



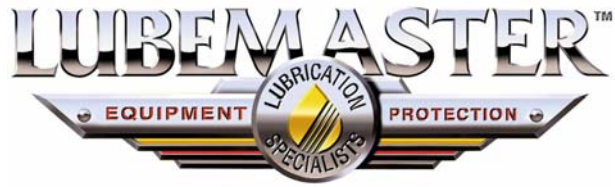
**Rose Oil Company**

**Fuel Quality Assurance Program**



**Diesel-Mate Clear  
Premium 2000**

*Diesel Fuel Improver*



**Diesel Fuel Is Often A Company's Largest Expense. Unfortunately, There Is Very Little Control Over Its Quality.**

# Fuel Quality Has Declined...

*“Over the last two decades, the cetane number and the API gravity, the basic measures of crude oil quality have declined”*

**Society of Automotive Engineers,**  
**(SAE) Bulletin 872243**

*“Diesel fuel quality has deteriorated for the past 20 years and is expected to continue this trend for the foreseeable future”*

**American Society for Testing and**  
**Materials, (ASTM) Pub. # 10056**

## **Fuel Quality Has Deteriorated Because...**



⬇ **Rougher grades of crude are being extracted.**

⬇ **Producers take shortcuts in refining.**

⬇ **The best parts of crude are being used to produce gasoline, jet fuel & kerosene.**



⬇ **The refining process used to meet new EPA regulations on ultra-low sulfur diesel (ULSD) results in reduced fuel economy and severe fuel system wear.**

## **Diesel Fuel Quality Deteriorates Every Time It's Handled.**



**1** Oil Well



**2** Refinery



**3** Pipeline



**4** Terminal



**5** Fuel  
Jobber



**6** Delivery  
Truck



**7** Storage



**8** Equipment

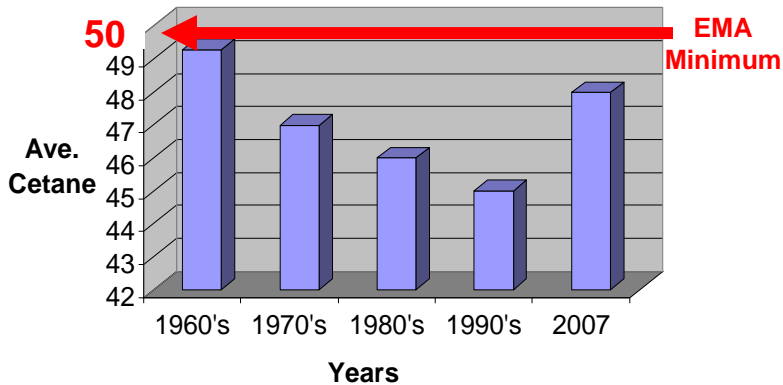
**Industry surveys show that low quality diesel fuel is the #1 cause of poor engine performance...**



# PROBLEM #1:

# LOW CETANE

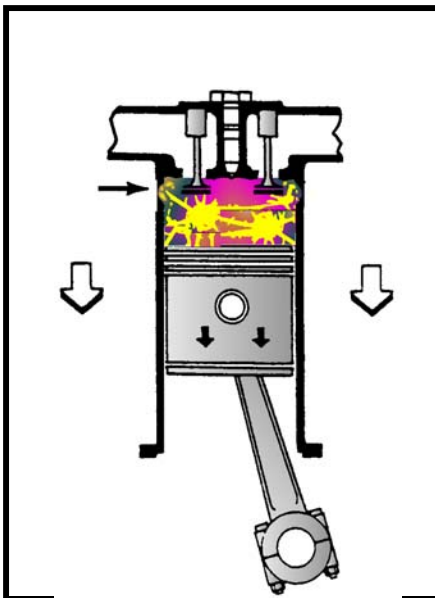
## Decline Of Cetane Number



**The Engine Manufacturing Association (EMA) Requires a Minimum of 50 Cetane for Optimal Performance**

**In 2005, Exxon reported that North American diesel fuels averaged only 43 cetane!**

**By 2007, the EPA mandates that ULSD\* fuel must have a minimum 48 cetane.**



## Below 50 Cetane Fuel Causes:

- Increased stack emissions.
- Poor combustion efficiency, loss of power, and lower mileage.
- Harder starting.
- Detonation wear - from violent explosions which damage piston heads, rings, valves, and cylinder liners.

**The higher temperatures needed to ignite low cetane diesel results in delayed ignition.**

# PROBLEM #2: POOR LUBRICITY

To reduce stack emissions, the EPA mandates Ultra-Low Sulfur Diesel fuel contain no more than 15ppm of sulfur.\*.

The removal of most of the sulfur, the natural lubricant in diesel fuel can cause two major wear problems in fuel injection systems:



System wear caused by poor lubricity.

**Mechanical Wear**: the removal of sulfur causes the fuel to become very dry. This results in 5 times more scuffing wear in fuel injection systems.

**Chemical Wear**: The hydro-treating process used to remove sulfur also removes natural corrosion inhibitors in diesel fuel. This causes the fuel to become corrosive.



Since 1993, injection system wear has increased 500%.

**Worn Injection Systems Result In Poor Fuel Economy, Excessive Stack Emissions, Equipment Down Time and Engine Repair Cost....**

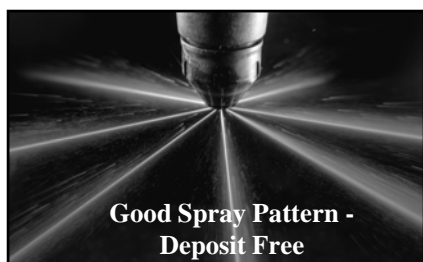
\*NOTE: Most off-road diesel fuel sold is ultra low-sulfur with red dye.



# PROBLEM #3: CONTAMINANTS



Poor Spray Pattern from  
Deposit Formation



Good Spray Pattern -  
Deposit Free

## Contaminants Form Deposits:

Today's diesel fuel contains high levels of contaminants that clog injectors and contribute to air pollution.

**Wax:** found in diesel fuel gel's at low temperatures causing filter plugging and starting problems.

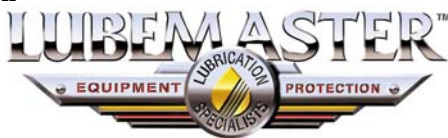
**Biodiesel:** naturally becomes thick at low temperatures causing filter plugging and starting problems.



Deposits on Piston Crown

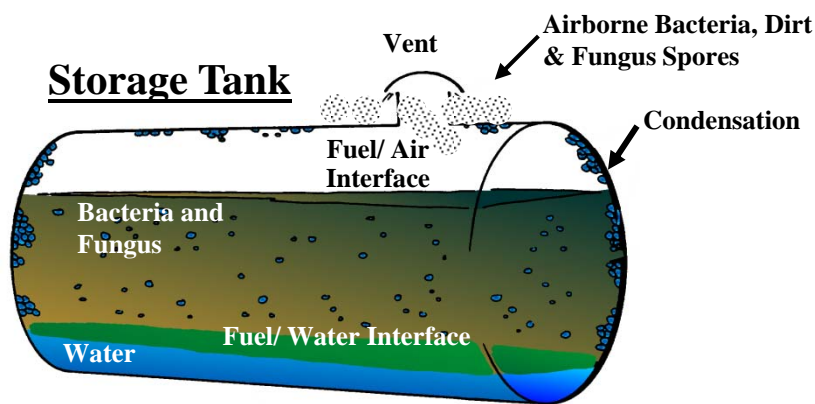
## Acids:

Some contaminants in diesel fuel form acids in the combustion process resulting in corrosive wear, ring deterioration, blow-by, and loss of compression.



# PROBLEM #4: Water Contamination and Biological Growth

## Condensation, rainwater, and seepage cause water contamination in fuel.



Water settles on the tank bottom, clings to the side walls and emulsifies with fuel

### Water Causes:

- Poor combustion
- Clogged filters
- Rust and corrosion
- Fuel line freeze ups
- Bacterial and fungal growth

**Biological Growth:** Bacteria and fungus enter fuel through water contamination or air vents. **Biodiesel** is especially susceptible to biological growth



There are 14 types of bacteria and 7 types of fungus that feed on the hydrocarbons in diesel fuel.



### Biological Growth Causes:

- Slime formation and bacteria feces which clog filters and injector tips
- The formation of corrosive acids which can cause leaking storage tanks and worn injectors.



# PROBLEM #5: EXHAUST EMISSIONS

**Exhaust emissions have become one of the major problems of the 21st century.**



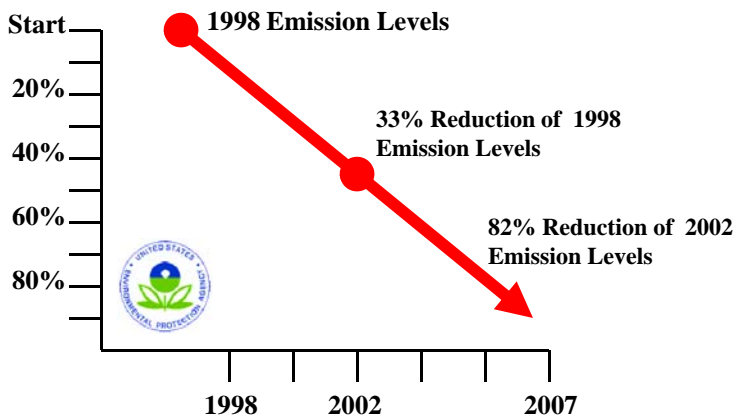
## Engine Emissions:

are damaging the ozone layer, causing global warming and creating severe health problems.

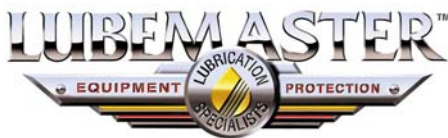
**The EPA has mandated that emissions be drastically reduced resulting in new engine designs and fuel regulations.**

**Unfortunately, as emission requirements become more stringent, the quality of diesel fuel has declined.**

## EPA Reduced Emission Requirements



**The best solution to better engine performance is to consistently improve the quality of the fuel that we run through our equipment...**







# Diesel Mate Clear Premium 2000™

*Diesel Fuel Improver*



**Contains No Sulfur**

**Year round diesel fuel conditioner designed to improve the performance of on-road, off-road and marine diesel fuel.**

*Improves engine performance, lengthens equipment life and reduces emissions.*

**EFFECTIVE IN ULTRA-LOW SULFUR  
DIESEL (ULSD) AND BIODIESEL**

**Provides Superior Fuel System Protection for:**

- Fuel Distributors
- Excavation & Demolition
- Utility Construction
- Concrete & Asphalt Paving
- Federal, State & Local Agencies
- Jobbers
- Universities & Hotels
- Power Generators
- Marine

Also available in a winter grade formula



**Reduces Emissions** — helps operators comply with clean air laws by promoting cleaner fuel burn to reduce smoking, soot and vapor exhaust.

**Boosts Base Cetane** — improves ignition, cuts starting time, and reduces detonation wear by raising Cetane levels.

**Reduces Friction and Wear** — contains AA-93™, a polymeric anti-wear additive that protects injectors and pumps from both mechanical and chemical wear caused by Ultra-Low Sulfur Diesel fuel.

**Separates Out Water** — demulsifiers separate water from fuel so it can be removed from storage tanks.

**Cleans Injectors & Pumps** — powerful new detergent cleans fuel pumps, injectors, and fuel lines and disperses contaminants to prevent the formation of gum, varnish, lacquer and carbon coke. Meets the latest Cummins L-10 injector cleanliness test.

**Prevents Gelling** — lowers fuel pour-point by up to 20°F.

**Reduces Oxidation During Storage** — oxidation inhibitors stabilize fuel during storage.

**Prevents Rust & Corrosion** — contains rust and corrosion inhibitors that protect storage tanks, on-board fuel tanks, fuel lines and engine components.

**Contains Metal Deactivators** — deactivates trace amounts of heavy metals, particularly copper. This prevents them from acting as catalysts that promote varnish and gum.

**Improves Mileage** — detergents that keep fuel systems clean and functioning properly and cetane improvers that provide more complete combustion.

Typical Treat Rate  
1 gal : 2000 gal

**\*Contains No Alcohol\***



# Diesel-Mate Clear Premium 2000™ contains an additive package that sets it apart from other diesel fuel conditioners

<b>Cetane Booster</b>	Raises cetane number an average of 2 or more points to help increase mileage, improve combustion and make starting easier.
<b>Demulsifier</b>	Prevents emulsification and separates water and condensation to the bottom of storage tanks where it can be drained or pumped away. Eliminates water contaminants to improve combustion and reduce clogging in injectors and water filters.
<b>Anti-Wear Agents</b>	Contains a molecular compound that forms a highly resistant lubrication film that bonds to metal surfaces and protects against mechanical and corrosive wear.
<b>Detergents and Dispersants</b>	Prevent sludge, varnish and gum formation that can clog filters, fuel lines and injector tips. By keeping injectors free of deposits, they let fuel atomize uniformly to reduce loss of power, decrease stack smoking and help prevent excessive detonation wear. Meets and exceeds Cummins L-10 Injector Deposit Test requirements.
<b>Pour Point Depressant</b>	Improves fuel flow, starting ability and operating efficiency at low temperatures by helping to prevent gelling.
<b>Oxidation Inhibitors</b>	Help prevent fuel breakdown during storage and reduce the formation of varnish, lacquer, gum and sludge.
<b>Rust and Corrosion Inhibitors</b>	Plate metal surfaces in storage tanks, on-board tanks, fuel lines and injectors to prevent corrosive damage. Reduce repair expenses and rust flakes that can clog injector tips and filters.
<b>Metal Deactivator</b>	Deactivates trace amounts of heavy metals, particularly copper. This prevents them from acting as catalysts that promote oxidation and form incombustible engine gums.

## The Complete LubeMaster Fuel Quality Assurance Product Line

<b>Tank Tonic™</b>	Complete Fuel Biocide & Fungicide For Gasoline, Diesel and Heating Oil
<b>Diesel-Mate Clear™</b>	Diesel Fuel Improver, Boosts Cetane, Reduces Emissions & Wear, Increase Mileage/Hours for All Diesel Fuel Users.
<b>Diesel-Mate Clear Winter Grade™</b>	Lowers Fuel Gel Pt. 30°F, Diesel Fuel Improver, Increases Diesel Fuel Quality Like Diesel-Mate, Designed for Sub-Freezing Weather.
<b>Diesel-Mate Clear Premium 2000™</b>	Diesel Fuel Improver for Distribution and Jobber Storage, Boosts Cetane, Reduces Emissions & Wear, Reduces Fuel Oxidation
<b>Diesel-Mate Clear Premium 2000 WG™</b>	Lowers Fuel Gel Pt. 30°F, Diesel Fuel Improver for Fuel Distributors and Jobbers, Boosts Cetane, Reduces Emissions & Wear, Reduces Fuel Oxidation.
<b>Diesel-Mate Clear City Emissions™</b>	Diesel Fuel Improver Designed to Reduce City Emissions, Boosts Cetane, Increase Mileage/Hours for All Diesel Fuel Users
<b>Diesel-Mate Clear City Emissions WG™</b>	Lowers Fuel Gel Pt. 30°F, Diesel Fuel Improver Designed to Reduce City Emissions, Boosts Cetane, Increase Mileage/Hours for All Diesel Fuel Users.
<b>Diesel-Shield™</b>	Single Application Diesel Fuel System Cleaner. Cleans Injector Tips and Prevents Clogging, Rusting and Corrosion of Fuel Systems.
<b>Fire-Up!™</b>	Diesel Fuel Cold Flow Improver - Lowers Pour Point 40 °F, Prevents Fuel Gelling and Icing.
<b>Thaw-Out™</b>	Emergency Diesel Fuel De-Icing Agent, Re-Liquefies Frozen Diesel Fuel
<b>Mile-Hi™</b>	Gasoline Performance Improver, Cleans Fuel System , Pistons and Cylinders, Reduces Emissions and Increases Mileage.
<b>Full Blast Plus™</b>	Heating Oil Performance Improver, Cleans Furnace System , Promotes Complete Burn, Keeps Fuel Fresh.

### Diesel-Mate Clear Premium 2000™ is Ideal For Use In:

Fuel Distributors and Jobbers Storage, Over-the-road and off-road diesel engines and storage, marine diesel engines and storage, diesel power generators, long-term fuel storage,.

**Do Not Use In:** Gasoline engines and storage (use **Mile-Hi™**), heating fuel (use **Full Blast Plus™**)

**Contains No Sulfur**



# What's Really In Treated or Premium Diesel From Typical Fuel Distributors?

## Premium Diesel Fuel From Typical Fuel Distributors:

- Premium Diesel usually contains only the minimum amount of additives that allow it to be labeled as “premium” by the *National Conference of Weights & Measures (NCWM)*.
- Premium Diesel usually contains only the least expensive additives.
- Even the best Premium Diesel from typical fuel distributors only address some of the problems with today’s diesel fuel.

## Rose Oil Company Offers The Complete Package

### Rose Oil Premium Diesel Package

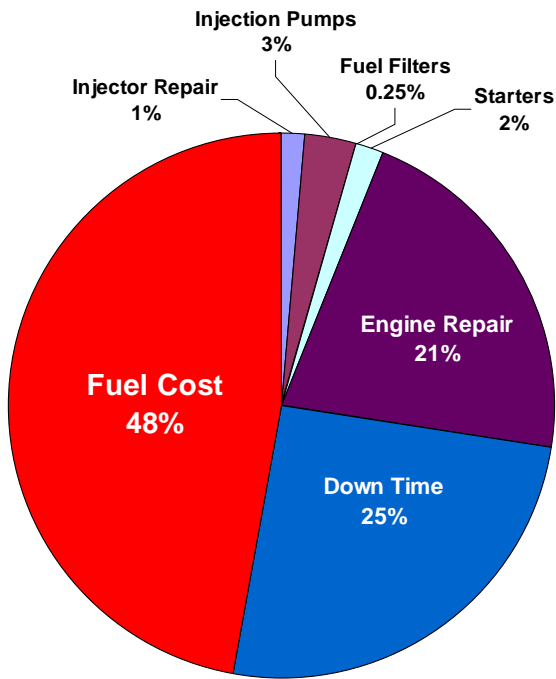
- Detergency Package
- Oxidation Inhibitors
- Cold Flow Improvers
- Cetane Boost
- Water Demulsifiers
- Fuel Lubricity Package
- Rust & Corrosion Inhibitors

### Typical Premium Diesel Package

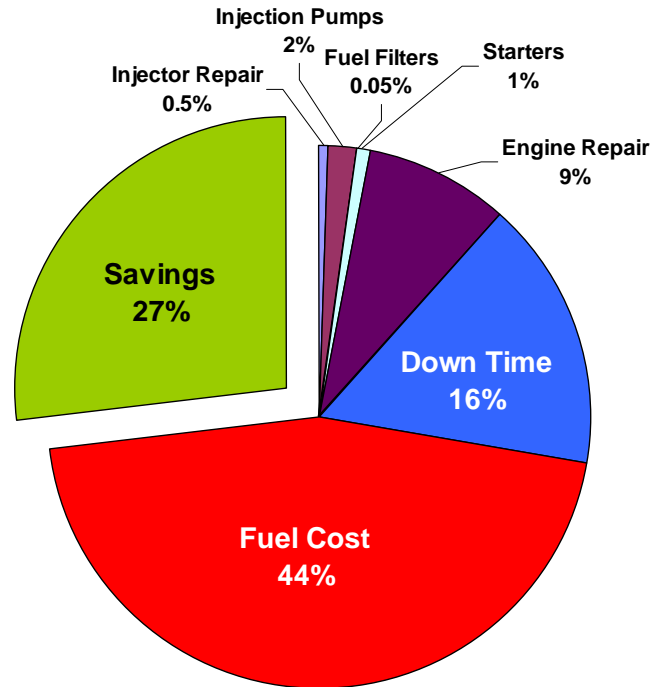
- Detergency Package
- Oxidation Inhibitors  
- Or -  
Cold Flow Improver

# The Real Cost of Fuel

## Untreated Diesel Fuel



## Treated Diesel Fuel



**Properly treated fuel will increase hours or miles per gallon, reduce emissions and lower repair & parts replacement costs.**

**The average increased fuel economy more than pays for fuel treatment!**