

November 2010

G-05-02-B149.1 [Rev 2]

(File number 16090-G01)

(Replaces Information Bulletin dated August 2005)

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REQUIREMENTS FOR VENTING GAS-FIRED APPLIANCES

Subject: Residential Appliance Venting, Vent Connectors and Liners

This bulletin has been jointly developed by Safety Services and the Gas Technical Council to inform designers, vendors, builders, contractors (Gasfitters and Sheet Metal Mechanics) and owners of the minimum requirements to ensure safe and effective venting of gas appliances.

Traditionally, gas appliances were designed with a draft hood or a draft diverter and depended on natural buoyancy to vent their products of combustion to the outdoors. Since most gas appliances had similar operating characteristics, rule-of-thumb guidelines were developed. These older and generic guidelines applied to:

- Natural draft appliances;
- Utilized only the maximum input ratings of all appliances being vented; and
- A venting system with high flue gas temperatures with excess air and flue gas dilution air that eliminated condensation issues.

However, with the introduction of Category I fan-assisted appliances, new venting guidelines were necessary to prevent excessive condensation in the venting system, which causes corrosion and icing of the vent terminations. These new guidelines and the tables address the differences between the draft hood and fan-assisted appliances, and deal with:

- Minimum appliance input rating;
- Maximum appliance input rating;
- Reduction of excess air;
- Elimination of flue gas dilution air;
- Condensation in the venting system (wet times); and
- Depressurization from exhausting equipment and tighter building envelopes.

In addition, the tables address maximum vent connector lengths and capacities. The Category I fan-assisted appliances are sensitive to vent connector configuration and the installer shall follow the vent tables

The venting of **Category I** fan-assisted appliances shall be in accordance with the **General Venting Requirements (GVR)** and the venting tables in the **Natural Gas and Propane Installation Code CSA-B149.1**, or shall be vented in accordance with the appliance manufacturer's certified installation instructions. There are no alternative sizing methods for Category I fan-assisted appliances; therefore the vent tables shall be used.

8.13 Vent and Chimney Sizing

8.13.1

A **vent** or a **chimney** serving a single **appliance** shall provide effective venting and shall be sized

- (a) so that its effective area is not less than that of the **draft-control device** outlet or the **flue** outlet; or
- (b) in accordance with good engineering practice, such as by the use of
 - (i) Table C.1, C.2, C.5, or C.6 of Annex C for a **draft-hood**-equipped or a fan-assisted **Category I appliance**; or
 - (ii) engineered venting tables acceptable to the **authority having jurisdiction**.

8.13.2

A **vent** or a **chimney** serving more than one **appliance** shall provide effective venting, and shall be sized

- (a) so that its effective **flue** area is not less than that of the largest **draft-control device** outlet or the largest **flue** outlet, plus 50% of the sum of the outlet areas of the additional **appliances**; or
- (b) in accordance with good engineering practice, such as by the use of
 - (i) Table C.3, C.4, C.7, or C.8 of Annex C for a **draft-hood**-equipped or a fan-assisted **Category I appliance**; or
 - (ii) engineered venting tables acceptable to the **authority having jurisdiction**.

The General Venting Requirements (GVRs) and the vent sizing Tables are in the Annex C of the CSA-B149.1 and they apply to both Category I draft hood equipped and Category I fan-assisted combustion appliances. The designers and installers are reminded to read the titles to the Tables to ensure that they are applied as intended. (**Note:** Clause 8.13.2 (a) applies to only draft-hood-equipped appliances)

Example: For vents and vent connectors serving two or more appliances:

Table C.4 applies to Type B Double-Wall Vents with Single-wall Connectors serving Two or more Category I Appliances.

If Table C.4 does not permit the appliance input rating to fit into a Fan Min/Max range or the table shows NR (not recommended), go to Table C.3., which is titled Capacity of Type B Double-Wall Vents with Type B Double-wall Vent Connectors serving Two or more Category I Appliances.

There are specific venting concerns that need to be considered such as:

- The 2-stage mid-efficient furnaces **Category I** vent connectors shall meet all requirements of the venting tables and the manufacturer's certified installation instructions. In many installations, this will require B-vent as a vent connector. (i.e. depending on minimum input and vent height, the rule-of-thumb single storey building less than 80,000 Btuh.)
- Oversized 2-stage mid-efficient furnace vents are more susceptible to excessive condensation. Therefore, special attention must be given to properly sizing furnaces for the space they are required to heat.
- The single stage mid-efficient furnaces **Category I** vent connector size and type shall be determined by appliance input and total vent height.
- The single wall vent connector total length limits shall comply with either **Table C.9**
- All water heater vent connectors shall meet the requirements of the venting tables. In some cases, appliance input and total vent height will determine that a 4-inch vent connector will be required.
- When a common vent manifold is used, the common vent capacity must be reduced by 10%.
- The horizontal length of the common vent manifold shall not exceed 1-1/2 feet for each inch of common vent diameter.

Appliance replacements and chimney liners:

A Category I fan-assisted may be common vented to a chimney; however, only if the existing chimney is serving at least one draft-hood-equipped gas appliance and the vent connectors and chimney are sized by Tables C.7 and C.8.

8.12.2 Except as provided in Clause 8.21.6, before replacing an existing **appliance** or connecting a **vent connector** to a **chimney**, the **chimney flue** shall be examined to ascertain that the **chimney**

- (a) is properly constructed;
- (b) is lined with a tile or metal liner;
- (c) is clear and free of soot, creosote, or obstructions;
- (d) will effectively conduct the **products of combustion** outdoors; and
- (e) is sized in accordance with Clause 8.13.

8.12.10 A **metal chimney** liner shall provide a continuous lining from the base inside the space where the **appliance** is located to the top of the **masonry chimney flue**, and it shall comply with the requirements of ULC S635. It shall be installed in accordance with the manufacturer's instructions.

There are specific requirements that need to be remembered when installing liners such as:

- The height of a masonry chimney is measured from the outlet of the highest appliance.
- Check that the capacity being connected does not exceed the Table C.10 for the chimney that is being utilized.
- A chimney liner is required if the masonry chimney is oversized.
- The capacity of a tile liner cannot exceed 25% of the total input of the appliances being connected.
- Vent capacity shall be reduced by 20% when using a certified flexible corrugated metallic liner system and be in accordance with the requirements of C.2.11 of the Natural Gas and Propane Installation Code CSA B149.1
- The liner termination above the existing chimney shall be equipped with tightly sealed flashing to prevent the entry of moisture and cold air.

The **Natural Gas and Propane Installation Code CSA-B149.1** is intended to establish essential requirements. Other than specific listed exceptions, the Code states every appliance shall be connected to either an effective chimney or a vent.

Therefore, before replacing an existing draft-hood-equipped appliance that is connected to a **vent**, the installer shall ensure that the existing **vent** was properly installed and its size will comply with **Clause 8.13**. When the existing **vent** is **oversized**, a properly sized certified liner shall be installed inside the existing vent or a chimney liner that is installed in accordance with the manufacturer's certified instructions. (An alternative method, when there is sufficient space, would be to install a new Type B vent inside the existing vent.)

The purpose of this notice is to ensure that designers, vendors, builders and contractors are aware of the provisions within the Natural Gas and Propane Installation Code **CSA-B149.1** for venting gas-fired appliances. This is to assist installers in selecting the appropriate method of venting and use the applicable vent-sizing table, so that the vent complies with the minimum Code requirements.

For more information related to **CSA-B149.1**, please contact Alberta Municipal Affairs – Safety Services at 1-866-421-6929.