Power Up NNL 690 is a unique boundary lubricant which is specifically formulated to solve many of today’s tribological problems in high pressure boundary conditions where metal to metal contact is inevitable. NNL 690 works by forming a wear reducing, protective film which is capable of withstanding extreme pressures as high as 200,000 lbs per sq. inch. NNL 690 provides critical engine parts, such as the ring zone, cam lobes and turbocharger, with boundary lubrication protection far exceeding that of conventional oils. NNL 690 is a carefully balanced, complete additive package which contains anti-wear and extreme pressure additives, detergent/dispersants, viscosity index improvers, corrosion inhibitors and acid neutralizers.

**Primary Benefits of NNL 690:**

- Strong film affinity maintains lubrication at start-up.
- By reducing the generation of large wear particles, the efficiency of the oil filter is improved.
- High base number helps neutralize acids that cause corrosion.
- Reduces friction and metal to metal contact in high load areas of the engine.
- Extends equipment life and increases equipment availability.
- Has a powerful detergent which cleans and suspends sludge and varnish.

NNL 690 is specifically designed for use in engines calling for medium to high ash oils (1.0% or more) and is suitable for use in most other lubricated equipment using non-E.P. oils. NNL 690 provides engines with exceptional anti-wear protection and also contains a superb detergent/dispersant package, viscosity index improvers and excellent anti-corrosion additives. NNL 690 is a balanced additive package that provides complete lubrication when used with good quality mineral based and synthetic oils.

The primary benefit of NNL 690 is friction reduction at the boundary lubrication location (metal to metal contact). This includes the ring zone, turbocharger and camshaft lobe areas in engines, and the pump, cylinder rods and valves in hydraulics.

**Secondary Benefits of NNL 690:**

- Reduces ultrasonic wear noise which relates directly to component wear.
- Helps prevent sludge and varnish formation.
- Lowers operating temperatures by reducing friction.
- Provides an improved seal around the ring zone area, improving combustion efficiency and reducing smoke opacity and blow-by.
- Reduces fuel and/or electrical power consumption.
- Improves filtration efficiency by reducing the generation of large wear particles.
- Extends equipment life and increases equipment availability.
- Reduces friction and lowers temperatures in critical bearing and ring zones.

“Since adding NNL 690 to my truck engine my fuel economy has improved 1/2 mile to the gallon from 5.9 miles per gallon to 6.4 miles per gallon. In the past, on cold mornings, I had problems with the truck starting up. Now with the addition of NNL 690 it starts right up every morning, even in temperatures as low as 0 °F.”

Kevin Lovell, K&S Trucking - Yuma, Colorado

Call today for more information 1-800-897-6937 or visit us online at www.powerupusa.net
Decreasing operating expenses, longer machinery life and remarkable fuel conservation are some of the benefits enjoyed by using **NNL 690**. This means that your vehicles and equipment will last longer and operate more efficiently, while saving you money. **NNL 690** reduces metal to metal contact like no other product, cleans, protects and reduces operating temperatures.

With over 80 years of fluid power engineering experience, testing by Fluid Engineering Services Inc., in Stillwater, Oklahoma concluded that “test results reveal that the Power Up NNL-690 has an SLI (Service Life Improvement) of 2.5 over regular oils alone.” This means when NNL 690 was tested with conventional oils it increased the component life at least 2 1/2 times longer than oils that were not treated.

**Our Tests Prove It! Check for Yourself:**

- High Film Strength
- Better Protection at High Temperatures
- Protects Against Dry Start Up Wear
- Improves Oil Flow in Cold Weather
- Keeps Parts Clean and Moving Freely
- Reduced Fuel Consumption
- Protects Against Water and Antifreeze Contamination and Diesel Dilution

In two test pairs, after the addition of Power Up **NNL 690**, under heavily loaded conditions, the amount of wear was reduced between 39% and 87% depending on the load. An average of 18.9% wear reduction was recorded after the addition of Power Up NNL 690 even under hydrodynamic lubrication conditions.

Fluid film retention performance is improved as much as 300% by using Power Up **NNL 690** as demonstrated when oil supply is removed.

“*The motor is a custom Perkins V8 that is 640 cu.in. making over 3000 horsepower. That kind of power is real hard on the internal motor parts but when I use NNL 690 in my oil, I see a much longer life out of the parts. I also use NNL 690G in the rear end of the tractor because with the front end of the tractor off the ground all the time I have to steer it down the track with the brakes and with NNL 690G it frees up the rear end so I do not have to use the brakes as much as I did before.*

**Robby Crutchfield, Massey Ferguson SS Pull Tractor, Liberty, NC**
Extreme Lubrication Protection!

In independent Contact Gamma wear tests, NNL 690 significantly reduced the amount of wear generated when an engine oil alone was used. Calculated estimates based on wear reduction (up to 86.9%) suggest that the use of NNL 690 can extend equipment life over 7 times by reducing typical friction losses that occur in normal day to day operations.

A series of dynamometer and ultrasonic noise tests were carried out by an independent consultant to determine the effect of NNL 690 on a diesel highway tractor engine. The application of 3% (by volume) NNL 690 increased the horsepower and torque, while reducing fuel consumption, ultrasonic wear noise and emissions. Some of the computer controlled and corrected dynamometer results are given in Figures 1 and 2.

“With oil sampling showing reduced wear counts after using Power Up NNL 690 in the engine, it was not a difficult decision to use Power Up products in rest of the drive train in my dozer. The transmission temperature dropped significantly and there are no more metal filings on the final drive magnetic drain plug. I have put on over 4,000 hours on this machine since I started using Power Up and have had no power train down time. It pays to use Power Up Lubricants.”

Patrick Culhane with Culhane Contracting - Waterville, Minnesota

Product Application:

NNL 690 is intended for use in internal combustion engine crankcases at 3% of the oil volume, each time the oil is changed. It is also suitable for use in automatic transmissions at an application rate of 1%, in power shift transmissions at 3%, and in circulating systems at 3% or 5%, depending on the severity of service. NNL 690 is compatible with mineral based and synthetic oils based on polyalphaolefins and diesters. At recommended application rates, engine oil viscosity ratings and typical engine seal materials remain unchanged.

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount NNL-690 to Add</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline Engines</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
<tr>
<td>High Mileage Gas Engines</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
<tr>
<td>Diesel Engines</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
<tr>
<td>Hydraulic &amp; Gear Applications Requiring Engine Oil</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
</tbody>
</table>

NNL 690 is available in the following convenient sizes:

- 1 Liter (35 oz.) Bottle
- 1 Gallon (128 oz.) Jug
- 20 Liter (5.5 Gallon / 700 oz.) Pail
- 205 Liter (56.05 Gallon / 7,175 oz.) Drum
Power Up NNL 690G has been developed to greatly enhance the lubricating properties of extreme pressure gear oils. Changing industry technology dictates improvements and demands specialization. Power Up has met this challenge head on.

**Primary Benefits of NNL 690G:**
- Reduced Friction
- Extremely High Film Strength
- Increased Energy Efficiency
- Improved Lubrication
- Reduced Dry Starts
- Increases Component Life and Equipment Availability
- Reduced Operating Temperatures
- Reduced Maintenance Costs and Downtime

**Applications for NNL 690G:**
Recommended wherever EP (extreme pressure) oils are used at 3-5% rates. Including but not limited to:
- Gear Reducers
- Bearing Housings
- Chain Drives
- Standard Transmissions
- Bull Gears and Pinions
- Mud Pumps
- Differentials (except limited slip)
- Final Drives
- Low Ash Engines
- Cone and Jaw Crushers
- Rotary Tables
- Tube and Ball Mills
- Drop Boxes

**Secondary Benefits of NNL 690G:**
- Reduces ultrasonic wear noise which relates directly to component wear
- Reduces dry start-ups
- Lowers operating temperatures and slows oil degradation.
- Decreases wear in cold temperature applications (conventional EP additives are very dependent upon temperature to chemically react with the wear surfaces). The high film strength protection provided by NNL 690G is less dependent on temperature
- Reduces fuel and/or electrical amperage consumption in gearbox or reducer applications
- Improves filtration efficiency by reducing the generation of large wear particles
- Non toxic

**Power Up NNL-690G Application Quick Reference Chart**

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount NNL-690G to Add</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Transmissions Using EP Gear oil</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
<tr>
<td>Standard Transmissions Using ATF</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
<tr>
<td>Differentials / Transfer cases using EP Gear oil</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
<tr>
<td>Differentials / Transfer cases using ATF</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
<tr>
<td>Limited Slip Diffs (NO Friction Modifier)</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
<tr>
<td>Gear Drives (w/EP Gear Oil)</td>
<td>3 - 5% (1 oz / qt - 1.7 oz qt)</td>
</tr>
</tbody>
</table>

**Product Application:**

NNL 690G is intended for use in all types of mobile and industrial equipment where EP oils are used. NNL 690G should be applied with each oil change at 3% of the gearbox capacity. With gear oils heavier than ISO 320, NNL 690G should be used at 3-5%. In internal combustion engine crankcases using low ash or ashless oils, NNL 690G should be used at 3% of the oil volume with each change. It is also suitable for use in automatic transmissions at an application rate of 1%, in power shift transmissions at 3%, and in circulating systems at 3% or 5%, depending on the severity of service. NNL 690G is compatible with mineral based oils and with synthetic oils based on polyalphaolefins and diesters. At recommended application rates, it will not effect typical gear or engine oil viscosity ratings or seal materials.

NNL 690G is available in the following convenient sizes:
- 1 Liter (35 oz.) Bottle
- 1 Gallon (128 oz.) Jug
- 20 Liter (5.5 Gallon / 700 oz.) Pail
- 205 Liter (56.05 Gallon / 7,175 oz.) Drum
Thixogrease, the new generation, multi purpose grease from Power Up, provides superior protection in the boundary lubrication regime. Thixogrease is ideal for applications where high loads, extreme pressure or high temperature cause serious metal to metal contact and wear. Superior water wash resistance and rust corrosion inhibition allow Thixogrease to excel in areas where conventional greases fail. Thixogrease is made of a unique base which offers minimal oil separation or hardening and demonstrates excellent compatibility with many traditional soap oil greases.

The primary benefit of Thixogrease is to reduce the friction caused by asperity (metal to metal) contact in the boundary lubrication regime. It is designed for grease filled applications where high temperature, extreme pressure, water and corrosion are common conditions.

**Primary Benefits of Thixogrease:**

- Thixogrease reduces ultrasonic wear noise which relates directly to lower component wear
- The high dropping point (570°F) and temperature pumpability of Thixogrease allow for a wide operating temperature range of 0°F to 480°F (-18°C to 250°C)
- Thixogrease is formulated with rust and corrosion inhibitors to withstand contamination and protect critical components
- Exceptional water wash resistance allows Thixogrease to work in marine, pulp and paper, and similar applications
- Thixogrease has outstanding shear stability, minimizing relubrication requirements
- Thixogrease is ideal for use in centralized lubricating systems due to its excellent pumpability

This product from Power Up Lubricants is formulated entirely of a Thixotropic complex and unlike conventional grease, offers virtually no chance of oil separation or hardening.

**Superior Film Strength Protection in High Pressure Applications**

Reduced Equipment Wear

Comparison tests of pressure performance and wear protection show Thixogrease to have unsurpassed EP lubricating properties, withstanding over 5 times greater pressure and up to a 45% reduction in scoring of metal surface, maximizing life expectancy of bearings. A microscopic layer of Thixogrease has proven effective in heavy unit loading up to 200,000 PSI, which means exceptional protection.

“We were losing a bearing a month on our wet plant conveyors. Each time a bearing went bad it would take us two to three hours to replace, depending on the location of the bearing. It is calculated to cost us $1,500 an hour each time we have to shut down the wet plant for repair. In June of 2006 we started utilizing the Power Up Thixogrease and have not experienced a failure in the three years since, thanks to the Thixogrease.”

Louie Figeroa, Cemex Plant Manager, Cortaro Plant, Arizona

**Superior Performance in Maximum Temperature Range Applications**

Thixogrease will not melt down into fluid at temperatures approaching 570°F (300°C), outperforming most soap-based greases by 20%. It maintains its soft, smooth and greasy texture even when cooled and will not harden. It remains highly effective at 0°F (-18°C) and withstands low temperature torque tests to -40°F (-40°C).
**Superior Grease Performance**

These graphs illustrate that Power Up Thixogrease (right) and its proprietary Overbased Calcium Sulfinate formula outperforms Aluminum, Lithium, Calcium, Bentonite (clay), and Poly Urea base or complex greases (below) in all major categories of compatibility, high temp performance, anti-wear protection, rust protection, corrosion protection, extreme pressure and resistance to water wash.

Power Up Thixogrease gives you the flexibility of using a complete formulated multi-purpose grease no matter what the application.

---

**LUBRICANTS**

---

**GIVE YOUR EQUIPMENT THE ADVANTAGE OF THE LATEST IN GREASE TECHNOLOGY**

---

**Thixogrease**

---

**Power Up Lubricants**

---
Thixogrease has been independently tested and proven to be superior in all categories. These tests were conducted by NLGI, the National Lubricating Grease Institute and ASTM, the American Society for Testing Materials. The tests confirmed that Thixogrease is highly efficient for use in centralized grease systems and offered superior performance in applications including industrial, automotive, marine, farming, and mining.

Thixogrease has the unique ability to maintain its integrity and effectiveness even in the presence of contaminating soap-based greases. Results from ASTM’s Salt Spray test showed water resistance of up to 20 times greater than conventional greases.

**Thixogrease is a Proven in ASTM Results!**
- Proven effective in heavy unit loading up to 200,000 PSI
- Superior performance at elevated temperatures
- Maintains consistency over extended use, extreme pressure and heat
- Highly compatible with residual greases
- Excellent resistance to water and oxidation
- Minimal contamination risk

---

### Resistance to Water

<table>
<thead>
<tr>
<th>Grease Type</th>
<th>Thixogrease</th>
<th>Lithium Complex</th>
<th>Poly* Urea</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLGI Grade</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>100,000 with 50% Water 60X</td>
<td>+5</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Water Wash Out D1264 at 70˚C Loss</td>
<td>2.7</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Shell Roll D1831 as Receive</td>
<td>290</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>After 2 Hours Rolling with 50% Water (77˚F)</td>
<td>279</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Rust Test D1743 Rating</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>ASTM B117-73 Salt Spray Test Hours to Failure at 1.5 mil</td>
<td>950</td>
<td>48</td>
<td>48</td>
</tr>
</tbody>
</table>

---

### Extreme Pressure Performance and Wear Protection

<table>
<thead>
<tr>
<th>Grease Type</th>
<th>Thixogrease</th>
<th>Lithium Complex</th>
<th>Aluminum Complex</th>
<th>Poly* Urea</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLGI Grade</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Timken OK Load D2509 Lbs</td>
<td>270</td>
<td>65</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>4-Ball EP Test D2596 LWI Weld Point Kg</td>
<td>&gt;95</td>
<td>45</td>
<td>45</td>
<td>80</td>
</tr>
<tr>
<td>4-Ball Wear Test D2266 [mm] Scar 40 Kg, 1200 RPM, 75˚C 1 Hour</td>
<td>0.30</td>
<td>0.50</td>
<td>0.55</td>
<td>0.35</td>
</tr>
</tbody>
</table>

**Thixogrease** is currently available in the following grades:

**NLGI No. 0** - Most suitable for centralized grease systems, this grease is readily pumpable and will not bleed excessively or age harden.

**NLGI No. 2** - A multi-purpose grease when superior lubrication performance is required. Thixogrease No. 2 is successfully used in the industrial, automotive, marine, farming, mining, forestry and construction industries.

**Thixo Tak 2** - Also available is a tackier version of Thixogrease for high speed applications where grease retention is required.

**Thixogrease** is available in the following convenient sizes:

- 10 Tube Carton - 425 gram (15 oz.) Cartridges
- 30 Tube Case - 425 gram (15 oz.) Cartridges
- 35 lb Pails
- 120 lb Kegs
- 400 lb Drums

---
**Gen49D** is an alcohol free lubricant formulated to separate water and provide complete diesel fuel system performance improvements. **Gen49D** is specifically formulated to meet all manufacturers requirements including GM, Caterpillar, Cummins and Detroit Diesel.

**Primary Benefits of Gen49D:**
- Increased Fuel Economy
- Improved Combustion
- Power Increase
- Increase Cetane Number
- Reduced Engine Wear
- Cleaner Components
- Lower Maintenance Costs
- Reduced Emissions
- Winter Fuel / AntiGel Protection
- Excellent for Biodiesel
- Cold Start Performance

**INCREASES CETANE OF FUEL**

Cetane number is a measure of its ignition quality. High cetane number fuels will start to burn earlier in the compression stroke, important for efficient engine operation and emissions. Gen49D will increase the cetane number of your diesel fuel by 2 to 3 numbers, which is important for efficient engine operation and emission control.

**Cetane Improvers Provide:**
- Improved Cold Start Performance
- Reduced Fuel Consumption
- Reduced Engine Noise
- Improved Engine Durability
- Decrease in Particulates, Nitrogen Oxides (NOx), Carbon Monoxide, and Hydrocarbon Emissions
- Reduce White and Black Smoke Production

“Prior to using Gen 49D, we were using an average of 900 gallons a day of diesel fuel per drilling rig. With the addition of Gen-49D we now are averaging 810 gallons per day per drilling rig. As an added bonus, due to the lubricating properties of Gen 49D, we now get extended fuel pump life and through the detergents present in the additive, our injectors are far cleaner.”

*Pat Burns, General Manager, Energy Drilling - Natchez, Mississippi*

**Call today for more information 1-800-897-6937**
or visit us online at [www.powerupusa.net](http://www.powerupusa.net)
The Ultra Low Sulfur Diesel specifications in the transportation industry have lowered the amount of sulfur in diesel fuel 97%, from 500 ppm to 15 ppm, effective Sept 15, 2006.

The ULSD specs are driven by the demand for reduced pollution. Sulfur is good in diesel fuel – not so good for the air we breathe. This will greatly reduce environmental toxins which affect air quality around the world.

**Ultra Low Sulfur Diesel Fuels Adversely Impact Fuel Properties**

- **Lubricity** - The processing required to reduce sulfur 97% also removes naturally-occurring lubricity agents in diesel.
- **Cold Flow** - The conversion of aromatics to paraffins affects the cold flow of S15 fuel adversely. The cloud point and pour point of the fuel is worse than with LSD (500 ppm).
- **Energy Content** - In general, the processing required to reduce sulfur to 15 ppm also reduces the aromatics content and density of diesel fuel, resulting in a reduction in energy content (BTU/gal). This expected reduction may negatively affect fuel mileage.

**Gen49D** with Cetane is the additive that addresses any and all concerns related to the reduction of sulfur in diesel fuel! It does this by first addressing the price at the pump. In repeat studies by a variety of users, **Gen49D** consistently offers fuel savings ranging from 6% to 15%.

A High Frequency Reciprocating Rig (HFRR) is a machine used to test lubricity of fuel. Typical fuels measure approximately 510 microns of wear – failing to pass the standard of 460 microns. With **Gen49D** added, wear is reduced to 370 microns – well below the standard of 460.

**The 7 Critical Functions of Gen49D:**

1. **FUEL TANK** - **Gen49D** begins working in the preflame zone of the fuel system by putting a protective coating inside the fuel tank and lines and stabilizes the fuel which prevents water from causing rust and corrosion.

2. **FUEL FILTER** - By cutting down on rust and corrosion, fuel filters last longer. Note: **Gen49D** may cause fuel filters to become dirty when used for the first time as it will clean the system as it protects. This may require a quick filter change (especially in old or high mileage equipment).

3. **FUEL PUMP** - The only lubricant in the fuel pump is the fuel itself. **Gen49D** adds an environmentally friendly lubricant to the fuel to prevent excessive wear and premature failure of pumps and injectors.

4. **FUEL INJECTOR** - **Gen49D** is formulated with an injector cleaner that dissolves carbon and other power robbing deposits from the spray nozzle. This generates a better mist improving fuel combustion efficiency and lowering emissions.

5. **CETANE IMPROVER** - Increasing the Cetane rating of diesel fuel will cause the fuel to atomize and ignite quicker. This creates a cleaner burn, more power and less smoke. **Gen49D** is equipped with Cetane Improvers and combustion enhancers that will increase the Cetane rating of diesel up to 3 numbers.

6. **TOP END LUBRICANT** - Creating a seal around the top ring is critical in preventing power loss and less blow by of gases into the engine oil. **Gen49D** creates this lubricating film on the fire side of the piston, giving you a better explosion and more bang for your buck. This results in better fuel economy and improved horsepower.

7. **CLEANER EXHAUST** - In addition to reducing emissions and engine smoke, **Gen49D** will lower exhaust temperatures which shows that the fuel is burning up in the cylinder head where it is supposed to, and not in the tail pipe.

**Gen49D** is alcohol free and specially formulated to meet all manufacturers’ requirements including GM, Caterpillar, Cummins and Detroit Diesel and brings the fuel much closer to the specifications requested by the OEM’s.

With the price of diesel escalating, along with wear and tear on engine components due to ULSD, **Gen49D** with Cetane offers the results operators are looking for.
Cold Starting Performance

Starting your equipment each day can seem to be the easiest of all tasks...that is until it won't start. All the proprietary components of Gen49D working together ensure exceptional starting efficiency especially in cold conditions. Gen49D will save unnecessary strain on starters and high stress on batteries. One of the first benefits our customers report is how much easier their equipment fires after applying Power Up Gen49D for the first time.

Gen49D contains a powerful synthetic lubricant package which reduces friction and wear in the top end of the cylinder, injectors and fuel pump. Poor fuel lubricity is commonly seen in new low sulphur fuels. Gen49D is approved for and surpasses the new standards for diesel fuel and exhibits wear and friction reduction significantly below typical levels. Poor fuel lubricity results increased maintenance costs, downtime and poor fuel economy.

Train Cylinder Heads Comparison

Untreated cylinder head shows hardened carbon deposits in control unit #4203 severely inhibiting engine performance.

Cylinder head is clean with very small amounts of soft residue.

Gen49D protects your fuel pump, the injectors and top end of the engine from premature wear and failure, reducing costs and increases life over straight diesel fuel.

The preflame region before fuel enters the combustion chamber is only a small part of the complete lubrication protection offered by Gen49D. Gen49D is designed and formulated to lubricate the top end of the combustion chamber where the severe stresses of burning new, dry low sulphur fuels are causing premature wear and poor performance. Fuel injectors, intake and exhaust valves and piston rings are being subjected to more extreme conditions than ever before.

Tests Show Positive Proof

New generation diesel fuels are now required to contain less than 0.05% sulphur and less than 35% aromatic content (10% in California). This new, dry fuel has been implicated in increased wear of fuel system components, especially pumps and injectors.

The lubricity of diesel fuel can be measured. Using a modified ASTM D5001 Ball on Cylinder Lubricity Evaluation (BOCLE). The test consists of a hardened steel ball bearing wearing against a rotating steel bearing race. Poor diesel fuel lubricity will result in increased wear on the steel ball.

Gen49D protects your fuel pump, the injectors and top end of the engine from premature wear and failure, reducing costs and increases life over straight diesel fuel.

Gen49D protects your investment, prevents fuel system component wear and will improve your equipment’s performance and service life!

Anti-Gel Protection

Gen49D fights water and gelling the leading problem with winter fuel. Cold flow is improved up to 27°F (15°C), giving your fuel the very best chance of flowing in extreme cold conditions.

Gen49D contains a powerful deicer that lowers the freeze point of water and prevents ice crystals from forming that may plug filters and cause misfiring. Additionally the antigel characteristic keeps crystal molecules from collecting or clumping to ensure problem free winter operation. Gen49D adds an excellent stabilizing package to your diesel fuel to combat the high temperature stress on fuels results in degradation products such as particulate solids which may lead to injector damage and filter plugging. Gen49D also fights the effects of oxygen and water in stored fuel, neutralizing the effect of water.

Train Cylinder Heads Comparison

Untreated cylinder head shows hardened carbon deposits in control unit #4203 severely inhibiting engine performance.

Cylinder head is clean with very small amounts of soft residue.

Gen49D protects your fuel pump, the injectors and top end of the engine from premature wear and failure, reducing costs and increases life over straight diesel fuel.

The preflame region before fuel enters the combustion chamber is only a small part of the complete lubrication protection offered by Gen49D. Gen49D is designed and formulated to lubricate the top end of the combustion chamber where the severe stresses of burning new, dry low sulphur fuels are causing premature wear and poor performance. Fuel injectors, intake and exhaust valves and piston rings are being subjected to more extreme conditions than ever before.

Tests Show Positive Proof

New generation diesel fuels are now required to contain less than 0.05% sulphur and less than 35% aromatic content (10% in California). This new, dry fuel has been implicated in increased wear of fuel system components, especially pumps and injectors.

The lubricity of diesel fuel can be measured. Using a modified ASTM D5001 Ball on Cylinder Lubricity Evaluation (BOCLE). The test consists of a hardened steel ball bearing wearing against a rotating steel bearing race. Poor diesel fuel lubricity will result in increased wear on the steel ball.
Biodiesel is fuel produced from organically derived oil combined with alcohol in the presence of a catalyst. It can be made from soybean, canola, waste vegetable oils or animal fats.

Although there are plenty of environmental benefits to using biodiesel there are still a few challenges such as:

- Lower energy content compared to petroleum diesel
- Cold weather performance
- Increased nitrogen oxide (NOx) emissions
- Short shelf life/Fuel stability

**Gen 49D** with Cetane Improver is a multi-functional diesel fuel additive that can help combat these challenges.

- **Gen 49D contains a cold flow improver that can help lower the pour point of diesel fuel**
- **Gen 49D contains cetane improver that will improve the combustion and performance of the fuel. Increasing cetane can also reduce NOx emissions.**
- **Gen 49D contains a fuel stabilizer that will improve the life of the fuel.**

The lower energy content of biodiesel refers to the btu’s. Unfortunately, there is no additive that exists that can improve the BTU’s of biodiesel.

There are also some additional benefits that Gen 49D can provide:

- Fully synthetic lubricity improver for ULSD fuel
- Diesel detergent to keep the engine clean
- Corrosion inhibitor
- Wax Anti-settling additive

Overall, the use of **Gen 49D** with Cetane Improver in diesel fuel or a biodiesel blend would benefit the performance and life of the engine.

---

**Gen49D with Cetane Improver should be added with each fuel fill at the rate of 0.08%. This is equivalent to 1 ounce of Gen49D per 10 gallons of diesel fuel. The treatment ratio is 1 part Gen49D added to 1250 parts of diesel fuel.**

<table>
<thead>
<tr>
<th>Gen49D to Diesel Lubrication Blend Ratio</th>
<th>Gen49D</th>
<th>Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Rate 1 oz of Gen49D to 10 Gallons of Diesel Fuel (1:1250)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ounce (29.5 ml)</td>
<td>10 Gallons (40 Liters)</td>
<td></td>
</tr>
<tr>
<td>32 Ounces (1 Quart Bottle)</td>
<td>320 Gallons (1,211 Liters)</td>
<td></td>
</tr>
<tr>
<td>128 Ounces (1 Gallon Jug)</td>
<td>1,280 Gallons (4,845 Liters)</td>
<td></td>
</tr>
<tr>
<td>640 Ounces (5 Gallon Pail)</td>
<td>6,400 Gallons (24,227 Liters)</td>
<td></td>
</tr>
<tr>
<td>7,040 Ounces (55 Gallon Drum)</td>
<td>70,400 Gallons (266,493 Liters)</td>
<td></td>
</tr>
</tbody>
</table>

"I have a Volvo with a Series 60 Detroit Diesel. When I started using NNL 690 and Gen49D, the truck had 697,000 miles on it. The first thing I noticed was my fuel economy increased. Prior to using NNL 690 and Gen49D in my truck, my worst fuel economy was 4.8 mpg and the best was 6.5 mpg. After running NNL 690 and Gen49D my worst fuel economy was 5.4 mpg and the best was 7.8 mpg. My truck now has 1,163,000 miles on it and it doesn’t use any more oil today than it did at 697,000 miles."

**John Couch, Owner, Couch Trucking - Wagoner, Oklahoma**

**Gen49D is available in the following convenient sizes:**

- 1 Quart (32 ounce) Bottle
- 1 Gallon (128 ounce) Jug
- 5 Gallon (640 ounce) Pail
- 55 Gallon (7,040 ounce) Drum
HYDRA MAXX PROVIDES LONG TERM PREVENTATIVE MAINTENANCE FOR ALL HYDRAULIC APPLICATIONS

HYDRA MAXX

HYDRA MAXX PROVIDES LONG TERM PREVENTATIVE MAINTENANCE FOR ALL HYDRAULIC APPLICATIONS

HydraMaxx is specially designed for use in hydraulic systems, where piston, gear or vane pumps are used to circulate oil and transmit power. HydraMaxx is the first hydraulic oil treatment specifically designed to maintain maximum operating efficiency of your hydraulic system. This unique hydraulic system treatment from Power Up works with your existing oil to provide long term wear and corrosion protection for metal components and extend seal and hose life.

At low application rates, HydraMaxx provides a wear-reducing, protective film inside pumps and valves which helps to reduce operating temperatures and extend equipment life. HydraMaxx also improves the corrosion inhibiting and low temperature flow properties of hydraulic oils to provide long-term protection in the most demanding applications.

Primary Benefits of HydraMaxx:

HydraMaxx reduces friction within the boundary lubrication regime where metal-to-metal contact occurs, primarily in the pump, cylinder rod and control valve areas of the hydraulic system. Reducing friction lowers operating temperatures and improves component performance, efficiency and longevity.

Secondary Benefits of HydraMaxx:

- Supplements protection against rust and corrosion
- Improves low temperature fluidity.
- Improves the oil's ability to demulsify (separate) water
- Emulsifies trace water to maintain a protective oil film that resists rupture.
- Improves the oil's ability to clean and disperse contaminants.
- Improves filtration efficiency by reducing the generation of large wear particles.

LOWERS OPERATING TEMPERATURES

Viscosity - A 5% application of HydraMaxx in typical ISO 32, 46 and 68 hydraulic oils results in little or no change in the viscosity or viscosity index of the oil.

Boundary Lubrication Protection - HydraMaxx enhances the protection of your equipment and its components while they experience conditions of high friction and wear in the boundary lubrication regime. Calculated estimates suggest that the use of HydraMaxx will extend equipment life up to 2.39 times by reducing wear up to 58%.

Inhibits Rust and Corrosion - HydraMaxx is formulated to provide excellent corrosion protection. This can be evaluated using the Copper Corrosion test, ASTM D130, and the Rust Prevention Characteristics test, ASTM D665. Paraffinic oils additized with 5% HydraMaxx display excellent copper corrosion ratings of 1b (slight tarnish) and easily pass the rusting characteristics requirements of ASTM D665.

Cold Weather Fluid Flow (Pour Point) - HydraMaxx imparts a positive influence to the pour point of most hydraulic oils. This benefit is evaluated using the ASTM method D97. Table 1 clearly shows the improvements in the pour points of hydraulic fluids additized with HydraMaxx, where the average pour point is lowered by up to 18°F (10°C).

### Table 1 - Fluid Pour Point Data

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Neat Oil</th>
<th>+5% Hydra Maxx</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ISO 22</td>
<td>-69°F (-56°C)</td>
</tr>
<tr>
<td>B</td>
<td>ISO 32</td>
<td>-44°F (-22°C)</td>
</tr>
<tr>
<td>C</td>
<td>ISO 32</td>
<td>-36°F (-3°C)</td>
</tr>
<tr>
<td>D</td>
<td>ISO 68</td>
<td>-6°F (-21°C)</td>
</tr>
<tr>
<td>E</td>
<td>ISO 100</td>
<td>-2°F (-20°C)</td>
</tr>
<tr>
<td>F</td>
<td>ISO 32</td>
<td>-26°F (-3°C)</td>
</tr>
<tr>
<td>G</td>
<td>ISO 32</td>
<td>-31°F (-5°C)</td>
</tr>
<tr>
<td>H</td>
<td>ISO 32</td>
<td>-54°F (-48°C)</td>
</tr>
</tbody>
</table>

Demulsibility - HydraMaxx improves an oil's ability to separate water. This benefit is evaluated using the ASTM method D1401. Table 2 clearly shows the improvements in demulsibility of hydraulic fluids additized with HydraMaxx.

### Table 2 - ASTM D1401 Water Separability

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Neat Oil</th>
<th>+5% Hydra Maxx</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>41-39-0 mL (15 min.)</td>
<td>42-38-0 mL (5 min.)</td>
</tr>
<tr>
<td>X</td>
<td>40-37-3 mL (25 min.)</td>
<td>40-38-2 mL (15 min.)</td>
</tr>
<tr>
<td>Y</td>
<td>41-39-0 mL (15 min.)</td>
<td>40-38-2 mL (5 min.)</td>
</tr>
<tr>
<td>Z</td>
<td>No Separation</td>
<td>40-37-3 mL (25 min.)</td>
</tr>
</tbody>
</table>

These results provide the volume of oil-water-emulsion phases (and the time required) for separation.

Product Application:

HydraMaxx is recommended in all hydraulic circulating systems at a 3% ratio for ambient temperatures above 0°C (32°F) and a 5% ratio in operating conditions where the temperature may drop below 0°C (32°F). HydraMaxx is recommended for use with mineral oils and polyalphaolefin and diester based synthetic fluids. HydraMaxx is not recommended for use with water based fluids, phosphate esters or polyglycol fluids.

HydraMaxx is available in the following convenient sizes:

- 1 Liter (35 oz.) Bottle
- 1 Gallon (128 oz.) Jug
- 20 Liter (5.5 Gallon / 700 oz.) Pail
- 205 Liter (56.05 Gallon / 7,175 oz.) Drum
Power Up Diesel FX is a performance enhanced High Pressure Fuel Injector Antifoulant. Diesel FX prevents filter plugging and injector fouling due to extreme pressures and temperatures in today’s common rail fuel injection systems. It also increases cetane number, disperses moisture, and contains both a fully synthetic lubricity improver and corrosion inhibitor. Although developed for newer model vehicles, Diesel FX can be used in any diesel motor engine, along with ULSD and Biodiesel fuel blends.

Primary Benefits of Diesel FX:

- Prevents filter plugging caused by thermal stressing within the engine
- Prevents fuel soot and sludge formation, extending fuel filter and injector life
- Cleans and prevents injector deposits in high pressure fuel injection systems
- Increases cetane number 3 to 5 numbers...can increase the Cetane number of diesel fuel up to 10%!
- Provides thermal and oxidative stability
- Improves and maintains fuel economy
- Reduces exhaust emissions
- Enhances lubricity with a fully synthetic non-acid lubricity improver
- Water dispersant to help safely remove water on a gradual basis
- Contains synthetic corrosion inhibitor
- Reduces cost of maintenance and downtime

Specially Formulated To Tackle the Shortcomings of Modern ULSD and Biodiesel

Diesel FX was developed in direct response to the performance issues surrounding modern diesel engines and new age fuels. Diesel FX complies with the federal low sulfur content requirements and does not exceed 15ppm.

To understand the benefits of Diesel FX it is important to appreciate how recent advances in engine and fuel technology have impacted vehicle performance and fleet maintenance costs. The technology at the core of the modern diesel engine is very sophisticated. Developments like high pressure common rail (HPCR) direct fuel injection have transformed vehicle performance, resulting in more powerful and efficient engines with lower emissions.

Alongside advances in engine technology we have seen a major shift towards new age fuels. These have been introduced to help reduce the environmental impact of exhaust emissions. Ultra Low Sulfur Diesel (ULSD) contains less than 15ppm sulfur and is a cleaner alternative to traditional diesel fuels. With its use now mandatory under EPA legislation, this fuel has quickly gained acceptance across the United States and is also used extensively in Canada.

While the introduction of ULSD is to be supported, it should be recognized that the hydrotreating process used to remove sulfur from refinery streams has severe effects on fuel properties.

Removing the sulfur not only affects a fuel’s natural lubricity, the process also removes nitrogen and oxygen. Without these naturally occurring components there can be problems with the fuel's low-temperature handling, thermal stability (vulnerability to peroxide formation) and corrosion potential.

This presents the fuel industry with the challenge of extracting maximum performance from today’s super-efficient engines while working with more problematic, yet environmentally friendly, ULSD fuels.

Diesel FX was developed to address two critical performance issues: Injector fouling and Fuel Filter Plugging.

Modern diesel engines operating on ULSD can be negatively affected by deposit contamination because of the extreme heat and high pressures generated by advanced fuel injection equipment.
DIESEL FX WAS DESIGNED TO ADDRESS THE ISSUES OF INJECTOR FOULING AND FUEL FILTER PLUGGING

First, stubborn deposits build up around the injector valve seat and nozzle, inhibiting fuel flow and adversely affecting engine performance. Second, black soot like deposits form in the fuel filter as a result of ULSD being thermally decomposed, in the injection system.

Both injector fouling and fuel filter plugging lead to increased maintenance costs on heavy duty vehicles fitted with modern diesel engines. **Diesel FX** was designed to resolve these problems. **Diesel FX** is an exciting fuel additive that can help fleet owners and operators reduce maintenance costs. With **Diesel FX** it is possible to push the performance of ultra low sulfur fuels to a new level. The additive not only helps to keep maintenance costs low but also boosts power in today’s high-tech engines while helping the environment by reducing harmful exhaust emissions and improved fuel economy.

**The Ultimate Cetane Number Booster!**

Higher cetane number means better ignition quality. It is widely recognized that high cetane number diesel fuels offer a number of benefits that are important for both engine performance and environmental health. Standard diesel fuel has a Cetane number of 40-44. **Diesel FX** will increase the cetane number of your diesel fuel by 3 to 5 numbers, which is important for efficient engine operation and emission control. Increasing cetane number can also reduce NOx emissions.

**Diesel FX will boost the cetane number of diesel fuel up to 10% using the recommended dosage!** High cetane number fuels will start to burn earlier in the compression stroke, important for efficient engine operation and emissions.

**Fuel Filter Plugging**

Under the extreme high temperatures and pressures present in modern diesel engines, ULSD is thermally decomposed in the injection system. This process forms black soot like deposits in the fuel filter, plugging the filter.

Field tests with heavy duty vehicles show that fuel filter plugging can occur after just 10,000 to 12,000 miles in operation. Filters are often found to be completely blocked with black soot and need replacing.

Using **Diesel FX** reduces fuel filter plugging dramatically. Field tests suggest the filter lifecycle is extended to the scheduled PMI of approximately 30,000 miles from between 5,000 and 12,000 miles. It is estimated that savings on fuel filters alone could cover the cost of using **Diesel FX**!
**Diesel FX** is a fuel additive created specifically to improve the performance of ULSD in newer model vehicles equipped with high pressure fuel injectors. The antifoulant in **Diesel FX** has been designed to combat the problem of fuel filter plugging.

Historically, the problem of fuel filter plugging and preventing deposits was combated using traditional detergents, but these products are proving less effective in modern heavy-duty diesel engines. The treat rates required to have any impact are simply not practical, and so the problem of fuel filter plugging must be tackled in a different way.

The antifoulant in **Diesel FX** is a highly innovative multifunctional middle distillate fuel additive that offers a number of important benefits to fleet operators. It prevents the formation of fuel soot by conditioning ULSD to withstand the extreme temperatures and high pressures of today's fuel injection systems.

**Diesel FX** not only maintains the thermal and oxidative stability of ULSD, it also prevents the formation of black sludge. This is a common problem but it can be made worse in high pressure engine units operating at high temperatures. Contaminants from unburnt fuel and combustion soot build up over time to form a thick black sludge, which ultimately affects performance.

Thanks to **Diesel FX**, it is possible to push the performance of ultra-low sulfur fuels to a new level. The additive not only helps to keep maintenance costs low but also boosts power in today's high-tech engines. It also helps the environment by reducing exhaust emissions and improving fuel economy.

**Injector Fouling**

When used in a modern diesel engine, ULSD can lead to deposit contamination because of the extreme heat and high pressures generated by advanced fuel injection equipment. These injection systems produce temperatures and pressures that are considerably higher than those found in older diesel engines.

Injector fouling is a known issue that affects high performance diesel engines operating on ULSD. Injector fouling occurs when deposits form in the high pressure fuel injection (HPFI) system. Particularly stubborn deposits form at and around the injector valve seat and nozzle. The result of injector fouling is injector drift, power loss, and an increase in smoke emissions.

In modern heavy-duty diesel engines, traditional detergents at treat rates required to have any impact, are simply not practical, as a means to prevent injector fouling. At the same time, the need to remove deposits in and around the injector valve seat and nozzle has become even more critical to overall performance.

**Diesel FX** is a highly innovative multifunctional middle distillate fuel additive that maintains the thermal and oxidative stability of ULSD. It offers a number of important benefits to fleet operators.

By conditioning ULSD to withstand the extreme temperatures and high pressures of today's fuel injection systems, the antifoulant in **Diesel FX** helps prevent the formation of fuel soot. **Diesel FX** also cleans up existing injector fouling deposits, returning injectors to "like new" condition within a short time period.

With injectors cleaned and maintained in top condition, operators can expect fewer injector failures and optimum combustion at all times. This makes for a more efficient running engine that benefits from restored power, reduced emissions, and better fuel economy.

**Diesel FX** has been trialed with a number of major fleet operators to see what effect using our additive had on a working fleet in terms of reducing maintenance costs. The results are impressive.

One customer reported no occurrence of injector fouling after starting to use **Diesel FX**. They also noted a substantial increase in fuel economy during the trial period. On the strength of these results, the fleet director recommended the use of **Diesel FX** at all of their company's locations.

"My fuel is gauged big time. My loads are 80% heavy but the odd load will be light. After 6 weeks of using Power Up Diesel FX and running on winter fuel, my last report said that I was getting 6.82mpg. On summer fuel, I was getting 5.5mpg at the best. I could give you any calculation I wanted but this is right off of the IFTA reports because I enter my odometer reading every time that I fuel up...... For my 10,000 - 12,000 miles per month, I need to spend roughly $100 per month on Diesel FX. That's putting an extra 2 grand in my pocket, in fuel savings. I knew that Power Up products were great before but with the FX, you knocked this baby right out of the park!"

Lawrence Kimoff, Owner/Operator - Calgary, AB
**Lubricity**

A fuel with adequate lubricity is critical to the satisfactory operation of diesel engines. The engine relies on the fuel to lubricate many of the moving parts within the fuel injection system. ULSD fuels in particular have poor lubricity. The processing required to reduce sulfur 97% in ULSD also removes naturally-occurring lubricity agents. ASTM has incorporated a lubricity requirement as part of the diesel fuel specification, ASTM D975. As a result all diesel fuel must have a High Frequency Reciprocating Rig (HFRR) test result (ASTM D6079) of no more than 520 μ. However, the fuel components that inherently provide protection are removed by the hydrotreating process, meaning ULSD typically has poor lubricity.

**Diesel FX** contains a powerful synthetic lubricant package which reduces friction and wear in the top end of the cylinder, injectors and fuel pump. **Diesel FX** is approved for and surpasses the new standards for diesel fuel and significantly reduces wear and friction below typical levels. Poor fuel lubricity results in increased maintenance costs, downtime and poor fuel economy. Lubricity-improving additives are the most cost-effective way of achieving the lubricity specification for ULSD. **Diesel FX** is engineered to improve the lubricity of low sulphur fuels and restore protection for the rotary fuel pumps. High fuel lubricity also prevents pump-sticking in the In-Line fuel pumps used in heavy-duty vehicles and equipment.

**Product Application:**

**Diesel FX** Advanced Diesel Fuel Treatment may be continuously or batch blended into diesel fuel, ULSD fuel or Biodiesel blend as a concentrate or as a stock solution.

<table>
<thead>
<tr>
<th>Diesel FX to Diesel Lubrication Blend Ratio</th>
<th>Application Rate 1 oz of Diesel FX to 8 Gallons of Diesel Fuel (1:1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel FX</td>
<td>Fuel</td>
</tr>
<tr>
<td>1 Ounce ( 29.5 ml)</td>
<td>8 Gallons (30.28 Liters)</td>
</tr>
<tr>
<td>32 Ounces (1 Quart Bottle)</td>
<td>256 Gallons (969 Liters)</td>
</tr>
<tr>
<td>128 Ounces (1 Gallon Jug)</td>
<td>1,024 Gallons (3,876 Liters)</td>
</tr>
<tr>
<td>640 Ounces (5 Gallon Pail)</td>
<td>5,120 Gallons (19,381 Liters)</td>
</tr>
<tr>
<td>7,040 Ounces (55 Gallon Drum)</td>
<td>56,320 Gallons (213,194 Liters)</td>
</tr>
</tbody>
</table>

**Diesel FX** is available in the following convenient sizes:

1 Quart (32 ounce) Bottle
1 Gallon (128 ounce) Jug
5 Gallon (640 ounce) Pail
55 Gallon (7,040 ounce) Drum
What is Power Up Genesis?

Power Up Genesis is the world’s only pure synthetic ceramic metal treatment proven to substantially decrease friction and reduce damaging harmonics and wear in the engine and transmission, in comparison with operation on oil alone. Genesis utilizes ceramic technology “SiC” to form a micro-ceramic seal on all metal parts within your engine, preventing the formation of performance degrading sludge and abrasive carbons. Genesis will restore lost power to your equipment and give you peace of mind.

Genesis utilizes a Ceramic Lubrication Catalyst, which is carried by the oil and is not a normal oil additive. It is also not a replacement for your oil. Genesis is a one-time advanced metal treatment that protects metal parts within your engine, transmission, gearbox and anywhere there is a need for surface enhancement and protection.

Genesis is designed to be used on any rigid or semi-rigid surface subjected to drag, sliding, rotating or oscillating harmonic friction. It is a combination of a unique ceramic resin and lubricating solids and works well in all applications, but is best at high temperatures, high loads and high speeds.

Genesis is formulated to provide an approximate cured film thickness of 6 microns or less of ceramic coating within the valleys of the metal surface. On the asperities (peaks) of the metal surface, it lays a film less than 1-micron, which will not alter factory tolerances or specifications.

How Does Power Up Genesis Work?

Genesis nano-molecules will bind with carbon chains within the metal sub-surface. Once fully cured, it yields a glass smooth sealed surface, eliminating surface flaws within the metals mating surfaces.

The surface boundary layers formed by Genesis have a submicronic molecular structure with characteristics that ensure extremely low levels of boundary friction between the surfaces.

Genesis is formulated with a “Surface Tension Modifier” that will reduce temperature, pressure, and friction between moving surfaces, minimizing boundary friction and wear. When the temperature is altered up or down and/or the pressure or friction is increased, Genesis activates a succession of chemical reactions with carbon acids and H₂O to reduce the surface tension.

What Power Up Genesis Does in Equipment:

Genesis nano-molecules are non-petroleum based ions with an extremely high affinity towards metal surfaces. Genesis molecules are able to penetrate gum and varnish residual buildup on surfaces without the use of solvents. Once Genesis has reached the metal surface after penetrating the varnish buildup, it forms a ceramic shield that protects the metal. Once bonded, the metal surface no longer has the cracks or pores for the gum/varnish particulate to latch onto. Once Genesis is set, it releases the varnish and carbon buildup back into the lubricant stream to be cleaned by the inline and/or bypass filtration system.

Genesis starts to activate at normal equipment temperatures. The higher the temperature, the faster the activation time, the more hours of constant operation, the faster the final results will become apparent.

Applications for Power Up Genesis

- Engines
- Transmissions
- Hydraulic systems
- Fuel pumps and injectors
- Drivetrains, trans-axles, hubs and transfer cases
- Air conditioning systems
- Power steering systems

Does Power Up Genesis Affect Your Warranty?

NO! Genesis treats metal only and is a non-hazardous, submicronic material. It does not negatively affect the metal surface or any type of seal material.

Genesis Will Significantly Reduce Vibration and Friction in Engines and Equipment

Genesis significantly reduces friction and vibration, thereby providing:

- More power to motorized equipment (increased rpm or improved energy output efficiency at the same rpm)
- Cooler operation in all engines, transmissions, gear boxes, sliding devices and bearing assemblies (as tested it yielded a 45°F average reduction in fluid temperatures)
- Longer equipment life
- Significantly longer lubrication (oil) service cycles
- Protection against carbon & lacquer buildup allowing for improved piston sealing

Call today for more information 1-800-897-6937
or visit us online at www.powerupusa.net
**Benefits for Engines**

In most cases, Genesis will reduce or eliminate oil burning however, Genesis will not fix physical defects. Many times, parts that we think are broken are simply heavily coated in lacquers, preventing optimal function. Genesis will remove these lacquers, making the parts work as intended.

**Advantages**
- Smooths, seals and protects the metal surfaces of bearings, pistons, cams, crankshaft, lifters and all other internal moving metal parts
- Protects engine against friction related heat and wear
- Reduces operating temperatures
- Increases horsepower
- Extends the life of lubricated engine parts
- Reduces oil consumption

**Benefits for Fuel Systems (Genesis for Fuel)**

Genesis will help alleviate common fuel system issues and help increase the performance of the fuel system. It works as a cleaner, conditioner and metal treatment all-in-one for the fuel system.

**Advantages**
- Octane booster
- Upper cylinder metal treatment
- Fuel system water remover and cleaner
- Fuel pump conditioner
- Fuel injector cleaner / conditioner

**Benefits for Transmissions**

One of the biggest enemies of a transmission is heat. The amount of heat present in the system will normally dictate the lifetime of that transmission. When Genesis is added, heat is significantly reduced. Genesis addresses the extreme pressure (EP) areas, such as planetary and worm gear systems, along with bushings, bearings and shafts by penetrating the metal surface and embedding a 6 micron layer ceramic coating. This process drastically reduces the internal friction, leading to a reduction of oil temperature, which will increase the transmissions efficiency and prolong operating life.

**Valve Body Operation**: In some cases, professional transmission builders have found that Genesis has freed the valve body and maximized performance with no recurrence of sticking or intermittent hang-ups.

**Governors**: As most builders are aware, there are certain governor systems that have unique tendencies to hang up for no apparent reason. Two reasons these hang-ups occur are contaminants and microscopic spiking of the metal due to electrolytic corrosion of the metal. Genesis will displace contaminants and smooth and seal metal surfaces with ceramic protection, removing electrolytic spikes and preventing their formation.

**Advantages**
- Lowers operating temperatures
- Frees valve body for maximum performance
- Eliminates governor hang-ups
- Keeps oil passages, orifices and ball checks clean and fully operational
- Extends the service life of the transmission
- Reduces metal particle fallout and debris
- Removes varnish buildup
- Eliminates lock-up chatter in the torque converter
- Ensures proper shifts
- No negative effect on sprag or clutch friction*
- Recommended for automatic and standard transmissions

* Although Genesis reduces friction, it has no negative effect on the sprag or clutch friction necessary for the operation of the transmission. Six years of real world testing, as well as over 20 dynamometer tests, confirm Genesis enhances the transference of horsepower to the road without any ill effects to the transmission.
Benefits for Power Steering/Rack Assembly

**Advantages**
- Quiets noisy power steering pumps
- Reconditions rack piston and cylinders
- Helps return smooth and easy operation to the unit *

* If you are experiencing difficulty with the unit, we recommend the unit be thoroughly flushed prior to the addition of Genesis.

Benefits for Differentials

**Advantages**
- Treats the metal sub-surfaces of the gears
- Quiets noisy drivetrains
- Optimizes performance for more power
- Extends the life of lubricated differential parts

Genesis Improves Horsepower

The improved lubricating properties of lubricants including Genesis oil additive were further demonstrated by comparing the horsepower generated by an automobile engine operating without Genesis added to the lubricant versus the horsepower the horsepower generated by the same automobile engine with Genesis added to the engine lubricant. In each case, the horsepower generated by a 1998 Jeep Grand Cherokee Laredo (“Jeep”) with a 4.0 liter, 6 cylinder engine was measured using a Dynojet Model 248C Dynamometer.

Five quarts of 10W30 petroleum-based motor oil were added to the Jeep, and its horsepower was initially measured prior to addition of Genesis. The automobile was tested from 0 to 5200 RPM with measurements taken at increasing 250 RPM intervals.

The absolute barometric pressure was recorded as 20.92 in. Hg (about 100kPa) with a vapor pressure of 0.61in. Hg (about 2kPa). The intake air temperature was measured at 88.8°F (31.6°C) and the gear ratio was recorded as 48 RPM/MPH. An SAE correction factor of 1.01 was used to convert the measured horsepower to a corrected horsepower.

A second test was performed on the same automobile by adding 2 ounces of Genesis to the 5 quarts of engine-lubricating oil, resulting in a Genesis concentration of 0.58%.

The measured and corrected horsepower of the Jeep at various engine speeds, operating with lubricant alone versus Genesis added to the lubricant, is detailed below in Table 1.

<table>
<thead>
<tr>
<th>Engine RPM</th>
<th>Measured HP w/o Genesis</th>
<th>Corrected HP w/o Genesis</th>
<th>Measured HP with Genesis</th>
<th>Corrected HP with Genesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>4500</td>
<td>138.5</td>
<td>139.5</td>
<td>142.7</td>
<td>144.2</td>
</tr>
<tr>
<td>4750</td>
<td>139.0</td>
<td>139.9</td>
<td>139.9</td>
<td>141.2</td>
</tr>
<tr>
<td>Average</td>
<td>125.4</td>
<td>126.3</td>
<td>133.4</td>
<td>134.7</td>
</tr>
<tr>
<td>Maximum</td>
<td>139.0</td>
<td>139.9</td>
<td>142.7</td>
<td>144.2</td>
</tr>
</tbody>
</table>

In comparing the data in Table 1, it can be seen that the corrected horsepower increased by an average of 8.4 horsepower when Genesis was added to the engine lubricant compared with the corresponding tests performed without the additive. Additionally, the maximum horsepower achieved in the tests using Genesis exceeded the maximum horsepower in the tests without the additive by 4.3 horsepower. The test measurements of increased horsepower resulting from use of Genesis supports the conclusion that use of Genesis provides better lubrication of the engine parts.

As seen in Table 2, in a second test done on a 2006 Ford F-150 Crew Cab, Genesis was first dyno tested for its benefits in the engine. Table 3 shows the results when it was added to the transmission, differential and the fuel. It can be seen that Genesis increased the horsepower when used in the engine alone by 8.65 horsepower and when added to the transmission, differential and used as a fuel additive, resulted in another 10 horsepower gain for a total gain of 18.65 horsepower! Torque was also increased by 20 lbs/ft in testing and the max torque was reached at 1,177 rpm less!

<table>
<thead>
<tr>
<th>Engine RPM</th>
<th>Measured HP w/o Genesis</th>
<th>Measured HP w/o Genesis</th>
<th>Measured Torque w/o Genesis</th>
<th>Measured Torque with Genesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>4758</td>
<td>220.95</td>
<td>229.6</td>
<td>262.7</td>
<td>276.5</td>
</tr>
<tr>
<td>4023</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2846</td>
<td>Max Torque reached 1,177 rpm less w/ Genesis</td>
<td>283.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ASM Emission Tests

A comparison of the emissions of automobiles with and without Genesis added to the engine lubricant Penzoil 10W30 was performed using the acceleration simulation mode (ASM) emission test for the State of California. The test results, detailed in Tables 4-6 below, provide the measured exhaust concentrations of hydrocarbons (HC), carbon monoxide (CO), and nitrogen oxide (NOx) gases, which are generally considered harmful. The data in the columns titled “Before Genesis Application” lists the results of the first test in which no Genesis was added to the engine lubricant (5 quarts motor oil). The data in the columns titled “After Genesis Application” lists the results of the second tests in which 2 ounces of Genesis were added to the engine lubricant to result in an overall concentration of Genesis in the lubricant of approximately 1.16% by volume.

<table>
<thead>
<tr>
<th>Emission Type</th>
<th>Before Genesis Application at 2110 RPM</th>
<th>After Genesis Application at 2149 RPM</th>
<th>Total Reduction with Genesis Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocarbon (HC)</td>
<td>68 ppm</td>
<td>3 ppm</td>
<td>95.60%</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>0.54%</td>
<td>0.04%</td>
<td>92.60%</td>
</tr>
<tr>
<td>Nitrogen Oxide (NOx)</td>
<td>377 ppm</td>
<td>107 ppm</td>
<td>71.60%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emission Type</th>
<th>Before Genesis Application at 1451 RPM</th>
<th>After Genesis Application at 1440 RPM</th>
<th>Total Reduction with Genesis Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocarbon (HC)</td>
<td>7 ppm</td>
<td>0 ppm</td>
<td>100.00%</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>0.04%</td>
<td>0.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Nitrogen Oxide (NOx)</td>
<td>131 ppm</td>
<td>68 ppm</td>
<td>48.10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emission Type</th>
<th>Before Genesis Application at 1717 RPM</th>
<th>After Genesis Application at 1871 RPM</th>
<th>Total Reduction with Genesis Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocarbon (HC)</td>
<td>931 ppm</td>
<td>82 ppm</td>
<td>91.20%</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>1.20%</td>
<td>0.17%</td>
<td>85.80%</td>
</tr>
<tr>
<td>Nitrogen Oxide (NOx)</td>
<td>319 ppm</td>
<td>370 ppm</td>
<td>-16.00%</td>
</tr>
</tbody>
</table>

These test results demonstrate that the use of Genesis significantly reduced the concentration of hydrocarbons and carbon monoxide in each case, and significantly reduced the NOx emissions in all but one of the applications. These results support the conclusion that the use of Genesis improves engine efficiency, which thereby reduces emissions of hydrocarbons, carbon monoxide and NOx gases.

Product Application*

Disclaimer: This product must be administered as detailed below or the product will not work as designed and we cannot take responsibility for any failure of performance.

Automotive: Run engine to operating temperature (preferably with old oil but this is not paramount). Administer Genesis dose and immediately drive moderately for 20 to 30 minutes. If driving is not an option (for example: stationary engines, etc.) hold engine at 2,000 RPM’s for 4 minutes and then at idle speed for 60 minutes.

2 Cycle: Administer Genesis dose into the fuel oil mixture tank (running or not), then use for a minimum of 20 to 30 minutes.

Automatic Transmissions: Administer Genesis dose preferably with engine running and drive for 20 to 30 minutes as soon as possible.

Manual Transmissions and Differentials: Administer Genesis dose and drive for 20 to 30 minutes.

*It is preferable to add Genesis while the engine is running, or administer treatment then start engine within 30 seconds; otherwise the treatment will be delayed up to 1,000 miles of driving before it is active. Genesis does not mix with oil, it uses oil as a carrier.

<table>
<thead>
<tr>
<th>Application Type</th>
<th>Type</th>
<th>Amount Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engines</td>
<td>Gasoline (4 cyl to 8 cyl)</td>
<td>2.5 oz</td>
</tr>
<tr>
<td>Diesel Car/Truck</td>
<td>(5 cyl to 8 cyl)</td>
<td>8 oz</td>
</tr>
<tr>
<td>Semi Truck</td>
<td>(6 cyl to 8 cyl)</td>
<td>16 oz</td>
</tr>
<tr>
<td>Transmissions (Automatic)</td>
<td>Rear Wheel Drive</td>
<td>2.5 oz</td>
</tr>
<tr>
<td></td>
<td>Front Wheel Drive</td>
<td>2.5 oz</td>
</tr>
<tr>
<td>Transmissions (Manual)</td>
<td>Car</td>
<td>2.5 oz</td>
</tr>
<tr>
<td></td>
<td>Semi Truck</td>
<td>8 oz</td>
</tr>
<tr>
<td>Power Steering</td>
<td></td>
<td>2.5 oz</td>
</tr>
<tr>
<td>Differential</td>
<td></td>
<td>2.5 oz</td>
</tr>
<tr>
<td></td>
<td>Semi Truck</td>
<td>8 oz</td>
</tr>
</tbody>
</table>

Genesis is available in the following convenient sizes:

2.5 oz bottle
8 oz bottle
2 oz bottle (Genesis for Fuel)
LHP-454 is a one-shot multifunctional performance additive for use in gasoline engines. It improves performance by:

- Reducing Intake Valve Deposits
- Keeping Port Fuel Injectors clean
- Improving fuel economy
- Reducing exhaust emissions
- Minimizing Octane Requirement
- Enhancing Corrosion Protection
- Reducing maintenance of the fuel system and emissions control equipment
- Optimizing drivability by preventing rough idling, stalling and surging
- Improves moisture absorption and reduces fuel line freeze-up

LHP-454 provides additional protection against corrosion for all engine components.

Performance Testing

Intake valve deposit testing was performed using the standard ASTM D5500 test procedure for the evaluation of intake valve deposit formation. This method uses a 1985 BMW 318i, driven in a driving pattern comprising 10% city, 20% urban and 70% highway driving for 10,000 miles.

Intake Valve Deposit Clean Up

The clean up performance of LHP-454 as evaluated in the Ford 2.3L. The testing comprises two 100-hour cycles the first of which is performed with base fuel to allow for deposit formation. The fuel is then treated for the second cycle.

LHP-454 provides superior intake valve detergency and meets EPA compliance performance criteria.

LHP-454 Product Application:

At the recommended treat rate of 12 oz. in up to 20 gallons, LHP-454 provides complete engine protection and improves performance. It is registered according to US-EPA certification standards. LHP-454 meets performance requirements specified by both the EPA and CARB.

LHP-454 is available in the following convenient size: 12 oz. (350 ml) One Shot Bottle.
R.C.L. 1000 is a revolutionary thin film, high load lubricant that protects and prolongs the life of equipment.

R.C.L. 1000’s primary benefits:

1. Resists rust and corrosion
2. Designed for thin film, heavy load lubrication.
3. Greatly reduces friction and drag
4. Reduces metal wear by forming a high strength boundary film
5. Prolongs operating life
6. Is compatible with typical seals, except EPDM
7. Is designed to withstand corrosive environments
8. Speeds drilling and tapping; cutting edges remain sharp longer
9. Displaces water

Ideal for:

- Rapid Penetration of Rusted and Seized Parts for Easy Separation
- Works Even in Wet Conditions
- Pleasant Aroma
- Prevents Rusting and Oxidation

Typical Properties of R.C.L. 1000

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Light Amber Translucent</td>
</tr>
<tr>
<td>Viscosity</td>
<td>8 cSt @ 40°C</td>
</tr>
<tr>
<td>Density</td>
<td>0.86 g/ml (20°C/68°F)</td>
</tr>
<tr>
<td>Flash Point</td>
<td>266°F (130°C)</td>
</tr>
<tr>
<td>Pour Point</td>
<td>-33°F (-36°C)</td>
</tr>
</tbody>
</table>

R.C.L. 1000 is available in the following convenient sizes:

- 17 oz. Aerosol (482 gram) Spray Can
- 500 Milliliter (16.9 oz.) Bottle
- 5 Liter (1.4 Gallon / 175 oz.) Jug
- 20 Liter (5.5 Gallon / 700 oz.) Pail

Penetrating Fluid 2000 is specifically designed for heavy duty penetration of rusting parts, even in wet conditions.

Penetrating Fluid 2000’s primary benefits:

1. Heavy duty performance
2. Designed for rapid, deep penetration of rusted or seized parts
3. Excellent surfactancy
4. Penetrates in wet conditions
5. Water soluble
6. Reduces sheer strength of rust particles at metal interface, minimizing the amount of force needed
7. Easily mistable

Ideal for:

- Rapid Penetration of Rusted and Seized Parts for Easy Separation
- Works Even in Wet Conditions
- Pleasant Aroma
- Prevents Rusting and Oxidation

Typical Properties of Penetrating Fluid 2000

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Light Amber Translucent</td>
</tr>
<tr>
<td>Viscosity</td>
<td>4 cSt @ 40°C</td>
</tr>
<tr>
<td>Density</td>
<td>0.83 g/ml (15°C/59°F)</td>
</tr>
<tr>
<td>Flash Point</td>
<td>226°F (108°C)</td>
</tr>
<tr>
<td>Pour Point</td>
<td>-6°F (-21°C)</td>
</tr>
</tbody>
</table>

Pen 2000 is available in the following convenient sizes:

- 17 oz. Aerosol (482 gram) Spray Can
- 500 Milliliter (16.9 oz.) Bottle
- 5 Liter (1.4 Gallon / 175 oz.) Jug
- 20 Liter (5.5 Gallon / 700 oz.) Pail

Aerosols contain no ozone depleting ingredients.
POWER UP MAKES YOU MONEY....8 WAYS POWER UP PRODUCTS PAY FOR THEMSELVES

1. **Extended Service Life**  
   Power Up can increase component life up to 2.5 times longer. Nobody prevents wear like Power Up! What is your equipment worth to you?

2. **Insurance**  
   Preventing major breakdowns and repairs (Overheating, anti-freeze leaks, loss of oil, etc.)

3. **Retention Agent**  
   Establishes a protective film on metal parts. No more cold or dry starting. Great for winterizing.

4. **Extended Oil Intervals**  
   Magnifies your additive package 10 to 15 times and boosts TBN.

5. **Pour Point**  
   Prevents cavitation and shudder. Dramatically decreases wear and stress on hydraulic pumps and motors during cold operating conditions (57°F degrees).

6. **Downtime**  
   This can be the most costly expense to your operation. POWER UP WILL HELP!

7. **Better Fuel Economy**  
   Less frictional drag in engines with NNL 690 and up to 15% saving in fuel using Gen 49D or LHP-454.

8. **Peace of Mind**  
   Knowing that you are getting the best protection that modern technology can provide.

---

### Power Up Products Application Quick Reference Chart

<table>
<thead>
<tr>
<th>Component</th>
<th>NNL-690</th>
<th>NNL-690G</th>
<th>Hydra Maxx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline Engines</td>
<td>3 - 5%</td>
<td>3 - 5%</td>
<td></td>
</tr>
<tr>
<td>Diesel Engines</td>
<td>3 - 5%</td>
<td>3 - 5%</td>
<td></td>
</tr>
<tr>
<td>Engines requiring Low-Ash / Ashless Oil</td>
<td>3 - 5%</td>
<td>3 - 5%</td>
<td></td>
</tr>
<tr>
<td>Small, air or water cooled two-stroke engines</td>
<td>3% (in 2-stroke oil)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic Transmissions</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Standard Transmissions Using EP Gear oil</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Standard Transmissions Using ATF</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Standard Transmissions Using engine oil</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Differentials / Transfer cases using EP Gear oil</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Differentials / Transfer cases using ATF</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Power Steering Pumps</td>
<td>3%</td>
<td>3%</td>
<td>3 - 5%</td>
</tr>
<tr>
<td>Gear Drives (w/EP Gear Oil)</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrostatic Drives</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Powershift Transmissions</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Ag-tractor TDH systems</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Hydraulic Systems</td>
<td>3%</td>
<td>3%</td>
<td>3 - 5%</td>
</tr>
<tr>
<td>Compressors</td>
<td>3%</td>
<td>3%</td>
<td>3 - 5%</td>
</tr>
<tr>
<td>Hydraulics/Compressors with Water separators</td>
<td>3 - 5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Manufactured by: Maryn International Ltd.  
Distributed by: Power Up USA  
(A Division of Kleenoil USA Inc.)  
6913 Ave K, Suite 303  
Plano, Texas  75074  
Telephone: (972) 633-2226  
(800) 897-6937  
Fax: (972) 633-0027  
Email: info@powerupusa.net  
Website: www.powerupusa.net

**DISTRIBUTED BY**