Use of CerBond™ in the crank case oil of the motor of an airplane:

Plane: Piper Cherokee 140 (PA-28 140
2-Year Test Results
Test Engine: LYCOMING MDL#0-320-E2A
Horsepower: 150

The test was performed on a piper Cherokee 140 : PA-28-140) airplane. The plane was purchased on December 1, 2003 in Dallas, Texas. At the time of purchase, the engine logs reflected 1,850 hours of engine operation since its last engine rebuild/service (Factory recommends rebuild at 2000 hour intervals). Upon inspection, the engine showed signs of oil being bypassed from the engine crank case (blow by) and dumped out under the plane, leaving severe oil coating under the belly of the plane. The plane was then flown to California and took 15 hours. During this flight, all vital stats were watched closely. The following items were recorded during the flight: oil consumption, fuel consumption per hour, engine performance, and head temperatures.

***Flight Data*:**

- Performance: Noted as (POOR) climb out 500 ft per min. Max. at 80 knots
- Oil consumption = 15 quarts per 5 hours engine time at cruise speed (60% power)
- Fuel consumption = 15-17 gallons per hour
- Engine head temperatures at 10,000 ft at 60% power = 190-240° F
- Compression check: Log book reflects last compression check to be #1 cylinder = 74/80, #2 cylinder 72/80, #3 cylinder = 70/80, #4 cylinder = 72/80 (Compression Test Data based on a differential leak down test as prescribed by the manufacturer)

Upon returning to California, the plane was serviced and received an oil change. The oil that was drained from the engine had been in service for over 15 hours. The drained oil appeared very dirty and extremely dark (this oil had also been mixed with new oil from the trip back — over 30 quarts). Upon inspection of the filter media it was found to contain an unacceptable amount of metal deposits, indicating excessive bearing wear.

New oil (Aero Shell 100wt) was added, the filter replaced, and 1 oz of CerBond™ was added to the crankcase. The engine was operated for ten hours and another oil change/filter replacement was performed. This oil change was to help flush out any contaminants/ debris that were still present from the first oil change. New oil (Aero Shell 100wt) was added, the filter replaced, and another 1 oz of CerBond™ was added to the crankcase. The plane was operated in normal flight conditions for approximately 12-15 hours of service. At this time, a visual inspection of oil showed very little oxidation. Fuel burn was noted and reflected an hourly burn of 5.5 gallons per hour (within the pattern and during level flight at 60% power). Oil consumption had been reduced to almost nothing and no additional oil was required after 15 hours of service.

Post- **CerBond™** *data*:

***Flight Data*:**

- Performance: Very good for age. Normal climb out 800 ft. + per min. 84 knots. no flaps
- MAX = (Normal day, pilot and 350 lbs Fuel, 1700 ft. min. Max at 64 knots, 10 deg. Flaps)
- Oil consumption = 1 qt per 25-30 hours of service (cruise speed / 60% power or better)
- Fuel consumption = 5.5 - 6.4 gallons per hour
- Engine head temperatures at 10,000 feet at 60% power = 140 — 160° F (*180° F noted on climb out of 800 ft per minute to a ceiling of 10,000 ft.)
- Compression check: 1 year later with no mechanical repairs noted) as follows: #1 cylinder = 78/80, #2 cylinder = 78/80, #3 cylinder = 78/80, #4 cylinder = 78/80 (Compression Test Data based on a differential leak down test as prescribed by the manufacturer)

Test above (post - **CerBond™**) was performed at the airplane's annual inspection. All tests were performed by a licensed FAA-certified mechanic. The compression test showed a reading better than any log entry prior to my purchase including when engine was new. At the time of the test, the engine had 2,430 hours of service since its last rebuild (430 hours more than recommended by factory). The mechanic noted that the engine was functioning at or above the plane's factory specifications.

The conclusion of this airplane test over a period of approximately two years is that the addition of **CerBond™** into the engine yielded a marked improvement in performance; a significant reduction in oil consumption; increased horse power that allowed the plane to climb at rates of 30-45% greater than factory-rated specifications for this specific airplane. It should be noted that the engine, after **CerBond™** treatment, also showed smoother accelerations and reductions in vibration, harmonics, and engine noise levels.