



## Viscon Combustion Emission Carbon Dioxide Avoidance Credits

### High Molecular Weight Polymer Enriched Diesel (HMWPED)

The HMWPED phenomena was first witnessed at the [China Lake Weapons Facility](#) in a test for the US Navy, US Airforce, and Department of Defense. After years of research and development formulations of HMWPED were created for the emission reductions in fuels.

With production facilities in Virginia and California, Viscon began marketing HMWPED as an emissions reduction technology. The journey began with the University of Santa Cruz and a northern California construction company both meeting governmental compliance regulations with the use of HMWPED. To date, the accomplishments of Viscon are unmatched as a technology that changes the combustion of fuels. Certifications have been granted by the Texas Commission on Environmental Quality (TCEQ) for NOx reduction, the California Air Resources Board (CARB) for particulate matter (PM) reductions and the California Environmental Protection Agency (CalEPA) for health risks review. No other additive in the world can claim to successfully meet the stringent requirements. The use of HMWPED for carbon footprint strategy planning can and should be used by every fuel refiner today.

### The Science Behind Viscon

It is well known that diesel engine combustion behavior can be enhanced by improving air/fuel mixture formation. Scientific evidence shows that blending the Viscon fuel additive in diesel reduces a wide range of harmful emissions, including CO<sup>2</sup> and Particulate Matter (PM), making Viscon a unique product in the global fight against release of greenhouse gases.

Viscon treated diesel fuel improves the fuel/air mixture formation by modifying the fuel rather than the engine. At best, the fuel behaves like an ordinary liquid. Under conditions of sudden stress, however, as in being sprayed from an injector, the fuel has greatly increased viscosity.

A viscoelastic fuel has different spray and vaporization behavior. The injector spray is more controlled producing more uniform droplet size and more uniform distribution of fuel over the cross section of the spray cone. Super fine, satellite droplets are eliminated and overall Sauter Mean Diameter is reduced. The benefits gained from changes in spray and vapor behavior in fuel penetration, dispersion, and homogeneity of light and heavy fuel species in the air/fuel mixture are each essential to ideal mixture formation. Increased spray penetration and improved dispersion are achieved by having more uniform droplet size, more uniform droplet distribution and reduced droplet growth by collision. The result is a more homogeneous air/fuel equivalency ratio.

Improved uniformity of air/fuel equivalency ratio throughout the mixture leads to greater cyclic uniformity. Less understood, but equally important in air/fuel mixture formation, homogeneous distribution of fuel components leads to lower peak temperatures and faster flame propagation. The light ends of the fuel which normally dominate and drive initial combustion moderated by the slower burning molecules. During flame propagation the normally slow burning molecules are heated and thereby aided in burning by the fast-burning light end molecules. Overall, uniformity of the air/fuel mixture results in more uniform and complete combustion of the fuel. Viscon treated fuel achieves optimal uniformity of air/fuel ratio by transforming the raw polyisobutylene polymer to a liquid state via a temperature-controlled mixing process. When mixed with fuel Viscon will:

- improve torque
- improve air quality
- improve fuel combustion
- reduce fuel consumption
- reduce harmful emissions
- reduce operating temperatures

### **HMWPED Prevents PM Emissions**

Pyrolysis, heat-induced chemical decomposition, is responsible for the formation of the solid carbon particles that are the nucleus of the particulate emissions from a diesel engine. Pyrolysis occurs in an engine cylinder when there's insufficient oxygen for combustion but sufficient heat to cause fuel to decompose. By increasing the availability of oxygen throughout the air-fuel mixture in a diesel engine, HMWPED inhibits pyrolysis and reduces the production of PM emissions. This is the only fuel blending component approved by the CARB as a Diesel Emission Level-1 Control Strategy (DECS) for reduction of greenhouse gasses with greater than 25% reduction of particulate matter.

CARB verified HMWPED as a strategy for controlling emissions of PM from diesel engines under its Diesel Emissions Control Strategies Verification program.

### [Viscon Multi Media Analysis](#)

CalEPA formed the interagency Multimedia Working Group (MMWG) to oversee fuels multimedia evaluations. The MMWG includes representatives from the Air Resources Board (ARB), State Water Resources Control Board (SWRCB), Office of Environmental Health Hazard Assessment (OEHHA), and Department of Toxic Substances Control (DTSC). The members of the MMWG are listed in Appendix A. The MMWG consults with other sister agencies and other experts as needed (e.g., if there are potential pesticide impacts, staff from the Department of Pesticide Regulation can be consulted).

Viscon is the only fuel additive to have completed the CalEPA Interagency Multi Media Working Group evaluation.

The multimedia evaluation of Viscon-treated diesel includes an assessment of potential impacts on air, water, and soil that may result from the production, use, and disposal of fuel treated with Viscon additive.

“OEHHA staff concludes that the use of Viscon-treated diesel fuel may reduce morbidity and mortality due to pulmonary diseases, including lung cancer in adults and allergic asthma in children, caused by substances in the particles contained in diesel exhaust.”

[Link to Multimedia Report](#)

## Tests Results

- [Model 3306 Caterpillar for CARB Verification](#)
- [Texas Low Emission Program \(TxLED\)](#)
- [California Air Resources Board Stockton, California Laboratory](#)
- Chile Tamaya Power Plant
  - [Baseline](#)     [8 Megawatt](#)     [10 Megawatt](#)
- [Terraforce in Ecuador](#)
- [Qingdao Public Traffic Group](#)
- [SITC Lines](#)

## **Key Facts**

- The use of Viscon when combined with diesel results in a 4.45% reduction in CO<sup>2</sup>. These reductions are verified, insured, and banked through Tesla Carbon Credit. Viscon is a proven, cost-effective strategy to reduce these emissions.
- Viscon Carbon Credits are insured by Swiss Re, Howden, or comparable Insurer.
- Endorsed by the Institute of Global Education, granted special consultative status with the United Nations Economic and Social Council (ECOSOC). [more...](#)
- Viscon Carbon Credits are considered a Super Offset Credit because Viscon also reduces other GHG emissions.
- Viscon Technology has been used for emission reduction programs since 2004

## **Tesla Carbon Bank (TCB)**

Carbon avoidance is a field of its own in the carbon footprint strategies arena. In evaluating potential methods the TCB first looks at Risk Assessment from both an environmental and economic position. The TCB has chosen to emulate the MMGA review process to evaluate environmental risks. Economic risks from a project generator or project offset credit purchaser will be addressed through a vetting process by a Qualified Insurance Underwriter.

## **TCB Level of Excellence**

The project standard will define the rules and requirements for both areas of risk assessment. Project owners may wish to add to the levels of performance but not diminish them. The goal of a TCB offset is to create a superior credit in today's market.

## **Accounting Methods**

Detailed procedures and methods for emissions reduction and avoidance testing will be reviewed and third party verified. Each project shall have additional GHG benefits to qualify for a TCB Super Offset Credit. The projects owner shall have an active role in the process by supplying all information needed to produce a Life Cycle Analysis (LCA).

## Registration of Offset Credit

All information related to the project is stored and available to project partners in an approved registry system. The registry will track creation, banking, sales, and retirement of each credit.

## How Carbon Credits Are Calculated

Carbon Credits are calculated by multiplying total amount of Viscon treated gallons of diesel by 22.4 (the scientific amount of CO<sup>2</sup> emissions in lbs, produced by 1 gallon of diesel combusted) to determine the pounds emitted from one gallon of diesel exhaust. As Carbon Credit transactions are defined in metric tons, we simply divide the total by 2200 to achieve the tons of CO<sup>2</sup> emitted from the volume of diesel treated. Then multiply the percentage of reduction determined by the TCB (4.5%) to the tons. From that figure the amount of GHGs including CO<sup>2</sup> that are generated by the manufacturing of Viscon are determined in a Life Cycle Analysis. In this case .05% is then subtracted from the 4.5% to give you a net reduction of 4.45% CO<sup>2</sup>. See formula below. The calculations are also shown in detail on the attached form. [Here](#)

### Carbon Offset Credit Calculator

<b>Company</b>	XYZ		
<b>Product</b>	Diesel		
<b>Diesel Gallons Per Day</b>			2,560.00
<b>Total CO<sup>2</sup>Emissions Produced lbs</b>		x22.4	57,344.00
<b>Converted to Metric Tons</b>		/2,200	26.07
<b>Percentage of Reduction Minus the Life Cycle Analysis for Viscon (4.45%)</b>			
		x4.45%	1.16
<b>Converted to Tons Per Year</b>		x365	423.40

## Frequently Asked Questions (FAQ's)

### Are the project credits certified?

Viscon Diesel Fuel Additive Carbon Offset Credits are Greenhouse Gas (GHG) emission avoidance reduction. The current Carbon credits are generated in the state of Texas by commercially treating 8.4 billion gallons of diesel fuel with verified reduction of 4.45% of CO<sup>2</sup> emissions and 40% reduction of particulate matter emissions. Expansion plans throughout the United States are now underway.

### Where are the credits generated?

The current Carbon credits have been generated in the state of Texas by commercially treating 8.4 billion gallons of diesel fuel with verified reduction of 4.45% of CO<sup>2</sup> emissions and 40% reduction of particulate matter emissions. Expansion plans throughout the United States are now underway. The Voluntary Carbon Credits can be generated globally.

**Are there projects already generating carbon credits?**

Yes, Viscon has been producing diesel fuel additives in accordance with CARB and Texas Low Emissions Diesel (TxLED) programs since 2010 and has commercially treated over 8.4 billion gallons of diesel fuel in that time period resulting in generating approximately 3,500,000 carbon offset credits since being certified.

**How many credits are available for transaction and over how many future years?**

Approximately 3,500,000 carbon offset credits are available now in which Viscon can create up to 1,000,000 new credits per year and scale commensurate with future customer sales.

**What is the vintage of the credits that are currently available?**

2010-2022 credits are available. Viscon has never issued any carbon credits in its history nor has any party laid claim to carbon offsets generated as a result of using Viscon's fuel additive.

**When is the earliest estimated deliver date?**

Viscon carbon credits are now available for purchase.

**Is Viscon EPA approved?**

Viscon is a pure hydrocarbon, and as such is exempt from EPA regulations. In accordance with the EPA registration requirements for fuels and fuel additives, 'additive' means any substance other than one composed solely of carbon and/or hydrogen.

**Will Viscon effect the oxygen sensor in my vehicle?**

In some vehicles, the oxygen sensor which provides feed back to the engine control module, will cause the engine to idle higher. Within consumption of the first tank of fuel, the injection system will recalibrate and resume normal idle.

**Who do I contact in order to pursue project opportunities?**

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