Recommended Boiler Performance Specifications

PA Fuels for Schools and Communities Group, October, 2017

Description:

These recommended specifications are intended to assist purchasers of biomass boilers by listing key performance parameters for a commercial scale biomass boiler, so that boilers can be compared more objectively. Purchasers of biomass boilers should insist on reviewing these data prior to selecting a boiler unit.

Performance Data to be Reported:

Boiler Model Number

Fuel Type:

Fuel used when testing boiler performance (i.e. type of wood, particle size, moisture content, ash content, Higher Heating Value)

Rated (maximum) Heat Output:

The maximum sustained heat output (in Watts or btu/hr) of the boiler when operating under standard conditions (these conditions should be briefly described, see below)

Rated (maximum) Thermal Efficiency:

Percent of fuel input energy (HHV) delivered as useful energy to the building or process served by the boiler, when running at full (rated) output.

Rated Fuel Input:

Rate of fuel use (in kg or pounds per hour) when boiler is operating at rated (maximum) output.

Rated (maximum) Parasitic Load:

Total electrical kw demand when operating the device at its rated (maximum) load.

Rated (maximum) Operating Conditions:

Form of heat delivery (i.e. hot water, steam, or hot air), pressure (if steam), temperature and flow rate when operating at rated (maximum) output.

Minimum Heat Output:

The minimum sustained heat output (in Watts or btu/hr) of the boiler when operating under standard conditions (these conditions should be briefly described)

Minimum Thermal Efficiency:

Percent of fuel input energy (HHV) delivered as useful energy to the building or process served by the boiler, when running at minimum output.

Minimum Fuel Input:

Rate of fuel use (in Watts or btu/hr) when boiler is operating at its minimum recommended output.

Minimum Parasitic Load:

Total electrical kw demand when operating the device at its minimum load.

Minimum Operating Conditions:

Form of heat delivery (i.e. hot water, steam, or hot air), pressure (if steam), temperature and flow rate when operating at rated (maximum) output.

Idling Fuel Input:

Rate of fuel use when boiler is idling (no useful heat output).

Notes:

- Parasitic load measurements should include all normal auxiliary devices, such as hot water circulation pumps, draft fans, pollution control devices, fuel delivery devices, controls, and other motors and devices used in the normal operation of the boiler.
- Cyclic loads should be averaged.
- Fuel Type should conform to Fuels for Schools Standard Fuel Specification document

Example of Data to be Reported:

Boiler Specifications

General Info:

Boiler	"BioBrand" Model XYZ
Fuel	Fuels for Schools Category A (Medium Clean Chip), 40% moisture (wb), 13.9 GJ/tonne (6000 BTU per lb)

Rated (Full Output) Performance:

Thermal Output	2.9 MWth (10 Million btu per hour)
Thermal Efficiency	72%
Fuel Use Rate	1,040 kg/hr
Parasitic Load	4.8 kW
Operating Conditions	Hot Water, 70 lps (1,100 gpm), 70°C leaving, 60°C returning (158° F, 140° F)

Minimum Output Performance:

Thermal Output	0.56 MWth (2 Million btu per hour)
Thermal Efficiency	64%
Fuel Use Rate	234 kg/hr
Parasitic Load	3.2 kW
Operating Conditions	Hot Water, 14 lps (220 gpm), 70°C leaving, 60°C returning (158° F, 140° F)

Idling Performance:

Fuel Use When Idling	N/A (shut down below minimum thermal output)