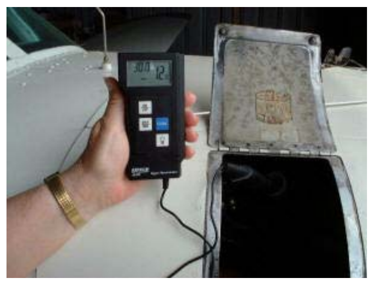
Engine Saver Test Report

The following is a report on testing that was done to verify the performance of the P/N 2-39 Engine Saver

The Engine Saver is designed to supply a continuous flow of dry air into the crankcase of an aircraft engine, lowering the moisture level in the engine, preventing the formation of moisture and rust. A series of tests were done to demonstrate that the system did lower the humidity level inside the engine crankcase and in the upper cylinder area.

Tests were performed on a Lycoming IO-360 engine. Tests were performed in the early afternoon in September. The aircraft had been sitting for over 24hrs in a hangar. An Extech model 45320 humidity / temperature instrument was used to obtain data. This instrument measured relative humidity in %, and temperature in degrees F. These measured values were then converted to dew point temperatures as this form is easier to understand. An initial reading was taken to determine the temperature and humidity levels in the area around the engine. A relative humidity (RH) of 38% was measured. This corresponds to a dew point of 60 degrees F. The dew point temperature is an important number. It is the temperature that the air must be cooled to, to cause moisture to form. In this initial reading, it was determined that air conditions were such that if the temperature of the outside air were cooled below 60 degrees F, water condensation would occur, and moisture would begin to form on surfaces. The oil stick was then removed, and the instrument inserted into the fill tube. Tape was used to prevent the entrance of outside air. A dew point temperature of 59 degrees F was measured in the engine crank case. A cardboard spacer with a small central hole was taped to the exhaust pipe to prevent the entrance of outside air into the exhaust pipe. The meter probe was inserted into the opening in the exhaust pipe, and the dew point was found to be 60 degrees F.

The Engine Saver adapter and air tube was then inserted into the end of the engine breather tube where it extends from the bottom of the cowl. The tube was inserted sufficiently so that the foam washers were located above the ice hole in the breather, sealing it off from the outside air. The Engine Saver was then plugged in and allowed to run for 30 minutes. At the end of this time, the Engine Saver was turned off. The oil dipstick was again removed and the meter probe inserted into the oil fill tube and taped off. The meter indicated that after 30 minutes. of operation, the Engine Saver had dropped the humidity level in the crank case from a RH of 38% to 12%. This 12% RH corresponds to a dew point temperature of 28 degrees F. Initially, the moisture level inside the engine crank case was such that if the outside air temperature dropped below 60 degrees F condensation would occur. It is quite possible that this could occur during the month of September. After running the Engine Saver for only 30 minutes, the dew point had dropped to 28 degrees F. There was little chance that air temperatures could ever drop it this level. The possibility that condensation would occur in the engine was significantly reduced.



The next test was to measure the moisture level of the air in the exhaust pipe after the 30 minutes of Engine Saver operation. A measured reduction in moisture level of the air in the exhaust would prove that the dry air was migrating past the piston rings and into the upper cylinder area protecting this portion of the engine as well. The instrument probe was then inserted into the hole in the cardboard cover taped on the exhaust pipe, and the humidity level was measured. The moisture level was measured at 29% RH. This corresponds to a dew point of 48 degrees F indicating that the dry air was migrating past the piston rings and into the upper cylinder areas. Although the dew point was not as low as that measured in the crank case, it was still a significant reduction for only 30 minutes of operation. The air temperature would have to drop to 48 degrees F before condensation would occur.

An additional test was performed, only this time the Engine Saver was allowed to operate continuously for 24 hrs before the measurements were made. Measurements made in the oil fill tube gave a RH reading of 10%. This is below the minimum reading on the meter scale. The actual RH reading was probably somewhat less than 10%, but was beyond the meters capability. The probe was then inserted into the exhaust pipe and a RH measurement was made. The instrument read 10% at this point also. Since these measurements were below the low range capability of the meter, accurate dew point measurements could not be determined. However it is safe to say that the moisture level in the engine crank case and in the upper cylinder area was substantially reduced by the use of the Engine Saver, and the likelihood of moisture forming on the precision engine parts was substantially less than it would have been if nothing was done.

This testing verified that the Engine Saver functions as described. It reduced the moisture level in the engine crank case and in the upper cylinder areas. Lower moisture means less chance of condensation occurring and less chance of moisture forming and RUST developing. Different dew point temperatures would have been found if the tests were performed under different atmospheric conditions. The important thing is to look at the dew point temperature differences that were achieved by using the Engine Saver. The fact that the Engine Saver was able to achieve reductions in dew point temperatures can be translated directly into an extra margin against rust formation, and a greater chance of achieving TBO.