



Bio-Boost™ Lube Concentrate Booster Pak Additive for Lubricants (Reduces Friction and Improves Lubricity)

Formulated to Improve Lubrication Performance in Equipment

“Because nobody knows your machine and its application like you”

Bio-Boost™ Lube Concentrate is a patented biobased Booster Pak that can be added to most any lubricant to boost performance and increase the life of high performance machines. Now more than ever, there is an increased need for an environmentally friendly, high performance additive that can provide improved protection in today's hi-tech and/or high stressed machines operating at increased speeds and feed rates. Bio-Boost's multipurpose performance helps in reducing inventory and lowering cost. This concentrated formulation is zinc-free (ashless), contains no solid particle to block filters, and offers a variety of advantages over conventional mineral oil-based additives without the use of chlorine, active sulfur, silicon, or heavy metals.

The use of Stabilized HOBS* with patented additive technology, improves power and performance through a reduction in friction and wear. Bio-Boost Lube Concentrate is specially formulated to be added to existing lubricants to improve lubricity and ensures excellent anti-wear performance in manual transmission, automatic transmissions, heavily loaded gears, high-pressure hydraulic systems, compressors, and different metal working applications. It works synergistically with existing ZDP and phosphorus-sulfur compounds, and other EP component found in these types of lubricants, while allowing a proper balance in other necessary performance functions. It may be added to noisy hydraulic systems as a friction modifier to prevent stick-slip and provide smoother operational benefits over formulas without this proven chemistry.

Where gears are heavily loaded, it provides improved extreme pressure (EP) protection when Bio-Boost Lube Concentrate is added to gear oil. In the FZG Load Tests DIN 51517 Part 3 for gear oils and in DIN 51354 Part 2 for hydraulic fluids, at a treat rate of 3% by volume, it has been used to improve a lower load stage range of 10 or 11 to a higher load stage 12 or greater. In the Four-Ball Wear Test ASTM D-4172, Bio-Boost Lube Concentrate added to petroleum base oil at 3% by volume, greatly reduced the wear score from 0.80 mg to 0.34 mg. In the same base oil at 3%, it passed clean no rust in both A and B Sequences of the ASTM D-665 Turbine Oil Rust Test and was 1A on ASTM D-130 Copper Corrosion Test.

This technology has shown to help prevent stick-slip in machine ways and eliminate table chatter by reducing friction between mating surfaces. Bio-Boost Lube Concentrate can be added to metal working oils to improve machining stainless and hard steel, such as Hastalloy and tool steels.

Although the primary use of this technology has been in transmissions, gear drives and industrial applications, it can be added to high performance turbo-charged and supercharged gas and diesel engine to improve lubricity and ensures excellent anti-wear performance in all areas, particularly in respect to multi-valve, high-lift camshafts and other heavily loaded valve train components.

HIGH PERFORMANCE BENEFITS OF STABILIZED HOBS FORMULATIONS:

- Super High Viscosity Index
- Energy Conserving
- Superior viscosity stability
- Tested by the USDA as Biobased
- Excellent antiwear & extreme pressure performance
- Superior low volatility reduces emissions (*Safe, Non-Combustible*)
- Excellent oxidation stability
- Improved biodegradability

STABILIZED by Renewable Lubricants * is RLI's trademark on their proprietary and patented anti-oxidant, anti-wear, and cold flow technology. High Oleic Base Stock (HOBS) are agricultural vegetable oils. This Stabilized technology allows the HOBS to perform as a high performance formula in high and low temperature applications, reducing oil thickening and deposits.

US Patents: 6,383,992, 6,534,454 with additional pending and Foreign Patents

* Trademark of Renewable Lubricants, Inc.

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Availability F.O.B. :Hartville, Ohio, USA Quarts 1 Gallon 5 Gallon Pails Drums Bulk

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Bio-Boost™ Lube Concentrate Typical Data

Specific Gravity @ 60°F	ASTM D-4050	.93	<u>Elements</u>	
Viscosity @ 100°F	ASTM D-445	9.6 cSt	Phosphorus	8160 ppm
Viscosity @ 40°F	ASTM D-445	52.9 cSt	Nitrogen	4590 ppm
Viscosity Index	ASTM D-2270	168	Patented Antioxidants	38500 ppm
Pour Point	ASTM D-97	-30°C		
Flash Point (PMCC)	ASTM D-93	230°C (Safe, very high flash)		

Bio-Boost™ Lube Concentrate's multipurpose performance helps in reducing inventory and lowering cost in many industrial markets. One drum of Anti-Wear (AW) hydraulic fluid, plus two gallons Bio-Boost Lube Concentrate, can replace and be used in many different lubricant applications. It can cut inventory in half or more. This can pay big dividends where areas are limited or distant from inventory, especially on ships, or in mining, drilling, forestry, and rail. Examples: Increasing FZG load in a premium AW hydraulic fluid to improved FZG gear requirements, or to be used as non-tacky slide-way oil, or to meet cutting oil requirements. Increasing the antiwear in a turbine R&O to meet AW hydraulic fluid requirements or improving a fighting grade hydraulic fluid towards premium grade AW hydraulic fluid. The use of this product can even play bigger dividend in an emergency replacement.

Direction For Use

Bio-Boost Lube Concentrate is compatible with synthetic polyolesters and diesters, natural esters, conventional petroleum, synthetic petroleum and semi-synthetics lubricants. This chemistry has been approved and used successfully in all of the applications below to provide the performance benefits claimed in this TDS. **Bio-Boost™ is the perfect viscosity that allows for easier mixing: 3% by volume is approximately 1oz per Quart of oil or only 4 oz per Gallon.**

Adding 3% by volume is the average recommended treat rate into existing hydraulic fluids, compressor oils, gear oils, motor oils, automatic and manual transmissions. Adding the recommended **3% by volume** will boost an additional average 245 ppm of phosphorus and 138 ppm of nitrogen into these lubricants that may already contain these elements. In Addition to the phosphorus and nitrogen elements, Bio-Boost Lube Concentrate contains the patented antioxidants, ester friction modifiers and lubricity enhancement components that will not be shown in universal oil analysis. **Highly Concentrated Pure Antioxidants by wt. = 38500 ppm, (Bio-Boost Lube Concentrate at 3% by volume provides 1155 ppm of Stabilized Patented Antioxidant).**

For automatic transmissions add **3% by volume** to extend fluid and transmission life by reducing oxidation and wear during fluid change intervals. It is an excellent product to boost the depleted fluid trapped in the torque converter and valves that can't be drained (**average 8 oz per transmission can boost the fluid in most automobiles and light duty trucks**).

In addition, **Bio-Boost can be added at 1.5% to 3% by volume** to existing turbine oils and circulating oils to boost the anti-oxidant, anti-corrosion, anti-wear, and lubricity performance. As a friction modifier in hydraulic systems and transmissions to prevent stick-slip and for use in noisy gear drives and hydraulic systems, **add 1.5% and if noise persists, add 1.5% more for the total of 3%.**

In more sever conditions or in problem gear drives, **add 6% by volume.**

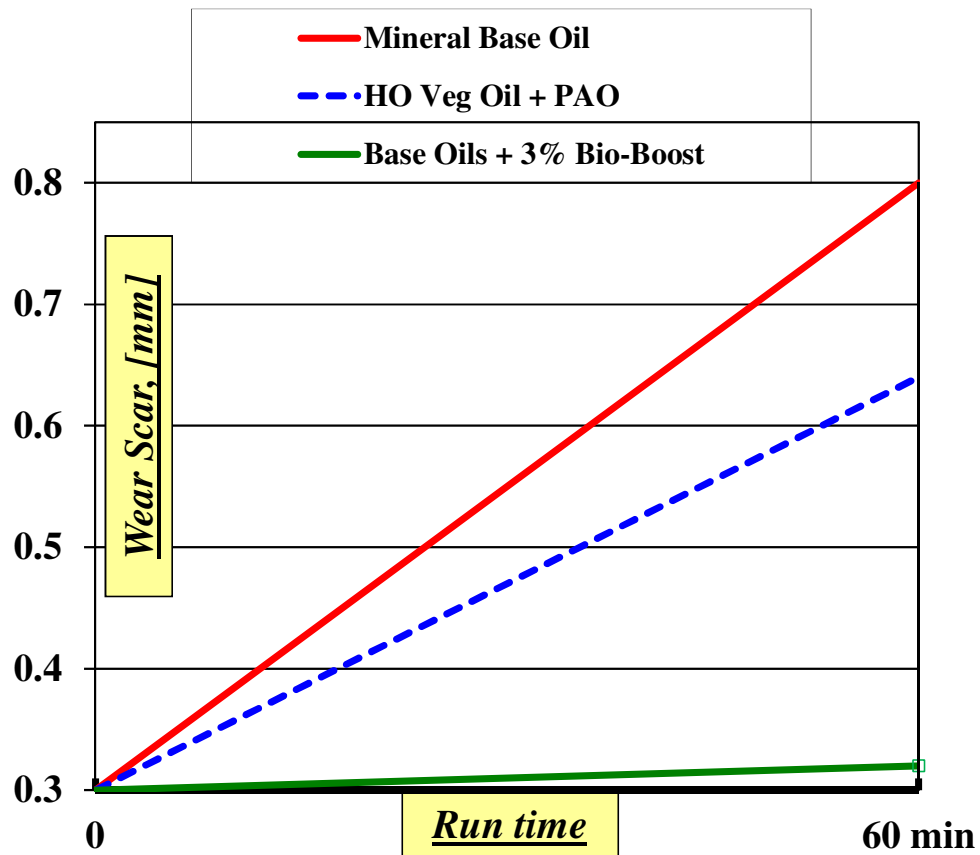
For machine ways (slide-ways), **add 3% by volume** to eliminate stick-slip or table chatter. In metal working oils **add 3% to 10% by volume** into existing metal working oils to reach desired performance.

Although Bio-Boost Lube Concentrate can improve most any oil formulation, the percentages used above to increase performance are to be used as approximate guidelines and keep in mind that performance can vary because of machine design and the different variables in the industry. The main purpose of this product is for our customer to be able to cost effectively evaluate their application and directly improve the performance in their own machines.

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Comparison of Four-Ball Wear Properties with Bio-Boost

Steel-on-steel, 40 kg load at 75°C, 1200 rpm



Above base oil HO Veg Oil + PAO was a 50/50 blend and was the base oil for Base Oils + 3% Bio-Boost blend.

All Base Oils in ASTM D-4172 (with Bio-Boost at 3%) have averaged in the low .32 mm to .34 mm.

Exceeding the higher recommended amounts may not improve performance and is not cost effective or recommended by RLI. The benefits listed above **will not** be achieved in equipment or machines, which are damaged or in need of repair due to mechanical failures.