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2111 Wilson Boulevard Suite 500 Arlington VA 22201-3001 USA  
Phone 703 524 8800 | Fax 703 562 1942  
www.ahrinet.org

February 14, 2014

Ms. Brenda Edwards  
U.S. Department of Energy  
Building Technologies Program, MS EE-2J  
EERE-2011-BT-TP-0042  
1000 Independence Avenue, S.W.  
Washington, D.C. 20585-0121

Re: NOPR to Revise Water Heater Test Procedures  
Docket No. EERE-2011-BT-TP-0042

Dear Ms. Edwards:

In the Air-Conditioning, Heating, and Refrigeration Institute's (AHRI) January 21, 2014 comments we objected to the proposal to eliminate the provision that allows electric water heaters that are identical, except for different input ratings, to be rated based on testing of the model with the standard input rating. We noted that we were developing a recommended revision of Section 7.2 to retain this concept. Supplementing that comment, AHRI's recommendation is that Section 7.2 should be retained, unchanged. The procedure for rating electric water heaters that are identical to the "standard input" model except for different input ratings should continue to be as specified in the current residential water heater efficiency test procedure.

Our previous comment noted that the only situation that may require some modification is the circumstance where a unit had both an input rating lower than the standard input and a first hour rating that places it in a lower FHR bracket. That circumstance would suggest that this particular unit should be tested with simulated use test (SUT) different than the SUT applied to the standard input model. However, after further consideration and some preliminary calculations, we have concluded that the lower input rating of the alternative unit essentially counters the effect of a lower daily hot water usage total. As a result the EF for the low input unit is essentially the same as that of the standard input model. Since DOE will be doing testing to determine both the effect of the revised procedure on efficiency ratings and the conversion factor to apply to existing EF ratings, the rating of a low input electric storage water heater at the low usage condition can also be examined.

Also, we now have comments on the following issue which DOE noted in the NOPR.

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8. The addition of terms to quantify daily electric energy consumption separately from fossil fuel energy consumption and adding separate estimates of annual fossil fuel energy consumption and annual electrical energy consumption in addition to the overall annual energy consumption.

Although the concept of this proposal is reasonable, on a practical basis this proposal is not necessary. Many gas-fired water heaters and all electric water heaters currently on the market use only a single fuel; i.e. natural gas, propane or electricity. For all these models Section 430.23 (e)(1) should specify that the estimated annual operating cost for the water heater shall be the product of the annual energy consumption, determined according to section 6.1.8 or 6.2.5 of appendix E of this subpart, times the appropriate representative average unit cost of energy. In those cases where models do use an auxiliary fuel, the cost of that energy is insignificant relative to the primary fuel used by the water heater.

Oil water heaters use electricity for the ignition system and the burner. There is no significant variation in the auxiliary electric consumption of residential oil water heaters currently on the market. Furthermore, the annual electricity consumption is very small and its cost is overwhelmed by the annual cost of the oil consumption. Differences in energy factor will result in different estimated annual operating costs which are significant to consumers. In contrast, any difference in annual electricity consumption will not show up as a significant difference in the estimated annual operating cost of an oil water heater. Accordingly, it would be sufficiently accurate for comparative purposes to specify in Section 430.23 (e)(1) that the estimated annual operating cost for oil water heaters shall be the product of the annual energy consumption, determined according to section 6.1.8 or 6.2.5 of appendix E of this subpart, times the representative average unit cost of oil.

The situation for gas instantaneous (tankless) water heaters and gas storage water heaters that use electricity is similar to that of oil water heaters. Many models use electricity for the ignition system and the burner. Some models also use electricity for venting. Although the auxiliary electric consumption of these residential gas water heaters will vary depending on what components use electricity, the total annual electricity consumption is very small. As is the case with oil water heaters, the estimated annual cost of gas consumption is the dominant cost. For similar reasons, it would be sufficiently accurate for comparative purposes to specify in Section 430.23 (e)(1) that the estimated annual operating cost for gas instantaneous (tankless) water heaters and gas storage water heaters that use electricity shall be the product of the annual energy consumption, determined according to section 6.1.8 or 6.2.5 of appendix E of this subpart, times the representative average unit cost of gas.

There is a typographical error in Section 6.1.8. The definition of  $E_f$  should reference 6.1.7, rather than 6.1.8.

There is an additional issue on which we have comments. The revised efficiency test procedure will establish a test procedure for point of use models which includes models with rated storage volumes less than 20 gallons. The current DOE minimum efficiency standards for residential water heaters do not apply to models having rated storage volumes less than 20 gallons. Therefore, with the establishment of an efficiency test procedure, we expect that DOE will be

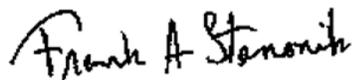
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developing a minimum efficiency standard for these models at some time. Therefore, we request DOE to provide information on any activities it has planned in this regard. In a related matter, we request DOE to provide information on any activities it has planned to revise the minimum efficiency standards for light commercial water heaters once the test procedure is finalized and implemented for those models.

There are two additional typographical errors that we noted. In Section 6.2.2:  $C_{p1}$  should be determined using the sum, not difference of  $T_{del,1}$  and  $T_{in,1}$  (i.e.  $(T_{del,1} + T_{in,1}) / 2$ ). In Section 6.2.3, the discussion of  $Q_{HWD}$  in the middle of page 66242 is not reflective of instantaneous water heaters. It appears to be a cut and paste from section 6.1.6. It should read “Thus, the daily energy consumption value, which takes into account that the temperature rise across the instantaneous water heater may not be 67°F (37.3°C), is:...”

We appreciate DOE’s willingness to consider these supplemental comments and look forward to continued participation in this rulemaking.

Respectfully submitted,



Frank A. Stanonik  
Chief Technical Advisor