The Oil Report

October 2009

For under $15, Thermo Cube will keep track of pre-heater operation automatically.

Oil the News that's Fit to Print!

We have a new website! If you haven't seen it yet, take a tour of www.blackstone-labs.com. Same great information, same great humor, but better functionality and a new look.

The following article was reprinted from the July 2002 issue of Aviation Consumer.

Thermo Cube Pre-Heat Control

by Jane Garvey

Wanna save a few bucks on electric preheat now that it's getting cold again?

If your preheat is combustion-based, we'll assume you're smart and never, ever leave it unattended. For those who have electricity available, the options are broader. In Juneau, of course, you just leave the thing plugged in until mid-July. In more temperate climes, that option wastes a lot of power.

On the other hand, the ad hoc approach inevitably will catch you short—and cold—some chilly morning when you either couldn't get to the airport to hook it up in advance or didn't know you were going until the last minute. Every winter, the aviation forums can be counted on for multiple threads on arrangements to "automate" non-permanent electric preheating, including elaborate discussions on setting off pagers hooked in line and the like.

There's a simpler way. When we saw a reference to the Thermo Cube, it was one of those smack-yourself-in-the-forehead "Why didn't I think of that" epiphanies. A thermostatically controlled electrical outlet, the Thermo Cube comes in five versions, with "on" temperatures from 0 to 120 degrees. The upper ranges are intended for fans and coolers, of course.

The heating controllers handle 15 amps and 1800 watts and come in three ranges: the TC-1, which turns on at 0 degrees and off at 10 degrees and, more useful for our purposes, the TC-2, on at 20 degrees, off at 30 degrees and the TC-3, which starts the juice to the heater at 35 degrees ambient and off at 45 degrees.

In usually balmy North Carolina, we opted for the TC-3 to run a Reiff HotPad and cylinder HotBand heating system. The hangar has power but no supplemental heat. For testing purposes, we placed a darkroom thermometer hooked to a Remove Before Flight lanyard on top of the engine, cowl flaps closed, cowl plugs in and a quilted bedspread draped but not fitted over the cowling.

An unusual March hard freeze yielded overnight temps to 22 degrees. By our 11:00 a.m. arrival, the spring sun had already brought the air temperature in the hangar well above the 45 degrees, the Thermo Cube cutoff temperature.

Nevertheless, when the darkroom thermometer was retrieved from inside the cowling, it registered a toasty 85 degrees. A previous test under similar conditions at the coldest part of the morning, while the Thermo Cube was still engaged, clocked an impressive 100 degrees on a spare OAT probe inside the cowling. On both occasions, start up had all temps within the green in under three minutes.

A quick check of the Web indicates that the most common use for the Thermo Cube is aquatic applications, so you might be able to find one cheaper at a farm supply, water garden or aquarium establishment. Probably the easiest source, however, is good ole Sporty's, which sells the TC-2 or TC-3 online for $13.95.

If you reside in Siberian latitudes, by all means leave it plugged in all the time. Or you could just rely on the oil pan heater thermostat, if it has one. Just don't forget those cylinder bands or dipstick heaters are likely on all the time, which is a waste of juice and money in more moderate areas.

Contact Thermo Cube, Inc at P.O. Box 452, Plymouth, Indiana 46563, phone 800-277 840 and www.thermocube.com. Try Sporty's at Clermont County Airport, Batavia, OH 45103-9747, 800-543-8633, www.sportys.com.

Report of the Month

This Continental IO-520-D has a serious problem. Can you figure out what it is? Take a look at the metals and see if you can figure it out before scrolling down to look at the caption.

	MI/HR on Oil	6	UNIT/ LOCATION AVERAGES	47				UNIVERSAL AVERAGES
	MI/HR on Unit	106		100				
	Sample Date	5/2/05		4/21/05				
ELEMENTS IN PARTS PER MILLION	ALUMINUM	15	20	64				8
	CHROME	22	23	88				8
	IRON	49	73	164				37
	COPPER	5	6	16				3
	LEAD	1864	5549	6873				4216
	TIN	3	3	13				1
	MOLYBDENUM	10	11	43				3
	NICKEL	6	18	23				4
	POTASSIUM	1	0	0				0
	BORON	1	4	0				0
	SILICON	10	25	25				7
	SODIUM	0	1	0				1
	CALCIUM	1	22	6				7
	MAGNESIUM	0	1	3				1
	PHOSPHORUS	1113	614	0				298
	ZINC	1	4	6				3
	BARIUM	0	0	0				0

			Values Should Be*					
PROPERTIES	SUS Viscosity @210°F	93.7	82-105	95.4				
	cSt Viscosity @ 100°C	18.86	16.0-21.8	19.26				
	Flashpoint in °F	490	>440	430				
	Fuel %	<0.5	<1.0	<0.5				
	Antifreeze %	-		-				
	Water %	0.0	<0.1	0.0				
	Insolubles %	0.3	<0.6	0.5				
	TBN							
	TAN							
	ISO Code							

*THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

Notice that the second sample was run a much shorter interval than the first, yet wear stayed high. When you look at the second sample's metals on a per-hour basis (divide a metal by hours on the oil), everything got much worse.

The engine was torn down after the second sample and the problem turned out to be a plugged cam oil port, which was causing oil starvation. It's good the owner took the initiative to look for the problem after the second cautionary analysis. Oil starvation is seriously bad news, as you can imagine.