



**COMBUSTION SYSTEM CATALYST**

IMPROVE PERFORMANCE • REDUCE EMISSIONS • IMPROVE MILEAGE

## EcoSave™ Catalyst: Engine Dynamometer Study - February 2011

### *Executive Summary*

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#### **Fuel Savings (Table 1):**

1. The consumer of liquid petroleum-based fuels may enjoy significant fuel savings when using EcoSave™ liquid fuel catalyst in their internal combustion engines (ICE). Simply put, EcoSave™ works by improving ICE efficiency. The catalytic action of EcoSave™ accelerates the combustion rate of fuel resulting in measurable increases in engine performance and fuel economy.
2. This is unequivocally demonstrated by the following engine dynamometer study, in which fuel consumption fell by 16% - 17% versus baseline after the engine was properly "conditioned" with EcoSave™ catalyst.
3. Furthermore, there was an increase in power by 2% - 2.8% when using EcoSave™ catalyst.
4. Air flow increased by 9.3% - 9.8% with EcoSave™ catalyst. This is consistent with a more complete burn of fuel in the combustion chamber and the need for additional air to complete the burn.

#### **Emission Reductions: Engine run under load at 2250 RPM (Table 2).**

1. Unburned hydrocarbons (CxHy) were reduced by a huge 84% using EcoSave™ catalyst when the engine was properly "conditioned" with EcoSave™ catalyst over an untreated engine. [The decrease was from 102 ppm to 16 parts ppm].
2. Oxides of Nitrogen (NOx) declined by 16%.
3. Carbon monoxide (CO) declined by 54%.
4. Carbon dioxide (CO2) declined by 9%.
5. Oxygen consumption went up 25%. This is consistent with more fuel burning while still in the combustion chamber (as opposed to the exhaust port) and requiring more oxygen for the burn.

**EcoSave Catalyst Dyno Study - February 2011**

**Table 1:** Summary of Dynamometer Measurements for engine performance as expressed in percent change (with versus without EcoSave™ catalyst added to fuel).

Description of Comparison	Increase in Torque	Increase in Power	Decrease in Fuel Consumption	Increase in Air Flow	Decrease in Energy Used (BSFC)*
First hour without EcoSave™ vs. Last hour with EcoSave™	2%	2%	17%	10%	17%
Average of First 12 hours without EcoSave™ vs. Last 12 hours with EcoSave™	3%	3%	16%	10%	16%

**Table 2:** Summary of Exhaust Emissions Measurements as expressed in absolute values and percent change (with versus without EcoSave™ catalyst added to fuel).

Description of Comparison	CO (%)	CO2 (%)	O2 (%)	Unburned CxHy (ppm)	NOx (ppm)
Without EcoSave™	2.7	13.3	1.1	102	924
With EcoSave™	1.2	12.1	1.4	16	780
% Reduction	55%	9%	27%	84%	16%

This Engine Dynamometer Study was conducted by an independent 3<sup>rd</sup> party testing facility using a matched pair of Ford Motor Company Windsor 302 cubic inch V-8 gasoline engines. The engine dynamometer was an advanced model SF-902 equipped with WynDyn software that enabled the direct measurement of specific fuel consumption in pounds per hour (lb/hr). The gasoline used was a standard pump fuel.

\* **Brake Specific Fuel Consumption (BSFC):** The ratio between the engine's fuel mass consumption and the crankshaft power it is producing. This makes it a valuable fuel efficiency indicator.

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**Fuel Savings - Raw Data from Dyno Study**

**Without EcoSave™:**

Fuel Readings First 12 hours	Day 1		1st 12 hrs.			
	RPM	Torque	Power	lbs./hour	Air Flow	BSFC
First 12 Hours of Study	2250	74.0	31.7	17.21	13.14	0.512
	2251	72.3	31	16.81	12.84	0.500

	2248	73.5	31.5	17.09	13.05	0.508
	2251	73.0	31.3	16.98	12.96	0.505
	2248	74.0	31.7	17.21	13.14	0.512
	2248	73.7	31.5	17.14	13.08	0.510
	2251	72.5	31.1	16.86	12.87	0.502
	2252	72.8	31.2	16.93	12.92	0.504
	2252	73.5	31.5	17.09	13.05	0.508
	2248	74.2	31.8	17.26	13.17	0.513
	2249	73.9	31.6	17.19	13.12	0.511
	2252	74.2	31.8	17.26	13.17	0.513
<b>Total</b>	<b>27000</b>	<b>881.6</b>	<b>377.7</b>	<b>205.03</b>	<b>156.51</b>	<b>6.098</b>
<b>Average</b>	<b>2250</b>	<b>73.47</b>	<b>31.5</b>	<b>17.09</b>	<b>13.0</b>	<b>0.51</b>

**With EcoSave™: Fuel  
Readings Last 12 hours**

**Day 14**

**Last 12  
hours**

	<b>RPM</b>	<b>Torque</b>	<b>Power</b>	<b>lbs./hour</b>	<b>Air Flow</b>	<b>BSFC</b>
	2249	75.3	32.2	14.23	14.21	0.423
	2248	75.6	32.4	14.29	14.26	0.425
	2249	76.0	32.5	14.37	14.34	0.427
	2249	76.1	32.6	14.39	14.36	0.428
	2250	76.2	32.6	14.38	14.66	0.428
	2251	75.8	32.5	14.30	14.59	0.425
	2251	75.7	32.4	14.28	14.57	0.425
	2249	75.6	32.4	14.26	14.55	0.424
	2250	75.4	32.3	14.23	14.51	0.423
	2250	75.1	32.2	14.17	14.45	0.421
	2249	75.2	32.2	14.19	14.47	0.422
<b>Last Hour of Test</b>	2251	75.3	32.3	14.21	14.49	0.423
<b>Total</b>	<b>26996</b>	<b>907.3</b>	<b>388.6</b>	<b>171.3</b>	<b>173.46</b>	<b>5.094</b>
<b>Average</b>	<b>2250</b>	<b>75.61</b>	<b>32.4</b>	<b>14.3</b>	<b>14.5</b>	<b>0.42</b>