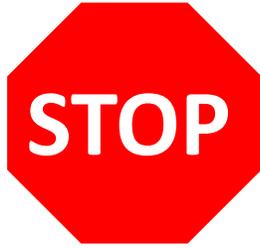


DO NOT USE THIS HEATER !

UNTIL YOU READ HOW IT WORKS



We spent three years and spared no expense to create a heater that would:

Facilitate EASY STARTING

Eliminate wear associated with starting a cold engine

The Twin Hornet 22 was only designed to facilitate easy starting of your engine. It was not designed as an oil heater, nor was it designed to heat your entire engine compartment evenly. Unfortunately, many pilots have misconceptions about what an engine heater should do.

We spent our first year learning:

HOW NOT TO BUILD AN ENGINE HEATER.

Like the vast majority of pilots, we believed the engine should be heated from the bottom up. This is a misconception and actually creates more problems than it solves.

Please use as directed and the heater will perform flawlessly.

- **Place the heater directly behind the prop**
- **Leave plugged in; the thermostat will maintain 70°F**
- **Allow up to 48 hours when heating a cold soaked engine**



Design Criteria

When we first set out to design the Twin Hornet 22, we started with a heater that was to be placed under the engine, as this is common sense.

However, heating from the bottom up created the following issues:

- Condensation is a by-product of combustion and is found in all engines. However, when you heat an engine from the bottom up, all the moisture that is entrained in the oil evaporates. This moisture condenses in the upper part of the engine because it is cooler (furthest point from the heat source).
- One of our biggest misconceptions was that the oil needs to be *WARM*. According to Aero-Shell, viscosity is guaranteed down to -15°C on Aero-Shell 15W-50. Our heaters, will maintain an oil temperature of 30 to 40 degrees, please do not let this be a concern .



Typical Properties of Shell AeroShell Oil W Multigrade 15W-50		
	Test Method	
Product Code		60070
SAE Viscosity Grade		15W-50
Property		
Viscosity:		
• @ -15°C , cp	D 2602	3150
• @ 100°C , cSt	D 445	19.6
• @ 100°F , SSU	D 445	588
• @ 130°F , SSU	D 445	300
• @ 210°F , SSU	D 445	98.9

Temperature readings:

Readings from EGT gauges, laser measurement devices, or thermometers placed in any location *other than the baffled off area directly behind the prop* will yield no meaningful data. The only accurate test is, to place a digital thermostat inside the cowl directly behind the prop. If this reading is above 60°F, the aircraft engine will turn over freely and ignition should be instantaneous (on an engine that is mechanically sound). Our heaters use conduction to heat the engine; this heats the engine from the inside out and it is why temperature readings can be misleading.

Conduction

Our heaters use convection to heat the air, *BUT* the method of heat transfer that is utilized is conduction. This is the most effective method of transferring heat. Once the cylinders are heated, heat will migrate to the piston, down the connecting rods to the crank, valves and all other inner-connected parts. Heat always migrates to the cold; this is one of the most basic heat transfer principles. Because of this, warm cylinders will yield an engine that will not experience excessive wear when started; however, the temperature of the engine case will still be cold.

We spend countless hours each year educating pilots regarding the heating needs of an aircraft engine. We respectfully ask that you disregard any preconceived ideas concerning adequate engine heating. Your cylinders will *FEEL COOL* to the touch; this is due to the fact that they are cooler than your body temperature.

If the Twin Hornet 22 is placed behind the prop, two heavy moving blankets are placed over the cowl, and 48 hours is given to heat a cold soaked engine, the engine will easily start.

IF YOUR ENGINE STARTS EASILY, YOUR HEATER IS WORKING!

If you suspect you have a problem with your heater, please perform the following test:

Start your engine

Did it appear to turn over easily and with no drag?

If so, the heater is working perfectly.