HOTFLOW CTM
Efficiency & Performance

Efficiency is Everything

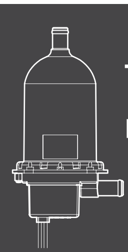
Engine heating provides essential benefits to organizations that rely on onsite power generation. However, an inefficient heating solution can slowly sap away time and money – in the form of excessive electrical costs, frequent repair costs or replacement of hoses and plumbing.

CTM MODEL

Wattage: **2500 W**
Engine: **20 L max.**
Circulation Method:
Forced Circulation
Set Temperature:
100 °F (on) / 120 °F (off)

Testing

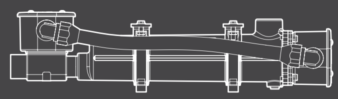
To evaluate the HOTflow CTM in terms of performance compared to standard thermosiphon, we tested it against our engine heating benchmarks: the HOTSTART TPS and CB models.



TPS MODEL

Wattage: **1500 W**
Engine: **8.2 L max.**
Circulation Method:
Thermosiphon
Set Temperature:
100 °F (on) / 120 °F (off)

CB MODEL



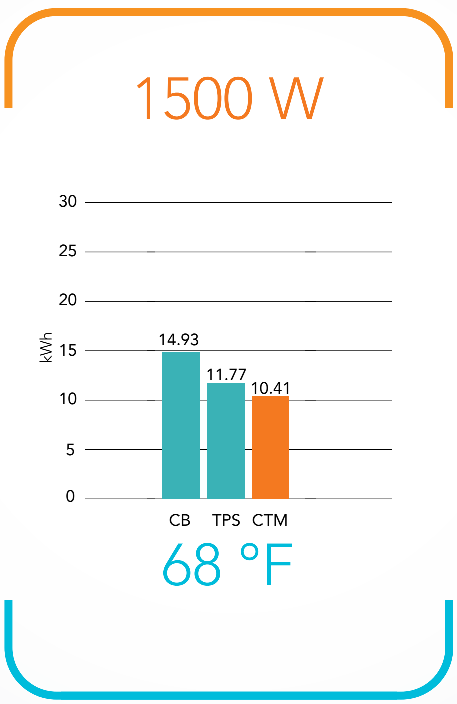
Wattage: **2500 W**
Engine: **13.1 L max.**
Circulation Method:
Thermosiphon
Set Temperature:
100 °F (on) / 120 °F (off)

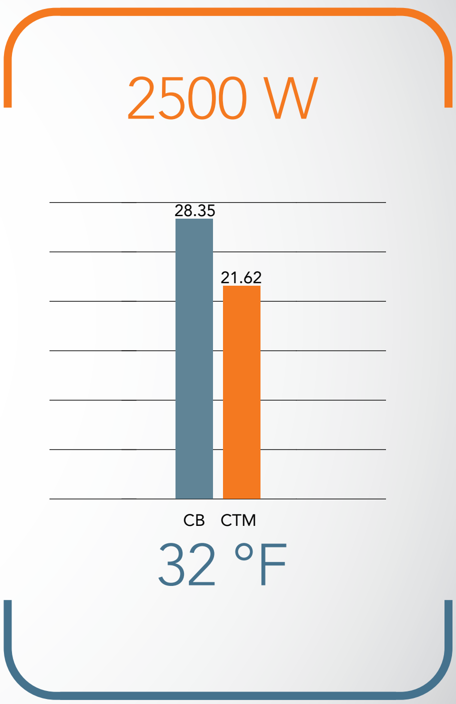
Energy Usage

Heaters were evaluated using the same engine block in tests performed at a room-temperature environment (68 °F) and a simulated outdoor temperature (32 °F). The kilowatt-hours of electricity consumed over a 12 hour period of steady state operation were recorded.

The CTM was the most efficient heating system in both temperature scenarios.

While the TPS model was able to approach the CTM efficiency mark in the room-temperature setting, the only thermosiphon heater able to adequately heat the engine in the outdoor scenario was the CB heater, which consumed substantially more energy than the CTM to do so.





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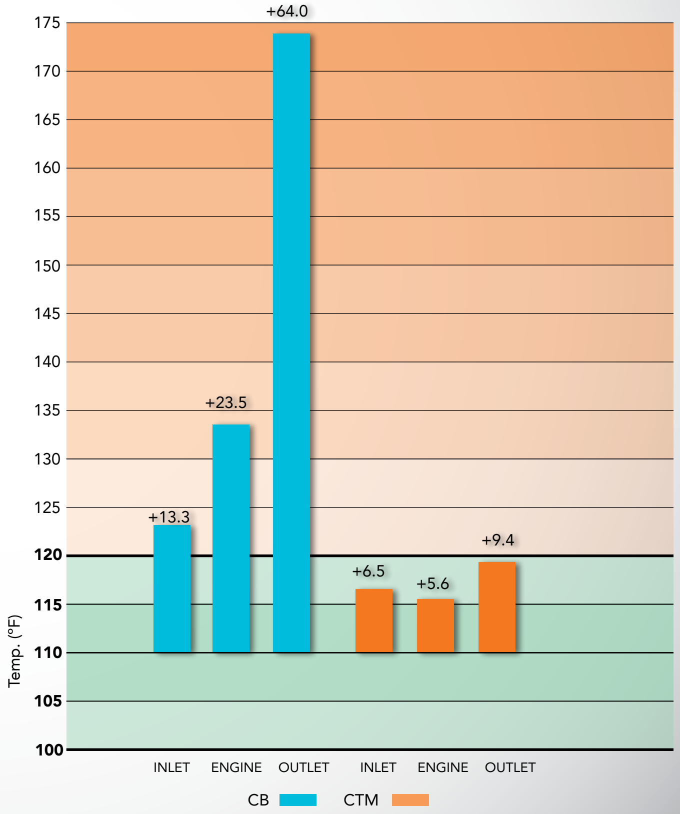
Heating Performance

The outdoor 32 °F simulation eliminated the TPS from contention, as in this ambient temperature it was unable to heat the engine above the temperature shut off point. Without sufficient heating power, the TPS could only heat the engine block to about 88 °F, well below the 110 °F target temperature.

While the CB model heater was able to keep the engine at an acceptable temperature, the effects of thermosiphon heating on outlet plumbing were readily apparent, with the CB heater recording an average outlet temperature of nearly 174 °F.

The CTM, while consuming the least energy, kept the temperature of the engine and outlet within optimal levels during the test, with an average engine temperature of approximately 115 °F, well within the ideal starting temperature range.



Analysis

The following is the measured average power consumption for an identical setup (above) and one month estimated cost (below). Cost and savings are calculated using a $0.10/kWh rate over a 730 hour period*.

The power and efficiency of the pump-driven CTM were evident – able to match the heating power of the CB heater in the cold weather test, while besting both thermosiphon models in power consumption in both testing scenarios.

68 °F

TPS	0.981 kW
CB	1.240 kW
CTM	0.870 kW
TPS	$71.62 / mo.
CB	$90.52 / mo.
CTM	$63.51 / mo.

11 – 30%

32 °F

CB	2.36 kW
CTM	1.80 kW
CB	$172.28 / mo.
CTM	$131.40 / mo.

24%

68 °F

INLET	TPS	104.6 °F
	CB	113.1 °F
	CTM	112.7 °F
OUTLET	TPS	146.9 °F
	CB	144.2 °F
	CTM	113.5 °F

32 °F

INLET	CB	123.3 °F
	CTM	116.5 °F
OUTLET	CB	174.0 °F
	CTM	119.4 °F

*Actual savings for installed heaters dependent on application, installation and local utility rates. Heater performance based on test engine. Temperatures may vary due to installation and application.