U.S.
Department of Energy
Bartlesville Energy Technology Center
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INTERIM REPORT
Evaluation of a Motor Oil Supplement

Experiments were conducted at the U.S. Department of Energy's Bartlesville (Okla.) Energy Technology Center to evaluate the motor oil supplement Microlon, manufactured by Chemlon Corporation, Houston, Texas, and to determine its influence on fuel consumption of a 1976 Chevrolet 305-CID (5.0ℓ), 2-bbl engine.

Microlon is formulated with Teflon (TFE resins) in microscopic size particles, and Chemlon Corporation claims reduced friction, reduced maintenance, and extended engine life when Microlon is used at the recommended concentration (32 oz added to the crankcase, and 4 oz added to the full fuel tank).

A 1976 Chevrolet 305-CID (5.0ℓ), 2-bbl engine with approximately 25,000 miles of city/highway driving was mounted on a test stand and coupled to an eddy-current dynamometer. An electric motor was also coupled to the engine in series with an in-line torque meter to allow measurement of frictional horsepower.

The engine was initially operated on the reference oil--a 10W40 premium quality SE oil. Fuel consumption and other pertinent variables were measured in duplicate at ten operating modes within an experimental error of ± 2% with the engine fully warmed-up. The engine was then motored at three speeds, 1,000, 1,500, and 2,000 rpm with closed throttle and wide-open-throttle and ignition off.

Microlon was then added to the crankcase and fuel at the recommended concentrations. The engine was then conditioned for 16 hours at 2,000 rpm, 19 hp. This was equivalent to 880 miles on the road in a mid-size vehicle at 55 mph. Fuel consumption and motoring torque were then determined for the same 16 modes examined with the reference oil.

The results, shown in figures 1, 2, and 3, indicate that Microlon reduced fuel consumption by an average of 3.4% over the 10 powered modes. Frictional horsepower was reduced by 13.0% at wide-open-throttle motoring (figure 4), but showed no measurable difference with closed throttle motoring.

FIG. 1 - FUEL CONSUMPTION VS. POWER

1976 CHEVROLET 305 CID (5.0L)

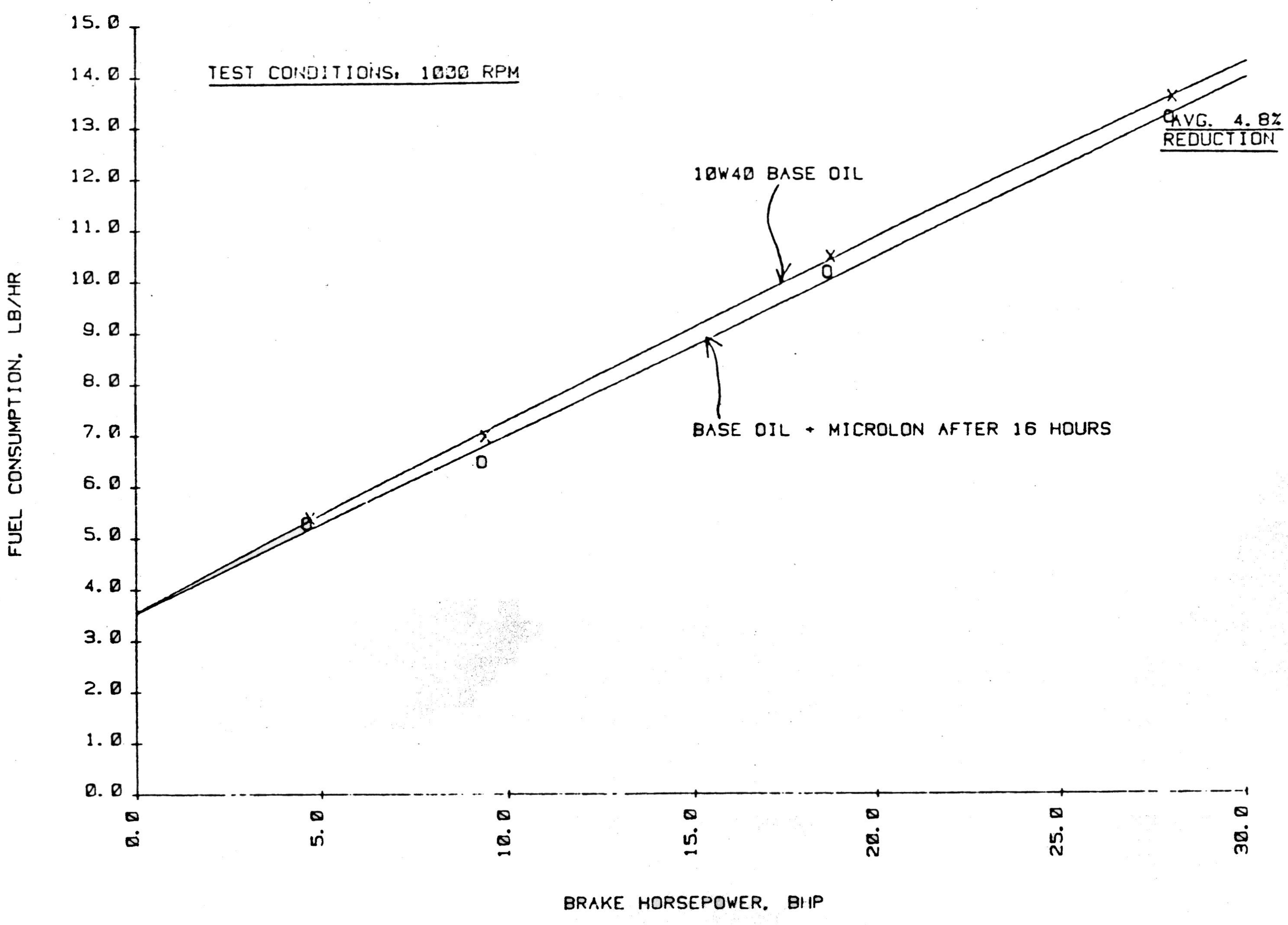


FIG. 2 -FUEL CONSUMPTION VS. POWER
'86 CHEVROLET 305 CID (5.0L)

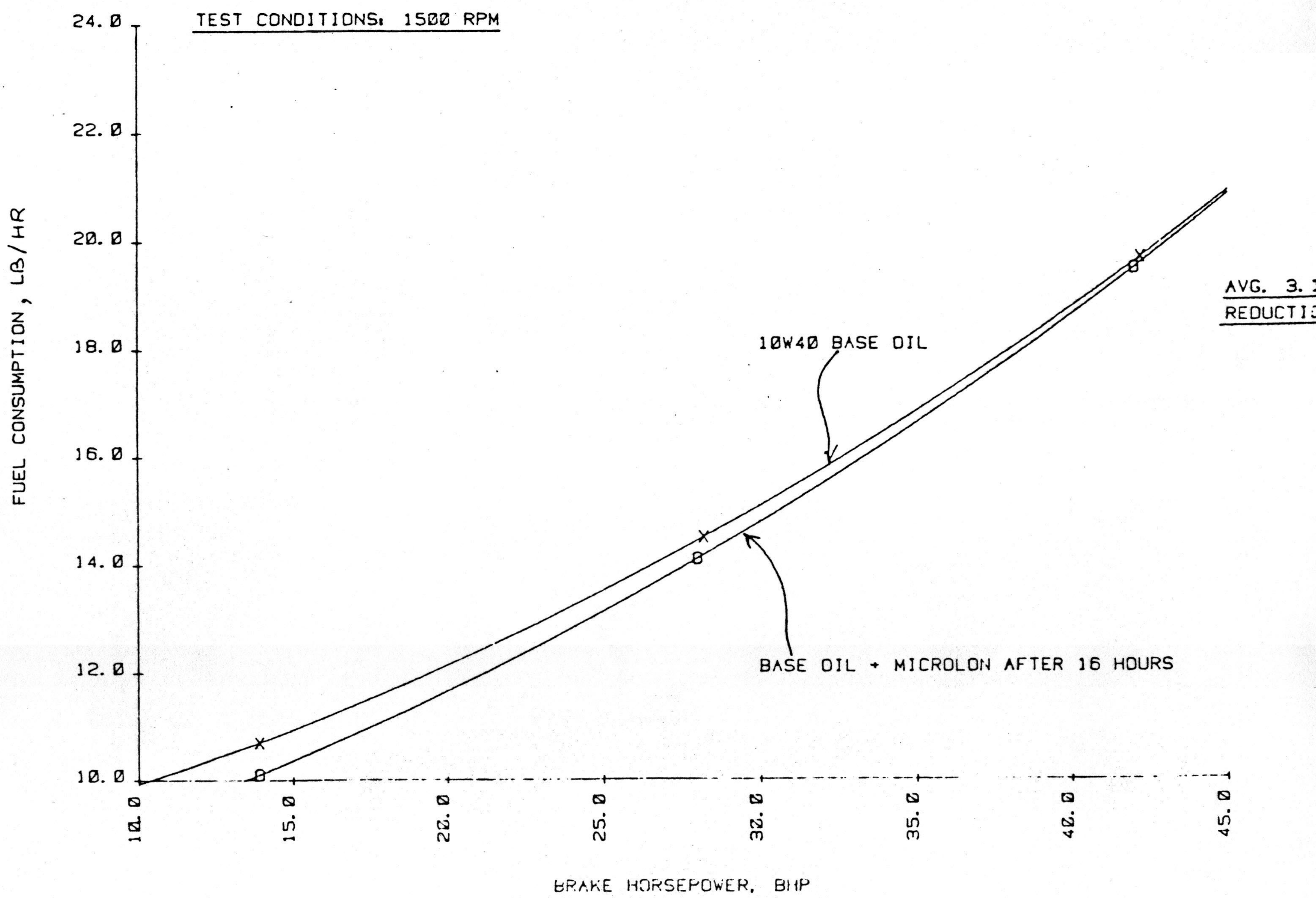


FIG FUEL CONSUMPTION VS. POWER

1976 CHEVROLET 305 CID (5.0L)

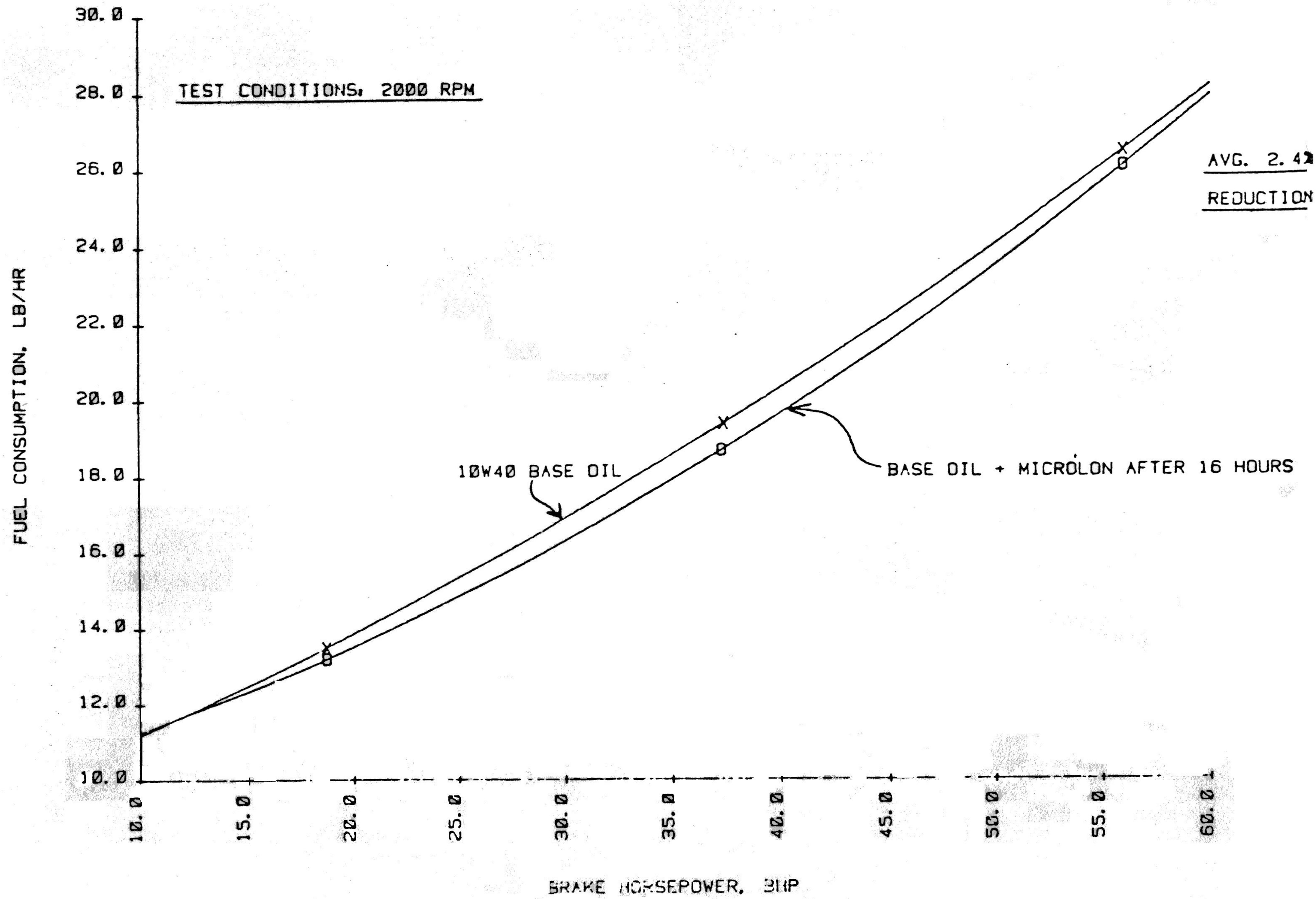
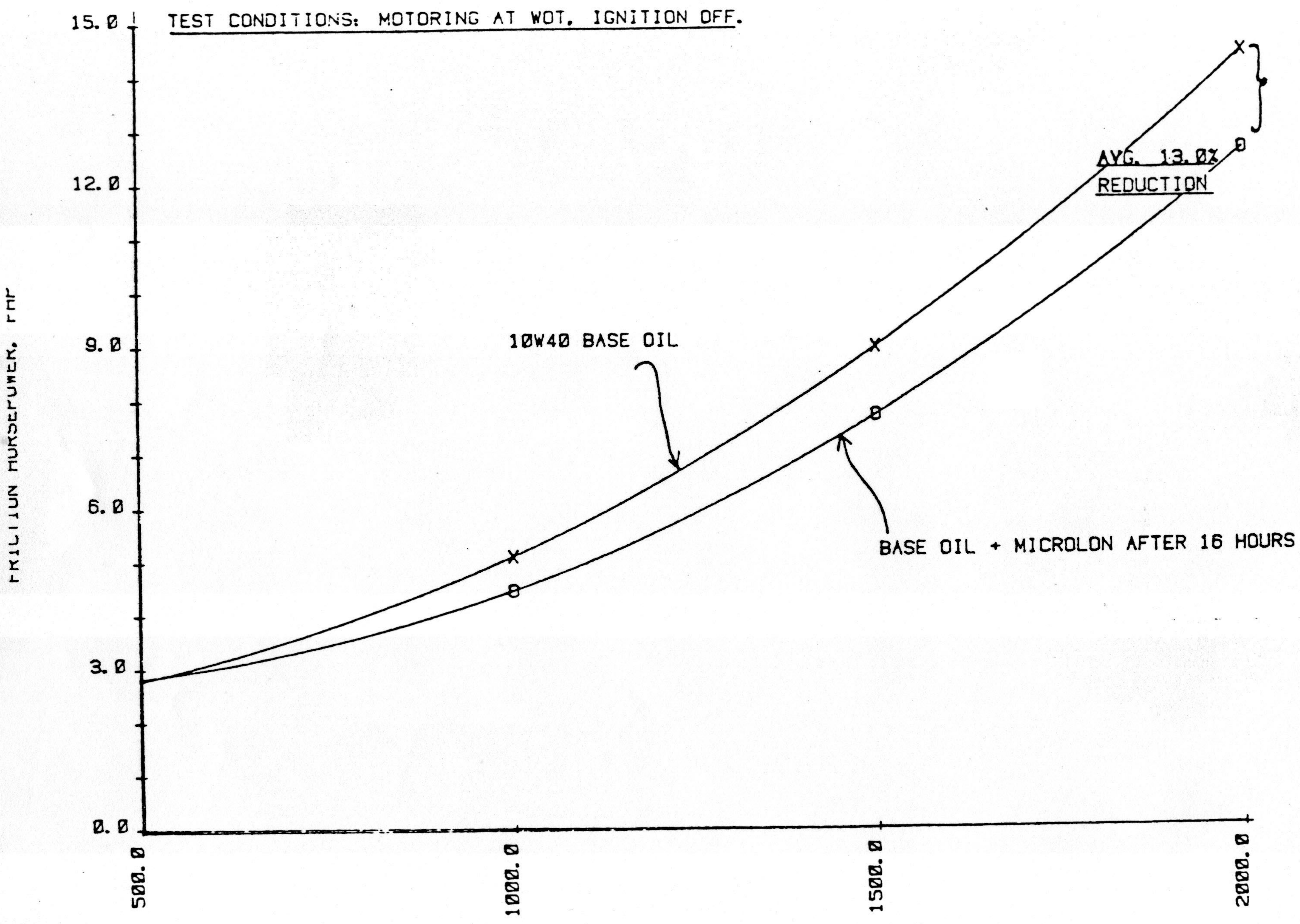


FIG. 4- MOTORING FRICTIONAL LOSSES
1976 CHEVY 305 C.I.D (5.0L)



The exhaust emissions before the catalyst were reduced as indicated in the following tables:

Table 1. - Exhaust emissions comparison-- CO emissions, gm/hr

Engine Speed, rpm	Engine Torque, ft-lb	Reference Oil	Microlon	% Change
1,000	25	252.1	215.6	-14.5
	50	314.3	106.7	-66.1
	75	82.6	77.5	- 6.2
	100	210.8	102.2	-51.5
1,500	50	170.7	125.0	-26.8
	100	121.5	107.7	-11.4
	150	482.3	609.3	+26.3
2,000	50	177.9	147.1	-17.3
	100	161.1	156.1	- 3.1
	150	1205.6	1048.4	-13.0
			Average	-18.4%

Table 2. - Exhaust emissions comparison-- HC emissions, gm/hr

Engine Speed, rpm	Engine Torque, ft-lb	Reference Oil	Microlon	% Change
1,000	25	37.4	38.4	+ 2.7
	50	43.5	39.2	- 9.9
	75	59.2	51.0	-13.9
	100	65.6	60.3	- 8.1
1,500	50	111.6	47.7	-57.3
	100	54.1	50.3	- 7.0
	150	90.4	84.7	- 6.3
2,000	50	36.0	28.0	-22.2
	100	65.1	64.9	- 0.3
	150	125.0	106.0	-15.2
			Average	-13.8%

Table 3. - Exhaust emissions comparison-- NO_X emissions, gm/hr

Engine Speed, rpm	Engine Torque, ft-lb	Reference Oil	Microlon	% Change
1,000	25	9.3	8.3	-10.8
	50	35.6	43.1	-21.1
	75	71.9	40.5	-43.7
	100	211.1	207.8	- 1.6
1,500	50	48.9	30.2	-38.2
	100	161.5	173.0	+ 7.1
	150	358.5	336.9	- 6.0
2,000	50	79.5	69.0	-13.2
	100	368.7	358.1	- 2.9
	150	505.4	491.2	- 2.8
			Average	-13.3%

The conclusion to be drawn from these tests is that within experimental error, the motor oil supplement had a measurable effect on fuel consumption and a significant effect on engine friction and exhaust emissions. It should be emphasized, however, that although exhaust emissions were decreased substantially, it is not known whether similar reductions will be observed in a vehicle tested under transient conditions, such as EPA city/highway cycles. Future tests will be conducted on a vehicle, and emissions will be measured before and after the catalyst to determine whether such reductions occur in these tests.