

# PREHEAT AND CORROSION: NO SMOKING GUN

About once a year, we hear a horror story about engine corrosion and just about as often, we're told by reputable engine shops that preheaters are the cause of this calamity. Specifically, say the shops, preheaters that are left on all winter turn the inside of the engine into an expensive terrarium, but without the turtles and plants.

Frankly, we've always doubted this claim, not because it doesn't make sense, but because no one had any convincing data. So we decided to get some. Here's how our experiment worked:

We instrumented the oil filler pipe of the IO-520 in a Bonanza equipped with a Reiff HotBand system and a sump heater. Over a period of days, we measured humidity in the crankcase with the heater running continuously, with it controlled by a thermostat and with the heater off. We were looking for the terrarium effect, the telltale spiking of humidity that would prove the engine shops' theory.

The results proved illuminating. With the heater running constantly in 20 to 30-degree F weather with lows in the teens, we found that the filler pipe area remained at a near constant 120 degrees F. Humidity levels were consistently 20 percent or lower and declined as the test progressed. These findings don't support the view that preheaters cause corrosion.

We also tried running the heater system with a thermostat set to 45 degrees F. Here, the humidity level was between 10 and 25 percent, but it was spikey, rising when the heater cycled off, declining when it cycled on. The closest temperature dewpoints spreads were

about 10 degrees, thus no condensation. Just to see what the numbers would do if we flew the airplane and charged the oil up with a bunch of moisture, we repeated the above test

after flying the airplane for about an hour on a cold winter day. The oil reached normal operating temperature during this flight.

Again, we found that the preheater drove the temperature up and the humidity down and the temperature line never crossed the dewpoint line. In fact, for the second test, the tem-

perature dewpoint spread remained consistently at about 35 degrees.

During this test, ambient humidity did what it usually does: It rose and fell with diurnal changes. When the temperature rose, the humidity declined and vice versa. The dewpoint trace roughly tracked the temperature line, but again, the temperature never got below the dewpoint.



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