



Heating, Refrigeration and Air Conditioning
Institute of Canada
2350 Matheson Blvd. East, Suite 10, Mississauga, ON
905-602-4700 hraimail@hrai.ca
www.hrai.ca



we make life better™
2311 Wilson Blvd, Suite 400, Arlington, VA USA
703-524-8800 ahri@ahrinet.org
www.ahrinet.org



Canadian Institute
of Plumbing & Heating
295 The West Mall, Suite #504, Etobicoke, ON
416-695-0447 info@ciph.com
www.ciph.com

December 21, 2018

Mr. Jamie Hulan
Office of Energy Efficiency
Natural Resources Canada
580 Booth Street
Ottawa, ON, K1A 0E4A

Re: Canada Gazette, Part I, Volume 152, Number 42: Regulations Amending the Energy Efficiency Regulations, 2016 (Amendment 15) – Gas and Oil Fired Boilers

Dear Mr. Hulan,

The Canadian Institute of Plumbing and Heating (CIPH), The Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) and the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) are submitting these comments pertaining to household and commercial gas and oil fired boilers in response to NRCan's October 2018 Canada Gazette, Part I, Volume 152, Number 42: Regulations Amending the Energy Efficiency Regulations, 2016 (Amendment 15). In this letter, we would like to address the proposed regulations for gas and oil boilers.

Members have identified the following issues needing further consideration:

In general we continue to support the need to harmonize with U.S. Department of Energy (DOE) efficiency regulations wherever possible. Harmonization provides for the best economies of scale and less burden on all manufacturers and distributors. NRCan has reiterated their policy goal of alignment with DOE regulations, but they are making several exceptions in this proposal. This divergence of standards is in conflict with the goals and direction being taken by the United States-Canada Regulatory Cooperation Council (RCC).

Household and Commercial Gas-fired hot water boilers

1. We are disappointed dual level MEPS for replacement and new construction applications were not established for gas-fired hot water boiler models. We continue to believe that dual level MEPS are the best option for consumers, and there will be significant financial and technical burdens to forcing condensing boilers into all existing installations. The approach for this type of product is disparate from that being applied to commercial gas storage water heaters, yet similar technical and other issues apply to both types of products. We strongly recommend NRCan reconsider and utilize a dual level approach with separate requirements for commercial gas boilers in new construction versus replacement installations.

The market for household and commercial condensing boilers has grown significantly over the last 15 years without having any minimum efficiency regulations in place. Condensing boilers are being utilized where they are economically justified, however there continue to be many applications where non-condensing boilers are still the best option for consumers. Historical CIPH market data also shows that the condensing boiler market share has leveled off over the past 3 years, indicating the ongoing need for the marketplace to maintain availability of non-condensing for replacement applications.

Current CIPH market data for large commercial boiler market segments shows that condensing boilers have a smaller market share, with medium commercial boilers (500 to 999 MBH) at 65% market share for condensing boilers, and large commercial boilers (>1,000 MBH) showing only a 50% market share for condensing boilers. The reality is that there are very valid reasons why certain parts of the market are not transitioning to condensing boilers. If retrofits can economically support upgrading the distribution system, piping and venting systems, then using a condensing boiler can be justified and the customer can realize the potential savings.

For many applications in order for any significant energy savings to be realized using condensing boilers, the heating distribution system must be upgraded (add more heat transfer surface area) and changed to a low temperature system in order to realize the savings. Otherwise, the condensing boilers will simply be called upon to operate at higher return water temperatures in order to meet the comfort or process demands which significantly reduces anticipated energy savings. There are many applications that just do not make sense for condensing technology. Some examples of these would be: Process heating applications, high-volume domestic water production, and older buildings with very restrictive and lengthy venting requirements. Many of these applications can be serviced very effectively with non-condensing boilers, and can still achieve significant fuel savings by utilizing a new modern non-condensing boiler, with multi-stage or modulating burners, modular boiler plants, and modern control systems. A condensing level MEPS across the board would likely harm consumers by forcing unjustifiable condensing installations and retrofits in applications where they extremely costly and provide minimal energy savings over a non-condensing boiler. In addition, condensing MEPS across the board will force many building owners to delay upgrades as long as possible, resulting in repairs to older, non-efficient boilers versus the costly expense of upgrading to new condensing boilers.

2. NRCan's cost benefit analysis (CBA) report has been used to justify its proposal to maintain condensing technology levels for gas hot water boilers. We believe that the cost benefit analysis study contains errors and inconsistencies in data, and leaves us feeling that we are often commenting on incomplete and/or incorrect data. Members believe that there are many issues with the CBA, and we have highlighted a few of the key issues below:

- The life expectancy used for commercial boilers of 24.8 years and of household boilers of 26.5 years. In fact the US DOE technical support document concludes *“that there is not enough data available to accurately distinguish the lifetime of condensing boilers because, as Bradford White stated, they have not been around long enough to understand what is typical versus where local adverse conditions may cause premature boiler failure”*. The majority of our members agree with this assessment.
- Venting costs were incorrectly categorized in the CBA Final Report page 28 Benchmarking Technical Assumptions: the Vent Material for the MEPS 90% Efficiency Type was listed as PVC. This material is rarely used for venting boilers in Canada, due to its lower temperature rating (max 65 °C). Boilers in Canada typically require the use of the much more expensive ULC S636

certified CPVC vent material (that is rated up to 90°C). This leads us to assume that other materials were not costed to correctly to represent the Canadian market.

- For commercial boilers we believe that the cost assessed at 33% for the replacement heat exchanger does not sufficiently cover the full cost of replacement. Based on typical boiler sizing and actual trade pricing, we believe the average cost is closer to 60% of the cost of a new boiler.
- The cost of a replacement heat exchanger should also be added to the CBA for household boilers.
- Material costs for replacements seem to be very low, and especially for the boilers that are in compliance with the proposed MEPS.

When these factors are taken into account the economic case for condensing boilers in all applications is not very strong.

3. A change to the conversion from metric to imperial related to the transition point between the household to commercial boiler categories should be considered. The boiler transition input rate (88 kW) does not align with P.2-13 scope (87.90 kW). The discrepancy has the potential to cause confusion; both 87.90 and 88.00 kW are defined as 300,000 Btu/h. Submitting data to NRCAN requires input rate in both Btu/h and kW. Converting from Btu/h to kW is complicated by different conversion factors in CSA standards.

- CSA B149.1-15 (Natural gas and propane installation code): 0.00029295 (300,000 Btu/h = 87.885 kW)
- CSA 4.9-2017 (Gas-fired low pressure steam and hot water boilers): 2.931×10^{-4} (300,000 Btu/h = 87.93 kW)
- P.2-13 (Testing method for measuring the annual fuel utilization efficiency of household gas-fired or oil-fired furnaces and boilers): none
- CSA B149.1, Table 8.1 equates 300 MBH to 90 kW.

The AHRI Directory of Certified Product Performance lists 21 commercial boiler model numbers rated at 300 MBH. Using either one-place or two-place rounding puts these models in the household category. And rounding to whole kW would place models rated at 299 MBH (87.59 kW) in the commercial category (47 household boiler model numbers listed in AHRI Directory).

Based on the issues we have outlined above, we would recommend the following:

1. Members recommend that NRCAN implement dual level standards for household and commercial gas-fired water boilers for new installations and retrofit installations, similar in concept to the proposed MEPS for commercial storage water heaters. We propose NRCAN adopt MEPS at a condensing level for new construction installations only. For replacement installations, we recommend the MEPS is harmonized with the current DOE requirements in the U.S.

2. To avoid confusion with conversion rates, we recommend that NRCAN work with CSA to establish the Btu/h to kW conversion factor that will be used in all future CSA appliance safety and installation standards. Also establish in the appliance safety standards the number of kW significant digits to be shown on the rating plate. The proposed regulations should be revised to align with kW input rates using developed protocol, recognizing the protocol will not be 'official' until safety standards published per CSA and/or ANSI revision process.

3. We can support the proposed effective date of January 1, 2023 for revised MEPS for commercial boilers, and January 15, 2021 for revised MEPS for household boilers only if those MEPS are harmonized with the final DOE standards and timelines. If a change to all condensing

MEPS requirements for household and commercial gas fired water boilers is implemented, then we would request that the effective date for these products be at least three years after the date the regulation is finalized. NRCan is grossly underestimating the time it takes to develop full product lines that meet the proposed MEPS. And in the end, it will be consumers, both residentially and commercially, that will be impacted the most.

We thank you for the opportunity to comment on these important matters. CIPH, HRAI and AHRI would welcome an opportunity to discuss our concerns further with NRCan's representatives.

Sincerely,

Sandy MacLeod



HRAI
President & CEO

Caroline Davidson-Hood



AHRI
General Counsel

Ralph Suppa



CIPH
President & GM

cc: D. Villarroel
R. Cochrane
M. Luymes
C. Czajko
D. Weishuhn
D. Kozina
L. Petrillo-Groh
R. Waters
A. Yilmaz
Canadian Hydronics Council
Canadian Boiler Manufacturers