for the venting of pressure control devices that require venting.
- 5.5.4** CSST is not included in the permissible materials listed in 5.5.4(a) for the venting of pressure control devices that require venting.

## **SECTION 6: PIPING AND TUBING SYSTEMS, HOSE AND FITTINGS**

### **6.2 MATERIAL**

**6.2.3.1** All fittings on schedule 80 piping systems shall be minimum Class 300.

**6.2.12.1** Examples of other permissible materials which meet or exceed the minimum acceptable performance standards for gas piping and fittings listed in Clause 6.2 include ASTM 312 stainless steel piping, and ASTM A182 stainless steel flanges, fittings, and valves commonly used in an aggressively corrosive environment such as potash or salt facilities.

#### **6.2.13.1 Requirements for Heat Fusion of Polyethylene Pipe:**

No person shall join plastic pipe to be used for the transfer of natural gas or propane unless that person has:

- (i) in the opinion of the Chief Inspector, had satisfactory experience in similar work, or
- (ii) satisfactorily completed a course of training prescribed by or acceptable to the Chief Inspector.

#### **6.2.22 CSST (Bulletin 02-2012)**

**6.2.22.1** All CSST shall be installed according to the manufacturer's certified instructions.

**6.2.22.2** Only use leak detector fluid recommended or authorized by the CSST manufacturer.

**6.2.22.3** Clearances from puncture points are to be maintained as per certified instructions.

**6.2.22.4** CSST shall not be used as a union.

**6.2.22.5** Steel wound bend supports shall be used as per certified instructions.

**6.2.22.6** Appliance outlets shall be secured using manufacturer's approved termination procedure and materials.

**6.2.22.7** When CSST is directly connected to a black iron swing joint, the swing joint will not perform as intended without causing excessive strain on the CSST. CSST shall not be directly connected to a black iron swing joint.

## **USE OF CAPACITY TABLES FOR SIZING OF PIPING AND TUBING**

- 6.3.6.1** For natural gas installations with a designed delivery pressure of 7 inches water column, the maximum allowable pressure drop is 0.5 inches water column.

For propane installations with designed delivery pressure of 11 inches water column, the maximum allowable pressure drop is 1 inch water column. (Bulletin 05-2013)

- 6.3.6.2** The reduction in capacity using Sch 80 pipe (compared to Sch 40) is dependent upon pipe size.

The capacity tables A.1 through A.7 in CSA B149.1 can be used for Schedule 80 pipe by using the following derating factors:

NPS ¾ sch 40 pipe – take the value from the table and multiply by 0.76  
NPS 1 sch 40 pipe – take the value from the table and multiply by 0.78  
NPS 1 ¼ sch 40 pipe – take the value from the table and multiply by 0.82  
NPS 1 ½ sch 40 pipe – take the value from the table and multiply by 0.83  
NPS 2 sch 40 pipe – take the value from the table and multiply by 0.84  
NPS 2 ½ sch 40 pipe – take the value from the table and multiply by 0.85  
NPS 3 sch 40 pipe – take the value from the table and multiply by 0.86  
NPS 4 sch 40 pipe – take the value from the table and multiply by 0.87

These factors are identical for each table (A.1 through A.7)

## **6.8 PIPING PRACTICES**

- 6.8.8** Job-fabricated welded fittings are not allowed in welded piping systems.

## **6.9 JOINTS AND CONNECTIONS**

- 6.9.1.1** A raised-face flange shall connect to a raised-face flange. A flat-faced flange shall connect to a flat-faced flange.

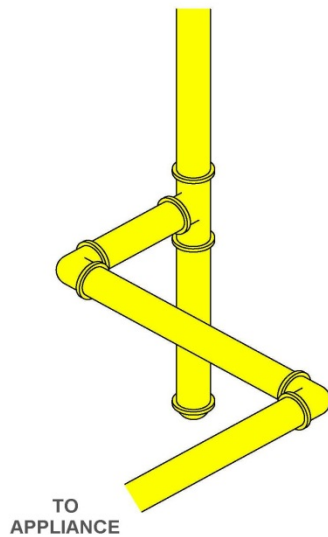
- 6.9.3.1** Welding of gas piping within Saskatchewan shall be performed in accordance with a procedure supplied to and approved by the Chief Gas Inspector. Welding procedures, registered with the Technical Safety Authority of Saskatchewan (TSASK), are acceptable. Welding of gas piping shall be performed by an operator qualified under the applicable welding procedure. Documentation of welder registration in the province, territory, state or country shall be provided to and approved by the Chief Gas Inspector.

- 6.9.4.1** The acceptance criteria for any welds shall be as specified in CSA Z662 “Oil and Gas Pipeline Systems” or, if applicable, ASME B31.1 “Power Piping” or, if applicable, ASME B31.3 “Process Piping”. All welding projects shall conform to the installer’s Quality Control (QC) Program, which has been developed following the principles of an appropriate standard, and shall be documented with a copy submitted to The Chief Gas Inspector. The QC Program shall contain records of welding procedures, qualification of personnel, weld schedules, repair schedules, and inspection reports.

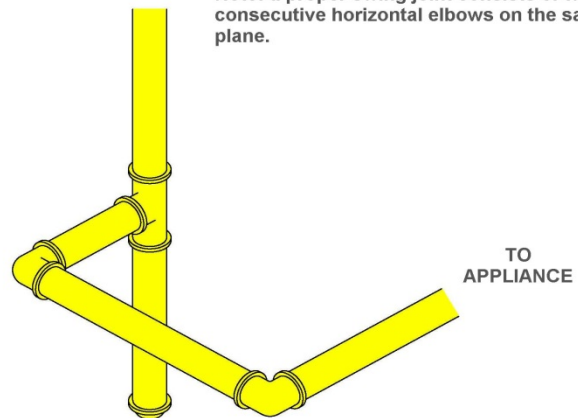
## **6.11 APPLIANCE CONNECTIONS**

- 6.11.1.1** Where an appliance is connected to a flexible piping or tubing system, connection to the appliance shall be outside the cabinet and into a tee fitting containing a drip pocket and rigid piping that extends to the appliance gas valve.
- 6.11.7** Appliances such as dryers and ranges can be connected directly to a rigid piping system. When a flexible piping or copper tubing system is used, the piping or tubing system must be securely terminated and the appliance connection must satisfy clause 6.11.2.
- 6.11.8** Installers shall provide an effective swing joint at all rigid piping manifold connections to appliances installed on earth supported floors. When using threaded pipe, the swing joint shall consist of two consecutive threaded elbows installed on a horizontal plane. When using CSST or tubing the installer shall provide a 5" to 8" offset connected to a nipple and drip at the appliance. (Bulletin 02-2012)

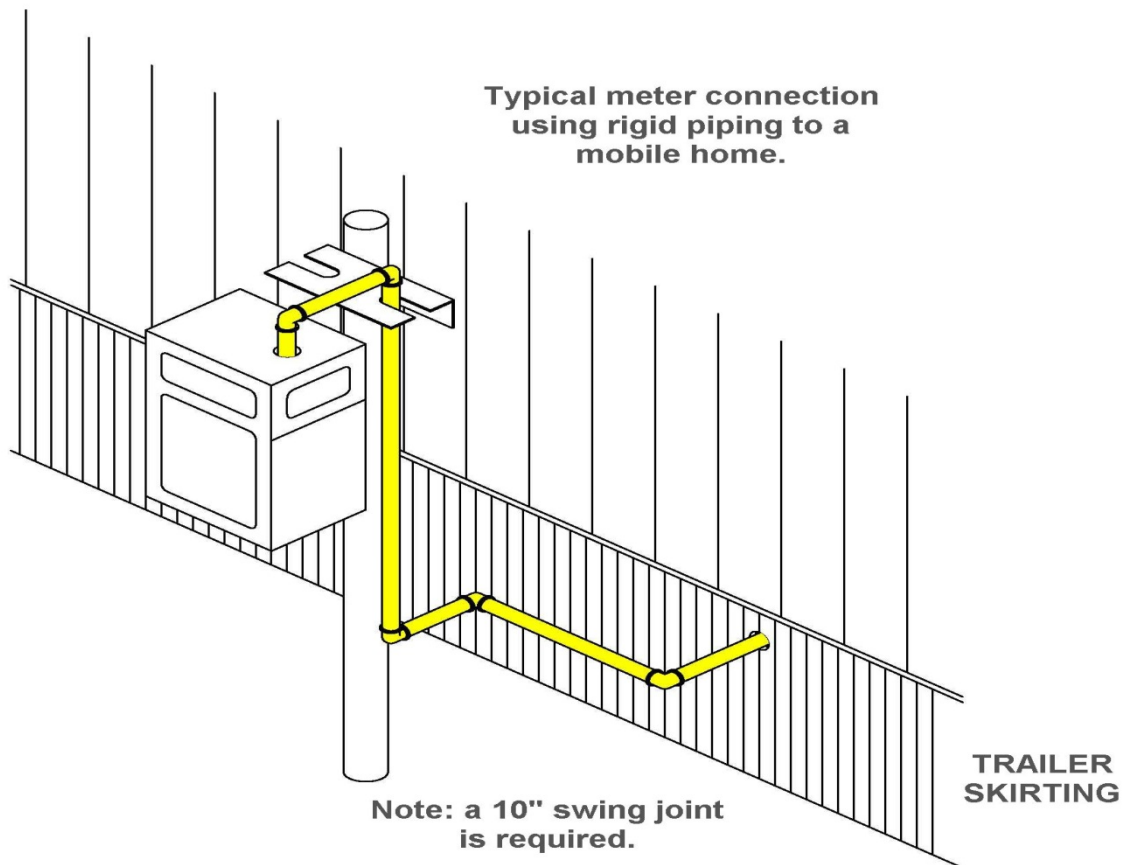
## Typical Swing Joint Configuration



Examples of Effective Swing Joint  
Note: a proper swing joint consists of two consecutive horizontal elbows on the same plane.

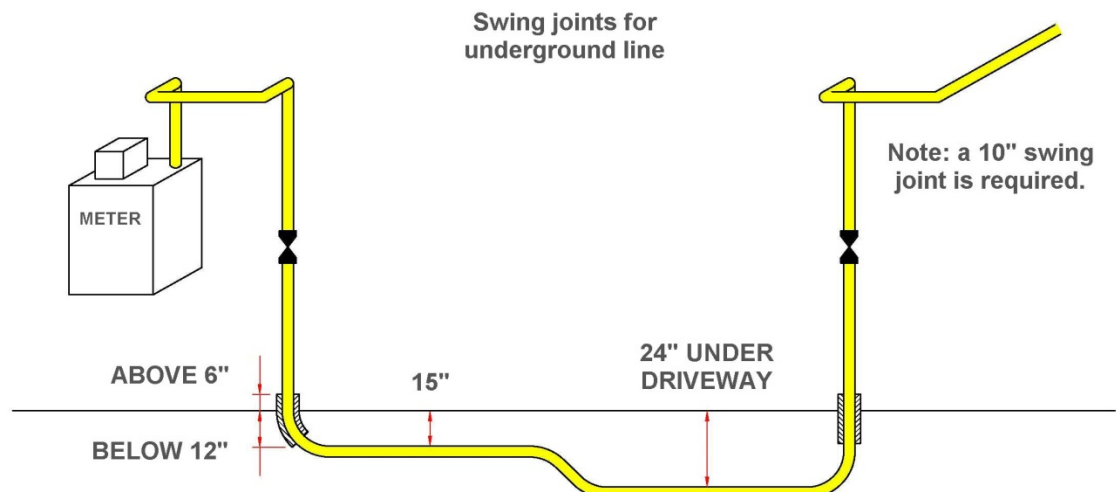


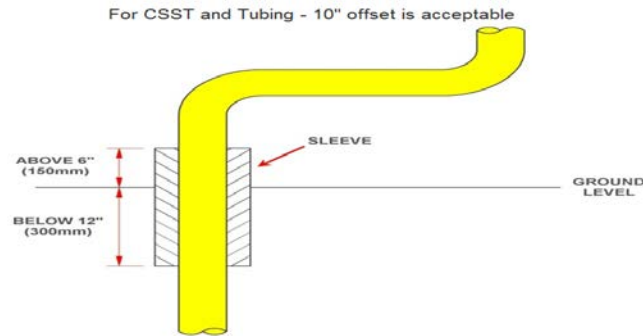
## Meter Stand Connection



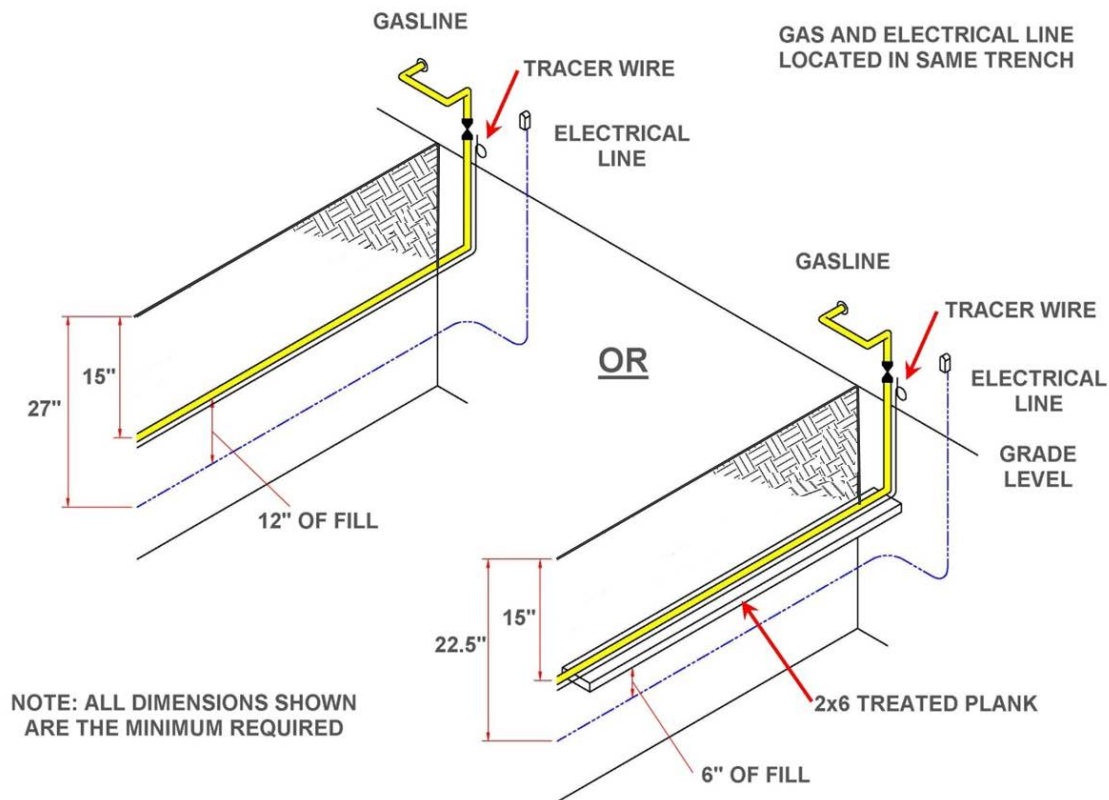
## **6.15 UNDERGROUND PIPING AND TUBING**

- 6.15.2** Underground steel piping systems shall only be joined below grade by welding.
- 6.15.3** Underground copper tubing systems shall only be joined below grade by brazing.
- 6.15.4.1** 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 J.
- 6.15.10.1** Where piping or tubing penetrates the grade-level, a sleeve shall be installed a minimum of 6" above to 12" below grade-level, to protect the piping or tubing where it penetrates grade-level to permit free movement of the soil and covering without placing strain on the piping or tubing.
- 6.15.13.1** The gas supply to underground piping or tubing shall be controlled by a shut-off valve situated above ground at the point of entry to the ground, and by a shut-off valve situated above ground at the point of exit from the ground.
- 6.15.14** Non-metallic piping or tubing shall be accompanied by a minimum 14 AWG TWU copper tracer wire tracing wire. The tracer wire must be taped to the gas line using low conductivity electrician's tape at consistent (max. 16 ft (5 m)) intervals, unless pipe and tracer wire are installed by ploughing. Tracer wire terminations shall be readily accessible by attachment to service risers or equivalent above ground structures. (Bulletin 01-2009)
- 6.15.15** A minimum 10" (250 mm) swing joint shall be installed at above ground connections to underground piping systems up to and including 2" in diameter. Swing joints are only effective when constructed from threaded pipe, or installed using a horizontal offset in CSST or tubing. Welded and press-connected fittings are inflexible and do not provide an effective swing joint. Above ground connections to welded underground piping systems over 2" in diameter shall be supported from ground movement using a concrete thrust block buried beneath the riser. When using threaded pipe, the swing joint shall consist of two consecutive elbows installed on a horizontal plane. When using tubing or CSST, the installer shall provide a minimum 10" (254 mm) horizontal offset. (Bulletin 02-2012)





- 6.15.16** Electrical wiring may be installed in the same trench as customer-owned propane or natural gas lines provided the electrical wiring is placed at a greater depth with at least 12" (300 mm) earth separation. Clearance can be reduced to 6" (150 mm) of earth separation if a treated 2" (50 mm) x 6" (150 mm) plank is installed between the gas line and electrical wiring.



- 6.15.17** Electrical wiring may be installed in a parallel trench to customer-owned propane or natural gas lines provided the propane or natural gas lines clearance to electrical wiring is maintained at least 12" (300 mm) separation.

- 6.15.18** Underground piping used to conduct liquid propane is restricted to non-residential properties and subject to these requirements:

- 1) The installation of underground liquid propane piping shall not commence until a site plan is submitted to the Chief Gas Inspector and approval is granted.

- 2) i) A liquid supply line shall have an automatic shut off valve (located upstream of buried piping) that will close automatically when the pump is shut off.
- ii) Vapor return piping shall comply with liquid requirements except that listed in 2 (i).
- 3) Piping risers shall be sleeved at least one size larger than the riser and shall extend from the horizontal section of the underground line to 12" (300 mm) above grade to provide for ventilation of the underground line.

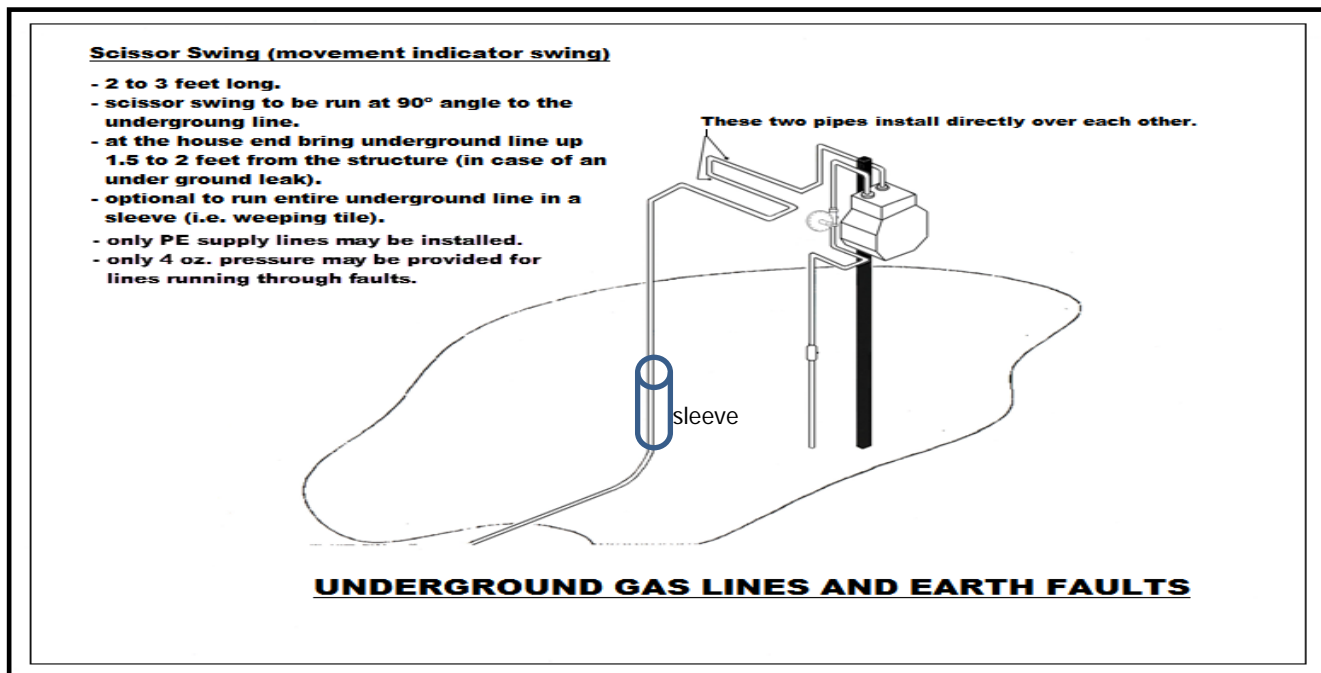
#### **6.15.19 GAS INSTALLATIONS IN LANDSLIDE AREAS (Bulletin 03-2012)**

Saskatchewan has several active landslides. These are located along the valley walls of rivers and lakes.

When installing a gas service to one of these areas check with the property owner for a copy of the geotechnical report showing where the structure is placed in relation to the fault lines. The gas utility cannot pass across fault lines with their service line. This means the gas meter may be installed some distance from the building. In this case, consult with the district gas inspector to see how the four ounce pressure supply line can be routed. You will need a copy of the geotechnical report in order to have the consultation with the gas inspector.

In some cases, the gas utility will have a copy of the geotechnical report.

Do not install any underground supply lines that cross fault lines in a landslide area without the district gas inspector's approval. An example of a swing joint used in a landslide area is shown below:





## **6.16 PROTECTION OF PIPING AND TUBING (Bulletin 05-2013)**

- 6.16.1.1** All outdoor piping or tubing shall be protected by either painting or coating, except for
- a) piping and tubing serving a residential building, or
  - b) piping and tubing in oilfield applications which must meet the owner's requirements for painting or coating.

### **6.16.3.1 Multi-Story Wood Structures**

Multi-story wood buildings can shrink or settle as much as 0.75 inches per floor depending on moisture content and the height of the wood framing. The design and installation of gas piping in a new multi-story wood building shall include a means to accommodate for building shrinkage as well as settlement. (Bulletin 01-2009)

- 6.17.4.1** Acceptable means of permanently identifying the room number, apartment number, or the area of the **building** served by each piping or tubing system includes:
- i. **Embossed Tag** - raised lettering on a stainless steel, brass or aluminum tag.
  - ii. **Engraved Tag** - engraved lettering on a .stainless steel, plastic or aluminum tag (Bulletin 01-2009)

- 6.17.4.2** All tags shall be fastened using an ultraviolet and corrosion resistant system such as stainless steel wire: (Bulletin 01-2009).

- 6.17.4.3** Unacceptable means of compliance include:
- i. "Permanent" Marker – whether or not used on a tag, wall, or piping.
  - ii. Any type of Printed or Written Tag – there is no existing ink product with sufficient durability to UV degradation to be considered acceptable.
  - iii. Illegible Markers or Tags (Bulletin 01-2009)

## **6.20 Gas hose and fittings**

### **6.20.3 When a gas hose is used**

- (a) for permanent installation, it shall not exceed 10 ft (3 m) in length and shall neither extend from one room to another nor pass through any wall, partition, ceiling, or floor;
  - i) when connected to mobile/manufactured homes or Park Model trailers the maximum 10 ft (3 m) in length gas hose connected to the supply utility must terminate to rigid piping at a location outside of where a skirting is or may be installed,
  - ii) when connected to agricultural or oilfield gas burning equipment, such as a grain dryer or treater, then the hose shall be protected from damage and shall not exceed 30 ft (9.1 m) in length.

## **6.21 Gas connectors**

- 6.21.3** Except as specified in Clause 7.23.3, a corrugated metal gas connector certified to ANSI Z21.24/CSA 6.10 may be used to connect rigid piping to a mobile/manufactured home furnace within the furnace cabinet, or to connect a water heater in a mobile/manufactured home.
- (d)

## **6.22 TESTING OF PIPING, TUBING, HOSE AND FITTINGS**

**6.22.1.1** Gas Inspections shall be notified of all underground air tests and all commercial air tests.

**6.22.1.2** All steel piping systems shall be leak tested using air or nitrogen as the test medium if the test pressure generates a stress below 30% of Specified Minimum Yield Strength (SMYS) of the piping material.

*Note: Example test pressures equating to a stress of 30% SMYS for steel piping systems are given in S.C.O.P. Appendix Table 6.3.1.*

**6.22.1.3** For test pressures exceeding a stress of 30% of SMYS:

- a) both a leak and a strength test are required following the testing requirements and limitations of CSA Z662;
- b) 100% of all welds have successfully passed radiographic inspection; and
- c) air, nitrogen, or water are permissible as the leak and strength test medium on natural gas piping, provided the test and purge procedures have been approved by the Chief Gas Inspector. Water is not permissible as a test medium on propane piping systems.

**6.22.2.1** The pressure test described in 6.22.2 shall be conducted on the entire system isolated from all appliance connections, and isolated from all connections to live gas piping systems, utilizing positive pressure terminations, in the form of blinds, caps or plugs located at each tie-in point. Valves do not provide a positive pressure termination, and all valves in the piping system shall be in their fully open position during this pressure test. All branch lines, including CSST that are extended after the initial pressure test shall be pressure tested in accordance to 6.22.2

**6.22.3.1** **Note:** Never assume an existing branch line is leak free.  
A piping or tubing system shall subsequently be connected and tested in accordance with 6.22.3.

**6.22.6** Where the fuel supply has been shut off to a building or equipment for a period exceeding one year, prior to reactivation the contractor shall:

- a) Air test the entire piping or tubing system downstream of the isolation point;
- b) Ensure that the appliances and venting system are safe for continued use; and
- c) Submit a Gas Permit and the appropriate fee.

**6.22.7** On all installations of a piping or tubing system the installer shall fill in all information on the piping verification tag and hang the tag on the gas line in an assessable location proximal to the work performed.

AIR ☐ SOAP ☐ DURATION'; 'TEST DATE' followed by a blank line; a statement 'This piping has been tested in accordance with B149.1 and found to be leak free.' in italics; 'GAS FITTER LICENSE #' followed by a blank line; 'GAS FITTER NAME' followed by a blank line; and the word 'Print' at the bottom right." data-bbox="201 75 832 303"/>

**PIPING VERIFICATION**

**ADDRESS** \_\_\_\_\_

**CONTRACTOR** \_\_\_\_\_

**TEST:** ☐ **AIR** ☐ **SOAP** ☐ **DURATION**

**TEST DATE** \_\_\_\_\_

*This piping has been tested in accordance with B149.1 and found to be leak free.*

**GAS FITTER LICENSE #** \_\_\_\_\_

**GAS FITTER NAME** \_\_\_\_\_

Print

## SECTION 7 INSTALLATIONS OF SPECIFIC TYPES OF APPLIANCES

### 7.1 BOILERS

#### 7.1.4 Requirements for Boilers

These requirements apply to any one or a combination of the following;

- Low pressure boilers with heating surfaces of 32.3 ft.<sup>2</sup> (3 m.<sup>2</sup>) (162,000 Btuh) or less;
- High pressure boilers with heating surfaces of 21.5 ft.<sup>2</sup> (2 m.<sup>2</sup>) (108,000 Btuh) or less;
- Residential installations of three family dwellings or less; and
- Where the Technical Safety Authority of Saskatchewan (TSASK) will not be informed or required to inspect.

**2.3** Boiler safety controls shall not be located or piped in such a way as to be isolated from the boiler by manual or automatic valves.

**2.4** All boilers shall have two limit controls. One shall act as an operating control and one shall act as a high limit safety control.

**2.5** Pressure relief valves shall be installed so as to stand in an upright position, with the spindle vertical and;

- a) discharge outlets shall extend downwards and be the same size as the relief valve opening.
- b) terminate no more than 12" (300 mm) or less than 1" (25 mm) off the floor, or a minimum of twice the internal diameter of the discharge pipe. The ends of the discharge pipe shall not be threaded or provided with a fitting, which could allow the discharge pipe to be blocked or restricted.

**Table 2.1**

<b>CAPACITY – TYPE</b>	<b>REQUIREMENTS</b>
Coil or Fin tube	Flow Switch*
All other boiler types Not exceeding 400,000 BTU/HR	Flow Switch or Low Water Cut-off*
All other boiler types Exceeding 400,000 BTU/HR	Low Water Cut-off

\* See 3.1

### **3.0 Low Water Cut-off Requirements**

- 3.1** A low water cut-off control must be installed when the boiler is located above the lowest point in the heating system.
- 3.2** Low water cut-off controls shall be installed as specified by the manufacturers certified installation instructions and shall be capable of shutting off the fuel supply to the burner(s).
- 3.3** Low water cut-off safety devices shall be installed and piped in the same manner as required by the Boiler and Pressure Vessels Act to allow for inspection and testing.

### **4.0 Boiler Installation and Operation**

- 4.1** Boilers designed to have burner operation with no flow conditions present shall be installed as per the manufacturers certified installation instructions and any other requirements set forth by any national or local codes and jurisdictions.
- 4.2** Boilers sensitive to low return water temperatures shall be installed and controlled in such a way as to maintain the minimum return water temperature during normal operation. Owners and/or operators shall be instructed of any requirements regarding minimum return temperature.
- 4.3** Boiler installations shall include a minimum of two thermometers or temperature sensors located to accurately sense the water temperature inside (or leaving) the boiler and the return water temperature entering the boiler. Installations shall have a minimum of one pressure gauge located to accurately sense boiler pressure.
- 4.4** When a venting system is used on a condensing boiler (Category IV) it shall be ULC - S636 certified gas venting material.

**Note:** Unless otherwise **Approved**, ULC-S636 PVC shall not be used as venting material for (Category IV) condensing boilers.

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## 7.2 GENERATORS, COMPRESSOR/PRESSURE BOOSTERS, STATIONARY ENGINES AND TURBINES (FOR NATURAL GAS ONLY)

### 7.2.1 General Requirements

7.2.1.9 The ventilation required by CAN/CSA clause 7.2.1.5 shall be interconnected with a gas detector that:

- a) is installed in accordance with the detector manufacturer's instructions for the type of gas;
- b) is set to activate at gas detection levels at and above one-fifth of the lower limit of flammability;
- c) upon activation, produces an audible and visual alarm;
- d) is interlocked with the mechanical ventilation system; ~~and~~
- e) ~~is interlocked to shut off the appliance.~~ → Not required in Saskatchewan!

*Note: This clause will only apply to gas fired stationery engines, not of the direct vent type, located in public buildings or buildings normally occupied. An interlocked gas detector is not required for:*

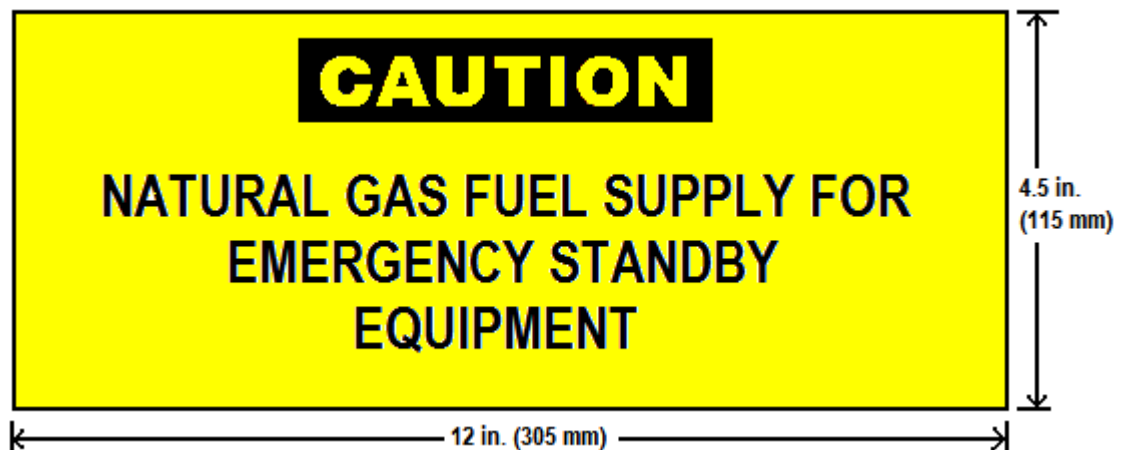
- i) *gas fired engines located in stand-alone buildings not normally occupied;*
- ii) *gas fired engines of the direct vented type; and*
- iii) *residential applications where direct vent combustion is employed.*

*Gas Inspections will refer to the NFPA 101 Life Safety Code definition of "occupied" as "any time a building is open to the public, or at any other time it is occupied by more than 10 persons."*

*See Appendix G for gas detection concentration unit conversions.*

### 7.2.3 Emergency Use Generators

7.2.3.1.1 The sign referenced in 7.2.3.1 shall meet the following specifications:



*NOTE: The appropriate fuel must be identified.*

*Color code: lettering - black*

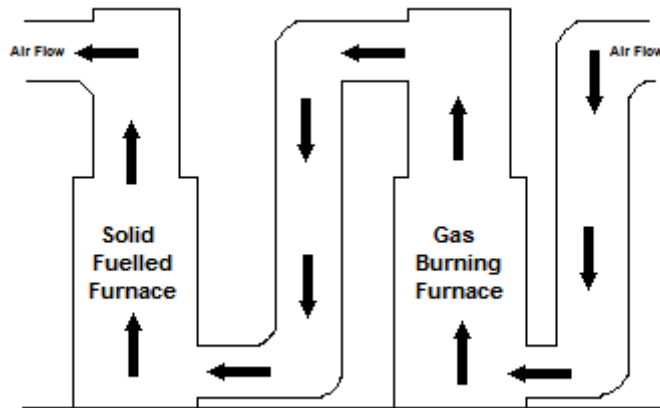
*background - yellow*

- 7.2.4.3.1** A safety shut-off valve installed by the manufacturer on a pre-packaged stationary gas engine fuel system in a location downstream of the gas hose connector does not need to be relocated to meet 7.2.4.2. However a second safety shut-off valve will need to be field installed external to the stationary engine manufactured system in cases necessary to meet either
- a) the valve certification to CSA 6.5 C/I as required by 7.2.4.2, or
  - b) the additional second valve required by 7.2.4.3,
- in which case this second automatic safety shut-off valve shall be installed upstream of the gas hose connector. All safety shut-off valves, either factory or field installed, shall be wired together in parallel.

**7.2.5.4.1** Clause 7.2.5.4 pertains to propane fired stationary engines or turbines only.

### **7.13 CENTRAL FURNACES**

**7.13.7** If a solid-fuel burning appliance and a gas fueled appliance are to be connected together, ductwork must be arranged as per diagram.



*Note: appliances must be vented separately as per CAN/CSA B149.1 clause 8.12.3.*

**7.13.8** All furnace installations shall include a removable **access panel** in the supply air plenum covering an inspection opening. The opening should be located on the front of the plenum, as close as practical to the furnace cabinet, and must be large enough to permit inspection of the heat exchanger for defects. The opening shall be the full width of the plenum less 2 inches (50 mm) and at least 10 inches (250 mm) high. Where an air conditioning coil is in place, the opening shall be between the coil and the heat exchanger. Where an existing air conditioning coil restricts the clearance necessary for this access panel, the coil should be raised as \*practical to accommodate. The access panel must always be in place when the unit is in operation. Unless otherwise **Approved**, case coils shall be raised to provide the necessary opening required.

\* (no alteration of a/c piping is required)

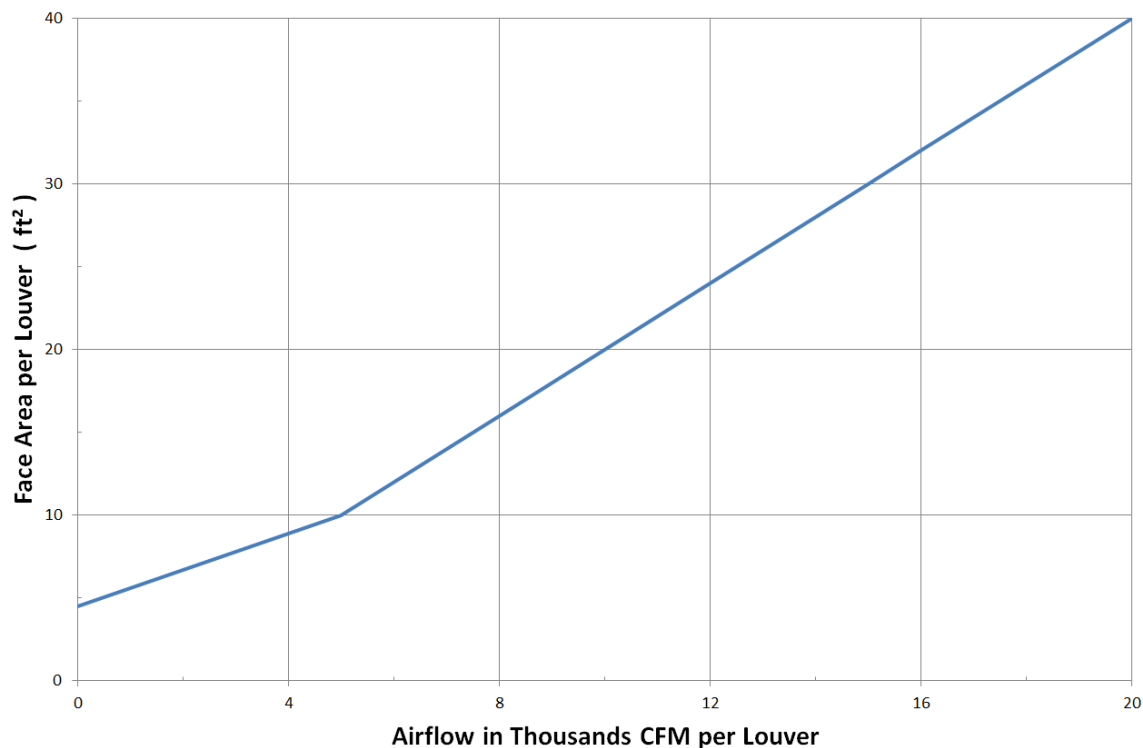
## 7.21 Non-recirculating direct gas-fired industrial air heaters (DFIAH)

### 7.21.9.1

Where the installation is dependent upon exfiltration through the **building** envelope or through relief openings, the **structure's** designed exfiltration rate and the size of relief opening(s) shall be determined by a professional engineer. Sizing of relief opening(s), at or exceeding the critical area for the maximum airflow rating of the DFIAH, in accordance with the following graph (published in the ASHRAE Fundamentals Handbook) is considered in compliance with this requirement.

#### Criteria for Exhaust Louver Sizing - ASHRAE Fundamentals

(taking into account a minimum free area of 45%)



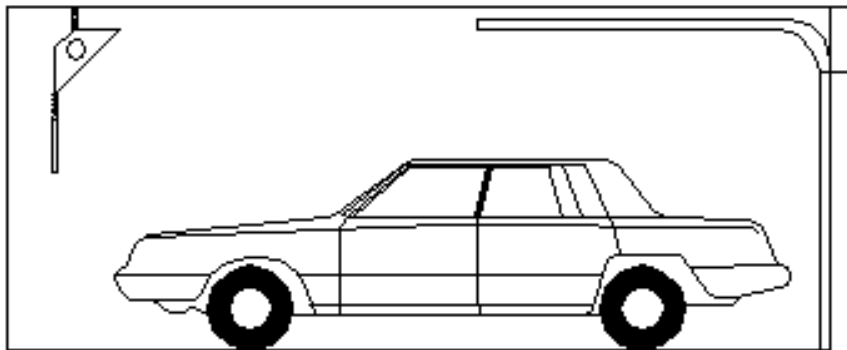
## 7.23 INFRA-RED HEATERS (Radiant)

### 7.23.3 (c) Residential Installation Requirements:

Residential Garages:

- Clearance to combustible materials and vehicles must be maintained.
- Where necessary clearances or barriers cannot be provided, heaters shall be installed on an angle in the upper corner of the wall opposite the vehicle access door.
- A clearance sign shall be installed on the lower portion of the heater or on the wall near the thermostat.

#### RESIDENTIAL INSTALLATION



**Note:** Residential means a typical attached storage garage

### 7.23.3 (d) Non-Residential Requirements:

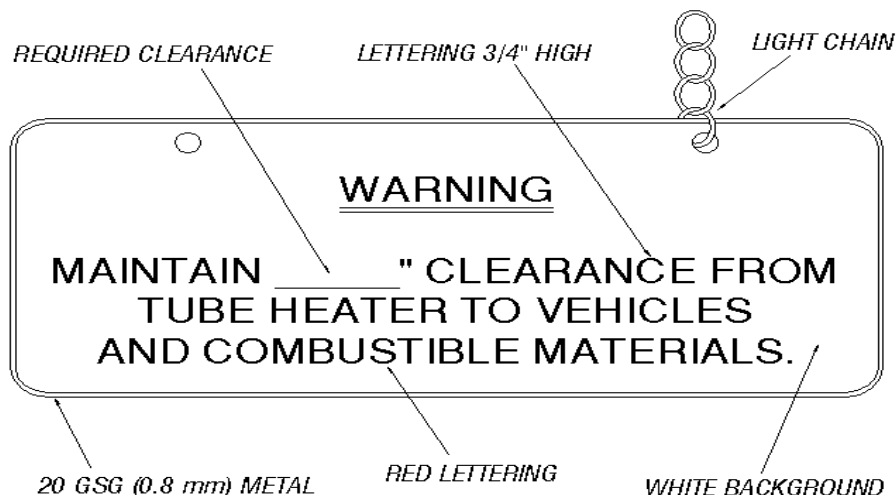
- (i) Heaters shall be installed to provide the required clearance below the heater to the height of the highest vehicle access door; and
- (ii) Clearance to combustible materials and vehicles must be maintained. (See "Acceptable means of maintaining clearance")

*Note: Clearance sign shall be installed with all installations.*



### 7.23.3 (e) Clearance Sign Requirements:

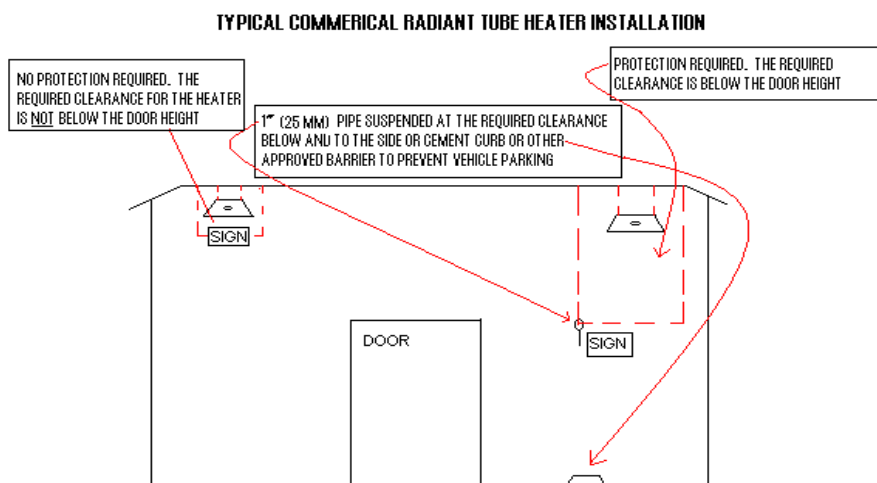
- The sign shall be not less than .020 GSG (0.8 mm) metal.
- Sign shall be prominently displayed and attached with light metal chain to the bottom edge of the reflective shield.
- Sign paint shall be heat resistant. Lettering shall be a minimum 3/4 inch (19 mm) high, red on white background, and shall contain the following information:



### 7.23.3 (f) Acceptable means of maintaining clearance:

- photoelectric sensor;
- cement barriers;
- 1" (25 mm) schedule 40 black pipe hung at appropriate level; or
- other barriers must receive prior approval.

*Note: Clearance signs shall be installed with all installations.*



## **7.25 Decorative appliances and gas logs**

### **7.25.1.1 Vented Gas Fireplace Heaters Installation** (Bulletin 04-2012)

All gas-fire-places and heaters that are certified to CSA 2.33 Vented Gas Fireplace Heaters have special requirements when it comes to clearances to combustibles. The standards that these fireplaces and heaters are constructed to carry this definition for combustibles:

**COMBUSTIBLE MATERIAL:** Materials made of or surfaced with wood, compressed paper, plant fibers, or other materials that are capable of being ignited and burned. Such material shall be considered combustible even though flame-proof, fire-retardant treated, or plastered.

**NONCOMBUSTIBLE:** Material that conforms to CAN/ULC-S114 requirements for noncombustibility.

Ensure that any material placed within the zone specified by the heater/fireplace manufacturer for non-combustible material has only non-combustible material installed. As an example, cement board and steel sheets are considered non-combustible. Fire-rated drywall or gypsum wallboard is considered combustible and cannot be used in a non-combustible material zone. Any material that does not meet this strict requirement for non-combustibles as specified above will have to be replaced.  
(Bulletin 04-2012)

## **7.27 WATER HEATERS**

### **7.27.8 Requirements for Water Heaters Used for Combination Heating Systems**

#### **1.0 Definitions**

**1.1** Combination system – an installation that combines both potable hot water and hydronic space heating.

#### **2.0 Requirements For Combination Heating Systems**

**2.1** Water heaters certified for use in a combination system shall be used. Water heaters cannot be used in a space heating only application.

**2.2** Side or bottom connections on water heaters shall not be used in combination potable/space heating applications unless the manufacturer has, by design, provided side or bottom connections for this purpose.

**2.3** A combination heating system shall have a timed circulator on the space-heating loop to circulate the water every 24 hours to meet the requirements of Saskatchewan Health.

**2.4** A heat exchanger shall be used when a non-potable heating medium is used in the space heating system.

**2.5** When a heat exchanger is used, the following requirements shall apply:

- a) A device shall be installed to automatically maintain the operating pressure of the secondary loop lower than that of the primary (potable) side.
- b) The gas contractor shall affix a prominent and permanent label to the secondary loop relief valve advising that the heat exchanger shall be examined in the event of relief valve discharge.
- c) Isolation valves shall be installed on the inlet and outlet piping.
- d) A timed circulator shall be installed capable of completely exchanging the water in the primary (potable) side every 24 hours.
- e) When temperatures greater than 140°F (60°C) are required in the space heating loop a thermostatic mixing valve shall be installed to ensure that the potable water does not exceed 140°F (60°C).
- f) The secondary loop shall require the following additional components:
  - i) a relief valve capable of protecting the lowest rated component of the system;
  - ii) an expansion tank rated for maximum system pressure;
  - iii) a back-flow prevention device if a potable feed water is attached;
  - iv) a pressure gauge;
  - v) temperature gauges located on the supply and on the return;
  - vi) a circulator; and
  - vii) an air eliminator.

**7.27.9 Gas Water Heaters In Mobile/Manufactured Homes**

All water heaters installed in these units shall conform to the following specifications:

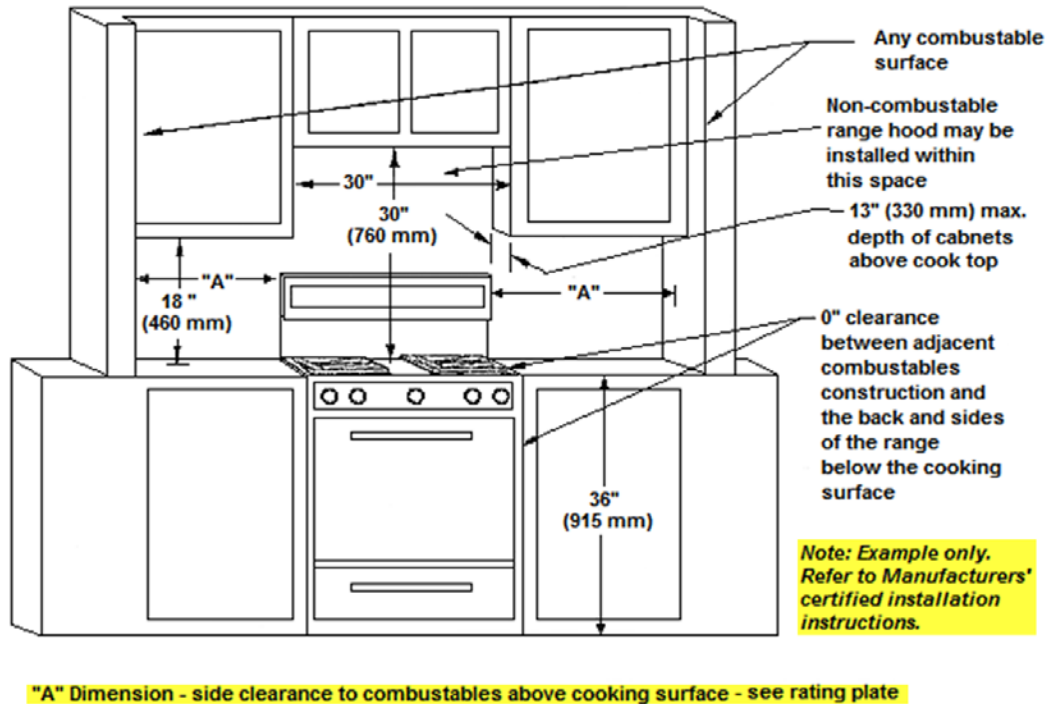
- 1) Water heaters shall be certified for installation in a mobile/manufactured home.
- 2) When installed, water heaters shall be secured to the floor at two legs, and the top of the heater is to be secured with a bracket from a wall. Specified clearances are to be maintained.
- 3) The heater shall be installed in an enclosure which provides complete separation of the heater from the air within the home.
- 4) Access to the heater may be either from outside the home or inside the home providing the door is tight fitting.
- 5) The heater enclosure shall be provided with a minimum of two screened openings to outdoors, each with a minimum area of 7 square inches {3" (75 mm) in diameter}.
  - i) The upper opening is to be taken through the roof or within 18" (450 mm) of the roof, ensuring it is above the relief opening of the draft hood.

- ii) The lower opening is to be taken through the floor or through an outside wall not exceeding 6" (150 mm) above the floor.

#### 7.33.4 Residential Type Ranges

Typical example of required clearances for a domestic range.

All clearance requirements must be as in the Manufacturer's Certified Installation Instructions.



**COMBUSTIBLE MATERIAL:** Materials made of or surfaced with wood, compressed paper, plant fibers, or other materials that are capable of being ignited and burned. Such material shall be considered combustible even though flame-proof, fire-retardant treated, or plastered.

**NONCOMBUSTIBLE:** Material that conforms to CAN/ULC-S114 requirements for noncombustibility.

## SECTION 8 VENTING SYSTEMS AND AIR SUPPLY FOR APPLIANCES

**8.5.4.....** An automatically operated *damper* or automatically adjustable louver shall be interlocked so that the main *burner* cannot operate unless either the *damper* or louver is in the fully open position. Stationary engines and turbines are exempt from this requirement (7.2.1.3)

### 8.10 METHODS OF VENTING APPLIANCES

**8.10.4.1** Available PVC and CPVC glues, primers, pipe and fittings must be used only with the compatible companion products in order to be certified as a venting system. Inter-mixing of glues, primers, pipe or fittings from various manufacturers in any combination is prohibited. For compatibility information, refer to the manufacturer's certified installation instructions. (Bulletin 05-2013)

**8.10.15** An unvented appliance shall not be installed in a residence with the exception of a domestic range which shall not be used for space heating.

#### 8.10.16 Chimney and vent clarifications

##### a) Chimneys

Prefabricated Type A chimneys shall not be installed to vent gas fired appliances with a stack temperature less than 470° F (245°C).

Chimneys - When connected to a gas appliance, masonry, concrete, brick and tile chimneys shall be lined with an approved metal chimney liner. A lined chimney shall be provided with an accessible inspection opening. An inspection opening shall be of such construction that it will remain tightly closed when not in use to prevent entrance of air into the chimney at that point.

##### b) Type B Vents

To be used for venting any appliances certified for use with Type B gas vent having a flue temperature not less than 275°F (135°C) and not exceeding 470°F (245°C).

##### c) Existing Tile Lined Masonry Chimneys (Sound Condition)

- i) No change required when used to vent a furnace or boiler and the **water heater only** is replaced.
- ii) Install a metal liner in accordance with section (g) or a Type B gas vent when the **central heating appliance** is replaced (draft hood equipped or fan assisted) (see S.C.O.P. 8.10.16 (d) *Note*).
- iii) If oversized (water heater only) - reduce in size in accordance with code requirements and use a metal liner in accordance with section (g) or a Type B gas vent.

##### d) Masonry Chimneys with Existing Metal Liner SOUND CONDITION

If properly sized interior located masonry chimneys may be used to vent:

- i) Draft hood equipped appliances; or
- ii) Fan assisted appliances.

**e) Exterior Masonry Chimneys**

When removing the largest (or major) Category I gas appliance vented into an exterior masonry chimney, the masonry chimney may not continue to be used unless it is lined with a properly sized B vent, L vent or an approved double wall liner. As well, the chimney must be boxed in and insulated such that the building provides a heated space for the chimney. One method of ensuring that the chimney is provided adequate heat is to have the three exterior sides of the boxed-in chimney insulated to at least twice the insulated value of the existing building wall. All repairs to existing masonry chimneys serving gas fired appliances must comply with these requirements. (Bulletin 02-2011)

Note: This rule does not apply to Category 2, 3 or 4 venting, nor does it apply to any appliances with special venting systems. (Bulletin 02-2012)

**f) Existing Type A Factory Built Metal Chimneys and Other Insulated metal chimneys:**

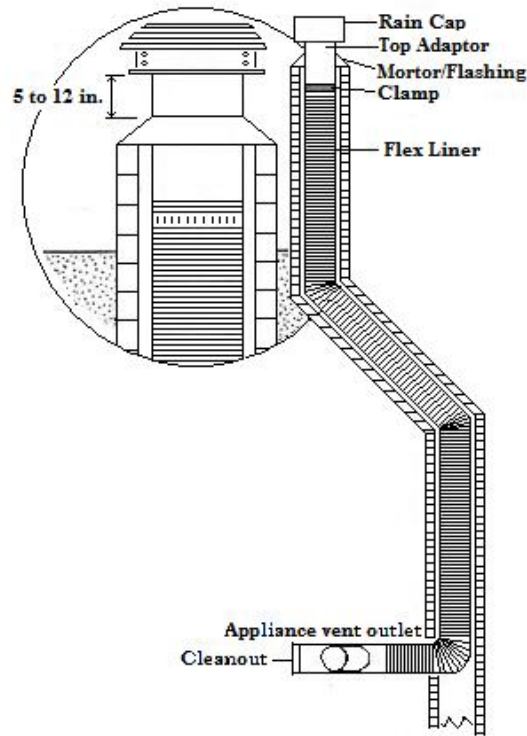
- i) If in **sound condition** may be used to vent a furnace or boiler and the water heater **only** is replaced.
- ii) Replacement of central heating appliances of the draft hood or fan assisted types shall be vented into a Type B gas vent or approved chimney liner.
- iii) If oversized (water heater only) reduce in size in accordance with code requirements and use a certified B vent or approved chimney liner.
- iv) If unsound (collapsed) - replace with a Type B gas vent.

*Note: Replacement components of Type A metal chimneys are no longer approved in Saskatchewan. Chimneys with defects must be replaced with a certified Type B gas vent.*

**g) Chimney Liners and Vent Connectors**

- i) Aluminum flexible chimney liners and flexible vent connectors shall be certified for the application of intended use.
- ii) For downsizing an existing Class A chimney in sound condition or a B-Vent in sound condition, a flexible liner certified for use in a factory-built chimney, a solid liner or a B-Vent may be used. The existing Class A chimney does not need to be reduced in height. (Bulletin 02-2012)
- iii) When a solid aluminum vent pipe is used to line or downsize a masonry chimney, a class A chimney or a type B gas vent or as vent connectors the following wall thicknesses shall be used;
  - a. 3" (75 mm) to 12" (300 mm) must be minimum .025 inches (0.64 mm)
  - b. 13" (325 mm) to 20" (500 mm) must be minimum .032 inches (0.80 mm)
- iv) Shop fabricated aluminum square liner is permissible where required.
- v) All liners shall be installed with the crimped end down. All joints in liners are to be fastened with stainless steel screws or aluminum or stainless steel rivets.

- vi) Liners that exceed the specifications in the venting tables are subject to good engineering practices.
- vii) Aluminum venting and liners may only be used for gas-fired appliances producing flue gas temperatures of more than 275°F (135°C) but not more than 475°F (245°C).
- viii) Where the manufacturer's certified appliance installation instruction calls for heavier or thicker vents or vent connectors, the Manufacturer's instructions shall be followed.



#### **h) Chimney Liner Insulation**

The use of puffed mica, zonolite, etc. to insulate the space between the liner and the chimney is prohibited. If you encounter it on an existing installation, please advise the owner to remove it.

## **8.14 VENT AND CHIMNEY TERMINATION**

### **8.14.8** A vent shall not terminate:

- i) Through a sidewall above a pedestrian doorway.
- j) Less than 4 ft. (1.2 m) beneath a ventilated soffit unless specified as per the manufacturer's certified instructions. For unvented soffits follow manufacturer's installation instructions.

### **8.14.14** A vent from a category IV appliance shall not extend through an exterior wall and terminate less than 4 ft. (1.2 m) from the property line. Where distances are 4 ft. (1. m) and up to 10 ft. (3 m) to property lines the vent termination shall have some means of directing the exhaust plume from directly discharging onto the adjoining property consistent with manufacturer's installation instructions.

*Note: The above requirements do not apply to locations where adjoining properties are public spaces such as road ways, alleyways, walkways or parks where structures would not normally be erected.*

*All installations are subject to CAN/CSA-B149.1 clause 8.14.8(a) and S.C.O.P clause 8.14.15.*

### **8.14.15** In all appliance installations the vent shall not be installed so that ice and frost can accumulate and have the potential to cause damage to property.

## **8.17 VENTS OUTSIDE BUILDINGS**

### **8.17.1(c)** Where a Type "B" gas vent is installed in an exterior chimney chase, the chase shall be adequately insulated on all exterior sides and provision shall be made for an inspection opening.

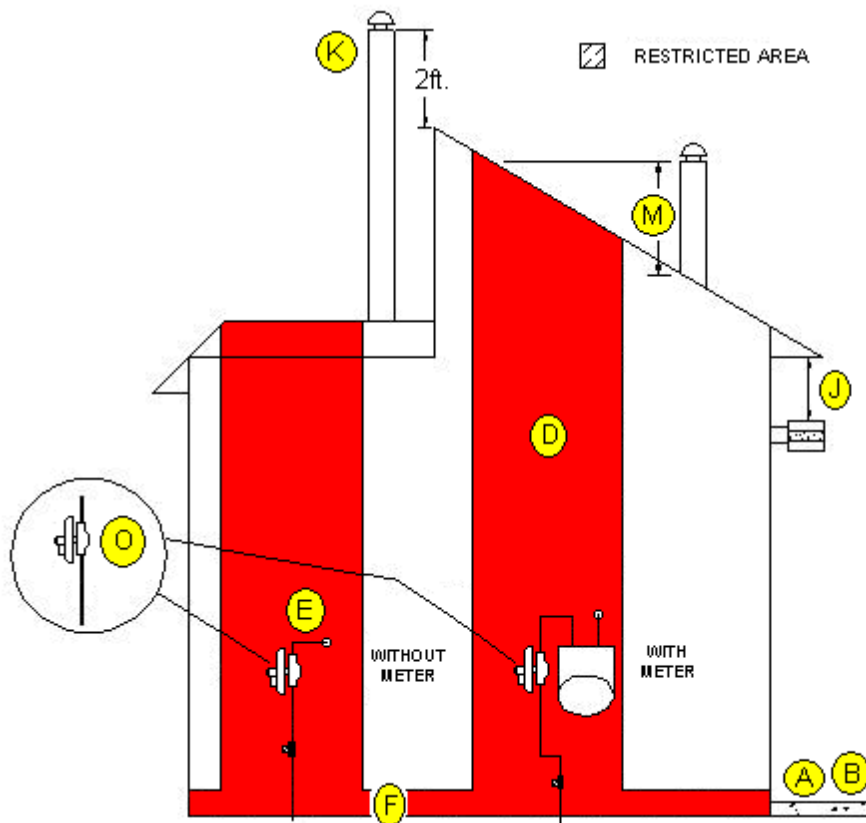
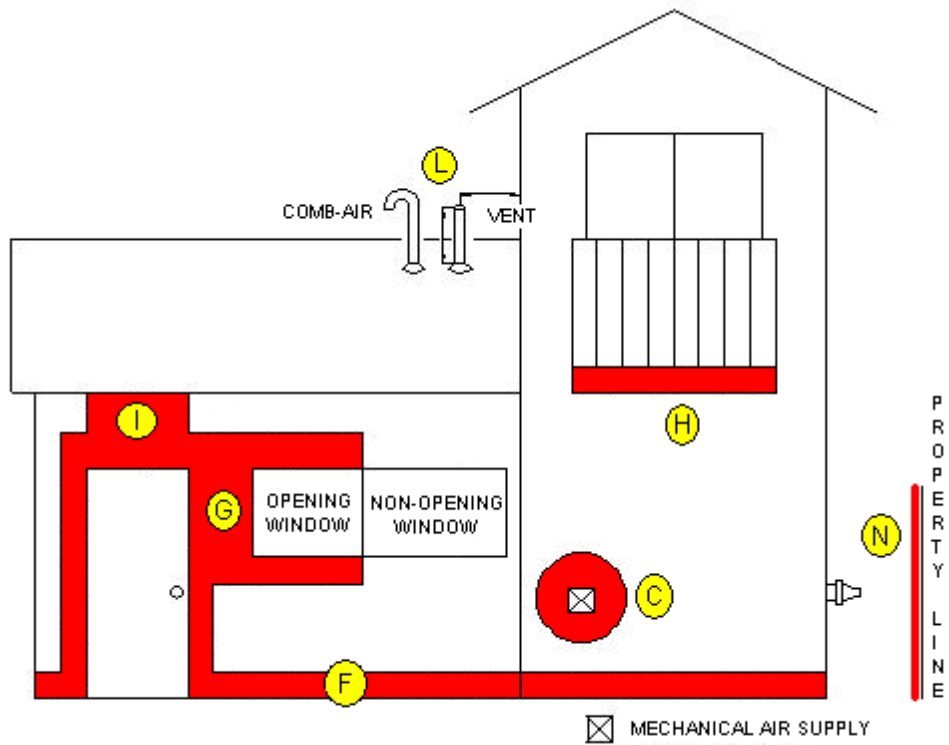
*NOTE: Where a vent cap is installed as part of a lining system, adequate space must be provided between the flashing and vent cap to prevent a buildup of ice which could block the flow of products of combustion. Clearance between flashing and vent cap shall be between 5" (125 mm) and 12" (300 mm).*



## Appendix A

### Quick Reference

#### Appliance Vent Termination and Regulator Discharge Clearances



## Appliance Vent Termination and Regulator Discharge Clearances

### 8.14.8 – Appliance Vent Termination

A vent shall not terminate:

- (A) 8.14.8(a) where it may cause hazardous frost or ice accumulations on adjacent property surfaces.
- (B) 8.14.8(b) less than 7 ft. (2.1 m) above a paved public sidewalk or driveway.
- (C) 8.14.8(c)† less than 6 ft. (1.8 m) within a mechanical air-supply inlet.
- (D) 8.14.8(d) above a regulator within 3 ft (900 mm) horizontally of the vertical centerline of the regulator vent outlet to a maximum vertical distance of 15 ft (4.5 m);
- (E) 8.14.8(e) except as required in 8.14.8(d), any distance less than detailed in Table 5.2 of any gas pressure regulator vent outlet.
- (F) 8.14.8(f) less than 1 ft. (300mm) above grade.
- (G) 8.14.8(g) less than the following distances from an opening door or window, non-mechanical air-supply inlet or combustion air inlet of an appliance;
  - i) 6" (150 mm) - up to including 10,000 Btuh (3 Kw).
  - ii) 12" (300 mm) - 10,000 Btuh (3 Kw) to including 100,000 Btuh (30 Kw).
  - iii) 3 ft. (900 mm) - exceeding 100,000 Btuh (30 Kw).
- (H) 8.14.8(h) underneath a veranda, porch or deck unless
  - i) it is fully open on two sides below.
  - ii) there is 1 ft. (300 mm) clearance below.
- (I) 8.14.8(i)\* through a side-wall above a pedestrian doorway.
- (J) 8.14.8(j)\* less than 4 ft (1.2 m) below a soffit, or as listed in the manufacturer's installation instructions.
- (K) 8.14.2‡ less than 2 ft. (600 mm) above a flat roof and 2 ft. (600 mm) above a vertical obstruction within 10 ft. (3 m) horizontally.
- (L) 8.14.3 (Special venting system) - less than 18" (450 mm) above the roof and not less than 18" (450 mm) horizontally from any obstruction. (also refer to manufacturer's certified instructions).
- (M) 8.14.5‡ less than 2 ft. (600 mm) above a sloped roof to 9/12 pitch (see Figure 8.1 for greater pitches) and 2ft. (600 mm) above a vertical obstruction within 10 ft. (3 m) horizontally.
- (N) 8.14.14 (a cat IV) not less than 4 ft. from property line (4 ft to 10 ft. directional devices to be installed)
- (O) Table 5.2 **Regulator Discharge Clearances**

	<u>Natural Gas</u>	<u>Propane</u>
i) Building opening	3 ft. (1m)	3ft. (1m)
ii) Appliance vent outlet*	3ft. (1m)	3ft. (1m)
iii) Moisture exhaust duct†	3ft. (1m)	3ft. (1m)
iv) Mechanical air intake‡		
commercial	10 ft. (3 m)‡	10 ft. (3 m)
residential	6 ft. (1.2 m)‡	10 ft. (3 m)
v) Appliance air intake	3 ft. (1m)	10 ft. (3 m)
vi) Source of ignition	3 ft. (1 m)	10 ft. (3 m)

\* Referring to Saskatchewan Codes of Practice.

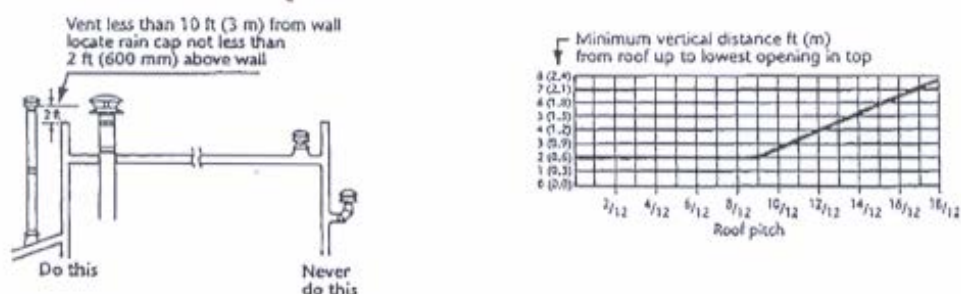
† Applies to gas or electrical dryer outlet.

‡ Mechanical air intakes which are less than 8 inches (200 mm) in diameter or equivalent area shall be considered a building opening when using this Table.

‡ Exposed lengths of B Vent shall be installed in an adequately insulated chase.

*Note – these references are a summarized form. For an exact wording, refer to the B149.1.and Codes of Practice.*

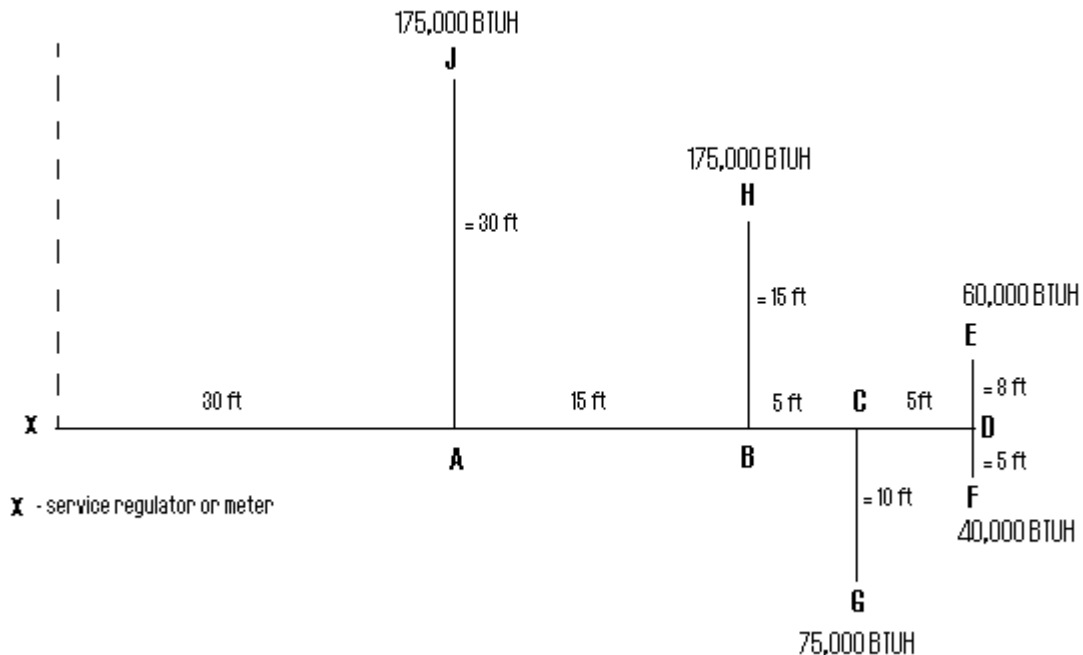
**Figure 8.1**



**Appendix B**  
**Actual Length/Actual Load**  
**Pipe Sizing Method (Imperial)**

Step #	Actual Distance	Actual Load (BTUH)	Natural Gas: Pressure 7" WC Specific Gravity = 0.6 Pressure Drop = 0.5" WC Table A-1.1 (B149.1-M95) Minimum Pipe Size Required	Propane: Pressure 11" WC Specific Gravity = 1.52 Pressure Drop = 1" WC Table A-1.1 (B149.2 M95) Minimum Pipe Size Required
1	X to F = 60 ft	40,000 at F	½ in. D to F	½ in. D to F
2	X to E = 63 ft	60,000 at E	¾ in. D to E	½ in. D to E
3	X to D = 55 ft	100,000 at D (E, F)	¾ in. C to D	½ in. C to D
4	X to G = 60 ft	75,000 at G	¾ in. C to G	½ in. C to G
5	X to C = 50 ft	175,000 at C (E, F, G)	1 in. B to C	¾ in. B to C
6	X to H = 60 ft	175,000 at H	1 in. B to H	¾ in. B to H
7	X to B = 45 ft	350,000 at B (E, F, G, H)	1 ¼ in. A to B	1 in. A to B
8	X to J = 60 ft	175,000 at J	1 in. A to J	¾ in. A to J
9	X to A = 30 ft	525,000 Total Load	1 ¼ in. X to A	1 in. X to A

**EXAMPLE OF PIPING DESIGN SIZING**  
**(IMPERIAL MEASUREMENTS)**

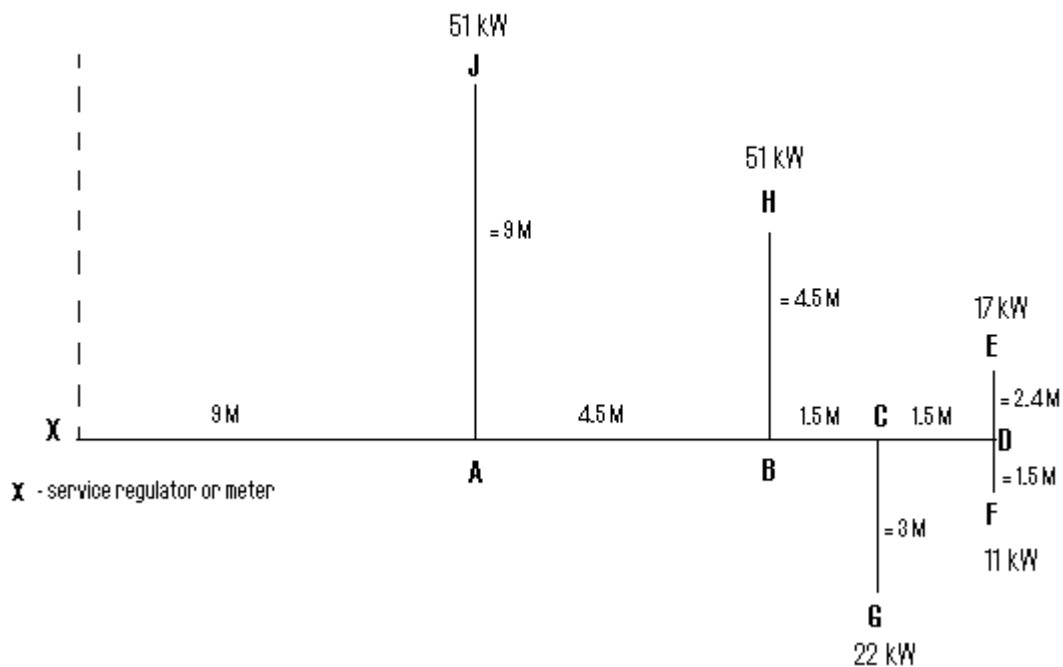


**Actual Length/Actual Load  
Pipe Sizing Method (Metric)**

Step #	Actual Distance (Meter)	Actual Load (Kilowatt)	Natural Gas: Pressure 1.75 KPa Specific Gravity = 0.6 Pressure Drop = 125 Pa Table A-1.1 (B149.1-05) Minimum Pipe Size Required	Propane: Pressure 2.7 KPa Specific Gravity = 1.52 Pressure Drop = 250 Pa Table A-1.1 (B149.1-05) Minimum Pipe Size Required
1	X to F = 17.4 m	12 kW at F	12.5 mm. D to F	12.5 mm. D to F
2	X to E = 17.9 m	18 kW at E	19 mm. D to E	12.5 mm. D to E
3	X to D = 16.5 m	29 kW at D (E, F)	19 mm. C to D	12.5 mm. C to D
4	X to G = 18 m	22 kW at G	19 mm. C to G	12.5 mm. C to G
5	X to C = 15 m	51 kW at C (E, F, G)	25 mm. B to C	19 mm. B to C
6	X to H = 18 m	51 kW at H	25 mm. B to H	19mm. B to H
7	X to B = 13.5 m	103 kW at B (E, F, G, H)	31.75 mm. A to B	25 mm. A to B
8	X to J = 18 m	51 kW at J	25 mm. A to J	19 mm. A to J
9	X to A = 9 m	152 kW -Total Load	31.75 mm. X to A	25 mm. X to A

Table 6.3.1

**EXAMPLE OF PIPING DESIGN SIZING  
(METRIC MEASUREMENTS)**



## Appendix C

### TEST PRESSURES FOR STEEL PIPE

**Maximum Allowable Air or Nitrogen Test Pressures for Steel Pipe (Seamless or ERW) to limit hoop stress to 30% of Specified Minimum Yield Strength (SMYS) per CSA Z662 4.3.5**

Nominal Pipe Size	CSA Z245.1 Category 1 Pipe Grade	Schedule	Wall Thickness $t_n$	Outside Diameter D	Maximum Air Test Pressure Not Exceeding 30% of SMYS <small>below which must be air or nitrogen tested</small>		Operating Pressure Test / 1.5
			<u>(mm)</u>	<u>(mm)</u>	<u>(MPa)</u>	<u>(psig)</u>	<u>(psig)</u>
3/4	172	40	2.87	26.7	4.44	644	429
3/4	172	80	3.91	26.7	6.05	877	585
1	172	40	3.38	33.4	4.18	606	404
1	172	80	4.55	33.4	5.62	815	543
1	241	40	3.38	33.4	5.85	848	565
1	241	80	4.55	33.4	7.88	1143	762
1 – 1/4	172	40	3.56	42.2	3.48	505	337
1 – 1/4	172	80	4.85	42.2	4.74	687	458
1 – 1/4	241	40	3.56	42.2	4.88	708	472
1 – 1/4	241	80	4.85	42.2	6.65	964	643
2	241	20	3.18	60.3	3.05	442	295
2	241	40	3.91	60.3	3.75	544	363
2	241	80	5.54	60.3	5.31	770	513
2	290	20	3.18	60.3	3.67	532	355
2	290	40	3.91	60.3	4.51	654	436
2	290	80	5.54	60.3	6.39	927	618
3	241	20	3.96	88.9	2.58	374	249
3	241	40	5.49	88.9	3.57	518	345
3	241	80	7.62	88.9	4.96	719	479
3	290	20	3.96	88.9	3.1	450	300
3	290	40	5.49	88.9	4.3	624	416
3	290	80	7.62	88.9	5.97	866	577
4	241	20	4.78	114.3	2.42	351	234
4	241	40	6.02	114.3	3.05	442	295
4	241	80	8.56	114.3	4.33	628	419
4	290	20	4.78	114.3	2.91	422	281
4	290	40	6.02	114.3	3.67	532	355
4	290	80	8.56	114.3	5.21	755	503

## Appendix C – (Continued)

Nominal Pipe Size	CSA Z245.1 Category 1 Pipe Grade	Schedule	Wall Thickness $t_n$	Outside Diameter D	Maximum Air Test Pressure Not Exceeding 30% of SMYS <small>below which must be air or nitrogen tested</small>		Operating Pressure Test / 1.5
			(mm)	(mm)	(MPa)	(psig)	(psig)
6	290	20	5.56	168.3	2.3	334	223
6	290	40 STD	7.11	168.3	2.94	426	284
6	290	80 XS	10.97	168.3	4.54	658	439
6	317	20	5.56	168.3	2.51	364	243
6	317	40 STD	7.11	168.3	3.21	465	310
6	317	80 XS	10.97	168.3	4.96	719	479
8	290	20	6.35	219.1	2.02	293	195
8	290	40 STD	8.18	219.1	2.6	377	251
8	290	80 XS	12.7	219.1	4.03	584	389
8	317	20	6.35	219.1	2.2	319	213
8	317	40 STD	8.18	219.1	2.84	412	275
8	317	80 XS	12.7	219.1	4.41	639	426
10	290	20	6.35	273.1	1.62	235	157
10	290	40 STD	9.27	273.1	2.36	342	228
10	290	60 XS	12.7	273.1	3.24	470	313
10	290	80	15.09	273.1	3.85	558	372
10	317	20	6.35	273.1	1.77	257	171
10	317	40	9.27	273.1	2.58	374	249
10	317	60 XS	12.7	273.1	3.54	513	342
10	317	80	15.09	273.1	4.2	609	406
12	290	20	6.35	323.9	1.36	197	131
12	290	STD	9.53	323.9	2.05	297	198
12	290	40	10.31	323.9	2.22	322	215
12	290	80 XS	12.7	323.9	2.73	396	264
12	317	20	6.35	323.9	1.49	216	144
12	317	STD	9.53	323.9	2.24	325	217
12	317	40	10.31	323.9	2.42	351	234
12	317	80 XS	12.7	323.9	2.98	432	288
12	359	20	6.35	323.9	1.69	245	163
12	359	STD	9.53	323.9	2.54	368	245
12	359	40	10.31	323.9	2.74	397	265
12	359	80 XS	12.7	323.9	3.38	490	327

### Notes:

% SMYS = (Sh) / SMYS x100 where:

Specified Minimum Yield Strength (SMYS) = CSA Z245.1 Category I Pipe Grade in megapascals (MPa)

Design Hoop Stress (Sh) =  $(P \times D) / (2 \times t_n) \times F \times L \times J \times T$

Test Pressure (P) is calculated in MPa and converted to psig. 1 MPa = 1000 kilopascals (kPa)

Wall Thickness ( $t_n$ ) and Outside Diameter (D) are measured in millimetres

Design Factor (F) = 0.8 per Z662 clause 4.3.5.1

Location Factor (L) = 0.5 per Z662 clause 4.3.5.1

Joint Factor (J) = 1.0 per Z662 clause 4.3.5.1 since ERW Pipe is limited to 57% of SMYS per 8.2.4.3 and 0.6 times 57% is 34% thus 30% with a joint factor of 1.0 remains conservative for both seamless and ERW.

Temperature Factor (T) = 1.0 per Z662 clause 4.3.5.1

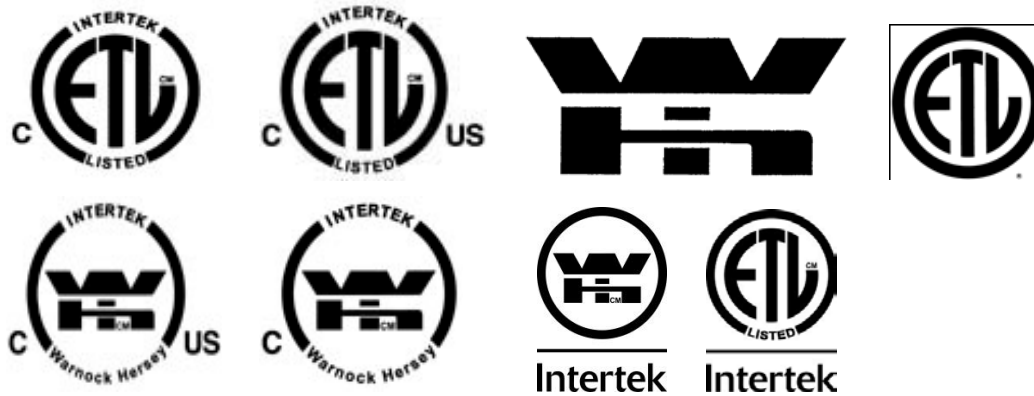
Test pressures exceeding these limits must meet the requirements of Standard Code of Practice 6.22.3

## Appendix D - Certification Logos

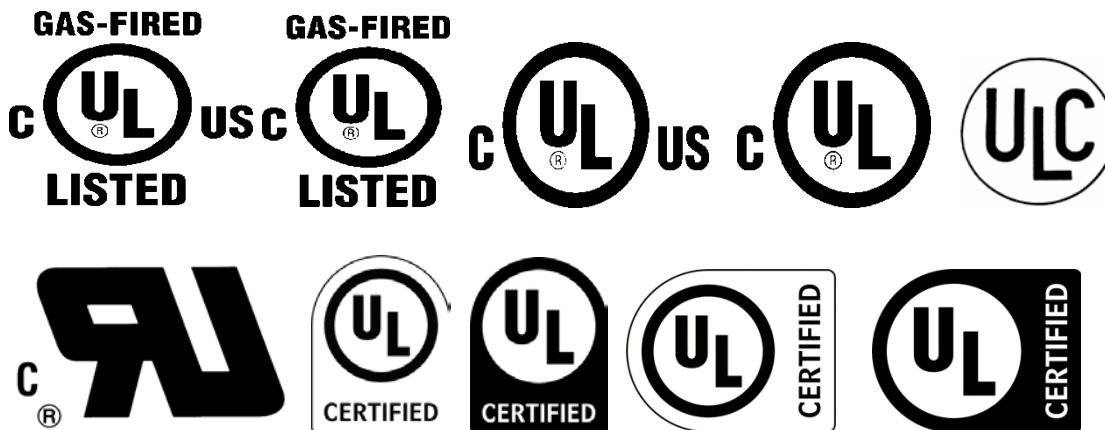
The following logos indicate **gas-fired equipment** certification for Canada;  
**Canadian Standards Association – CSA Group**



**Intertek Testing Services Ltd**



**Underwriters' Laboratories (& Underwriters' Laboratories of Canada)**



**Omni-Test Laboratories Inc**



(continued) The following logos indicate **gas-fired equipment** certification for Canada;

**Labtest Certification Inc**



**IAPMO Research and Testing Inc**



**ICC EVALUATION SERVICE, LLC**



**PFS Corporation**



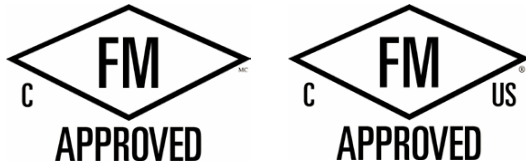
**QAI LABORATORIES LTD.**





The following logos indicate **other related** certifications for Canada;

**FM Approvals LLC (combustible gas detectors, fire-rating of materials)**



**NSF International**

**(CSA B137.4 Polyethylene (PE) piping systems for gas services)**



**Safety Equipment Institute (gas detection equipment)**



**T.R. Arnold & Associates (TRA) (modular buildings)**



The following are examples of logos that **DO NOT** indicate **gas-fired equipment** certification for Canada;

### US Only Certification Logos (not approved for Canada)



### Other Country Certification Logos (not approved for Canada)



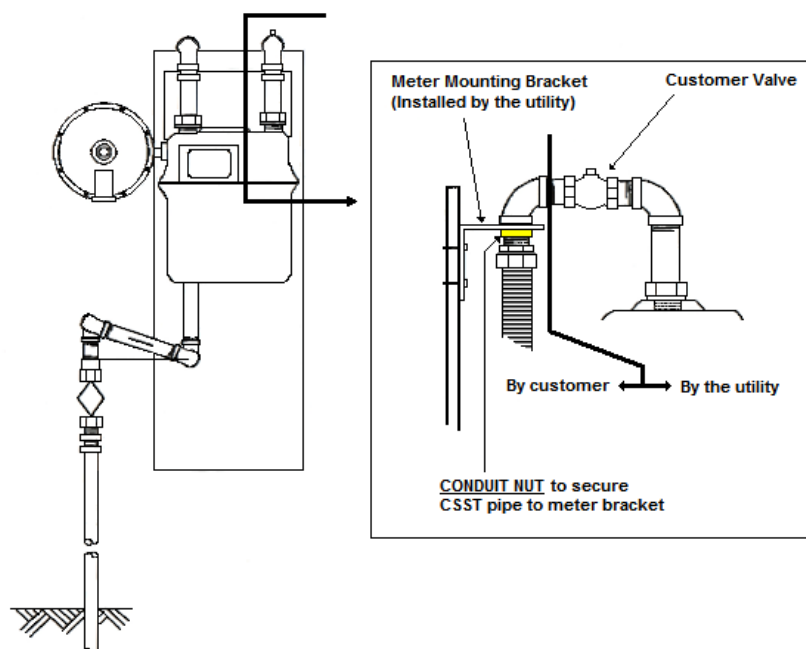
### Certification Logos (approved for Canada but not gas certified)



## Appendix E

### **CSST PIPING CONNECTION TO METER BRACKET**

#### **Example Method to Secure CSST Pipe to Meter Bracket**



## Appendix F

### CARBON MONOXIDE (CO) RESPONSE GUIDELINE

SaskPower Gas Inspection Division offers these standard action levels for informational purposes. Any increase in parts per million (ppm) from outside to inside warrants further investigation as to the source and should be documented.

#### **Standard for Action Levels**

The following action levels have been defined as minimums for an operator trained by the manufacturer of the testing equipment. An operator may adopt more stringent standards than the ones defined in this document. As such, the operator may enforce those higher standards. Under no circumstances shall an operator trained by the manufacturer of the testing equipment recognize less stringent standards or ignore conditions in excess of the defined action levels. The action levels are considered net indoor ambient readings - i.e. - indoor ambient minus outdoor ambient readings.

#### **0 to 9 parts per million (ppm) net indoor**

**Normal:** CO levels in this range are acceptable for short periods (8 hr. average concentration).

**Action:** No Action. Typical from outdoor sources, fumes from attached garages, heavy smoking, burning candles, wood burning fireplace spillage and operation of unvented cooking appliances. If unvented cooking appliances are in operation, recommend additional ventilation in areas of operation. With concentrations in this range, the operator may continue testing sequences.

#### **10 to 35 parts per million (ppm) net indoor**

##### **MANDATORY REPORT**

**Concern:** This level could become hazardous in some situations.

**Actions:** Occupants should be advised of a potential health hazard to small children, elderly people and persons suffering from respiratory or heart problems. If the home has an attached garage document CO levels in the garage. With concentrations in this range, the operator must continue testing to locate the CO source. Test combustion appliances one at a time to determine the source of CO production. If an appliance is determined to be the source of CO production, it should be shut off and not used until a licensed gas fitter can service it.

#### **36 to 99 parts per million (ppm) net indoor**

##### **MANDATORY REPORT**

**Excessive:** Medical Alert. This is a hazardous condition.

**Actions:** Ask occupants to step outside and query about health symptoms. Advise occupants to seek medical attention. Advise occupants not to drive. Emergency service personnel must be called if occupants exhibit symptoms of CO poisoning. Enter the building, open doors and windows to ventilate the structure. Turn off all combustion appliances until the CO level has been reduced to below 10 ppm. If the home has an attached garage document CO levels in garage. Test combustion appliances one at a time to determine the source of CO production. If an appliance is determined to be the source of CO production, it should be shut off and not used until a licensed gas fitter can service it.

**100 - 200 parts per million (ppm) net indoor**

**MANDATORY REPORT**

**Dangerous:** Medical Alert. Emergency conditions exist.

**Actions:** Evacuate the building immediately and check occupants for health symptoms. Advise all occupants to seek medical attention. Advise occupants not to drive. Emergency service personnel must be called if occupants exhibit symptoms of CO poisoning. Evacuation is important, but operators must not subject themselves to excessive conditions. Maximum exposure time is 15 minutes. Open all doors and windows that can be done quickly. If the home has an attached garage document CO levels in garage. Disable combustion appliance operation. This may involve shutting of the service valve. Continually monitor indoor ambient levels while moving through the building. Once the atmosphere within the structure has returned to below 10 ppm test combustion appliances one at a time to determine the source of CO production. If an appliance is determined to be the source of CO production, it should be shut off and not used until a licensed gas fitter can service it.

**Greater than 200 parts per million (ppm) net indoor**

**MANDATORY REPORT**

**Dangerous:** Medical Alert. Emergency conditions exist. Extremely hazardous.

**Actions:** Evacuate the building immediately and check occupants for health symptoms. Advise all occupants to seek medical attention. Advise occupants not to drive. Emergency service personnel must be called if occupants exhibit symptoms of CO poisoning. Evacuation is important, but operators must not subject themselves to these conditions. Disable combustion appliance operation. This may involve shutting of the service valve. Do not stay inside or re-enter the building until conditions have dropped below 100 ppm. Open all doors and windows that can be done quickly without entering the structure. Shut off gas supply (if applicable and necessary). If the home has an attached garage, document CO levels in garage if possible to do so without being subjected to high levels of CO. Once the atmosphere within the structure has returned to below 10 ppm test combustion appliances one at a time to determine the source of CO production. If an appliance is determined to be the source of CO production, it should be shut off and not used until a licensed gas fitter can service it.

**Where a gas appliance is the possible source of the CO or the source cannot be determined and the net indoor reading is in excess of 9 ppm, a report must be sent to SaskPower Gas Inspection Division.**

## Appendix G

### **Natural Gas and Propane concentration unit conversion chart (7.2.1.9)**

Concentration Equivalents			
Parts per Million (PPM)	Percent Gas in Air (% Gas)	Percent Lower Explosive Limit (% LEL) for natural gas	Percent Lower Explosive Limit (% LEL) for propane
10	0.001	0.02	0.05
50	0.005	0.1	0.24
100	0.01	0.2	0.48
500	0.05	1	2.38
1,000	0.1	2	4.8
2,500	0.25	5	11.9
4,200	0.42	8.4	20.0
5,000	0.5	10	23.8
10,000	1	20	47.6
21,000	2.1	42	100.0
50,000	5	100	

***CSA B149.1-15 clause 7.2.1.9 reads:***

***The ventilation required by Clause 7.2.1.5 shall be interconnected with a gas detector that***  
***(a) is installed in accordance with the detector manufacturer's instructions for the type of gas;***  
***(b) is set to activate at gas detection levels at and above one-fifth of the lower limit of flammability;***

To meet requirement "7.2.1.9 a)" above, the combustible gas detector must be mounted as high as practical for natural gas, or as low as practical for propane.

To meet requirement "7.2.1.9 b)" above, the combustible gas detector must alarm at 10,000 ppm for natural gas, or at 4,200 ppm for propane. Lower set points are acceptable.

## Appendix H - EMERGENCY FLOOD GUIDELINES

DATE: March 13, 2007  
REVISION: April 5, 2011

CATEGORY: FLOODING  
SECTION: EMERGENCY PROCEDURES GUIDELINE  
For Licensed Gas Contractors

PAGE: 1

### Procedure

Flooding in the province of Saskatchewan can occur from the following ways:

1. Waterway spillover;
2. Flash Floods;
3. City, town or village water/sewer system failures;
4. Plumbing (water system failures & sewage backup).

When flooding occurs, damage to property can be extensive. The safe operation of gas appliances is a priority for SaskPower Gas Inspections. To ensure this, SaskPower Gas Inspections enforces The B149.1 National Gas and Propane Installation Code requirement for gas appliances that are involved in a flood;

#### 4.5 Suitability of Use

##### 4.5.5

Appliances, accessories, components, equipment, piping and tubing that have been exposed to fire, explosion, flood, or other damage shall not be offered for sale, installed, reactivated, or reconnected to the supply until the appliance, accessory, component, equipment, piping or tubing has been inspected by a person acceptable to the authority having jurisdiction. The inspection of piping or tubing exposed to flood shall include a check for water in the piping or tubing system.

*Note: In Saskatchewan, a licensed gas fitter is acceptable to the Authority Having Jurisdiction.*

**Note - Any gas fired appliance found to be unsuitable for continued use shall have its rating plate removed by the licensed gas fitter**

#### Procedure for Single Property Flooding

1. Gas suppliers may isolate area flooded and Red Tag affected appliance or property.
2. Buildings affected by flooding will need to have their whole gas system checked by a licensed gas contractor and have the affected gas appliances serviced/replaced. The red tag process is to be used where corrections are not carried out. The local gas inspector will offer advice and answer any questions the home owner might have.
3. Listed on the following page are the more common gas appliances with the required action depending on the flood condition. For other gas appliances that are not listed contact your local gas inspector for action advice. For inspector contact information call:  
Toll-free number at 1-888-757-6937 option 5 (Gas and Electric Inspections)

#### Reactivation After a Major Flood

SaskPower Gas Inspections require the use of red tags to document flood damaged gas appliances. The red tag procedure for reporting to Gas Inspections must be followed.

1. Local Gas Inspector in conjunction with local gas utility will coordinate start up of affected areas to ensure public safety. For properties that have been shut-off but have no flood damage, the authorization to reactivate the service will come from the local gas inspector – no permit or air test is required.
2. Public will be advised through the EMO Centre that when returning to their homes that they:
  - (a) Have a licensed gas contractor inspect and service equipment.
  - (b) If they smell gas upon returning home to leave immediately and notify appropriate authorities - ie Natural Gas – SaskEnergy 1-888-700-0427 or Propane – their Propane supplier
3. Local Gas Inspector will advise local gas contractors to hang an air test verification tag on the meter and to phone in applicable permit numbers to the utility before the utility turns the gas on to the home or facility.
4. Local Gas Inspector will advise owner to apply to SaskEnergy for a meter activation.

DATE: March 13, 2007  
REVISION: April 5, 2011

CATEGORY: FLOODING  
SECTION: EMERGENCY PROCEDURES GUIDELINE  
For Licensed Gas Contractors

PAGE: 2

Gas Inspection Emergency Procedures Guideline

<u>Gas Appliance</u>	<u>Condition</u>	<u>Solution</u>
Furnace	Completely Submerged	Replacement
Furnace	Flooded above gas train	Replacement
Furnace‡	Flooded Fan Compartment (Containing Electronic Board)	Replacement
Furnace‡	Flooded Fan Compartment (Below Motor & Board)	Service/Test
Water Heater	Completely Submerged	Replacement
Water Heater	Flooded Gas Valve& Burner	Replacement
Water Heater (FVIR)	Flooded Sensor or Arrestor Screen	Replacement
Water Heater	Below Burner	Service
Instantaneous Water Heater	Completely Submerged	Replacement
Instantaneous Water Heater	Flooded Burner & Controls	Replacement
Instantaneous Water Heater	*Flooded Atmosphere / Sprayed	Service
Clothes Dryer	Completely Submerged	Replacement
Clothes Dryer	Flooded Burner & Controls	Replacement
Clothes Dryer	*Flooded Atmosphere / Sprayed	Service
Fireplace	Completely Submerged	Replacement
Fireplace	Flooded Burner & Controls	Replacement
Fireplace	*Flooded Atmosphere / Sprayed	Service
Boiler	Completely Submerged	Replacement
Boiler	Flooded Burner & Controls	Replacement
Boiler	*Flooded Atmosphere / Sprayed	Service

\* Flooded Atmosphere - is an area in which there has been prolonged high humidity or moisture where gas appliances are located. (e.g., Prolonged standing water in a basement due to the time taken for cleanup i.e. more than 2 days)

‡ If furnace ran during flooding with water/sewage in fan compartment, the furnace shall be replaced.

**Note: Appliances that have been removed due to flooding shall have rating plates removed before being disposed of.**



## Appendix J

### Installation of piping or tubing in rocky areas

Where, due to rocky terrain, it is impractical to comply with section 6.15.4 (a), piping or 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, or PE piping, 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.
11. A Plan Review application to Gas Inspections must be completed and approved prior to installation.

