

UNVENTED GAS FIREPLACES

Introduction

Unvented gas fireplaces (UGF) are a relatively new product in North America. The devices consist of a gas burner, simulated logs, and no chimney. All exhaust products, heat, and moisture are simply exhausted into the room where the appliance is located. Oxygen depletion sensors theoretically protect the occupants by cutting off the gas supply if oxygen levels drop significantly. The fireplaces are sold with the warnings that they should not be used continuously as a heating device, that adequate ventilation be provided, and that they be maintained annually by a professional.

Hundreds of thousands of unvented gas fireplaces are sold annually in the US. Manufacturers and distributors of UGF are requesting approval from Canadian regulatory authorities. At one time, UGF were permitted for use in BC, but that approval has since been withdrawn. Both BC and Manitoba still allow a specific type of “blue-flame” unvented gas heater for interior use.

The American Gas Association (AGA), the Gas Appliance Manufacturers Association (GAMA), and the Vent-Free Gas Products Alliance have been supporting this technology with research and presentations. Representatives of these groups met with the Ontario Ministry of Consumer and Commercial Relations (the provincial gas regulatory body) in November, 1996 to request that such appliances be allowed in Ontario. On the other hand, the gas industry is currently considering a request by federal agencies to conduct a risk assessment on the use of UGF in Canadian houses and climates.

Potential Problems

It is clear from CMHC and other Canadian research that unvented appliances are incompatible with Canadian houses and that the spillage of combustion products from fuel-fired furnaces, hot water heaters, and fireplaces leads to unacceptable indoor levels of various contaminants. Codes, standards, equipment, and installation practices have been changed in the last ten years to protect householders from combustion spillage.

The contribution of UGF combustion to indoor levels of CO, CO₂, NO_x, water vapour, and other pollutants will be significant. UGF can match or exceed the size of a hot water heater or small furnace. CMHC reviewed a testing report from American Gas Association (AGA)¹ on UGF emission limits and modelling of the effects of UGF on indoor air quality. Results presented in this report, interpreted in the Canadian context, argue against UGF use in Canada. The simulations show that the modelled appliances exceed the Canadian guidelines for indoor air quality, in part because the maximum allowable pollutant concentrations used in the modelling are significantly higher than Canadian guidelines. As well, the study uses theoretical house air change rates, which are higher than the actual air change rates measured in many Canadian houses. One could argue, as proponents of UGF have, that every house should have an effective ventilation system installed and operating, which would maintain a minimum air change rate of 0.35 air changes per hour.



However, such systems are rarely found in Canadian houses and many houses have natural air change rates lower than this threshold.

The AGA report suggests that the UGF sizing be based on room heating requirements and the maintenance of acceptable indoor air quality. The report outlines how fireplaces can be sized to meet these requirements. The recommended fireplace size for many northern US installations is often smaller than the smallest device commercially available. None of these sizing recommendations are currently required by US codes. Retailers admit that the small UGF recommended are often ignored by salespeople and consumers. Fireplace promotional literature quotes AGA as finding unvented fireplaces safe for use. The information typically fails to emphasize or mention the size limitations that AGA finds necessary for safe use.

Considerations for the Housing Industry

There are numerous models of acceptable vented fireplaces now for sale in Canada; and, they are being installed in great numbers. Unvented gas fireplaces represent a different type of product. Their cost and convenience may make them particularly appealing for occupants of existing houses. However, unvented gas fireplaces will probably exceed Canadian nitrogen dioxide guidelines and contribute a significant amount of moisture to the house even if they are:

- properly sized for the climate area and the house type;
- properly installed and diligently maintained;
- used for no longer than four hours at a time; and
- installed in a house with an effective, distributed ventilation system.

Based on surveys of similar household appliances such as heat recovery ventilators², installations with the above attention to detail will be rare, and the degradation of the indoor environment could be even more pronounced than the modelled results. Also, the current Canadian emphasis to ensure that all combustion appliances have negligible combustion spillage will have to be reconsidered if large appliances with 100% spillage are approved.

Builders and regulatory officials will probably be solicited in the near future to support the introduction of unvented gas fireplaces in different provinces. From the above considerations, it is CMHC's view that unvented gas fireplaces are not suitable for Canadian housing.

References:

1. DeWerth, Douglas W., Borgeson, Robert A., Aronov, Michael A. Development of Sizing Guidelines for Vent-Free Supplemental Heating Products, Topical Report for the Gas Research Institute, Chicago, March 1996.
2. Field Survey of Heat Recovery Ventilation Systems, CMHC Research and Development Highlights, 96-215, Ottawa, 1996.

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