

Pick a Number, Any Number

No one really knows how efficient many cordwood and pellet heaters are. Confusion reigns and it's high time to do something about it.

"As therefore so much of the comfort and conveniency of our lives, for so great a part of the year, depends on the article of fire; since fuel is become so expensive and (as the country is more clear'd and settled) will of course grow dearer and dearer; any new proposal for saving the wood, and for lessening the charge and augmenting the benefit of fire, by some particular method of making and managing it, may at least be thought worth consideration."

– Benjamin Franklin, 1744
"An Account of New Invented Pennsylvanian Fire-Places."

Everyone is talking about efficiency these days, given the concern over energy costs, the need for many families to be especially frugal as a consequence of the economy, and excitement about the new tax credit for efficient biomass stoves. Unfortunately for cord-

Energy Efficiency (%) Using Lower Heating Value (European Basis)	Energy Efficiency (%) Using Higher Heating Value (American Basis)*
50	45
60	54
70	63
75	68
80	72
85	78
90	81

*Assumes wood fuel with a typical 6% hydrogen content and with 20% wet basis moisture. 75% is the threshold for the new federal tax credit.

wood and pellet heaters, no one really knows how efficient many heaters really are; confusion over accepted values and efficiency testing methods reigns. For the consumer, realistic apples to apples comparison between models is tough.

There are two documents that have been in place since the early 1990's, have listed efficiency for wood heaters, and have become widely accepted. These are: (1) The United States Envi-

ronmental Protection Agency, Office of Air Quality Planning and Standards, Emission Factor Documentation for AP-42: Section 1.10, Residential Wood Stoves and (2) Code of Federal Regulations, Protection of Environment (40 CFR), Part 60, (specifically §60.536).

The efficiencies tabulated in the first document are "...based on data collected from in-home testing." The default values listed in the second document, which all certified wood heaters have used to date, are "estimated efficiencies." In the first case, no standardized method was used to determine the efficiencies; in the latter case, no measurements at all are made.

The Hearth Industry needs to agree on a standardized efficiency method, use it, and disseminate the data. This should have been done two decades ago. We are now paying the price. 🏠

Wood Heater Type	Net Efficiency (%) U.S. EPA AP-42	Default Efficiency (%) for Certified Heaters 40 CFR
Conventional Uncertified Wood Stove	54	–
Non-catalytic Wood Stove	68	63
Catalytic Wood Stove	68	72
Certified Pellet Stove	68	78
Exempt (Uncertified) Pellet Stove	56	–
Masonry Heater	58	–

In both cases, it is not clear whether higher (American basis) or lower (European basis) heating values were taken into consideration in developing the efficiency numbers. For normal cordwood, there is about a 10 percent difference between efficiencies calculated by higher and lower heating values.

Dr. James E. Houck is president of OMNI Environmental Services. He can be reached at (503) 643-3788, houck@omni-test.com or visit www.omni-environmental.com for technical publications and services.