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EVALUATION OF STA-POWER FUEL ADDITIVE

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16. Abstracts

Sta-Power fuel additive is being marketed as an emission reduction compound when mixed in the specified proportions with gasoline. It was desired to determine whether there was an immediate effect on emissions. An immediate effect would indicate that Sta-Power effects the chemical properties of the fuel or the reactions in the combustion process. A 1970 Plymouth Valiant with a 225 CID six cylinder engine was used for the emission testing. Baseline, and additive tests were run using the 1968 Federal Emission Test Procedures. Continuous emission measuring was used, values being calculated according to the 1968 Federal Emission Test Procedure. The test data indicate that Sta-Power has no immediate chemical or combustion effect which results in an emission reduction. No evaluation of long term detergent effect was made.

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Sta-Power fuel additive

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Background

Sta-Power fuel additive is being marketed as an emission reduction compound when mixed in the specified proportions with gasoline. While it is assumed that its intended effect is a detergent one, it was desired to determine whether there was an immediate effect on emissions. An immediate effect would indicate that Sta-Power effects the chemical properties of the fuel or the reactions in the combustion process. No attempt to measure the results of its detergent action was made. The extent of any reduction of emissions with long term use of Sta-Power would be dependent on the condition of carburetor and engine parts.

Control Technique

Sta-Power is a petroleum based product marketed by the Sta-Power Company of San Rafael, California. It is added to the fuel tank at a rate of one ounce of Sta-Power per gallon of gasoline.

Test Program

A 1970 Plymouth Valiant with a 225 CID six cylinder engine was used for the emission testing. The car was operated on the chassis dynamometer at 50 miles per hour to allow the engine to reach normal operating temperatures. Baseline 7-mode cycles (as used for the 1968 Federal Emission Test Procedures) were run using Indolene 30 test fuel. At completion of the baseline cycles the vehicle was allowed to run out of fuel. The vehicle was then run several minutes using a mixture of Indolene 30 and Sta-Power. Two more 7-mode cycles were run followed by fuel runout. Finally two more cycles were run with pure Indolene 30.

For the baseline and additive tests, continuous emission measuring was used. Emission values were calculated according to the 1968 Federal Emission Test Procedure. NDIR instrumentation was used to measure hydrocarbon, carbon monoxide, carbon dioxode, and nitric oxide emissions from the vehicle tailpipe. A hot start test was employed to eliminate cold start variability which might have masked any additive effect. Continuous tailpipe analysis enabled comparison of the additive's effect on each engine operating mode.

Results

The modal analysis data is presented in the Appendix. The effect on Sta-Power is summarized in the following table:

ffect of Sta-Power from Baseline

Mode	HC	CO	NO
Idle	no effect	no effect	no effect
0-25 Accel	no effect	slight red.	no effect
30 Cruise	slight inc.	slight inc.	slight red.
30-15 Decel	no effect	no effect	slight red.
15 Cruise	no effect	slight inc.	reduction
15-30 Cruise	no effect	no effect	slight inc.
50-20 Decel	slight red.	no effect	no effect

Hot 7-mode Cycles
Weighted & Averaged

	HC	CO	NO
Baseline	133.7 ppm	.57%	1425.2 ppm
Sta-Power	132.8 ppm	.57%	1447.5 ppm

As can be seen, no significant effect on Sta-Power was measured.

Conclusions

Sta-Power has no immediate chemical or combustion effect which results in an emission reduction. No evaluation of long term detergent effect was made.

APPENDIX

MODE-BY-MODE STA-POWER ADDITIVE ANALYSIS

		Pre-Baseline Average	Sta-Power Average	Post-Baseline Average
IDLE				
	HC	118.7 ppm	113.4 ppm	109.1 ppm
	CO	1.89%	1.72%	1.59%
	CO_2	12.46%	12.63%	12.66%
	NO	4.5 ppm	4.5 ppm	4.5 ppm
0-25 ACCEL				
	HC	124.6 ppm	118.9 ppm	116.1 ppm
	CO	.51%	.38%	.42%
	CO_2	13.09%	13.14%	13.15%
	NO	1320.9 ppm	1427.1 ppm	1528.5 ppm
30 CRUISE				
	HC	102.3 ppm	108.4 ppm	97.3 ppm
	CO	.16%	.19%	.12%
	CO_2	13.36%	13.85%	13.51%
	NO	1302.4 ppm	944.9 ppm	1196.5 ppm
30-15 DECEL				
	NO	99.7 ppm	95.7 ppm	87.8 ppm
	CO	1.59%	1.53%	1.26%
	CO_2	12.85%	12.86%	13.06%
	NO	250.3 ppm	221.4 ppm	264.8 ppm

	Pre-Baseline Average	Sta-Power Average	Post-Baseline Average
15 CRUISE			
HC	132.8 ppm	120.2 ppm	116.5 ppm
CO	1.47%	1.50%	1.21%
CO_2	12.95%	12.79%	13.17%
NO	11.3 ppm	6.1 ppm	39.5 ppm
15-30 ACCEL			
HC	123.8 ppm	120.0 ppm	115.5 ppm
CO	.34%	.28%	.23%
CO_2	13.14%	13.28%	13.29%
NO	1808.5 ppm	1918.8 ppm	1737.8 ppm
50-20 DECEL			
HC	419.1 ppm	408.4 ppm	481.8 ppm
CO	1.78%	1.72%	1.46%
CO_2	12.85%	12.95%	12.80%
NO	379.0 ppm	373.7 ppm	322.9 ppm
CYCLES WEIGHTED & AVERAGED			
HC	137.0 ppm	132.8 ppm	130.3 ppm
CO	.64%	.57%	.50%
CO_2			
NO	1425.3 ppm	1447.5 ppm	1425.0 ppm