PERFORMANCE REPORT ON

BISHOP'S ORIGINAL ENGINE PROTECTION

BY THE

UNIVERSITY OF UTAH

ENGINEERING EXPERIMENTAL STATION

The test were performed using PfL Formula 101, Anti Wear Engine Protection only.

The University of Utah Engineering Experimental Station conducted the test especially for:

1) Internal engine friction
2) Fuel consumption
3) Horsepower
4) Engine wear and oil galley clogging
5) Exhaust emissions

These parameters have been measured both before and after the addition of the engine treatment to the test engine.

The test were conducted in three phases. The first phase included 10 hours of testing to determine the normal or baseline operating characteristics of the engine. Phase 2 consisted of running the engine foe 50 hours, or the approximate equivalence of 2500 miles, with the engine treatment added to the crankcase. Finally, Phase 3, an additional 50 hours were put on the engine with fresh oil minus the treatment to determine if indeed the wear surfaces had become plated, how quickly and beneficial effects would disappear. The test comparisons were made with a standard high grade motor oil, and no conclusions or comparisons with synthetic oils have been made.

The manufacturer claims that the engine treatment will reduce friction, wear engine operating temperature, and oil consumption, while increasing lubrication, horsepower and gas mileage. The engine treatment is a product which is claimed to permanently bond to the bearing surfaces, reducing internal engine friction and thus giving rise to the above effects. The engine treatment is added to the crankcase of a normal auto engine during the oil change, replacing one quart of oil. The manufacturer is currently alleging lifetime permanency.

Test Equipment:

The test were performed on a 6 cyl. Chevolet 259 cu.in. engine set up in the Mechanical Engineering Department at the University of Utah. Power output is taken from the engine directly into a General Electric dynamometer which acts as a variable load and can also be reversed to back drive the motor. The system is instrumented to measure following:

Engine RPM	Engine operating time
Oil pressure	Oil temperature
Block water temperature	Manifold vacuum
Volume of fuel consumed	Dynamometer output load
Dynamometer output power	Internal engine friction

An oil filter adaptor, allowing the measurement of the pressure drop across the oil filter with a differential manometer, was conducted.

Exhaust emissions were measured on a Beckman Exhaust Analysis System.

Test Procedure:
The engine was set up with a new filter (Fram PH30), Pennzoil SAE 10W-40W. The engine was run 10 hours at a moderate load. At the end of this run we got our base line data. The engine was then reassembled and the engine treatment was added per the manufacturer's instructions. The engine was then run 50 hours and data was obtained. The engine was drained and the oil was changed and ran an additional 50 hours to obtain final data sheets.

RESULTS:

Engine Friction Losses TABLE I

	Baseline 0 Hrs.	Treatment Time 50 Hrs.	% Decr.	Treatment Time 100 Hrs.	% Decr.
RPM 750	5.42	4.83	10.9%	5.07	6.5%
1000	7.80	7.14	8.4%	7.00	10.2%
1250	10.54	9.18	12.9%	8.74	17.1%
1500	14.05	11.17	20.4%	11.42	18.7%
		Average Decrease = 13.1%		Average Decrease =12.6%	

(Oil changed at 50 hrs.)

Horsepower TABLE II

		Treatment Time 50 Hrs.	% Incr.	Treatment Time 100 Hrs.	% Incr.
RPM 1000	3.1	4.0	22.5%	3.3	6.1%
1500	5.8	7.7	24.6%	7.2	19.4%
2000	9.5	10.9	10.5%	11.7	18.8%
2500	13.6	14.1	3.5%	16.0	26.1%
3000	21.4	21.6	.9%	23.2	7.8%
		Average Increase = 12.4%		Average Increase =15.6%	

(Oil changed at 50 hrs.)

SPECIFIC FUEL SAVINGS

		Gal/HP/HR	% Incr.	Gal/HP/HR	% Incr.
RPM 1000	.32	.26	18.8%	.25	21.9%
1500	.26	.21	19.2%	.20	23.0%
2000	.20	.18	10.0%	.17	15.0%
2500	.19	.18	5.2%	.16	15.8%
3000	.17	.16	5.8%	.15	11.8%
		Average = 11.8%		Average =17.5%	

ENGINE FRICTION RESULTS

Repeatable data indicates that treating reduces internal forces due to friction by an average of 13.1% after 50 hours of treatment with the additive still in the crankcase. After an 50 hours without the engine treatment the engine still had a 12.6% decrease in frictional forces over the original untreated engine indicates that the treatment is effective and remains so.

HORSEPOWER RESULTS

An increase in power under light loading conditions of 12.4% after 50 hours of testing and of 15.6% for 50 additional hours past the removal of the treatment was observed. The change in horsepower due to the treatment should be noticeable to the driver. The in- crease in horsepower continued to increase as time went on, after treatment.

FUEL CONSUMPTION

The specific fuel consumption measured in gallons per horsepower per hour. The fuel savings with the engine treatment that could be expected on the road can be calculated from test data shows the gas mileage would increase from 25.0 mpg to 27.7 mpg. The fuel savings is due to the increase in the efficiency of the engine and the reduction of in- ternal friction.

ENGINE WEAR

No measurable wear indicated. The decrease in friction should improve wear.

CONCLUSIONS

The treatment has been shown to reduce internal engine friction by 13.1% with the treat- ment in the crankcase. The claimed effect of reduction of internal friction even after removal of the additive appears to be correct. Emissions could not be measured because of a breakdown of test equipment. Plating of the metal surfaces did occur. Oil filter clogging is not indicated.

This report was furnished in its entirety to the manufacturer and has been shown in this abbreviated short form to be concise.