



How
Safe is
Your

Heater?

Preheating Your Aircraft's Engine
May Create Another Costly Problem

By Maggie Pickart

Aircraft owners know that in cold weather, their airplane's engine needs to be preheated prior to start-up. Without preheating, owners take the risk of causing expensive damage to the engine, in addition to increasing the likelihood of a disastrous accident. Nearly every aircraft owner is aware of these risks and takes the proper precautions in order to avoid them. But, what some aircraft owners don't realize is that preheating can create an entirely different risk to their aircraft.

Herb Hill realized this back in the early 2000s. He did everything an aircraft owner should do when preparing to fly in cold weather; he started his Tanis heater before flight and checked the weather

radar. Even though his airplane was warmed up and ready to go, the weather he was to fly through did not look favorable, so he canceled his flight. Everything should be safe, right?

Wrong, and that's what Hill discovered. Preheating caused condensation and moisture to form in the motor oil, which concerned him, especially when considering the cost of repairs and overhauls. Hill states, "I came to the conclusion that...you better fly that airplane and warm that engine up and get rid of that condensation for everything to work properly." However, weather does not always allow a pilot to get airborne after preheating, so what should a pilot do?

Hill, who's been a pilot since the 1990s and has owned a handful of different aircraft, wondered the same thing. He began to consider ways heaters could effectively preheat an engine yet not create the condensation. Hill wanted to create something that worked similar to a house heating system, where air is continuously re-circulated through a heating system to progressively increase temperatures. With an idea in mind, Hill set to work.

The first model was created by 2005. Hill purchased a heater and attached coupling devices to add hoses. These hoses were inserted into the engine compartment; one hose blew warm air in, while the hose on the other side drew cooler air



out to be cycled through the heater and back into the engine compartment. This process effectively eliminated condensation in the oil, but it had a problem of its own.

The heated air would cause the fan sleeve bearing to dry out, causing the fan to stick. Hill needed to find a way to keep the bearing lubricated. While trying to create an improved version of his heater, he addressed some other aspects of heaters that he did not like.

First, Hill wanted to install a thermostat on his heater. With a thermostat, he could leave the heater on throughout the entire winter without overheating the engine or creating a huge electricity bill. He also wanted to create something that



When packed in the portable carrying case, the AeroTherm Deuce measures 38.25" x 6.5" x 7" and weighs 11 pounds.

didn't need to be attached to the airplane, yet was easily portable.

In 2007, the heater was completed. To solve the fan sleeve bearing problem, Hill installed a self-lubricating, ball-bearing fan in the new heater. This modified fan had another benefit — it created a higher air flow. Hill also installed not only one, but two thermostats that automatically maintain the owner's desired temperature. The second thermostat acts as a precautionary measure in case the first one fails. Finally, Hill succeeded in creating a portable, easy-to-install heater; the entire system weighs just 11 pounds, can be transported in a carrying case, and can be hooked up in less than five minutes.

Hill was proud of the final product and was ready to market it to other aircraft owners, but first, it needed a name. Aptly entitled for its dual airflow system, the heater is known as the AeroTherm Deuce.

The AeroTherm Deuce is a reliable system. In addition to the previously mentioned benefits, its fan is rated for 40,000 hours, the thermostat is rated for 100,000 cycles, and the entire system is weather-proof. The heater warms the engine compartment evenly, as it works similarly to a home furnace and is essentially no different than putting an aircraft in a heated hangar. Additionally, every component of the AeroTherm Deuce is modular, making any repair quick and easy.

It is also inexpensive to run. When the AeroTherm Deuce is running, it uses about \$0.09 of electricity an hour. Once the desired temperature is reached when using a thermostat, the system will turn on and off automatically to maintain the temperature. With this feature, the heater is actually off about 40 percent of the time, and if the owner also uses an engine blanket,

the electricity cost reduces to about \$0.04 an hour. If the AeroTherm Deuce is left on full time, the cost to run the heater is only about \$30 a month.

So how exactly does the AeroTherm Deuce work? The AeroTherm is a whole-engine heater, which means it heats all engine components to the same temperature. This is important, because airplanes utilize cast-iron engine cylinders, and the cast iron should be the same temperature as the aluminum pistons. Uneven heating of the pistons results in piston scoring, which occurs when the pistons are hotter than the engine cylinder. This problem is typical of oil heaters, which also cause condensation due to uneven heating.

The AeroTherm Deuce eliminates this problem by using two 800-watt heating elements and heat-circulating technology with a thermostat. When it's plugged in, the AeroTherm Deuce supplies 6,500 BTUs of heat at 210 degrees Fahrenheit to the engine compartment. It then draws the same heat out of the compartment and back through the heater until the desired temperature is reached.

The best way to heat an aircraft engine is in a heated hangar, but Hill kept in mind that doing so is not always possible. Therefore, the AeroTherm Deuce can be used as a heater or a traditional preheater. When used as a preheater, the engine will be warm enough to start in about 90 minutes, but it can completely heat the engine, including oil, in three hours when the outside temperature is zero.

Any aircraft with engine-compartment holes four inches or larger can use the AeroTherm Deuce. The system is quick and easy to set up; the heating unit hangs from the propeller with provided straps, and hoses are attached on each end of the heating unit and are inserted into the engine compartment. Sponges are provided to block any additional openings to the engine compartment.

The entire AeroTherm Deuce system is not only convenient, it adds safety for pilots and their aircraft. Even the most astute pilots could be putting themselves at risk with a traditional preheater, but thanks to Herb Hill and his ingenious mind, pilots everywhere can feel a bit safer in the colder weather because of the AeroTherm Deuce. —✈

For more information on the AeroTherm Deuce, call (800) 401-4397 or visit www.aerothermheaters.com.