Stoves, Fireplaces and masonry Heaters

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Stoves, fireplaces and masonry heaters all burn pretty cleanly when burned hot with sufficient combustion air. Fireplaces and masonry heaters burn hot and fast and have considerable thermal mass which enables them to keep heating after the fire is out. Stoves don't have much thermal mass so when less heat is needed the combustion air is reduced which can make the stove smolder.

During the energy crisis of the 1970's, especially the 1973 oil crisis and the 1979 energy crisi, fuel prices went through the roof. People in brand new homes bought stoves. Many were installed unsafely into fireplaces with large flues and caused chimney fires which sparked code changes requiring a positive connection the flue of the correct size and eventually to UL listings. Many home owners also didn't really know how to use stoves. They bought big stoves and let them smolder all day long.

In 1987 the Lung Association sued EPA to force the EPA to regulate stove emissions - https://www.epa.gov/sites/default/files/2015-06/documents/113cv1555_complaint.pdf The EPA didn't want to regulate stoves "on a retail basis" ticketing or fining individual home owners. But they were forced to. They narrowly agreed to require only stoves that could burn at a low burn rate without smoldering. They exempted fireplaces and masonry heaters which burned pretty clean and couldn't or weren't starved for air to smolder.

This is what the EPA was charged to - make sure stoves could not be made to smolder. When stoves were burned hot, like fireplaces and masonry heaters, they burned clean and were not a problem. The EPA developed a test that made sure stoves

burned fairly clean at the lowest burn rate. And the EPA expressed the emission rate in grams of pollutant per hour because they were testing stoves at low burn rates expressed in kilograms of fuel per hour.

The EPA might have tried to educate people about how to use their stoves but, maybe because of the Lung Association lawsuit, they decided to regulate stove manufacturers instead. That had the effect of driving out of business all the small back yard stove builders and outlawed many of the clearly superior European stoves. One telling example was the Danish Morsø stove. For years this excellent stove could not pass the EPA emissions tests - until Morsø learned to install one screw which prevented the operator from closing down or off the air supply. They were dumfounded. Europeans would never run the stove at a smolder but would want to close the air intake completely off after a fire to shut down the draft or for safety reasons if there was a chimney fire.

The EPA correctly exempted fireplaces and masonry heaters because they were not an emissions problem. The stove industry has been reduced to a very few companies large enough to do the testing and pay for the lawyers, engineers and lobbyist needed to keep them in business.

Those of us who favor masonry fireplaces or masonry heaters are still basically small companies built around one or two craftsmen or masons.

The irony is that in some places, especially in California and Colorado, fireplaces and masonry heaters are increasingly required to meet the EPA stove emission standard. Might sound reasonable but how do you make an open radiant-heating fireplace or a masonry heater burn slow enough to smolder?

The EPA did their best by developing an emission test appropriate for fireplaces - and Colorado used the same tests to test masonry heaters. The tests appropriate for masonry fireplaces and masonry heaters is a fast burn with all the air needed to burn clean. The tests are expressed in terms of grams of pollutants per kilogram of fuel burned.

Stoves smolder. Fireplaces burn fast and clean. The stove standard is a smolder test expressed in g/hr and favors a slow burn. The fireplace standard expressed in g/kg favors a fast clean burn. They are completely different tests and the EPA equivalency, which took five years to develop, is way more than just recalculating the raw data to convert g/kg to g/hr. The fireplace, burning fast, would probably have a high g/hr result and the stove, burning at four or five low burn rates, would probably have a high g/kg result.

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Note:

The comments above are based on my peripheral involvement with the EPA, ASTM, Washington and Colorado air quality regulators, the Western States Clay Products Association (WSCPA) and the Hearth, Patio an Barbecue Association (HPBA).

I have tried to find documents or articles to support my comments above. Maybe they exist somewhere in EPA, OMNI or HPBA files but I have not been successful in finding them. My contacts mostly have retired or died. Nevertheless I think it is clear that the EPA, Washington and Colorado considered the fireplace standard, expressed in g/kg to be equivalent to the EPA Phase II (stove) rate expressed in g/hr. Why would they come up with a standard that was not equivalent to the stove standard?