MECHANICALLY VENTED APPLIANCES

PURPOSE

This STANDATA has been developed to provide clarity to safety codes officers and industry stakeholders as to what types of appliances are considered to meet the definitions of *mechanically vented* and *direct-vented* in the Alberta Building Code 2014 (ABC 2014) and, subsequently, when make-up air would need to be provided within a dwelling unit to protect against the effects of depressurization.

DISCUSSION

The Alberta Building Code 2014 contains two defined terms for situations where make-up air would not be required to be supplied to a dwelling unit to offset the potential hazard from depressurization of the dwelling unit and the subsequent spillage of products of combustion from fuel-fired appliances. Under Sentence 9.32.3.8.(1) dwelling units that have fuel-fired space-heating or water-heating appliances are not required to provide make-up air if they are *mechanically vented* or *direct-vented* appliances as defined in the ABC 2014.

Safety codes officers and industry has asked for additional clarification regarding the types of fuel-fired appliances that would meet the definition of *mechanically vented*. Some safety codes officers have interpreted the requirements such that if there is any mixing of the air from the space where the appliance is located and products of combustion (regardless of the design of the appliance and any safety features which may be present), then the appliance is considered to be at risk for the spillage of products of combustion, in which case make-up air must be provided.

CSA B149.1-15, “Natural Gas and Propane Installation Code” makes reference to specific categories of fuel-fired appliances in the definition of “appliance”. All fuel-burning appliances in Canada are required to be classified to receive certification, including any modifications or accessories to the appliance that might change the classification category.

Category I and II appliances often have flue gas dilution air requirements and may result in pathways for exhaust gases that are not totally enclosed. The absence of forced draft or induced draft fans in category I and II appliances result in a non-positive vent static pressure and an appliance that is sensitive to the effects of depressurization. These appliances are susceptible to downdraft, which could result in the discharge of combustion products into the occupied space.

Category III and IV appliances may be configured as forced draft, induced draft or direct vent categorization. The presence of a fan creates a positive vent pressure that requires that the vent is sealed and has no pathways for exhaust gases to escape other than at the terminal on the exterior of the building. These appliances do not have the same level of sensitivity to depressurization as category I and II appliances.

Issue of this STANDATA is authorized by the Building Administrator and the Gas Administrator

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CODE REFERENCES

1. Clause 3 of CSA B149.1 Natural Gas and Propane Installation Code, contains the following definitions:

Air supply (with respect to the installation of an appliance) – combustion air, excess air, flue gas dilution air, primary air, secondary air, and ventilation air.

Combustion air – the air required for satisfactory combustion of gas, including excess air.

Excess air – that portion of the combustion air that is supplied to the combustion zone in excess of that which is theoretically required for complete combustion.

Flue gas dilution air – the ambient air that is admitted to a venting system at the draft hood, draft diverter, or draft regulator.

Primary air – that portion of the combustion air that is supplied for the initial stages of the combustion process and is supplied upstream from the point of ignition.

Secondary air – that portion of the combustion air that is supplied for the intermediate and final stages of the combustion process and is supplied downstream from the point of ignition.

Ventilation air – air that is admitted to a space containing an appliance to replace air exhausted through a ventilation opening or by means of exfiltration.

Appliance – a device to convert gas into energy; the term includes any component, control, wiring, piping, or tubing required to be part of the device.

Category I appliance – an appliance that operates with a nonpositive vent static pressure and with the flue loss not less than 17%.

Note: This category consists of draft-hood-equipped appliances, appliances labelled as category I and fan assisted appliances for venting into type B vents.

Category II appliance – an appliance that operates with a nonpositive vent static pressure and with the flue loss less than 17%.

Category III appliance - an appliance that operates with a positive vent static pressure and with the flue loss not less than 17%.

Category IV appliance - an appliance that operates with a positive vent static pressure and with the flue loss less than 17%.

Draft - the flow of air or combustion products, or both, through an appliance and its venting system.

Chimney draft - the available natural draft of the chimney measured at or near the base of the chimney.

Mechanical draft – a draft produced by a mechanical device such as a fan blower or aspirator that can supplement natural draft.

Forced draft – a mechanical draft produced by a device upstream of the combustion zone of an appliance.

Induced draft – a mechanical draft produced by a device downstream from the combustion zone of appliance.

Natural draft - a draft other than a mechanical draft.

2. ABC Sentence 1.4.1.2.(1) of Division A contains the following definitions:

> *Direct-vented* (as applying to a fuel-fired space- or water-heating *appliance*) means an *appliance* and its venting system in which all the combustion air is supplied directly from the outdoors and the products of combustion are vented directly to the outdoors via independent, totally enclosed passageways connected directly to the *appliance*.
>
> *Mechanically vented* (as applying to a fuel-fired space- or water-heating *appliance*) means an *appliance* and its combustion venting system in which the products of combustion are entirely exhausted to the outdoors by a mechanical device, such as a fan, blower or aspirator, upstream or downstream from the combustion zone of the *appliance*, and the portion of the combustion venting system that is downstream of the fan, blower or aspirator is sealed and does not include draft hoods or draft control devices. (See Appendix A.)

3. ABC Appendix note A-1.4.1.2.(1) of Division A states:

> **A-1.4.1.2.(1) Defined Terms.**
> …
> **Mechanically Vented**
> The definition of this term is intended to include all types of appliances and venting systems that rely entirely on fans to evacuate the products of combustion. Systems variously referred to as “forced draft,” “power vented” and “induced draft” in standards and industry terminology may be covered by this definition. The key characteristic of such systems is that they are more resistant to depressurization-induced spillage of combustion products into the building in which they are housed because the combustion venting system downstream of the fan is “sealed,” i.e. includes no draft hood or draft control device.
> …

4. ABC Sentence 9.32.3.8.(1) states:

> **9.32.3.8. Protection Against Depressurization**
> (See Appendix A.)
> **1)** This Article applies to
> a) *dwelling units* that contain a fuel-fired *space-heating appliance* or fuel-fired water-heating *appliance* of other than *direct-vented* or *mechanically vented* types, and
> b) ancillary spaces that contain an exhaust device, where the space is not within a *dwelling unit* in a house with a *secondary suite* and where the house with a *secondary suite* contains a fuel-fired *space-heating appliance* or fuel-fired water-heating *appliance* of other than *direct-vented* or *mechanically vented* types.

INTERPRETATION

1. Category I and II appliances do not meet the definition of either *mechanically vented* or *direct-vented*. As such, any dwelling unit with a category I or II appliance installed within it shall be protected from the effects of depressurization in accordance with the requirements of Article 9.32.3.8.
2. All category III and IV appliances are considered to meet the definition of *mechanically vented*. Any dwelling unit with category III or IV fuel-fired space-heating appliance or fuel-fired water-heating appliance does not need to be protected from the effects of depressurization in accordance with the requirements of Article 9.32.3.8.

3. Appliances that are installed such that combustion air and products of combustion are directly supplied from and discharged to the exterior via independent, totally enclosed passageways that are connected directly to the appliance are considered to meet the definition of direct-vented and not subject to depressurization.

   This INTERPRETATION is applicable throughout the province of Alberta.