

EPA Testing Update – Nov 2011

Last year, I authored three articles for GARNews discussing some of the issues related to the test method that the EPA uses to approve hydronic wood heating units for inclusion in their “White Tag” program. The goal of this program is to provide the public with a list of wood heating equipment that produces particulate emissions *less than* the EPA limit of .32 lbs per million BTU yielded (i.e. clean burning wood heating units). The test method specified is EPA Method 28 OWHH, with “cribwood” as the fuel. If a unit passes this test, it is issued a “White Tag” indicating that it is a clean burning unit; in addition, it is listed on the EPA’s web site as an approved unit: <http://www.epa.gov/burnwise/owhhlist.html>.

As you know, I strongly agree with the EPA’s goal of cleaner wood heating equipment and the present EPA’s emission limit. However, I have had serious questions about the units listed on the EPA web site because of questionable results. Until a year ago, the EPA list included several additional columns that are *presently not included*:

- Emissions based on energy input
- Emissions based on energy output
- HHV and LHV efficiencies
- Calculated efficiency

If one were to divide energy output emissions by energy input emissions, the result would be the efficiency of the unit. In 8 cases the calculated efficiency fell significantly short of the listed efficiency by 10% to 28%. This problem could be due to a number of factors:

- Data instrumentation not of sufficiently accuracy
- Inadequate test method
- Ignoring the energy input from propane or electric re-igniters (not required by the Method 28 OWHH)
- Inappropriate fuel (cribwood)
- Sloppy lab work
- Etc.

Although all data was reviewed by the EPA prior to listing, the inconsistencies were either not identified or misunderstood. However, about a year ago the additional columns were pulled down by the EPA, thus preventing any cross checking of the published results. Several months ago the EPA stopped accepting test results because of these issues. In addition, NYSERDA (New York State Energy Research and Development Authority) contracted with Brookhaven National Labs to review EPA’s Method 28 OWHH test results. Brookhaven issued their report in September 2011:

http://nysesda.ny.gov/Page-Sections/Research-and-Development/Energy-Resources/Biomass-Research/~media/Files/Publications/Research/Biomass%20Solar%20Wind/11-17_Outdoor-Wood-Hydronic-Heater.ashx .

On page 25 of the NYSERDA report you will find Section 5, Findings of Review. This report is a **must read** for everyone. The following can be found in Section 5:

“For 14 of 23 hydronic heater units analyzed, the reported efficiencies were higher than the efficiency determined based on the stack loss method. Of those units, eight reported efficiency higher than the efficiency based on analysis of stack losses during the category IV tests, which are essentially full load, steady firing rate. It is thermodynamically impossible for a unit to have a reported efficiency higher than the stack loss efficiency. At full load operation the reported efficiency can approach the stack loss efficiency; however it can never be greater.”

In other words, 61% (14 of 23) of the units had *overstated efficiencies; eight with impossible efficiencies*. Over the past several months, the EPA has worked with the test labs and manufacturers to revise the test method to include a stack loss analysis for each unit tested. And additional “accuracy tightening” procedures were put in place. This should produce more accurate, truthful results; albeit with lower efficiencies and higher emissions.

The bigger problem is that many people are making purchasing decisions based upon the *existing* EPA list and are unknowingly compromising their decision because of inaccurate or incomplete data. Their decision involves thousands of dollars and significant air emission issues. Yet the list remains published. The list should be removed and the questionable units retested. If a sufficient number of concerned citizens’ contact their local and state Representatives, this can be changed.

Finally, note that no GARN unit is included on the EPA White Tag list. GARN WHS equipment was tested per the *ASTM Method using cordwood*. EPA’s Method 28 requires the use of cribwood (a critique of which I discussed in 3 prior GARNews issues). I concur with ASTM and with European and Canadian test agencies that cordwood is a much better indicator of real world performance than cribwood. However, because the EPA does not recognize cordwood as a test fuel, they will not add GARN WHS units to the White Tag list. That said, every state to which the GARN test results were submitted has approved the GARN equipment. At this point I am glad GARN is not on the list.

The ASTM test results for the GARN WHS 2000 unit (tested in October 2011) will be published shortly