

### Appliances and Equipment Require Special Certification for Installation at High Altitude

#### PURPOSE

This bulletin has been jointly developed by Municipal Affairs and the Safety Codes Council to inform designers, vendors, builders, contractors and owners of the minimum requirements to ensure safe effective venting of gas appliances.

#### DISCUSSION

In Alberta, under the *Safety Codes Act*, the inspection and approval of gas appliances and equipment for use at altitudes over 2000 ft. (600m) shall comply with the requirements listed below.

#### CODE REFERENCES

The B149.1 *Natural gas and propane installation code*

#### 4.22 High-altitude installations

##### 4.22.1

For high-altitude installations, appliances shall be certified in compliance with CSA 2.17 and shall be adjusted to the high-altitude rating shown on the nameplate following the manufacturer's instructions when installed at elevations between 2000 ft and 4500 ft (600 m and 1350 m) above sea level.

##### 4.22.2

When an appliance is installed at elevations above the maximum elevation option provided by the manufacturer, the input rate shall be reduced following the manufacturer's instructions. If no instructions are given for configuring the appliance for higher altitudes, the input rate shall be reduced at the rate of 4% for each additional 1000 ft (300 m). The input rate shall be reduced from the rate indicated for the highest altitude option provided.

#### INTENT & RATIONALE

*unofficial support information*

The intent of Clause 4.22 is to accurately adjust the input ratings of appliances certified for high altitude to ensure proper performance. The rated output of gas-burning appliances decreases with higher altitudes due to the reduction in atmospheric pressure. This reduction in the density of the air reduces the venting effectiveness of buoyancy vented appliances (natural draft and fan-assisted).

Induced or forced draft, and direct vent appliances are also affected by high altitudes, but not to

Issue of this STANDATA is authorized by  
the Gas Administrator

[Original Signed]  
Sidney Manning

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.

the same extent as buoyancy vented appliances. For these reasons, appliances installed at altitudes exceeding 2000 feet above sea level must be certified for this application to ensure satisfactory performance, according to **CSA 2.17 Gas-fired appliances for use at high altitudes**. In the case of natural draft and fan-assisted appliances, high altitude ratings may be obtained by a change in orifice size or by a change in manifold pressure when the appliance is equipped with a gas pressure regulator.

Appliances may be equipped or adjusted at the factory for the high altitude rating, or may be field converted using a manifold pressure change, or by using a certified field conversion kit. For induced or forced draft, and direct vent appliances, adjustments to the air supply are typically required to ensure proper high altitude performance. In all cases, appliances must be suitably marked to indicate their altitude adjusted input rating.

The application of **CSA-2.17 Gas-fired appliances for use at high altitudes** is intended for indirect fired appliances up to and including 400 000 Btuh (117.23 kW). Some manufacturers, at their option, may choose to test and mark indirect fired appliances with greater inputs.

High Altitude marking ranges are:

2 000 - 4 500 ft (610 - 1 370 m) or

0 - 4 500 ft (0 - 1 370 m) for multiple-rated appliances.

## APPLICATION

**In all cases, appliances must be suitably marked to indicate their adjusted altitude rating.**

About 22 Alberta municipalities are at elevations below 2000' (600m). All other installations of appliances regulated by the gas regulation shall be derated and labelled as required for high altitude. The *National Building Code – Alberta Edition*, Division B, Appendix C contains Table C-2. Climatic Design Data for Selected Locations in Alberta. This appendix contains elevations for various sites in Alberta.

**The CSA-2.17 Gas-fired appliances for use at high altitudes** standard states;

### 1.6 Instructions

1.6.1 *The appliance installation instructions shall include information on the use of the appliance at high altitude. The method to be used to obtain the high altitude rating shall be clearly detailed. The necessity of attaching any supplementary labels or marking the name/ rating plate relative to a field conversion shall also be clearly indicated.*

## INTERPRETATION

This notice clarifies responsibilities under the *Safety Codes Act*. Under the *Safety Codes Act*, it is the responsibility of the owner, vendor, contractor, and user to ensure that the installation and operation of appliances comply with the *Act* and are in accordance with the regulations.