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Clark Daywalt:

It is my opinion that the recently performed Reid Vapor Test ("R.V.P.") is the most significant and meaningful test demonstrating the effects of the ecolizer. Vapor pressure is a measure of the ability of a liquid to dissociate into the gaseous state. In a fixed volume of space, a liquid will exhibit an equilibrium of evaporation and condensation at a specific pressure and temperature. Hydrocarbon liquids display a specific vapor pressure correspondent to their chemical make-up when this equilibrium is obtained. Short chain hydrocarbons exert higher vapor pressures than do longer chain heavier components. Molecular dissociation is effected by molecular forces, charge, surface tension, surface area, and structure.

The distillation of crude oil at the refinery breaks the original feed stock into fractions characterized by Vapor pressures and corresponding molecular weights. The diesel component is fractionated at a higher temperature than gasoline due the longer carbon chain structures typical to that fluid. Therefore, diesel exhibits a lower vapor pressure than does gasoline. Generally speaking, each addition of a carbon atom in the hydrocarbon structure increases the resistance of that liquid to exert a vapor pressure.

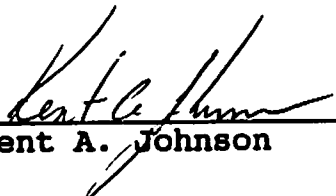
The combustion reaction is defined as the combination of a hydrocarbon, oxygen and an initial input of energy yielding water (H₂O), carbon dioxide (CO₂), and a positive net heat of reaction value (Q). The heat value is converted to power in an engine through the pressure of thermal expansion against a piston. In order for the hydrocarbon and oxygen to combine the hydrocarbon must exist in the Vapor state. The heat associated in the combustion chamber of this reaction is often high enough to vaporize the majority of incoming fuel. However, as the quality of the fuel degrades (longer carbon chain structures), the ability for the entire amount to vaporize diminishes. Thus, unburnt hydrocarbons are produced in the emissions or product side of the combustion equation.

The black diesel exhaust is visible evidence of the lack of diesel fuel to vaporize in the combustion process. If the combustion process was 100% efficient the only product would be water and carbon dioxide. A higher vapor pressure fuel will interact and burn to a greater degree of completeness while generating less unburnt byproducts. The amount of thermal pressure will consequently increase and cause a greater amount of work performed per unit of fuel within an engine.

The test results you have forwarded to myself indicate an initial vapor pressure for untreated diesel of .6 psi R.V.P. and a treated diesel of 1.0 psi R.V.P. This is of great significance for identifying the physical mechanism which accounts for both the observed differences in driving a vehicle with an ecolizer and the reduction in hydrocarbon emissions. The gasoline test indicated a change in R.V.P. from 7.6 psi untreated to 8.4 psi for the treated sample. Although the magnitude is not quite as large as observed with diesel, the result is very significant. The government has recently imposed restrictions on gasoline at the pump limiting the R.V.P. to 7 psi. This is effective only during the summer months due to the volatile nature of gasoline during warmer temperatures. The restrictions were created to control the amount of vapors escaping and coming in contact with humans. Therefore, the octane rating of the gasoline must be achieved through alternative means other than through the high vapor pressure components. The installation of an ecolizer becomes of even greater significance during these periods because the fuel can be treated to increase its volatility while on a direct path to the engine and not hinder the health of individuals.

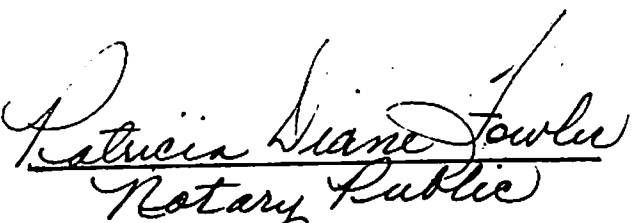
Vapor Pressure Analysis is a very positive step in the description of effects caused by the product. There are additional areas of investigation which will break down the academic analysis of the effects but quantitatively the vapor pressure analysis is an easily repeatable, recognizable by the industry, and inexpensive test of high validity.

Pursuant to your request concerning my education and interest, I have a B.S. in petroleum Engineering from the University of Tulsa, a background in organic geochemistry (chemistry of oil), interest in a refinery.


Kent A. Johnson

daywalt.let

State of Oklahoma
County of Tulsa


Patricia Diane Fowler
Notary Public
My commission expires Nov. 19, 1991