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Attn: Mark Krause, Emily Yen
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4182
Emal:mkrause@aqmd.gov, eyen@aqmd.gov

Subject Rule 1146.2

Dear Mark and Emily,

Thank you all for conducting meeting #4 on October 19, 2023 – it seems we are getting down to a lot of the important decisions on this rule which require factual analysis and decisions based on your goals and the reality.

We have a lot of input we wish you to consider. My mind goes in a lot of different directions as I think about this.

1. Boiler Definition.

I don't think you should be redefining a boiler but perhaps establishing SCAQMD categories, like Water Heater up to 140 F or Hot Water Boiler up to 180 F. Steam Boiler, Low Pressure Steam Boiler etc.

> A boiler is defined in the dictionary as:
> "A device for generating steam or hot water. Designed to transmit heat from an external combustion source to a fluid contained in the boiler. They utilize contained controlled combustion."

There are many organizations, entities, etc that define boilers and the definition above is common and offers a simple definition. I am attaching to this letter our Definitions of Boilers Bulletin which goes deeper into the categories of boilers, water heaters etc.

The Steam Boiler subcategories and Hot Water Boiler subcategories are the ASME definitions and these dividing lines and are industry standard.

The Water Heater Definition is from the various codes.

2 Parker Search for equipment.

We are very interested in staying in business in the future and are studying hard the water heating and boiler solutions offered by Heat Pumps. Quite frankly in my 47 years in HVAC design and being with Parker Boiler in the field I have never seen one successfully in operation. George Hrebien with Porter Boiler Service for over 40 years, has not seen one, Steve Ocampo with San Jose Boiler has not seen one either. These are boiler and water heater service companies with many techs out in the field to service these devices every day of the week.

I have studied the water heating and water boiler solutions that I can find online, and the available offerings seem limited to me. Also, the sizes available seem to be limited. As I dug in and read about the Intellihot offering from the link on page 26 of the presentation I was quite surprised to find a number of things that make the unit much less than ideal. Therefore, I have prepared and attached an Engineering Evaluation for review. It does not seem like this unit really offers the COP advantage that a heat pump can.

As I study other offerings, I see that there are few offerings for the higher input units. For residential applications there seem to be a reasonable number of alternatives available.

I looked at the 500,000 btuh heat pump offered by Watts, which is over 11 ft long and requires 9 feet above it. This is way longer than any boiler and, in most cases, this type of space is not available. They show 3 separate tanks as being required for optimum performance.

From what I can see there are no reasonable larger size (over 400,000 BTUH) hot water boilers available at this time which offer a reasonable footprint. And we see no steam boiler solutions available as UL Listed products that are practical. You referred me to Armstrong for such a device, but they have none installed in California and the equipment looks very complex.

I realize that these are newer products and things will likely improve.

Another factor is that most heat pump water heaters and components are manufactured in China and Asia. So, the result here will be sending more work their way as China fires up 2 coal fired power plants per week according to google. This seems off to me, and counterproductive to clean air in our world.

3 Slide 9
My comment on this slide is that in restaurants the dishwashing temperature requirements depend on the amount and type of chemical used. Higher temperatures for washing mean less chemical used, a benefit.

4 Slide 10
The statement that the steam is provided by large boilers in hospitals is not true. Evidence has been presented on this fact.

5 Slide 14
From reviewing this data, we do not see available higher temperature units.

6 Slide 16
The statement that the steam is provided by large boilers in hospitals is not true. Evidence has been presented on this fact.

7 Slide 26 and 27
The unit used in this comparison relies 50% on resistance heating which is not 100 % using the COP. This is not a valid unit to compare for this reason and others in the attached Engineering Evaluation. This does not mention the huge cost burden placed upon an owner for such a device and the ongoing energy costs.
Downsizing: we do agree that in some cases a unit can be downsized, however, not in every case.

8 Slide 28
Same comments as Slide 26 / 27.

9 Slide 33
I do not understand the cost-effective numbers particularly for the 2.0MM BTUH unit.
They do not seem to be substantiated.

10 Slide 38
We would suggest a category for boilers and water heaters up to 140F and another category for up to 170 F.
Beyond that, these are higher temperature applications, and no reasonable technology exists to satisfy your requirements as a practical matter.

11 Slide 39
Compliance dates. Our general comment here is how will the district address the existing unit compliance situations as we have pointed out in previous comments. These include a nursing home losing their boiler on a cold winter night and a hospital that needs emergency backup losing their boiler. In both cases a boiler is needed now and there is no time for the required conversion to heat pump electrical service, space etc.
Also, this rule will be a burden for building owners in terms of increased initial cost and increased operational cost.
For many apartments / condos in the SCAQMD the price of housing will increase.
In new construction it is much easier to use heat pumps. Changing existing boilers to heat pumps in our thinking is not practical in many instances.

We thank you for listening to our comments and we look forward to participating in the rule development process.

Greg Danenhauer
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ASHRAE – Life Member
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