U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

November 14, 2000

Mr. Robert Stack
Standards Engineer
Canadian Standards Association International
8501 East Pleasant Valley Road
Cleveland, Ohio 44131

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**Re:** Results of the CPSC Staff's Furnace Emissions Testing

Dear Mr. Stack:

In a letter dated August 31, 2000, the staff of the U.S. Consumer Product Safety Commission (CPSC) provided to the ANSI Z21.47 Central Furnace Subcommittee the emissions test report and analysis reports for a gas-fired central furnace (Furnace #1). CPSC staff tested an additional four furnaces. The following test and analysis reports for those furnaces (Furnaces #2-5) are enclosed:

(1) "Furnace Carbon Monoxide Emissions Under Normal and Compromised Vent Conditions" (C. Brown, D. Tucholski, R. Jordan, U.S. CPSC)

(2) "Indoor Air Modeling for a Furnace with Blocked or Disconnected Vents" (W. Porter, U.S. CPSC)

(3) "Carbon Monoxide (CO) Emissions from a Residential Furnace: Projected Consumer Exposure and Related Health Concerns" (S. Inkster, U.S. CPSC)

The results of our tests and analyses indicate that CO emissions and the resultant room concentrations and exposure risks can vary in severity depending upon furnace design, maintenance, and operating conditions, as well as environmental conditions. Given the variations in these conditions for the units tested, the severity of projected consumer exposure to CO ranged from minimal impact to a consumer's health, to levels of CO that could lead to death or injury. The conditions under which we tested do not reflect every possible scenario that could cause a furnace to present a CO exposure risk to consumers. Rather, they were based in part on conditions described in CPSC incident reports; performance requirements in the furnace standard, ANSI Z21.47, and related standards; and assumptions made by CPSC staff about house volumes and air exchange rates.

Any degree of vent blockage or separation that allows combustion products to reach hazardous levels in the living space, instead of being vented to the outdoors, presents a serious health risk

to consumers from CO poisoning. This risk should be addressed by appropriate performance requirements in the furnace standard. To reduce this risk, the CPSC staff recommends that the following performance requirements be added to the furnace standard:

(1) Require the furnace to shut off in the event the vent pipe becomes disconnected (originally proposed in 1997).

(2) Require the furnace to shut off in the event the vent pipe becomes totally or partially blocked.

In the event technology is not available to accomplish (1) and (2), CPSC staff recommends the following alternative performance requirements to address this risk:

(3) Require a means to prevent furnace CO emissions from exceeding the standard limits once installed in the field.

Or

(4) Require a means, once installed in the field, to shut down the furnace if CO emissions exceed the standard limits.

I look forward to participating in future meetings of the furnace subcommittee's Technical Working Group to further discuss our proposals and develop performance requirements to address the hazard posed by these conditions.

These recommendations represent the position of the Commission staff. They have not been reviewed or accepted by the Commissioners. If you have any questions please call me at (301) 504-0508, extension 1295.

Sincerely,

Ronald A. Jordan

Ronald A. Jordan
Project Manager, Fire/Gas Codes & Standards
Directorate for Engineering Sciences

cc:
Gary Thibeault, Gas Appliance Manufacturers Association

Enclosures