HOTSTART®

HEATER SIZING RECOMMENDATIONS

FOR THERMOSIPHON HEATERS

DETERMINE YOUR HEATER TYPE

HOTSTART's externally-mounted engine heaters circulate heated coolant through the engine block by thermosiphon action, functioning without the need for a pump. These types of heaters can be used to preheat engine sizes up to 27 liters (1650 cubic inches) of displacement and are typically used in generator, heavy equipment, and truck and bus applications.

If your engine is larger than 27 liters, a forced circulation heater may be required to effectively preheat your engine. Forced circulation heaters are also an excellent heating choice for those seeking increased heating efficiency, more evenly-distributed heating and lower operating costs. See the HOTSTART product catalog for more information about forced circulation heaters.

FIND YOUR ENGINE SIZE

Engine size is typically expressed as cubic inches or liters of displacement. Check your engine's manual or other documentation for the displacement sizing.

REFERENCE YOUR LOCATION'S AMBIENT TEMPERATURE

The lowest expected temperature of your engine's location is an important factor. Engines that are located indoors, in climate-controlled environments or in locations where the lowest temperature remains above 0 °F (−18 °C) will require less heating power to maintain an optimal starting temperature. Engines that are located outdoors in locations where the lowest temperature falls below 0 °F (−18 °C) will require more heating power to maintain an optimal starting temperature.

CALCULATE YOUR REQUIRED HEATING WATTAGE

Based on your engine location and lowest expected ambient temperature, use the following equations to calculate the minimum wattage requirement of your heater.

- If your engine location's temperature **will remain above 0 °F (−18 °C):**
  3 × [your engine's cubic inch displacement] = your heater's wattage requirement, or
  183 × [your engine's liter displacement] = your heater's wattage requirement.

- If your engine location's temperature **will fall below 0 °F (−18 °C):**
  5 × [your engine's cubic inch displacement] = your heater's wattage requirement, or
  305 × [your engine's liter displacement] = your heater's wattage requirement.

CHOOSE YOUR HEATER MODEL

Choose your heater model based on your engine's displacement and your power source:

MODEL	ENGINE DISPLACEMENT	PHASE
TPS	2.5 – 11.5 L (150 – 700 in^3)	single-phase
CB/SB	5.7 – 13.1 L (350 – 800 in^3)	single-phase
CL/SL	13.1 – 27 L (800 – 1650 in^3)	single-phase
WL	9.8 – 27 L (600 – 1650 in^3)	three-phase
EE (hazardous location only)	8.2 – 27 L (500 – 1650 in^3)	single-phase/three-phase

Thermosiphon heaters are typically available as 120, 208, 277, 240, 380 or 480 volt variants.

NOTE: Be sure to select a heating system that matches your power source's voltage rating. Connecting a heater to a power source with a different voltage rating may result in heater failure or greatly reduced heating performance. Improper heater application may void the HOTSTART warranty.

For detailed engine displacement size ranges, voltage and phase options for all thermosiphon heaters, view our product catalogs at http://www.hotstart.com/en/home/resources/catalogs/ or speak with a HOTSTART customer service representative at **509.536.8660**.

CHOOSE YOUR THERMOSTAT RANGE

For thermostat selection, begin by noting the desired temperature you wish to maintain. Thermostats that begin heating at 100 °F (38 °C) and stop heating at 120 °F (49 °C) will maintain an engine's internal temperature at about 130 °F (54 °C). This thermostat range is typical and will meet the requirements for the majority of applications. Keep in mind that HOTSTART recommends choosing a thermostat that will maintain an engine temperature about 70 °F (21 °C) above the ambient temperature in cold-weather conditions.

EXAMPLE

A customer is searching for a thermosiphon heating system for an outdoor generator. His engine is 5.7 liters in displacement and winter temperatures in his location typically dip below 0 °F (–18 °C).

Based the expected ambient temperature, he will need a heater with at least 305 watts for every liter of displacement.

305 watts × 5.7 liters = a heater requirement of at least 1740 watts

Because his power source is single-phase, the customer will need to specify a TPS, CB or SB model thermosiphon heater in the 2000 watt to 2500 watt range. He will be able to choose from 120, 208, 240 and 277 volt variants. Because he wants to maintain an engine temperature approximately 70 °F (21 °C) above the ambient temperature in cold weather, a thermostat set to maintain 100 °F (38 °C) to 120 °F (49 °C) will keep his engine at the optimal temperature – even during the coldest winter weather.

FOR MORE INFORMATION

For more information on selecting the right heater size, wattage, power options and thermostat range, see the HOTSTART website or contact our customer service department at **509.536.8660**. Reference our online product catalog at: http://www.hotstart.com/en/home/resources/catalogs/.