

Best Practices

Date: 5/14

Annual Fuel Utilization Efficiency (AFUE) Discrepancy:

General Overview -

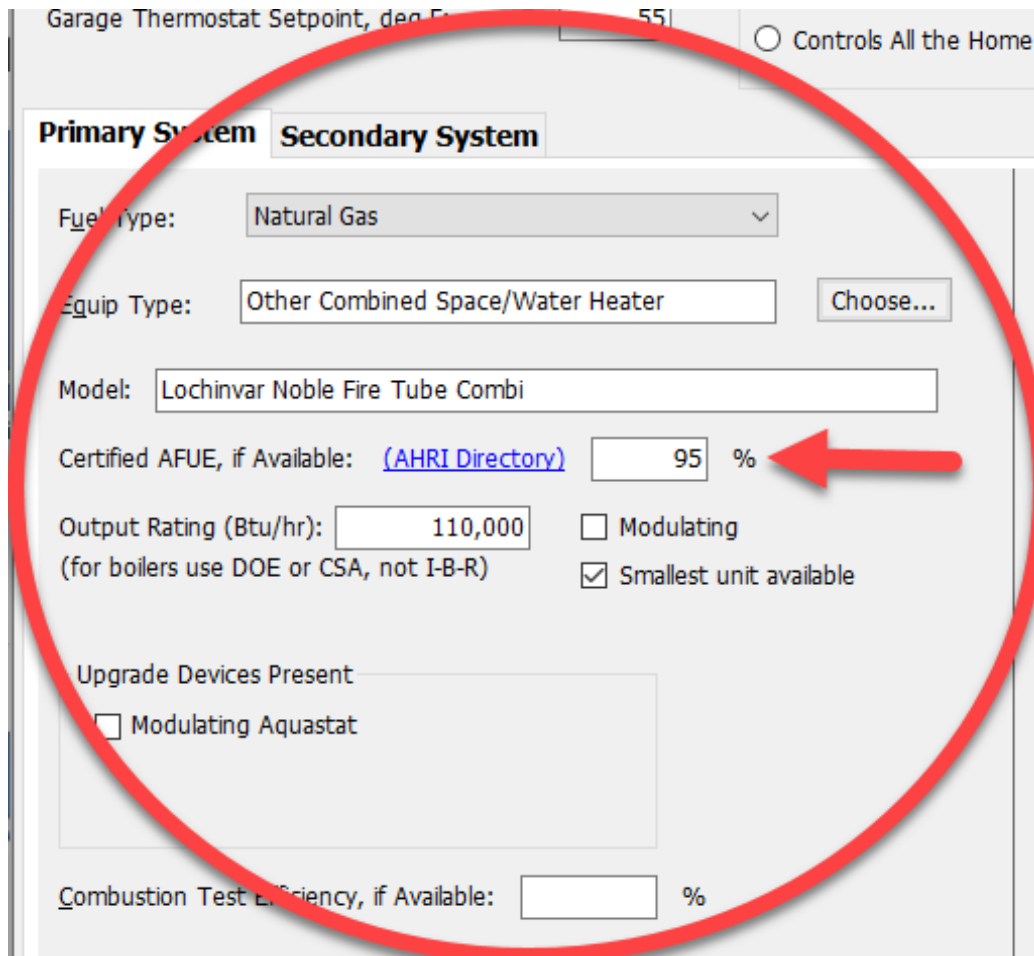
The Annual Fuel Utilization Efficiency (AFUE) is crucial for boiler systems because it measures how efficiently the boiler converts fuel into heat over the course of a year. A higher AFUE indicates better efficiency which means lower energy costs for the homeowner.

The AFUE can be found on the EnergyGuide label, in the appliance manual and in the AHRI Directory. Energy Rater's will enter the percentage under the Heater tab in AkWarm, when listing the details of the homeowner's heater.

We wanted to make sure our AkWarm files fully represent what is happening in the house.

An Example -

In the first screen share, you can see that the Certified AFUE was entered correctly as 95% (highlighted with a red arrow).



Garage Thermostat Setpoint, deg F: 55 | Controls All the Home

Primary System **Secondary System**

Fuel Type: Natural Gas

Equip Type: Other Combined Space/Water Heater | Choose...

Model: Lochinvar Noble Fire Tube Combi

Certified AFUE, if Available: [\(AHRI Directory\)](#) 95 %

Output Rating (Btu/hr): 110,000 | Modulating
(for boilers use DOE or CSA, not I-B-R) | Smallest unit available

Upgrade Devices Present
 Modulating Aquastat

Combustion Test Efficiency, if Available: %

In the second screen share, the red arrows point to the 87% efficiency rating for this boiler.

House: Single Family
Living Floor Area: 1,746 square feet
Attached Garage, 576 square feet

Rating: BEES

Envelope Efficiency

Floor Insulation	R-33.1 *
Wall/Door Insulation	R-18.6
Ceiling Insulation	R-60.4
Window U-Value	U-0.17
Window SHGC	0.20
Window to Wall Ratio, Living Space	6.6%
South Facing Window Area	52 square feet
Air Leakage	1.3 Air Changes per Hour at 50 Pascals 0.07 Air Changes per Hour Natural

* Includes the insulating value of the ground in contact with these components.

Space Heating System

Fuel	Natural Gas
System Type	Boiler
Model	Lochinvar Noble Fire Tube Comb
Efficiency	87%
Btu/hr Output	110,000 Btu/hr
Primary Htg. Sys. Design Load	58,462 Btu/hr
Garage Htg. Sys. Design Load	0 Btu/hr
Supplemental Fuel	None
Thermostat Setting	70.0 degrees F
Setback Thermostat	None

Water Heater

Efficiency	82%
Location	Conditioned Space
Fuel Type	Natural Gas

Space Cooling System None Present

Ventilation

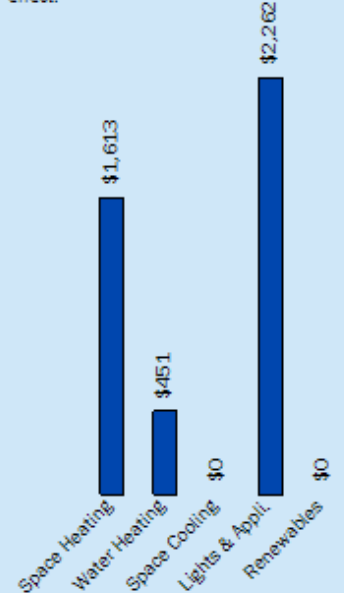
System Type	Heat Recovery Ventilator
Required Ventilation	81 CFM
Measured Ventilation	145 CFM

Other

Number of Bedrooms	3
Clothes Dryer Fuel	Electricity
Cooking Range Fuel	Electricity
Oven Fuel	Electricity
Miscellaneous Lights/Appliance Use	Average
CAZ Test Normal Conditions	Pass

Estimated Annual Energy Costs

Actual use and costs may vary from these estimates depending upon weather conditions, occupant life styles and utility rates currently in effect.



Space Heating	\$1,613
Water Heating	\$451
Space Cooling	\$0
Lights & Appl.	\$0
Renewables	\$0

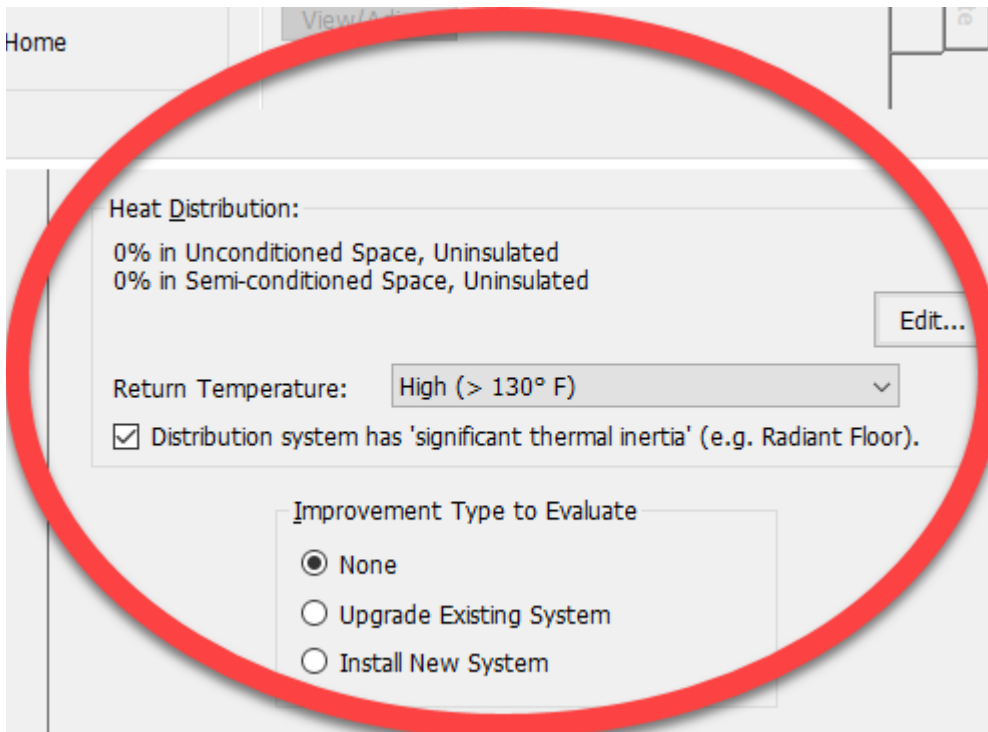
Electricity: \$0.2862/kWh, Natural Gas: \$2.25/ccf
 Space Heating: 90 kWh of Electricity, 706 ccf of Natural Gas
 Water Heating: 200 ccf of Natural Gas
 Space Cooling:
 Lights & Appliances: 7,903 kWh of Electricity



Why is there a discrepancy between the entered AFUE rating in the AkWarm file and the efficiency rating in the Space Heating System section of the Features Report?

The answer -

As you are entering information about the heating system into AkWarm, always make sure you enter in the correct Return Temperature under the Heat Distribution partition. In this instance, the Return Temperature was listed as above 130° F, and AkWarm calculated that the boiler would not operate to its full condensing efficiency. The Return Temperature should be accessible from the display screen on the boiler or through manual testing. The Return Temperature should always be confirmed and documented correctly.



Home View/Action

Heat Distribution:

0% in Unconditioned Space, Uninsulated
0% in Semi-conditioned Space, Uninsulated

Edit...

Return Temperature: High (> 130° F)

Distribution system has 'significant thermal inertia' (e.g. Radiant Floor).

Improvement Type to Evaluate

None
 Upgrade Existing System
 Install New System

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