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Dee-Zol Test Report
University of Nevada at Reno – Agricultural and Industrial Mechanics Division

This test protocol was performed at the Agricultural and Industrial Mechanics Division of the University of Neveada, Reno. It was performed by Jim Patterson under the supervision of Associate Professor Theodore Butler. Bell Performance, the manufacturer of this product, makes claims of increased power, lower fuel consumption and a lower pour point for treated fuel. This study was undertaken to see if these claims were valid.

Scope

The following is an evaluation of claims by Bell Performance, Inc., relating to the sale of the Dee-Zol fuel additive to diesel fuels.

The test was conducted in seven phases:

1. Be sure test engine was properly tuned to manufacturer's specifications
2. Establish baseline data to compare results
3. Operate the test engine using a ratio of four ounce of Dee-Zol additive to ten gallons of fuel. Record results.
4. Operate the test engine using a ratio of two ounces of Dee-Zol to ten gallons of fuel. Record results.
5. If an improvement is noted from baseline data, reduce the dynamometer setting to that established in Phase 2 and record changes, if any, in fuel consumption.
6. Operate test engine again without Dee-Zol additive. Record results.
7. Check for changes in pour point of treated fuel vs. untreated fuel at low temperature.

The test engine used had very few hours on it, therefore there was little, if any, carbon or gum build-up in either the engine or injectors.

Phases I and II

The test equipment consisted of a 371 Diesel Diesel engine mounted in an immobile stand properly tuned to manufacturer's specifications. A dynamometer was installed to register horsepower (HP) and revolutions per minute (RPM). To register fuel consumption, a timing system was used. It was recorded how many minutes it took for the engine to consume a measure quantity of fuel (one gallon) and then converted to gallons per hour (GPH). The test engine initially was operated for three hours on untreated diesel fuel to establish baseline data. Baseline conditions for the engine utilized in the study were as follows:

90 HP
1050 RPM
2.75 GPH

Phase III – Operate Engine with Four Ounces of Dee-Zol Additive Per Ten Gallons of Fuel

Four ounce of additive were added to ten gallons of diesel fuel and the engine operated. Within one hour, a slight drop in fuel consumption was noted to 2.68 GPH. After a period of three hours, an additional drop in fuel consumption and an increase in horsepower were recorded. At this point, readings were as follows:

92 HP
1050 RPM
2.55 GPH

Readings then remained stable for a period of two hours when another drop in fuel consumption was noted, to 2.45 GPH, and soon after, the horsepower climbed to 93. These readings remained stable for six hours afterwards. A comparison of operating characteristics with time follows:

Phase II – Baseline Data	Hours Since Addition of Additive		
	1	2	3
90 HP	90 HP	92 HP	93 HP
1050 RPM	1050 RPM	1050 RPM	1050 RPM
2.75 GPH	2.68 GPH	2.55 GPH	2.45 GPH

Phase IV – Operation of Engine with Two Ounces of Dee-Zol Additive Per Ten Gallons of Diesel Fuel

Twelve hours into the test, the Dee-Zol mixture was changed to two ounces of additive to ten gallons of diesel fuel. This is the manufacturer's recommended ratio of additive to diesel fuel following the initial break-in period using a double dosage (four ounces to ten gallons of fuel).

No changes in either fuel consumption or horsepower were noted for a one hour period. At this point, fuel consumption began to slowly drop over a four hour period to a level of 2.35 GPH. Concurrently, horsepower increased to 94 and up to 95 through several fluctuations. These readings remained the same for eight hours of additional operation.

The stabilized readings after twenty-four hours into the test, as follows:

Phase II – Baseline Data	Twenty-Four Hours Since Addition of Additive
90 HP	94 HP
1050 RPM	1050 RPM
2.75 GPH	2.35 GPH

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Phase V – Compare Results of Phase III and IV with Baseline Data

This phase tries to compare the relationship of theoretical mileage traveled as compared to fuel consumption. The dynamometer setting was reduced to 90 HP, which was the original level established during Phase II.

Phase II – Baseline Data	**Data With Dynamometer Reduced From 94 to 90**
90 HP	90 HP
1050 RPM	1050 RPM
2.75 GPH	2.30 GPH

Lowering the dynamometer setting to the original horsepower is very noteworthy as the increase in fuel efficiency shown at the same HP and RPM is closely related to the miles per gallon or gallons per hour a vehicle will consume.

Phase VI – Re-operate Engine Without Additive Following Completion of Phase V

In an attempt to verify if improvement indicated was the result of the addition of the Dee-Zol additive, the test engine was operated without additive and the dynamometer reset to 94 horsepower. If the additive was responsible for previous improvement, the engine operating characteristics should return to the baseline data recorded in Phase II.

Energy output began to drop almost immediately. Within one hour, the horsepower had dropped from 94 to 92 and fuel consumption had returned to the original level of 2.75 GPH. Two hours later, all readings had returned to the baseline levels recorded in Phase II.

This portion of the test was concluded after an additional three hours of engine operation with no further changes in engine operating characteristics.

Phase VII – Test Dee-Zol-Fuel and Untreated Fuel For Variation in Pour Point Temperature

The method use for testing for ASTM D97-66 (Standard Test Method for Pour Point of Petroleum Oils). #2 diesel fuel was used for this portion of the test.

Samples were made as follows:

Untreated Fuel: 4 oz. to 10 gallons – ratio Dee-Zol treated
2 oz. to 10 gallons – ratio Dee-Zol treated

Results were as follows:

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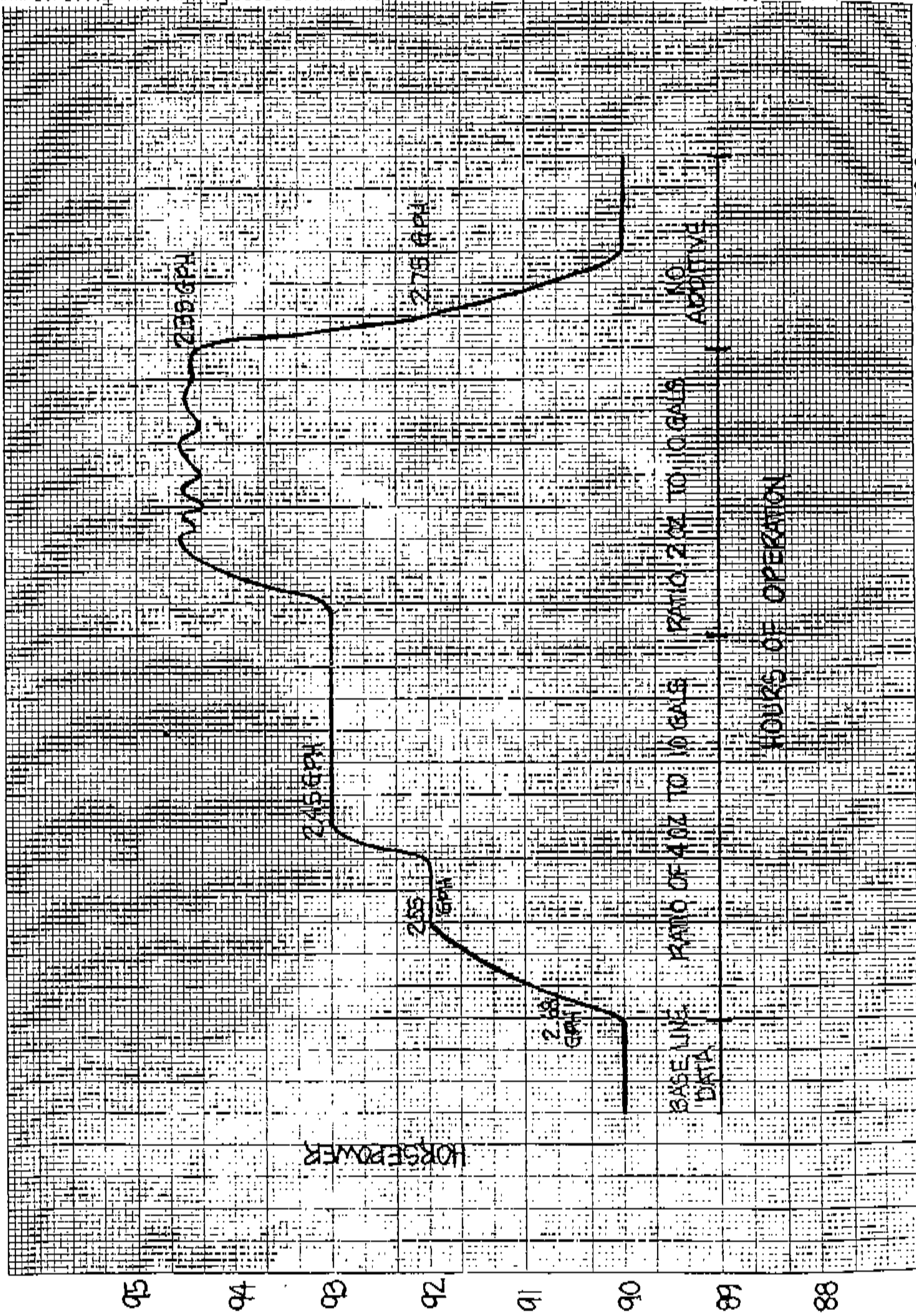
Untreated Fuel:	Pour Point = -9 degrees F
2 oz. to 10 gallons:	Pour Point (Standard Dose) = -17 degrees F
4 oz. to 10 gallons:	Pour Point (Double Dose) = -19 degrees F

Summary of Conclusions

Preliminary research indicates increased engine efficiency and a lower pour point for fuel treated with the Dee-Zol treated fuel. Long-term analysis is recommended to verify the preliminary results for various engine types having different load demands and various degrees of maintenance and repair.


HORSEPOWER
95
94
93
92
91
90
89
88
HOURS OF OPERATION
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
BASE LINE DATA
RATIO OF 4 OZ TO 10 GALS
RATIO 2 OZ TO 10 GALS
NO ADDITIVE
2.48 GPH
2.55 GPH
2.45 GPH
2.55 GPH
2.75 GPH

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