
LEGACY. TECHNOLOGY. PERFORMANCE.
DIESEL 1
GLOBAL

What You Will Learn

- What's Changed, Why Evolve?
- Supply Chain Challenges
- Engine Technology Advances
- New and Improved Diesel1
- Managing Winter Performance

What's Changed, Why Change?

1996 2017

Seismic Shifts In All Links Of The Supply Chain Have Occurred

Refining

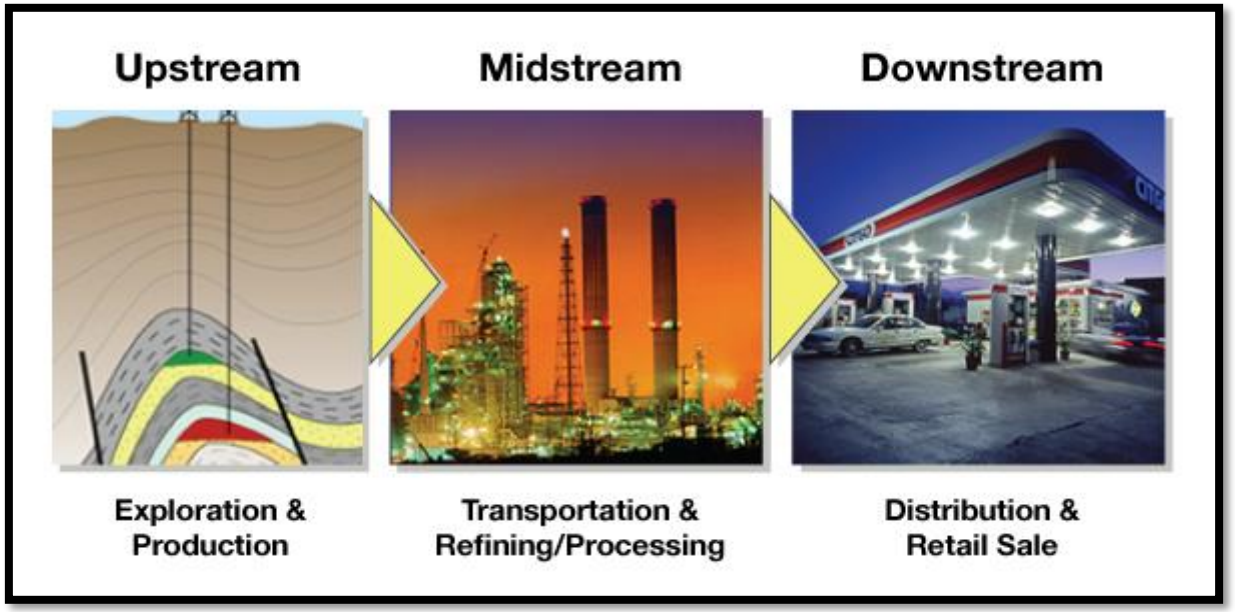
- Utilizes high temperatures, pressures, catalysts, chemical agents, varied blend stocks and complex processing pathways to produce ASTM distillates.

- Their goal is to optimize crude slates that produce ASTM spec products while maximizing their profits. Operability assurance is the down streams responsibility.

Logistics

- Efficiently and economically transferring finished fuels throughout the supply chain by pipeline, water, railcar or truck is challenging.

- Objective is to meet downstream demand, ratably, efficiently and competitively.



Terminals

- Premium fuels available where and when you require it.
- Behind the scenes there is comprehensive management of fuel stability, water, microbes and cold weather operability values.
- Optimizing chemistry, we’re never static.
- Oversight quality management has no time off.

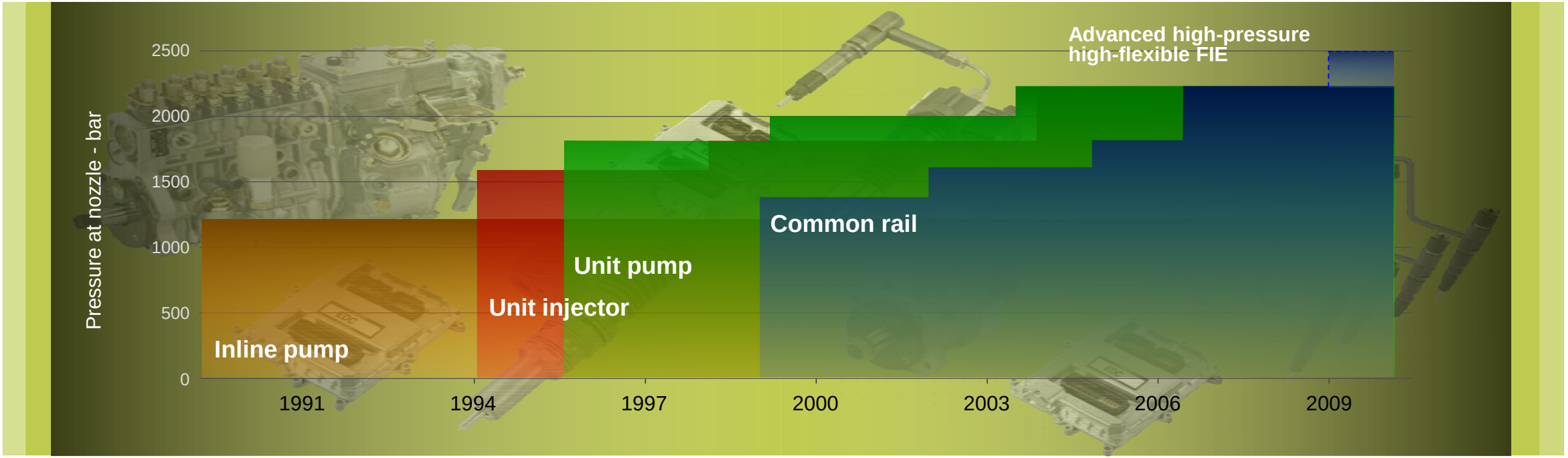
Distribution

- Maintain ASTM specifications
- Enhancing the gallon
- Develop and execute fuel quality and tank management strategies throughout the supply chain

New Demands, New Technology

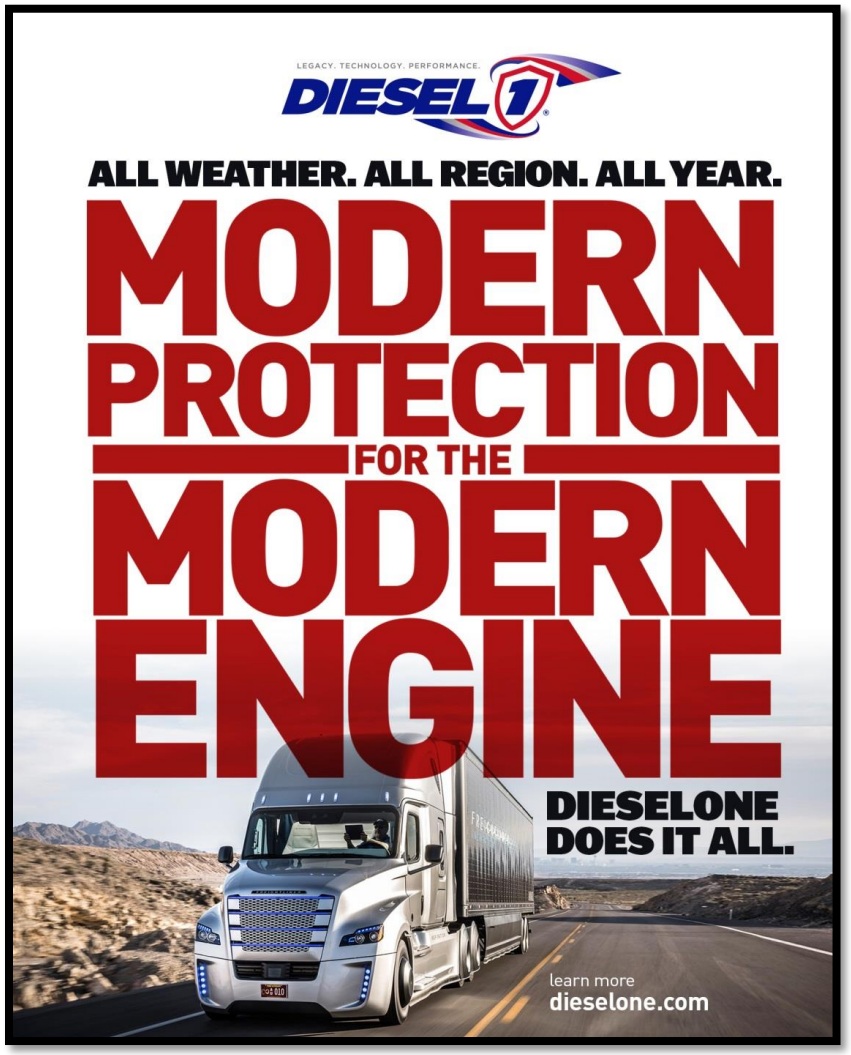
- Ensure competitive product values
- Elevate customer knowledge about relevant developments on policy, hardware advancements and changing fuel slates
- Help you educate your customers so they understand the difference between total operating costs versus lowest cost

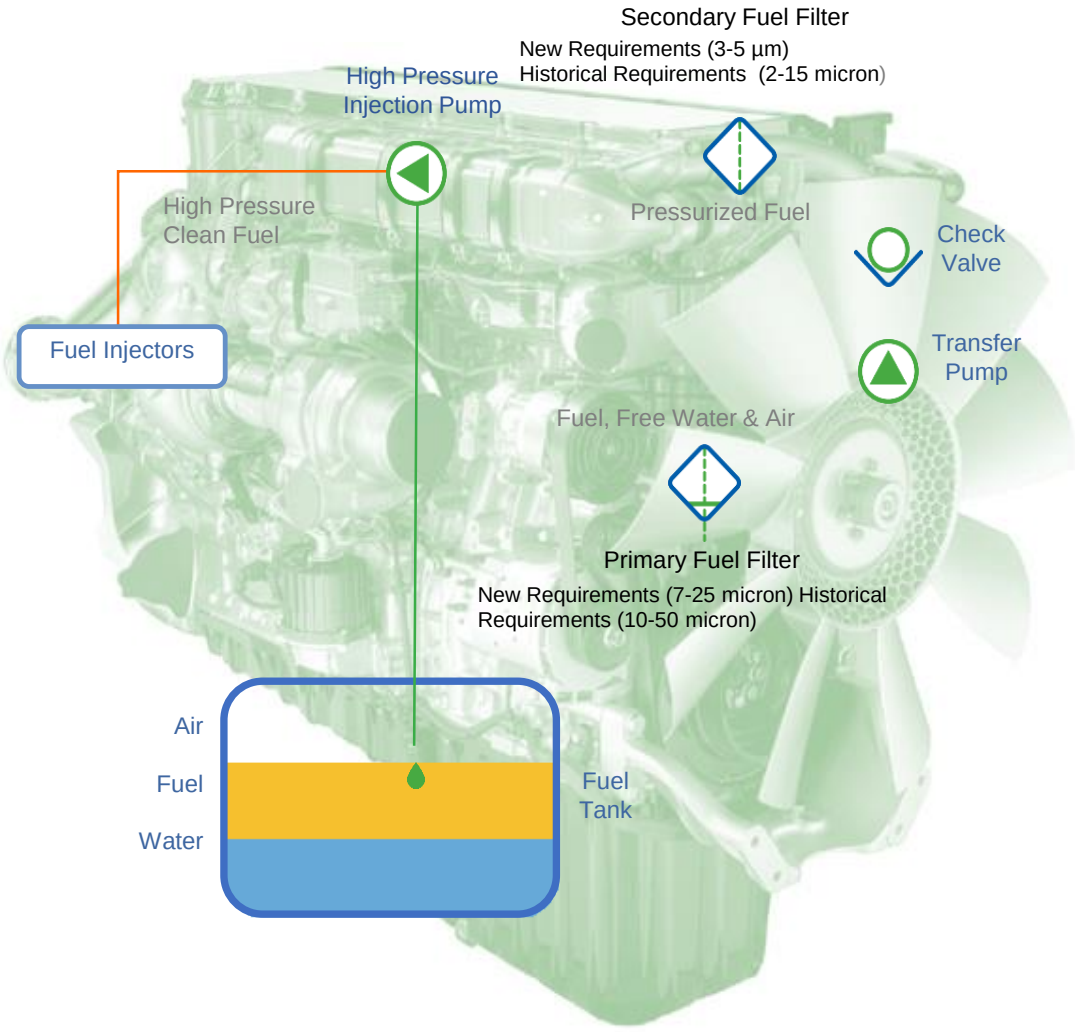
Tier 3, Warning Signs Appear



Source - Bosch SAE Oct. 2008

Technology - Challenges Filtration & Fuel



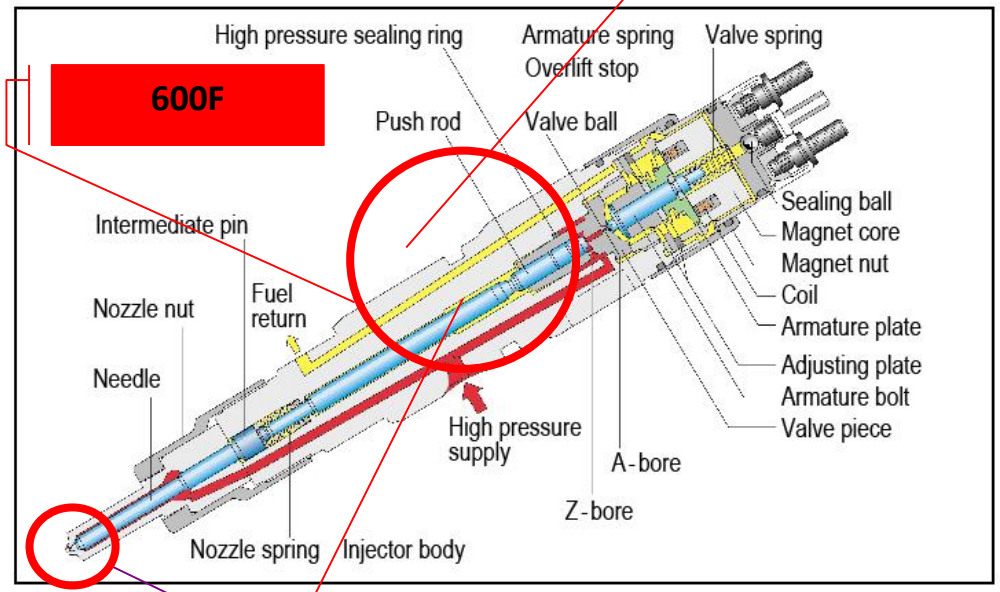


Extreme Temperatures & Pressures

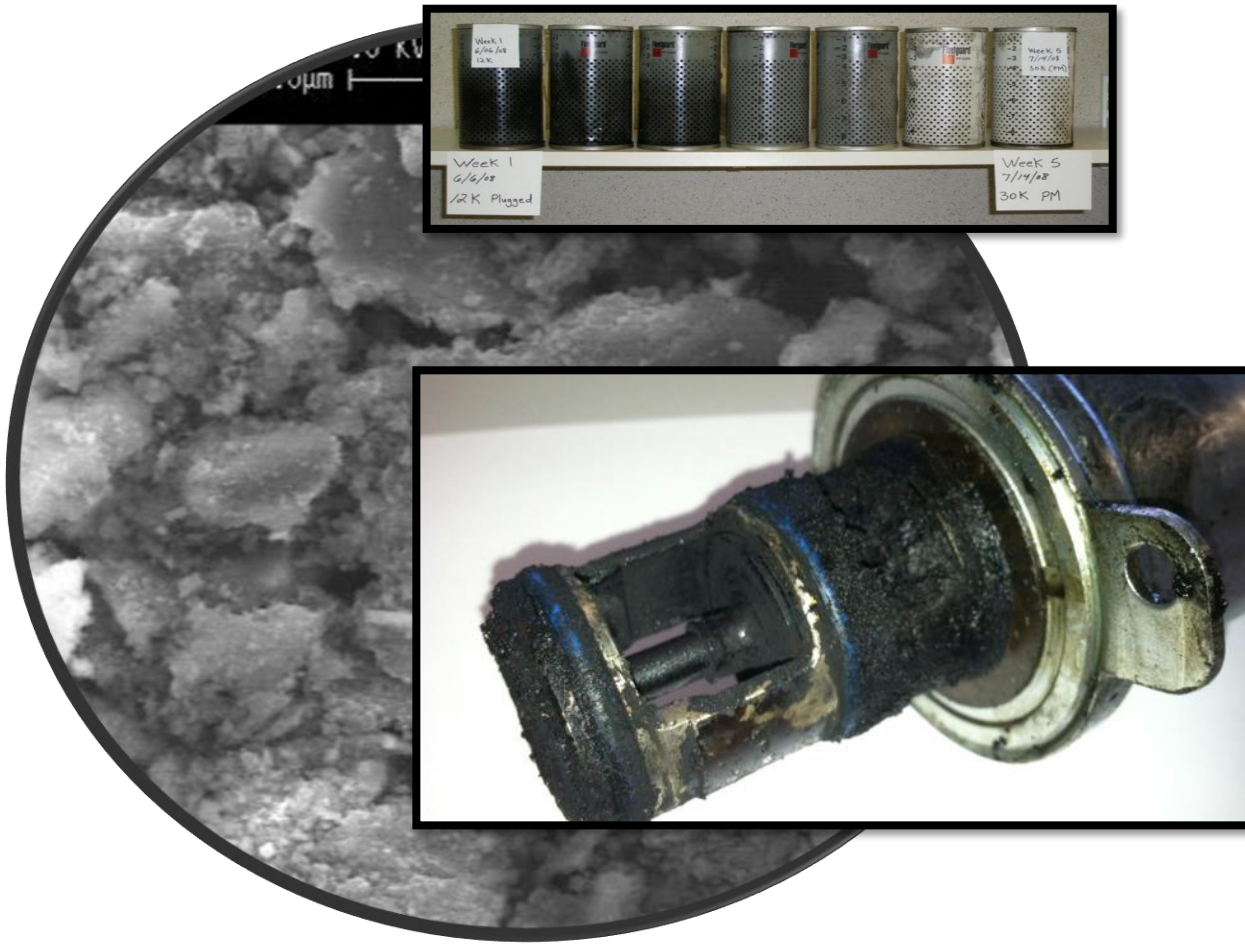
Drives Black Filters, Compromised EGR & Reduced PMI

38,000 PSI, on inbound supply side to injector unit.

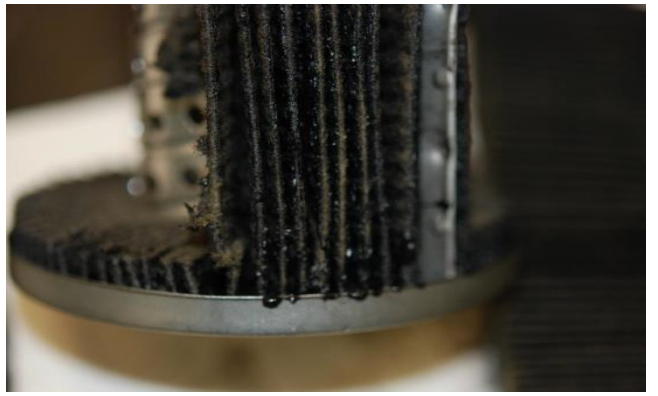
Common Rail Injector for Trucks
CRIN1

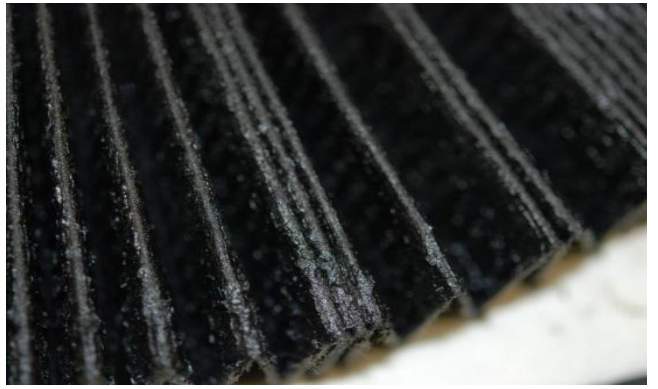


Deposit Locales



Filter Deposits, Premature Failure



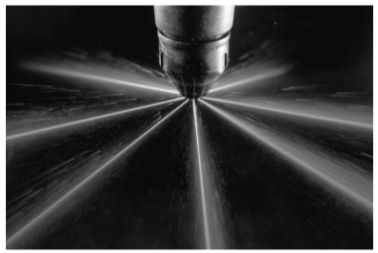


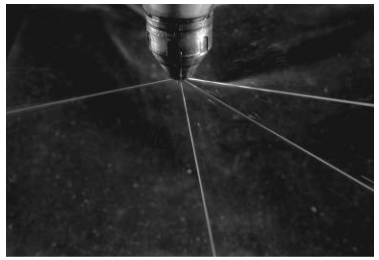
A Filter Can Expose The Challenges Associated With The Injectors Punishing Impact On Fuel

Consequences

- **Injector Fouling, Internal and Injector Tip**
  - Filter Blocking ⟷ **Shortened PMI**
  - Power Loss ⟷ **Reduced Performance**
  - Economy Deficits ⟷ **Increased Fuel Costs**

- **Current fuel injection technologies are designed to comply with stringent emission and fuel economy targets**
  - Smaller orifices
  - Tighter tolerances



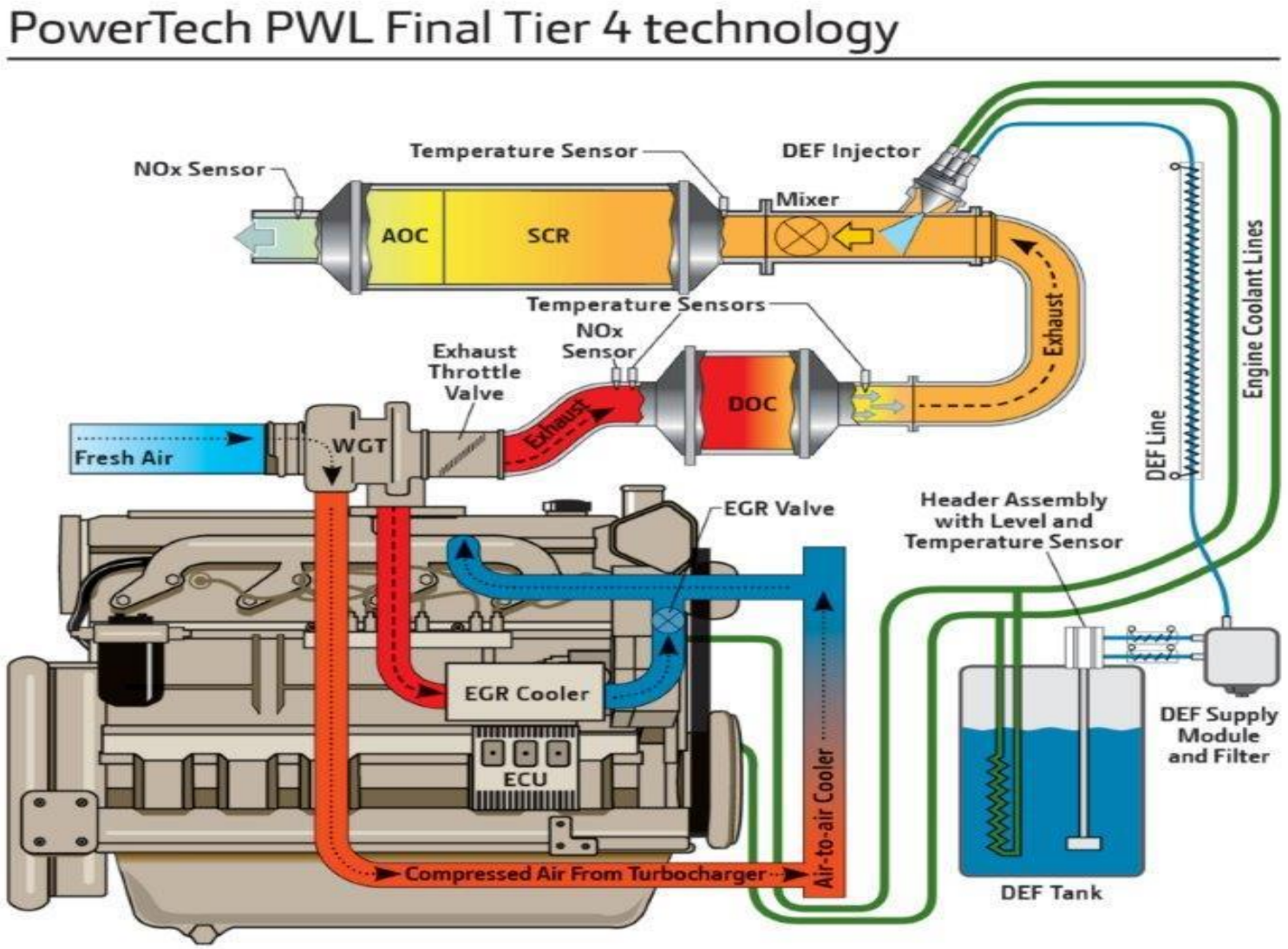


- **Increased pressures are required to generate adequate fuel flow through reduced dimension labyrinth.**

Early Warning Signs

"I'm just keeping track here and we have a 2017 Mack with 20,758 miles on the truck and the filter, please see the attached pictures of the fuel filter and pictures of the stringy deposits in the bottom of the Davco filter housing. The bottom of the fuel tank now looks just like the Davco filter housing, it has deposits laying in the bottom of the tank and a stringy like substance from the bottom protruding upward."

The Exhaust Side



Post Combustion Issues

Exhaust Gas Recirculation Valve Cleanup

DPF plugging
Turbocharger failures
Exhaust system replacement
Fuel pump failures
Exhaust sensor failures

Managing Water Concentrations

- Biodiesel can hold up more water than ultra-low sulfur diesel fuel, it can reach saturation points of approximately 1200 ppm
- ULSD reaches saturation at approximately 200-300ppm
- A B2 blend has the same saturation as ULSD
- The higher the biodiesel blend, the higher the saturation point
- As temperatures decrease, there is lower solubility which means water will drop out of solution

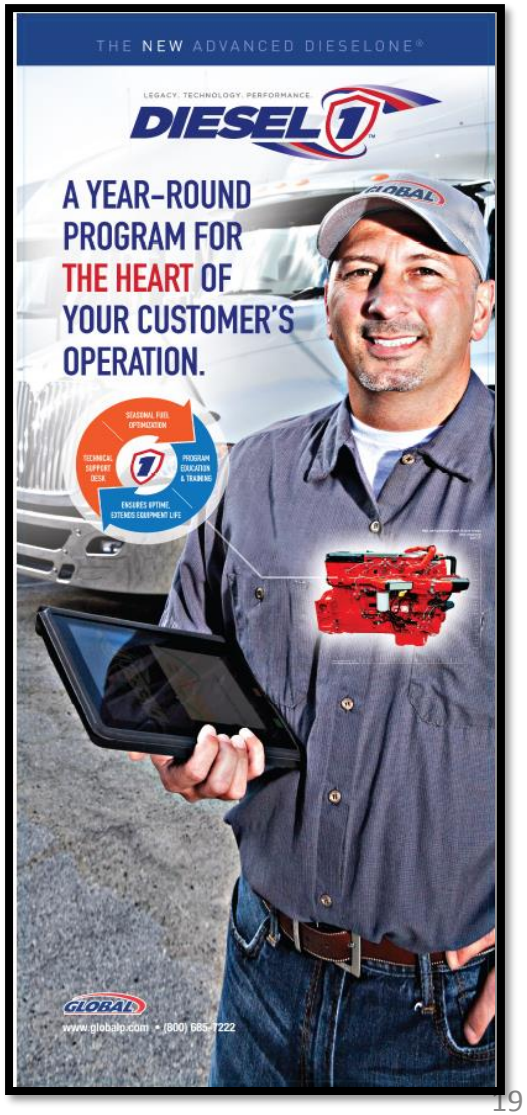
Corrosion Inhibitor

Treated Fuel	Untreated Fuel
NACE TM 01-72 A	B+
ASTM D665A 0% corrosion	2% corrosion

Injector Clean Up

Cummins 6.7L ISL,

All evidence of sodium salts remediated on DMV, Armature plate, and Valve Piston

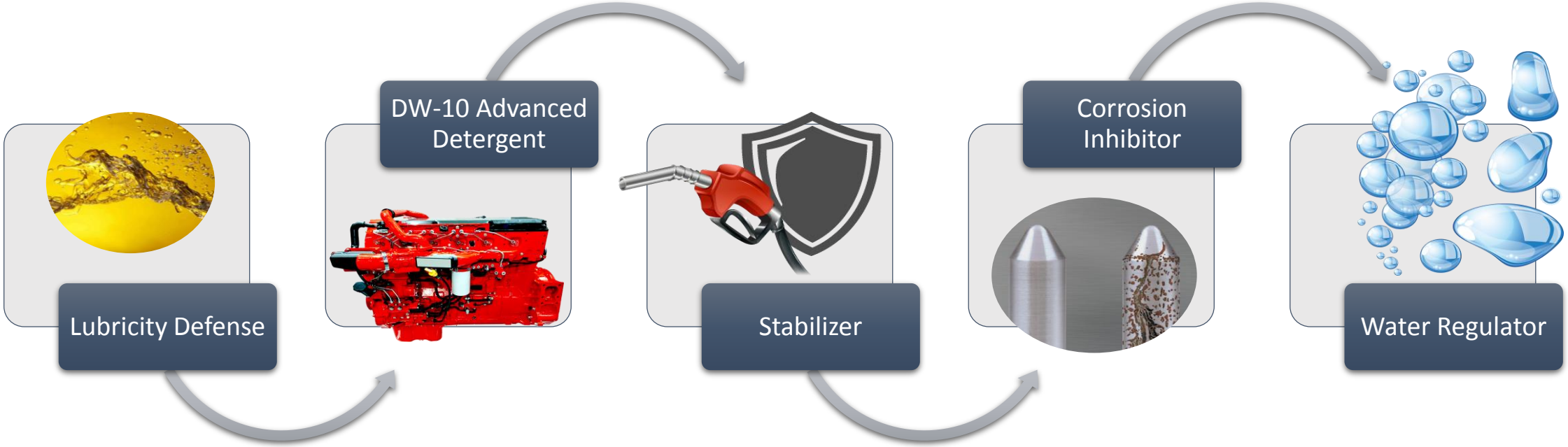


Scalable Component Benefits

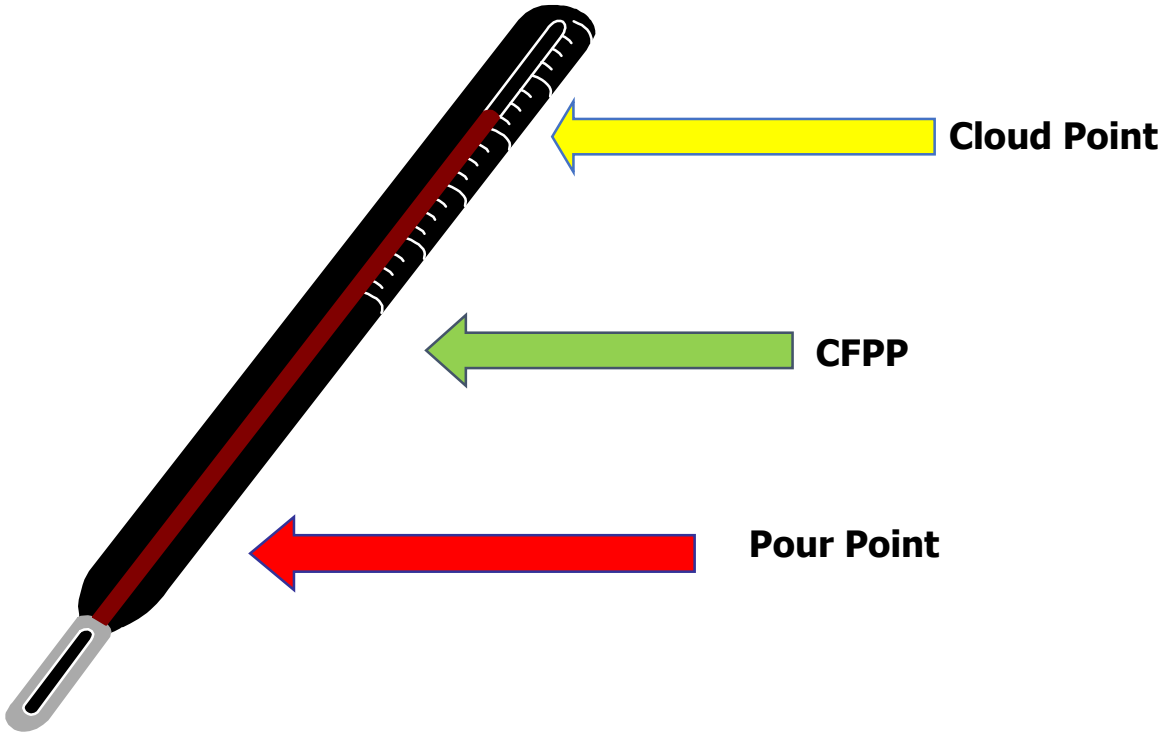
Benefits	Achieved
Test proven in common rail	✓
Keeps Clean against zinc deposits (DW10)	✓
Rapid Clean Up of zinc deposits (DW10)	✓
Keeps Clean against metal carboxylates (DW10C)	✓
Lowers maintenance costs	✓
Cleans up injector tips	✓
Cleans up internal injector parts	✓
Longer filter and engine life	✓
Maintains power	✓
Restores lost power	✓
Provides corrosion protection	✓
Provides enhanced lubricity to D975 fuel*	up to 70 micron
Maintains fuel economy	✓
3-5% restored fuel economy	✓
Prevents sludge buildup in fuel tank	✓
Provide thermal stability	✓

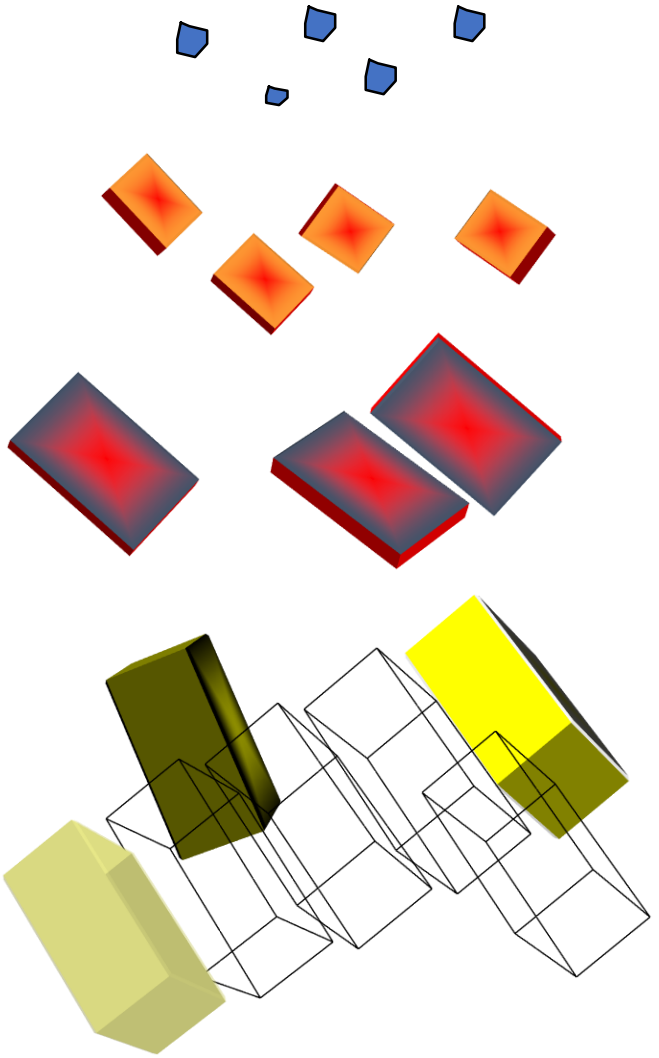
*** Average of 10 fuels**

What's Inside Diesel One™?



Optimizing Winter Performance





NUCLEI

VISIBLE CRYSTALS
Cloud Point

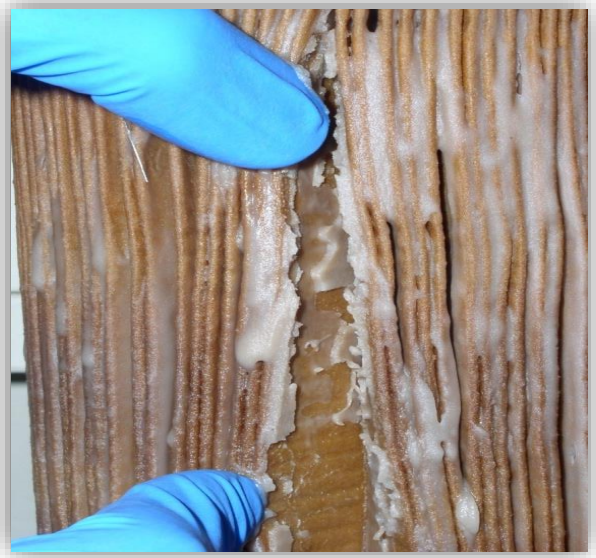
CRYSTALS GROW AND BEGIN TO ADHERE TO ONE ANOTHER

Water – Paraffin – Oxidation

Filter 3: Severe Water Contamination

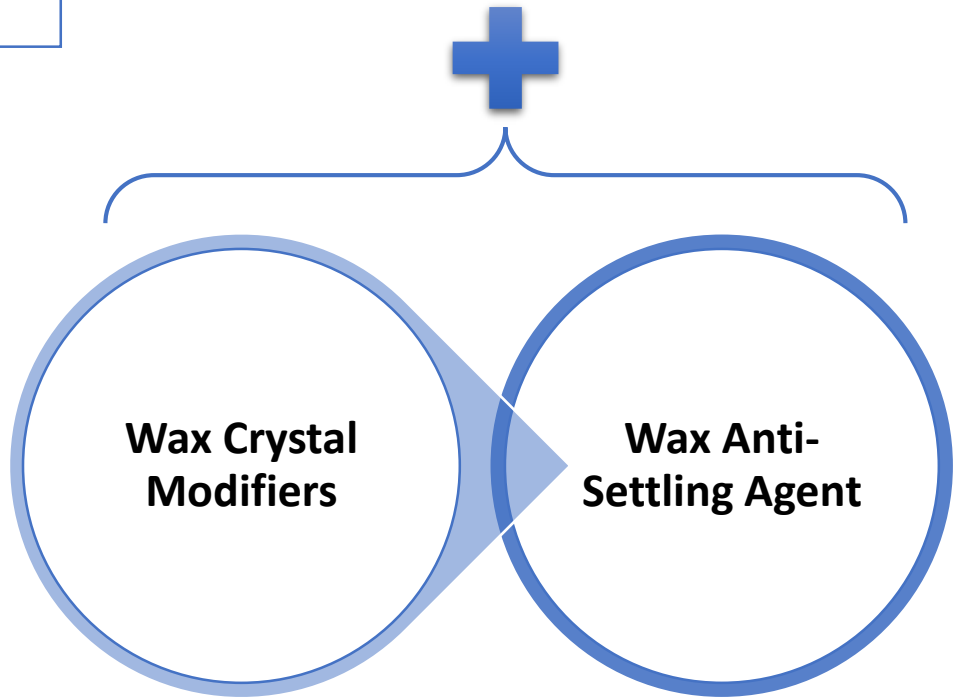
Filter 2: Petroleum Diesel Oxidation Contamination

Microbial, Corrosive & Monoglycerides

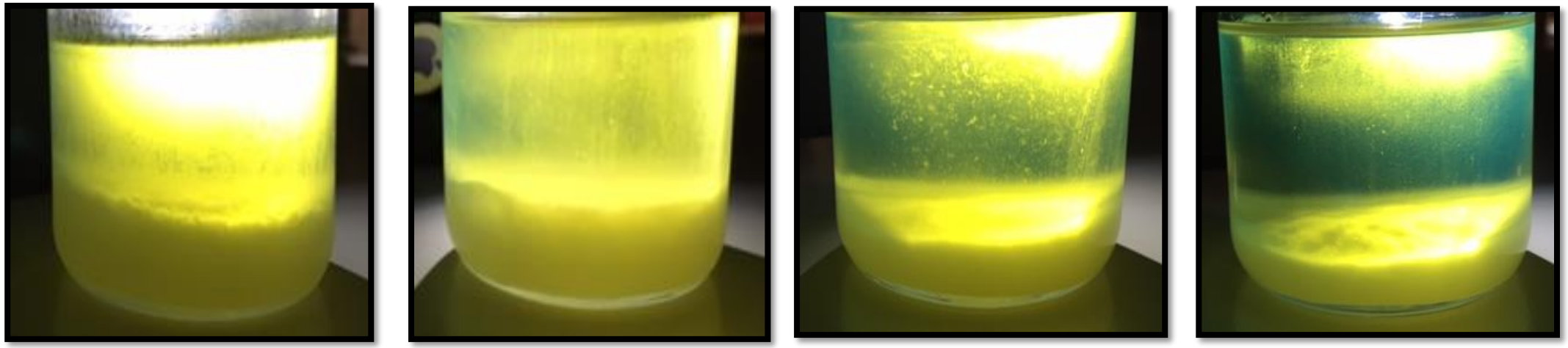


Legacy Winter Grade

1. Provides lowest CFPP
2. Disperses wax during extended engine shutdowns in sustained low temperature environments.
3. Manages entrained water

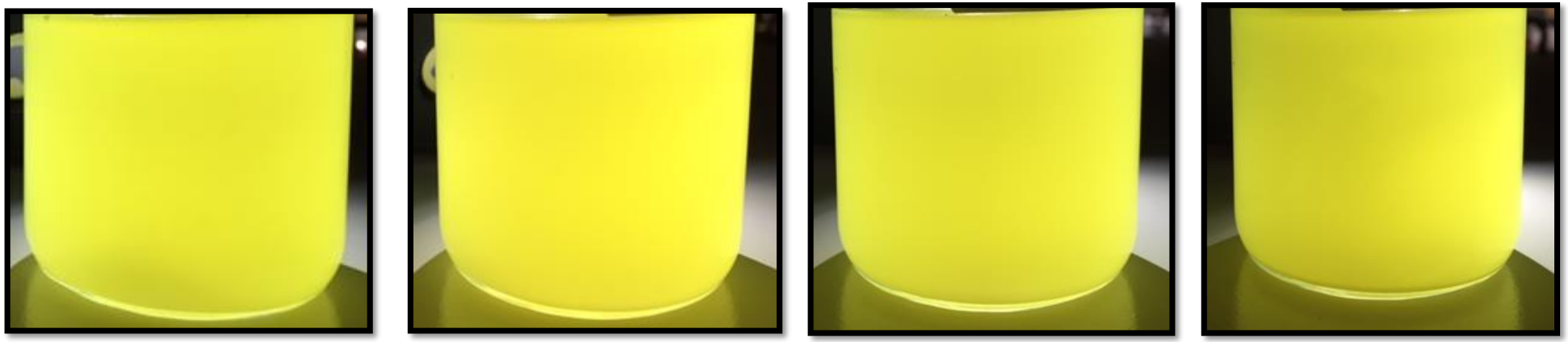


Diesel Without Diesel One Winter Synergist

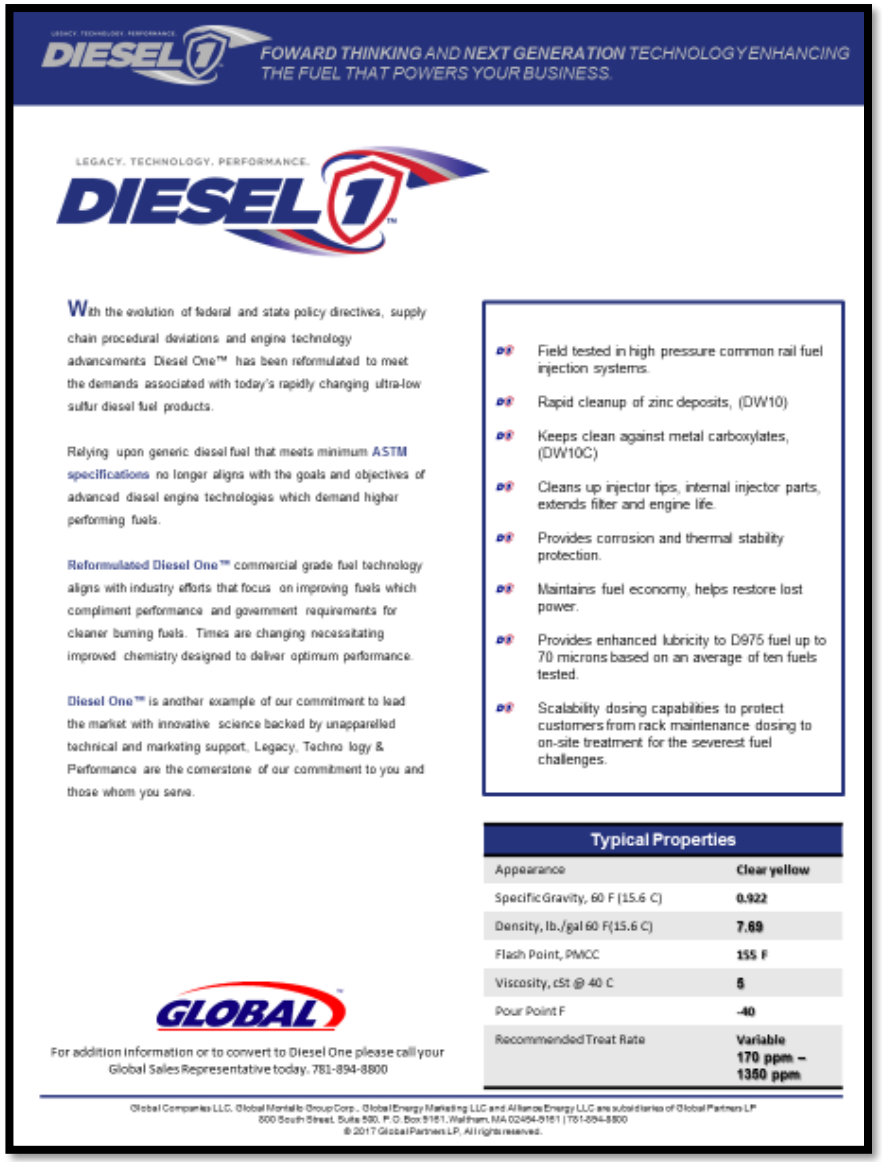


Over Night | 28 Hours | Day 3 | Day 7

Diesel One Extends Operability Time Line



Field Instructional Tools



DIESEL 1 FOWARD THINKING AND NEXT GENERATION TECHNOLOGY ENHANCING THE FUEL THAT POWERS YOUR BUSINESS.

LEGACY. TECHNOLOGY. PERFORMANCE. DIESEL 1™

With the evolution of federal and state policy directives, supply chain procedural deviations and engine technology advancements Diesel One™ has been reformulated to meet the demands associated with today's rapidly changing ultra-low sulfur diesel fuel products.

Relying upon generic diesel fuel that meets minimum ASTM specifications no longer aligns with the goals and objectives of advanced diesel engine technologies which demand higher performing fuels.

Reformulated Diesel One™ commercial grade fuel technology aligns with industry efforts that focus on improving fuels which compliment performance and government requirements for cleaner burning fuels. Times are changing necessitating improved chemistry designed to deliver optimum performance.

Diesel One™ is another example of our commitment to lead the market with innovative science backed by unapparelled technical and marketing support. Legacy, Techno logy & Performance are the cornerstone of our commitment to you and those whom you serve.

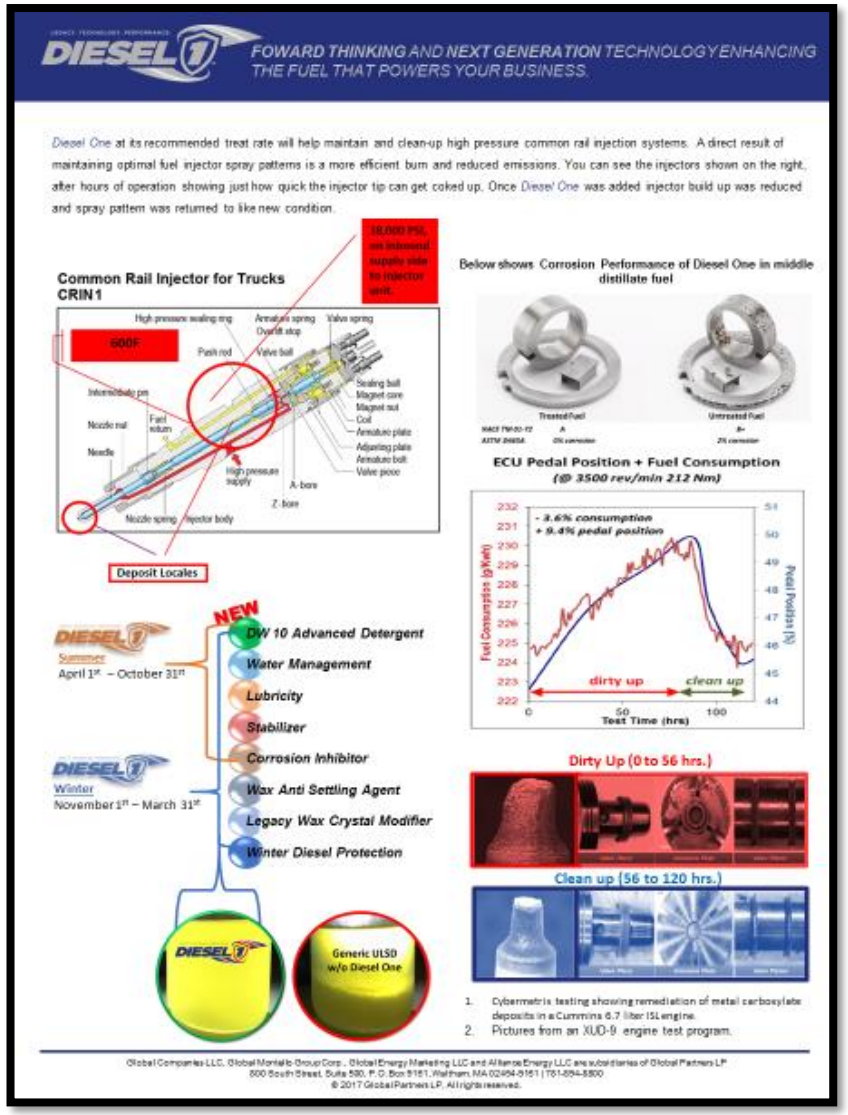
- Field tested in high pressure common rail fuel injection systems.
- Rapid cleanup of zinc deposits, (DW10)
- Keeps clean against metal carboxylates, (DW10C)
- Cleans up injector tips, internal injector parts, extends filter and engine life.
- Provides corrosion and thermal stability protection.
- Maintains fuel economy, helps restore lost power.
- Provides enhanced lubricity to D975 fuel up to 70 microns based on an average of ten fuels tested.
- Scalability dosing capabilities to protect customers from rack maintenance dosing to on-site treatment for the severest fuel challenges.

Typical Properties	
Appearance	Clear yellow
Specific Gravity, 60 F (15.6 C)	0.922
Density, lb./gal 60 F(15.6 C)	7.69
Flash Point, PMCC	155 F
Viscosity, cSt @ 40 C	5
Pour Point F	-40
Recommended Treat Rate	Variable 170 ppm – 1350 ppm

GLOBAL

For addition Information or to convert to Diesel One please call your Global Sales Representative today. 781-894-8800

Global Companies LLC, Global Montello Group Corp., Global Energy Marketing LLC and Alliance Energy LLC are subsidiaries of Global Partners LP
800 South Street, Suite 500, P.O. Box 9161, Waltham, MA 02454-9161 | 781-894-8800
© 2017 Global Partners LP. All rights reserved.



DIESEL 1 FOWARD THINKING AND NEXT GENERATION TECHNOLOGY ENHANCING THE FUEL THAT POWERS YOUR BUSINESS.

Diesel One at its recommended treat rate will help maintain and clean-up high pressure common rail injection systems. A direct result of maintaining optimal fuel injector spray patterns is a more efficient burn and reduced emissions. You can see the injectors shown on the right, after hours of operation showing just how quick the injector tip can get coked up. Once Diesel One was added injector build up was reduced and spray pattern was returned to like new condition.

Common Rail Injector for Trucks CRIN1

Below shows Corrosion Performance of Diesel One in middle distillate fuel

ECU Pedal Position + Fuel Consumption (@ 3500 rev/min 212 Nm)

NEW

- DW 10 Advanced Detergent
- Water Management
- Lubricity
- Stabilizer
- Corrosion Inhibitor
- Wax Anti Settling Agent
- Legacy Wax Crystal Modifier
- Winter Diesel Protection

DIESEL 1 Summer April 1st – October 31st

DIESEL 1 Winter November 1st – March 31st

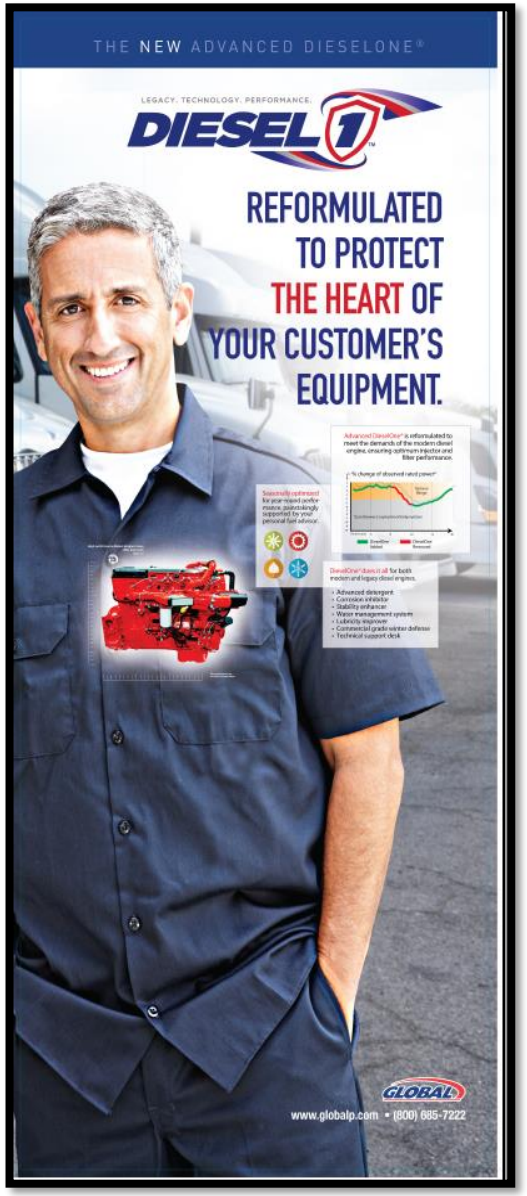
Dirty Up (0 to 56 hrs.)

Clean up (56 to 120 hrs.)

Generic ULSD w/o Diesel One

1. Cybermetrix testing showing remediation of metal carboxylate deposits in a Cummins 6.7 liter ISL engine.
2. Pictures from an XUO-9 engine test program.

Global Companies LLC, Global Montello Group Corp., Global Energy Marketing LLC and Alliance Energy LLC are subsidiaries of Global Partners LP
800 South Street, Suite 500, P.O. Box 9161, Waltham, MA 02454-9161 | 781-894-8800
© 2017 Global Partners LP. All rights reserved.



Winter Protection

Commit To Diesel One

The two most common cold weather complaints are a drop in fuel economy or, worse, vehicles that refuse to start when temperatures dip below zero. Seasonally enhanced fuels like Diesel One is optimized to will operate in temperatures as low as its cold filter plugging point (CFPP) which can be as low as –25° F.

Drain Water Separators and Replace Filters

Water in the fuel system can damage fuel pumps and injectors in cold temperatures. This creates cold engine startup issues that some fleet owners assume is “fuel gelling.” It’s more likely that water is turning to ice in fuel storage tanks and filtration systems, plugging filters during the first couple of cold snaps. Suggest to your customers to avoid those issues by replacing water-absorbing filters and regularly draining the water separator.

Check Fluids

Like diesel fuel all motor oils are not created equal, and running the wrong oil in the winter can cause unnecessary engine wear. Heavier oils might be too viscous to achieve effective lubrication at low temperatures. For easier cold cranking and startup, fleets might think about switching to a full-synthetic oil with a lower cold temperature viscosity full synthetic diesel engine oil, formulated to operate in a wide range of temperatures.

News You Can Use

- Most diesel engines in the U.S. use a combination of technologies to reduce emissions. Usually there will be a diesel particle filter **(DPF),** selective catalytic reduction **(SCR)** and an exhaust gas recirculation **(EGR)** system. An effective EGR system paired with these technologies will reduce nitrous oxide (NOx) in the exhaust for cleaner emissions

- A high-quality fuel, like Diesel One™ that contains detergents and stabilizers that will result in cleaner fuel injectors, less fuel breakdown under pressure and heat, and better spray patterns that produce more complete combustion and less soot at the very beginning of the process. Reliable fuel conditioners like Diesel one can help reduce fouling of the EGR valve, EGR cooler and turbocharger.

- There are also some basic maintenance tips that may help your customers minimize soot and ash buildup in their EGR system:
  - •Reduce engine idling time when possible and maintain a regular maintenance schedule.
  - •Consider a high-quality, low-ash engine oil to help with engine performance and operability.
  - •Conduct an oil analysis on every drain cycle to look for early signs of engine trouble is also recommended, and
  - •When they see any engine warning lights or signs of engine hesitation, address it quickly to help avoid costly repairs or extended downtime.