

Pratt Institute
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Office of the Dean

Mr. Michael Racano
Major Automotive Products, Inc.
975 West Jericho Turnpike
Smithtown, New York 11787

Dear Mr. Racano

Enclosed please find a report titled "The Effects of Additives X2000 and Kleen Fuel on the Rate of Fuel Consumption".

This report is the result of a series of laboratory test conducted under my supervision in your laboratories At the above address.

Sincerely,

William J. Stack PH. D., P.E.

Consulting Engineer and Dean

INTRODUCTION

A series of laboratory tests were conducted under the supervision of the author, Dr .W. J. Stack, Consulting Engineer and Dean of the School of Engineering at Pratt Institute.

The purpose of these laboratory tests was to explore the effect of a liquid substance Formula (X2000- KLEEN FUEL) Combustion Improver on the rate of consumption of gasoline fuel by using a Briggs & Stratton, 3.5 HP, 4 stroke, one cylinder engine analysis system.

In addition, a series of tests were conducted to explore the effect Formula Kleen Fuel Combustion Improver on the rate of consumption of Diesel Fuel by using a Petters Diesel, type AAI, BHP-3.5 Engine System.

The results were analyzed and conclusion was derived.

DESCRIPTION OF TEST

Equipment

The equipment used for conducting the laboratory tests for studying the effect of the additive Formula (X2000) (KLEEN FUEL) Combustion Improver on the rate of consumption of gasoline fuel was:

Engine:

Briggs & Stratton
3.5 HP
Four Stroke Cycle
One Cylinder

Dynamometer:

Go-Power Systems
Mode 1 DY- 7D

Rotometer:

Go-Power Systems
Model M- 1100

This engine analysis system duplicates the performance and fuel consumption of a 350-HP automotive engine at 1/100 scale.

For measuring the composition of the emissions for gasoline tests, an E.P.A. 75 Test Meter was used. The gasoline used was Citgo regular.

The equipment used for conducting the laboratory test for the investigation of the effect of the additives formula (X2000) (KLEEN FUEL) Combustion Improver of the rate of consumption of diesel fuel was:

Engine: Petters Diesel
BHP - 3.5
Type - AAI
Rev/min. 3600
Four Stroke Cycle
One Cylinder

Dynamometer: Go-Power Systems
Model DY- 7D

Rotometer: Go-Power Systems
Model M-II 00

Exxon # 1 Diesel engine fuel was used.

Procedure

In general terms, the procedure used for all the laboratory tests was as follows:

For the tests using gasoline, a container containing Citgo regular was connected to the engine system.

A combination of load (torque) and speed (rpm) was selected and the reading of the rotometer was recorded. A wide range of combinations of load (torque) and speed (rpm) were selected so that most of the possible driving conditions (within the limits of the engine system used) were simulated.

Subsequently, additive Formula X2000 KLEEN FUEL Combustion Improver was added to Citgo regular at the rate of 3/4 of an ounce to one gallon and the same combinations of load (torque) and speed (rpm) were repeated. The corresponding readings of the rotometer were recorded.

By using the M-1100 Rotometer Fuel-flow Curve Chart (See Appendix) the rotometer reading recorded for each test was converted to flow (lbs. /hr .) By comparing the flow for each combination of torque and rpm recorded, the change in the rate of flow was determined.

The exact procedure was used for determining the effect of Formula X2000 KLEEN FUEL Combustion Improver on Diesel fuel. In this case, the proportion of the additive changed to one ounce Formula X2000 KLEEN FUEL Combustion Improver per one gallon of Diesel fuel.

In those cases in which the effect of the additive Formula X2000 KLEEN FUEL Combustion Improver on the composition of engine emissions was to be studied, the emissions were directed to an EPA 75 Test Meter and the recordings for HC and CO were recorded with and without the additives.

The laboratory tests were conducted at an approximate room temperature of 70°F.

ANALYSIS OF RESULTS AND CONCLUSIONS

To simulate as many driving conditions as possible (within the constraints of the laboratory engine system) the following combinations of load (torque) and speed (rpm) were recorded: (See the attached lab text data sheets in appendix).

Gasoline

Torque 2 lbs.	RPM	2500
		3000
		3500
		4000
Torque 3 lbs.		4000
Torque 4 lbs.		2500

Diesel Fuel

Torque 2 lbs.	RPM	2000
Torque 3 lbs.		2500
		1500
Torque 4 lbs.	RPM	2000
		2500
		3000

As a result of these tests, it was concluded that additive Formula X2000 KLEEN FUEL Combustion Improver reduces the rate of fuel consumption in gasoline, Diesel engine fuel respectively.

The rate of reduction of fuel consumption depends on the selected combination of torque and rpm, all other factors kept constant.

The percentage of reduction of fuel consumption for the gasoline used due to additive Formula X2000 KLEEN FUEL Combustion Improver ranged from a minimum of 13.5% (for a combination of torque 4lbs. and 2500 rpm) to a maximum of 34.7% (for a combination of torque 2lbs. and 2500 rpm). The average percentage of reduction of the rate in fuel consumption for the laboratory tests conducted using gasoline was computed to be 25.47%

Similarly, the percentage of reduction of fuel consumption for Diesel fuel used due to the additive formula X2000 KLEEN FUEL combustion Improver ranged from a minimum of 15.6% to a maximum of 35.66%, with an average of all tests conducted of 27.99%.

At constant torque, it was determined that the rate of reduction of fuel consumption increased as the revolution per minute decreased.