

Fuel Gas Pressure Piping in Plants

PURPOSE

This bulletin has been jointly developed by Alberta Municipal Affairs, the Pressure Equipment Sub-Council, the Alberta Boilers Safety Association (ABSA) and the Safety Codes Council to inform industry of the requirements associated with the installation of fuel gas pressure piping in Alberta. This bulletin identifies the division between the *Gas Code Regulation* (AR 111/2010) and the *Pressure Equipment Safety Regulation* (AR 49/2006) for fuel gas piping at Plants with and without **Owner-user** programs

DISCUSSION

Designers and **Installers** must adhere to the provisions for fuel gas service pressure piping above and below **15 psi (103 kPa)**, and engage the authorities having jurisdiction before designs are finalized and the work proceeds.

CODE REFERENCES

The CSA B149.1 - *Natural gas and propane installation code* addresses all piping systems that convey fuel gas to fuel burning appliances, at all pressure levels.

The Pressure Equipment Safety Regulation under the *Safety Codes Act* adopts certain *ASME B31 Piping Codes* and the *CSA B51 Boiler, pressure vessel, and pressure piping code*. The *Pressure Equipment Safety Regulation* addresses “pressure piping” (as defined below).

Gas piping used exclusively for fuel purposes regulated under the *Gas Code Regulation* is specifically exempt from the *Pressure Equipment Safety Regulation*.

APPLICATION

This STANDATA establishes the specification break points between the *Gas Code Regulation* (AR 111/2010) and the *Pressure Equipment Safety Regulation* (AR 49/2006) for piping in fuel gas service installed at Plants with and without **Owner-user** programs.

- Fuel gas piping for pressure not exceeding 15 psi (103 kPa) are exempt from ABSA registration requirements. Fuel Gas piping at all pressures located in between the appliance shut-off valve and the burner shall be designed and constructed in accordance with the *Gas Code Regulation*.
- Process gas piping for pressure exceeding 15 psi (103 kPa) shall be designed and constructed as “pressure piping” in accordance with the *Pressure Equipment Safety Regulation*.

Issue of this STANDATA is authorized by the Gas Administrator and the Pressure Equipment Administrator

[Original Signed]
Sidney Manning

Mike Poehlmann

The logo for the province of Alberta, featuring the word "Alberta" in a stylized, cursive font with a small blue square at the end of the word.

Fuel gas piping for pressure exceeding 15 psi (103 kPa) located upstream of the appliance shut-off valve must be designed and constructed in accordance with the gas code regulation unless it is located at **Owner-user** facilities where this Standata identifies an option for the piping system to be designed and constructed as “pressure piping” in accordance with the *Pressure Equipment Safety Regulation*. Drawings and design information must clearly indicate the code of design and construction, and indicate where any code changeover occurs.

The *Pressure Equipment Safety Regulation* does not apply to:

- (a) a pressure piping system operating at and with relief valves set at 103 kPa (15 psig) or less;
- (b) piping systems used to convey gas exclusively for fuel purposes and that is subject to the Gas Code Regulation.

Administration of the *Pressure Equipment Safety Regulation* has been delegated to ABSA. In the *Pressure Equipment Safety Regulation*, the following definitions apply to the design and construction of a pressure piping system:

"Pressure Piping System" means pipe, tubes, conduits, fittings, gaskets, bolting and other components that make up a system for the conveyance of an expansible fluid under pressure and may also control the flow of that fluid.

"Expansible Fluid" means

- (i) a vapour or gaseous fluid, or
- (ii) a liquid under pressure and at a temperature at which the liquid changes to a gas or vapour when the pressure is reduced to atmospheric pressure or when the temperature is increased to ambient temperature.

In this document the term

"Owner-user" means an owner of pressure equipment that has provided an Integrity Management System in accordance with the *Pressure Equipment Safety Regulation* and has been issued a quality management system Certificate of Authorization Permit under PESR section 11(3).

"Fuel Gas" means any of the following gases or mixtures of gases utilized within the scope of the CSA B149.1 - *Natural gas and propane installation code* and may include natural gas, manufactured gas, or mixtures of propane gas and air, propane, propylene, butanes (normal butane or isobutane), and butylene. And includes manufactured gas such as hydrogen, raw gas, well head gas, process generated gas and may include sweet, sour or wet applications.

"Gas Piping" means pipe, tubes, conduits, fittings, gaskets, bolting and other components that make up a system for the conveyance of fuel gas under any pressure, may also control the flow of the fuel gas and shall be designed and constructed in compliance with the *Gas Code Regulation*.

The *Gas Code Regulation* adopted the CSA B149.1 - *Natural gas and propane installation code*. This code applies to the installation of piping and tubing systems, appliances, equipment, components, venting and accessories where **gas** is to be used for **fuel purposes**, but does not cover piping or tubing where the gas is used as feedstock or process gas.

Installations of fuel gas using manufactured gas (as defined above) shall meet the intent of the *Gas Code Regulation* by utilizing appliances that are certified or approved as indicated under

the options within the *Gas Code Regulation*. Hydrogen gas as a fuel is currently addressed as manufactured gas and within the scope of the CSA B149.1 - *Natural gas and propane installation code*, and a permitted installation would address the installation of the piping. Such installations may be considered for compliance under complex project provisions requiring the engineer of record to integrate the CAN/BNQ 1784-000 *Canadian hydrogen installation code* into the design package.

Permitting requirements under both Gas & Pressure Equipment Disciplines

The *Permit Regulation AR 204/2007*, under the *Safety Codes Act*, indicates that a permit, for a gas installation that is under the gas discipline, is required:

“12(1) A permit in the gas discipline is required to install, alter or add to a gas system.”

Work performed on piping under the jurisdiction of the *Gas Code Regulation (AR 111/2010)* must be done by certified gas fitters.

All fuel gas piping must be permitted and meet the requirements of the *Gas Code Regulation*, **except** for the portion of the piping that is approved as part of the “pressure piping” at an Owner-user facility.

Work performed under the jurisdiction of the *Pressure Equipment Safety Regulation* shall follow the requirements outlined therein and in accordance with ABSA document AB-518.

Gas piping systems at owner-user plant sites.

1. Fuel gas piping systems installed at owner-user facilities having a design pressure in excess of 15 psi (103 kPa) designed as pressure piping is subject to the *Pressure Equipment Safety Regulation* and shall be included in the design registration of the pressure piping system for the facility. Gas piping used exclusively for fuel purposes regulated under the *Gas Code Regulation* is specifically exempt from the *Pressure Equipment Safety Regulation*, shall **not** be included in the design registration of the pressure piping system for the facility.
2. Fuel gas piping for pressure of 15 psi (103 kPa) or less, and fuel gas piping at all pressures located in between the appliance shut-off valve and the burner must be designed and constructed in accordance with the *Gas Code Regulation*.
3. The construction, modification, repair or alteration of a fuel gas piping system designated as pressure piping referenced in point 1 above shall be performed by the holder of a quality management system certificate of authorization permit and in full compliance with the *Pressure Equipment Safety Regulation*.
4. The construction inspection of the fuel gas piping (pressure piping) upstream of the appliance isolation valve and/or the pressure regulator (where the pressure is reduced to 103 kPa or less) or other designated design code changeover shall be carried out by an owner's inspector in accordance with the code of construction and documented on an ABSA form AB-83 *Piping Construction and Test Data Report*.
5. Fuel gas piping systems installed at owner-user facilities having a design pressure of 15 psi (103 kPa) or less and fuel gas piping exceeding 15psi (103kPa) designated by the designer as “gas piping” shall be designed as “gas piping” and is subject to the *Gas Code Regulation*.
6. The installation inspection of the gas piping system, appliance isolation valve and/or pressure regulator will be carried out by a gas safety codes officer under the *Gas Code Regulation*. The required gas permit will also cover the installation of the gas-fired appliance and the final piping where gas is used for fuel purposes.

Installation inspection carried out under *Gas Code Regulation (AR 111/2010)* shall include:

- Verification from the owner or contractor that the upstream pressure piping system has been registered with ABSA;
- Verification the AB-83 form has been completed and signed off by the owner's inspector.
- Installer qualifications (gasfitter) respecting the type of installation permitted;
- Piping and tubing systems (verifying size, schedule, capacity, supports, etc.);
- Pressure regulators and line relief devices (verifying working pressures, capacities, venting to a safe location outdoors);
- Appliances (verifying certification, approvals for Alberta, clearances, protection, venting systems and air supply);
- For underground piping and tubing (verifying burial depth, routings away from buildings, sleeves on riser passing through concrete/pavement, use of swing joint on entry to buildings, etc.)
- Odorization as required in *CSA Z662 Oil and gas pipeline systems* (when gas is utilized for fuel purposes); and
- Other inspection items associated with CSA B149 Codes and referenced standards.

Fuel gas piping systems at all other plant sites not managed by an Owner-user.

1. Fuel gas piping systems installed at all design pressures shall be deemed "gas piping" and subject to the *Gas Code Regulation*.
2. The construction, modification, repair or alteration of a fuel gas piping system reference in point 1 above shall be performed by a holder of an appropriate trade certificate of competency and in full compliance with the trade regulations under *Alberta Advanced Education / Apprenticeship and Industry Training (AIT)*.
3. The installation inspection of the piping system including appliances, isolation valve and/or pressure regulator, and piping from the isolation valve and/or regulator to the burner will be carried out by a gas safety codes officer under the *Gas Code Regulation*. The required gas permit will cover the installation of the gas-fired appliance and the final piping where gas is used for fuel purposes.

Installation inspection carried out under *Gas Code Regulation (AR 111/2010)* and shall include:

- Verification from the owner or contractor that the pressure piping system (if applicable) has been registered with ABSA;
- Installer qualifications (gasfitter) respecting the type of installation permitted;
- Piping and tubing systems (size, schedule, capacity, supports, etc.);
- Pressure regulators and line relief devices (working pressures, capacities, venting to a safe location outdoors);
- Appliances (certification, approvals for Alberta, clearances, protection, venting systems and air supply);
- For underground piping and tubing (burial depth, not permitted under building, sleeves on riser passing through concrete/pavement, swing joint on entry to buildings, etc.)
- Odorization or equivalent (when process gas is utilized for fuel purposes); and
- Other inspection items associated with CSA B149 Codes and referenced standards

A natural gas service and meter upstream of a gas distribution system on a plant site shall be in accordance with the *Pipeline Act*, or the *Oil and Gas Conservation Act* as appropriate including regulations and referenced codes/standards.

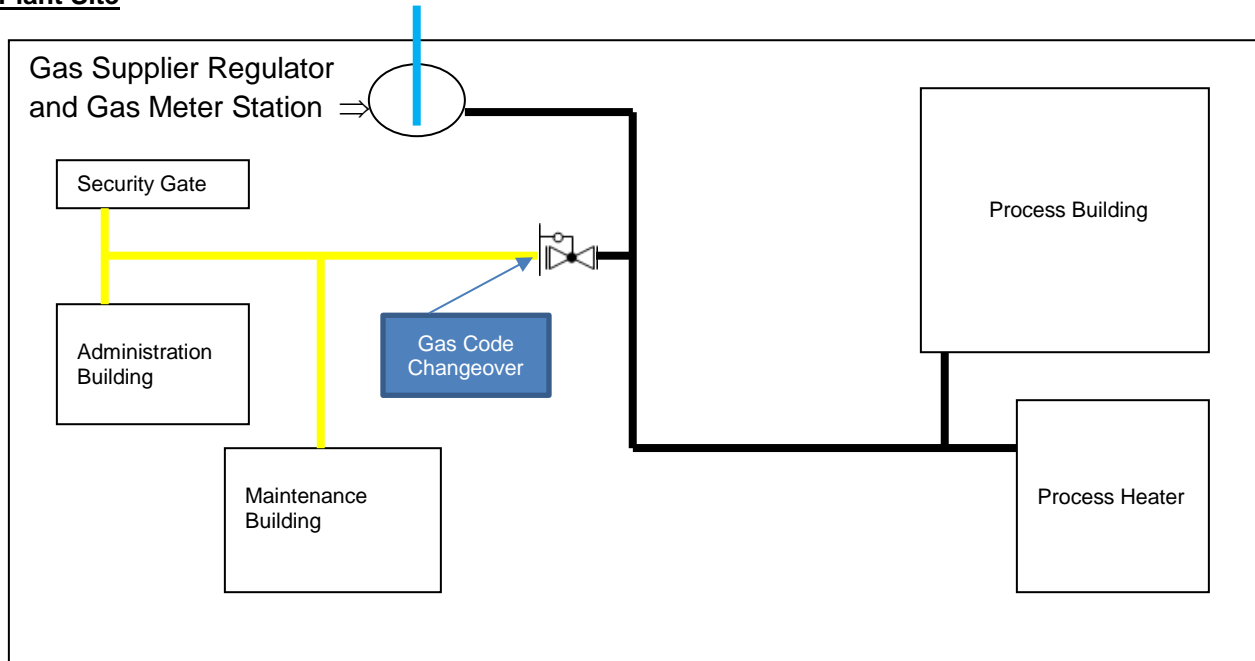
Anyone concerned about the status of a fuel gas piping system or a pressure piping system could contact Alberta Municipal Affairs - Community & Technical Support, visit the Web site <https://www.alberta.ca/gas-codes-and-standards.aspx>, contact the local ABSA office, or visit ABSA Web site <http://www.absa.ca> for further information.

INTERPRETATION

All fuel gas piping systems shall be permitted and shall meet the requirements of the *Gas Code Regulation*, except for the portion of the piping that is approved as part of the pressure piping at an Owner-user facility.

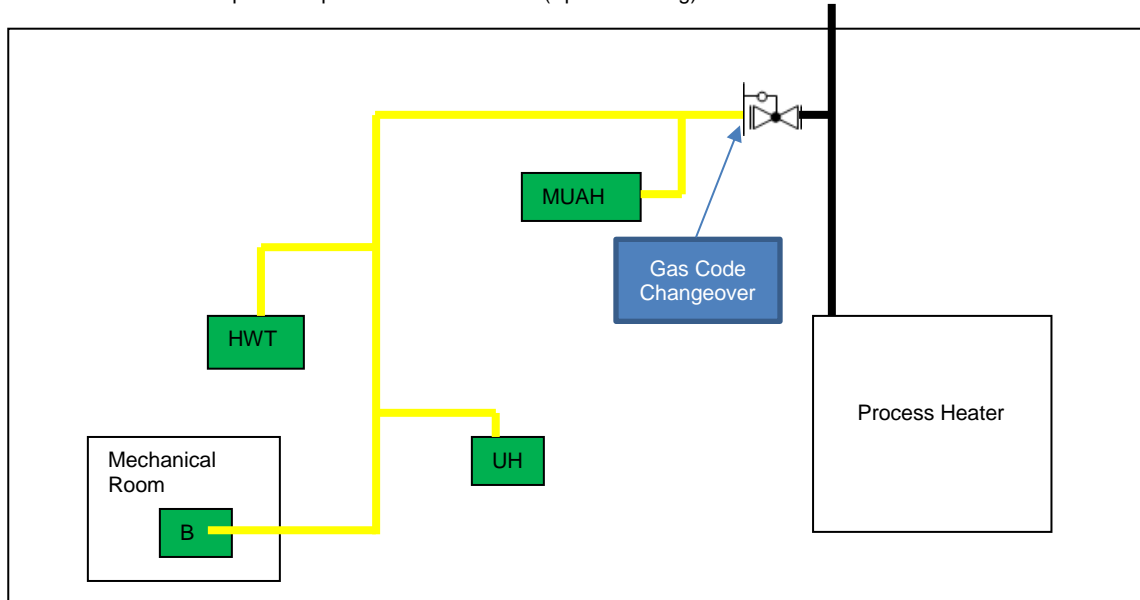
- Gas Supplier Distribution line (Alberta Agriculture and Forestry, Rural Utilities Section)
- Process Distribution ABSA – Registered Pressure piping system
- Fuel Distribution *Gas Code Regulation* or as ABSA Registered as process gas pressure piping for Owner-User if pressure >15psi
- Appliance (Certified / Uncertified) *Gas Code Regulation*

Plant Site

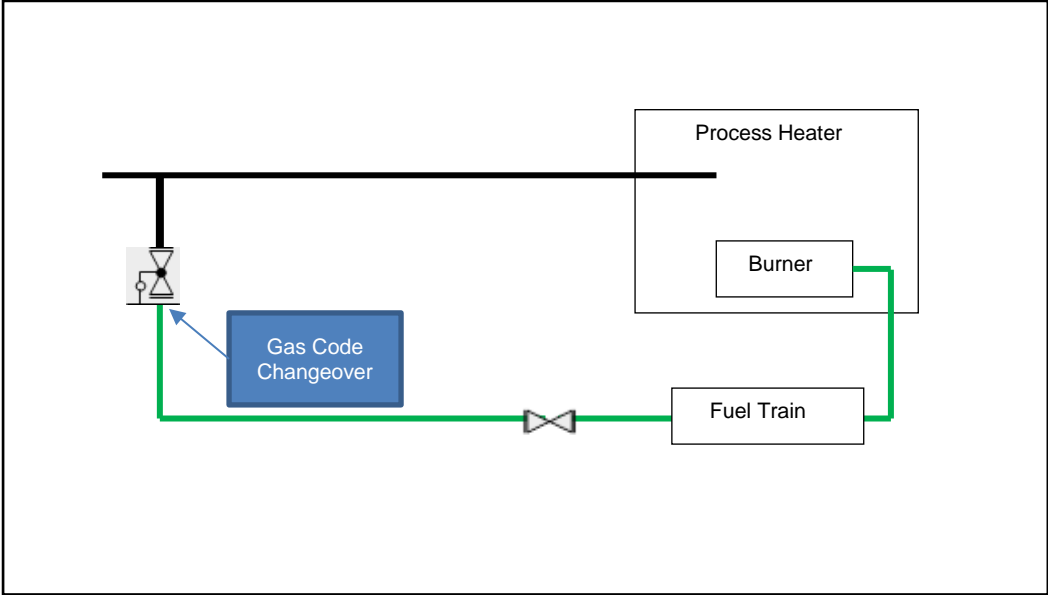


Process Building

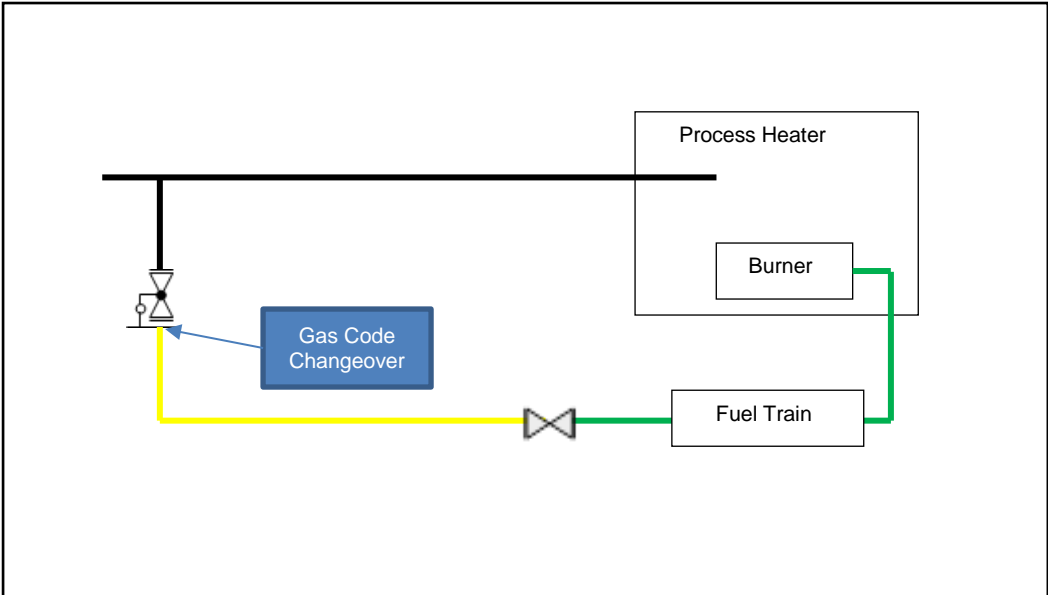
MUAH – Roof top Make-up Air Units **B** – Boiler (Space Heating) **UH** – Unit Heater **HWT** – Hot Water Tank



Process Equipment



Process Equipment Owner-User Over 15 PSI



Process Heater

