



# TECHNICAL DATA

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## 139A SOYSHIELD® ALL SEASON

### Application

SoyShield® All Season is a concentrated multi-functional premium diesel fuel additive that is specially formulated for use in all types of diesel, especially low sulfur and ultra low sulfur diesel fuels.

### Features and Benefits

SoyShield® All Season contains a unique blend of methyl soyate bio-diesel derived from soybean oil and a highly concentrated multi-functional additive package. When used at the recommended treatment ratio, this unique combination allows the SoyShield® All Season to provide the following performance benefits.

1. Supports the use of a renewable farmer-supplied fuel source.
2. Boosts the fuel's cetane rating up to 4 points.
3. Faster warm-up.
4. Reduced misfiring at lower air inlet temperatures.
5. Superior Cummins L-10 Injector Depositing Test and Cummins N-14 Injector Corrosion Test Performance
6. Detergency to provide cleanliness throughout the entire fuel system.
7. Clean up and Keep clean performance for the entire fuel system.
8. Improved combustion of the fuel by completely vaporizing the fuel into smaller particles, thus providing better fuel economy and preventing a significant loss in engine power.
9. Increased fuel economy up to 5%.
11. Dispersion of insoluble gums and varnish present in low quality fuels.
12. Modification of existing injector deposits, allowing for their removal and safe passage into the combustion chamber where they can be burned.
13. Reduced emissions, exhaust smoke and particulates.
14. A reduction in black smoke.
15. Increased fuel lubricity. (Soy based biodiesel has 3 times the lubricity of diesel fuel).
16. Excellent anti-wear protection for the injectors and the fuel pump especially for those engines burning low sulfur and ultra low sulfur diesel fuel.
17. Lubrication of the upper cylinders, fuel pumps and injectors.
18. Supplemental ring and valve-train anti-wear protection.
19. Increased thermal stability to the diesel fuel in order to provide the ability to resist thermal degradation.
20. Inhibition of oxidation during storage.
21. Extended storage stability.
22. Helps control the acidic by-products produced by the combustion of diesel fuel.
23. Rust and corrosion protection to the entire fuel system.
24. Dispersion of water present in diesel fuel in order to prevent fuel icing and other problems associated with water.

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- 25. **Prevention of the formation of stable fuel-water emulsions.**
- 26. **Flow Improver to lower the fuel's gelling point.**
- 27. **Allows the diesel fuel to meet the NCWM's Premium Diesel Fuel Specifications.**
- 28. **Helps control the conditions that lead to foul smelling fuel, stringiness and plugged filters.**

SoyShield® All Season also contains a proprietary wax crystal modifier, cold flow improver, heavy wax modifier polymeric type additive **system that when added to the diesel fuel before the fuel has reached its cloud point**, helps to prevent the formation of wax crystals. The proprietary polymeric additive system modifies the individual wax crystals by encapsulating and dispersing them as they are formed. This not only drastically reduces the size of the wax crystals, but also prevents the growth of larger wax crystals and their adhesion to each other. This in turn allows the wax crystals to flow through the fuel filters and lines and into the combustion chamber with the fuel. **By the addition of SoyShield® All Season to the diesel fuel before it has reached its cloud point, the gelling point of the diesel fuel will be lowered an average of 10°F to 25°F below the original gelling point of the untreated diesel fuel.**

#### **Increased Lubricity Protection with SynShield®**

Today's diesel powered vehicles feature low emission engines that are more susceptible than ever to diesel fuel related wear. Diesel engine designs are employing the use of higher fuel injection pressures, hotter fuel return temperatures, higher operating temperatures and complex engine geometry to control emissions. All of these factors result in increased fuel system wear and can shorten engine life.

With the mandate by the United States EPA to reduce the sulfur content of diesel fuels to control emissions, this has resulted the elimination of certain naturally occurring polar compounds that aid in protection of the fuel system from wear by forming a protective layer on the metal surfaces of the fuel injection system. The increased use of the hydrotreating and hydrocracking refining processes to reduce the sulfur content of the diesel fuel in order to meet the mandated sulfur content of 500 ppm and the 2006 ultra-low sulfur diesel fuel specification of 15 ppm maximum causes these naturally occurring polar compounds to become either chemically altered or completely removed, thus resulting in increased engine and fuel system wear.

To protect today's diesel engines from fuel system related wear Schaeffer Mfg has further blended into the SoyShield® All Season is a proprietary lubricity additive called SynShield® is one of the few lubricity additives that not only surpasses industry standards for diesel fuel lubricity but also exceeds the EPA's new standard by being the only lubricity additive that does not contain sulfur or sulfur containing compounds. SynShield® prevents fuel system wear and injector scoring by forming a protective layer on the metal surfaces of the fuel system and injectors that provides boundary lubrication between metallic parts in critical fuel system components. This protective boundary lubrication film not only reduces friction and wear between the fuel system surfaces that are in relative motion but also increases fuel system component life, thus leading to less downtime and increased longer equipment life.

**Treatment Ratio**

**One gallon of SoyShield® All Season to every 500 gallons diesel fuel.**

**One 12-ounce bottle of SoyShield® All Season to every 50 gallons of diesel fuel**

**When treating Ultra Low Sulfur Diesel Fuels additional treatment may be necessary for improved winter operability. Treatment ratios may need to be doubled or tripled.**

SoyShield® All Season is registered and meets the US EPA requirements for blending into low sulfur and ultra low sulfur diesel fuels. When used at the recommended treatment ratio SoyShield Winterized will not have any measurable effect on the cetane on the cetane index or aromatic content and sulfur content of the diesel fuel. It is recommended that SoyShield® Winterized be stored above 20°F.

**THIS DIESEL FUEL ADDITIVE COMPLIES WITH THE FEDERAL LOW SULFUR CONTENT REQUIREMENTS FOR USE IN DIESEL MOTOR VEHICLES AND NON-ROAD ENGINES.**

**THIS DIESEL FUEL ADDITIVE IS COMPATIBLE AND APPROVED FOR USE WITH DIESEL FUELS THAT MEET ASTM D975 AND BIODIESEL THAT MEETS ASTM D6751 AND BIODIESEL THAT MEETS EN 14214.**

**TYPICAL PROPERTIES**

Specific Gravity @ 60°F	0.8268
Flash Point °F/°C PMCC (ASTM D-93)	158°/70°
Pour Point °F/°C (ASTM D-97)	20°/-7°
Copper Strip Corrosion Test (ASTM D-130)	1a