



Wise Solutions, Inc.

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Bio-Extreme™ High Temperature Oven Lubricants **ISO 68, 100, 150, 220 (NSF H-1 Versions Available)**

"Biobased Lubricants that Perform Like Synthetics"

Bio-Extreme High Temperature Oven Lubricants are unique biobased biodegradable food grade¹ lubricants fortified with synthetic food grade white graphite. This synthetic white graphite will lubricate at **extreme high temperatures** up to and over 1000°C with intermittent lubrication up to 2000°C and will provide a light clean lubricating powder after the biobase oil cleanly dissipates. These products are free of Volatile Organic Compounds (VOCs) and provide an auto ignition temperature (ASTM D-659) of over 371°C. In addition, the products provide improved extreme pressure and lubricity after black graphite, Teflon, and molybdenum disulfide lose their lubrication between 400°C and 500°C.

Applications:

- Roller chains on oven conveyors
- Lithographic chains, beverage can lines
- Tenter frames in textile plants
- Kiln car wheel bearing/refractory plants
- Paint lines, drying ovens
- Sealed for life units
- Kiln support rollers, cement plants
- Bakery oven chains
- Automatic lubrication systems^(note)
- Many others

Outstanding Advantages:

Exceptional High Temperature Stability- made from biobased and biodegradable base oils that reduce tendency to form hard carbon deposits in high temperature applications.

Cleanliness- helps to eliminate accumulation of hard carbon solids that create maintenance clean-up problems and downtime, cleans chains already dirtied by inferior lubricants.

Better Protection- reduces wear, rust, oxidation, and corrosion; extends equipment life, reduces maintenance costs.

Bio-Extreme High Temperature Oven Lubricants are ENVIRONMENTALLY RESPONSIBLE products that are formulated from renewable agricultural plant resources. We believe Earth's environmental future rests in the use of renewable materials.

High Oleic Base Stock (HOBS) are agricultural vegetable oils. This technology allows the HOBS to perform as a high performance formula in high and low temperature applications, reducing oil thickening and deposits.

Full compliance with other applicable restrictions of FDA, USDA, oil spill, and oil pollution prevention statutes is recommended.

(NOTE) Because of the High Concentration of White Graphite, Agitation is required Before Use to Ensure an Even Distribution of the Solid Lubricant Particles.

Typical Specifications for Bio-Extreme™ High Temperature Oven Lubricants

ISO Grade	68	100	150	220
Specific Gravity @ 60°F, (ASTM D-287)	.886	.90	.90	.915
Viscosity (ASTM D-445) @100°C cSt	12.5	16.7	24.9	36.0
@40°C cSt	67.5	96.0	147.1	219.0
Viscosity Index (ASTM D-2270)	187	190	203	214
NOACK Volatility %, 250°C (ASTM D-5800)	2.5	2.0	2.0	2.5
Evaporation Loss, Wt %, 6.5 hrs, 250°C (ASTM D-972)	3.5	3.0	3.0	3.5
Flash Point (ASTM D-92)	590°F (307°C)	590°F (307°C)	595°F (309°C)	588°F(306°C)
Fire Point, COC (ASTM D-92)	635°F (332°C)	645°F (337°C)	640°F (335°C)	645°F (337°C)
Pour Point (ASTM D-97)	-28	-25	-25	-25
Rust Prevention A,B (ASTM D-665)	Pass	Pass	Pass	Pass
4 Ball Wear, 1h, 167°F ,1200 RPM, 40kg (ASTM D-2266), Coefficient of Friction	0.40 0.10	0.40 0.10	0.40 0.10	0.40 0.10
4 Ball Weld (ASTM D-2783)	160kg	160kg	160kg	160kg

Typical White Graphite Lubricity Performance at High Temperatures

Coefficient of Friction (2200°C – 2760°C)	0.08 to 0.12
Pin-On-Disk @ 450°C in argon, nickel static substrate, sliding velocity 0.5 m/sec, 2 N load	
Wear Rate, mm ³ /N/m	0.023-0.044
Coefficient of Friction	0.62

Optimum Viscosity- is provided by the Super High Viscosity Index (VI) that gives energy efficiency and optimum lubrication at higher operating temperatures. The chart below shows the exceptional viscosity performance of the Bio-Extreme HT Oven Lubricant ISO 220 (VI of 214) compared to a conventional petroleum based lubricant ISO 220 (VI 95). Bio-Extreme HT Oven Lubricants provide a lighter fluid at room temperature, but maintains double the fluid film (viscosity in cSt) over 100⁰C.

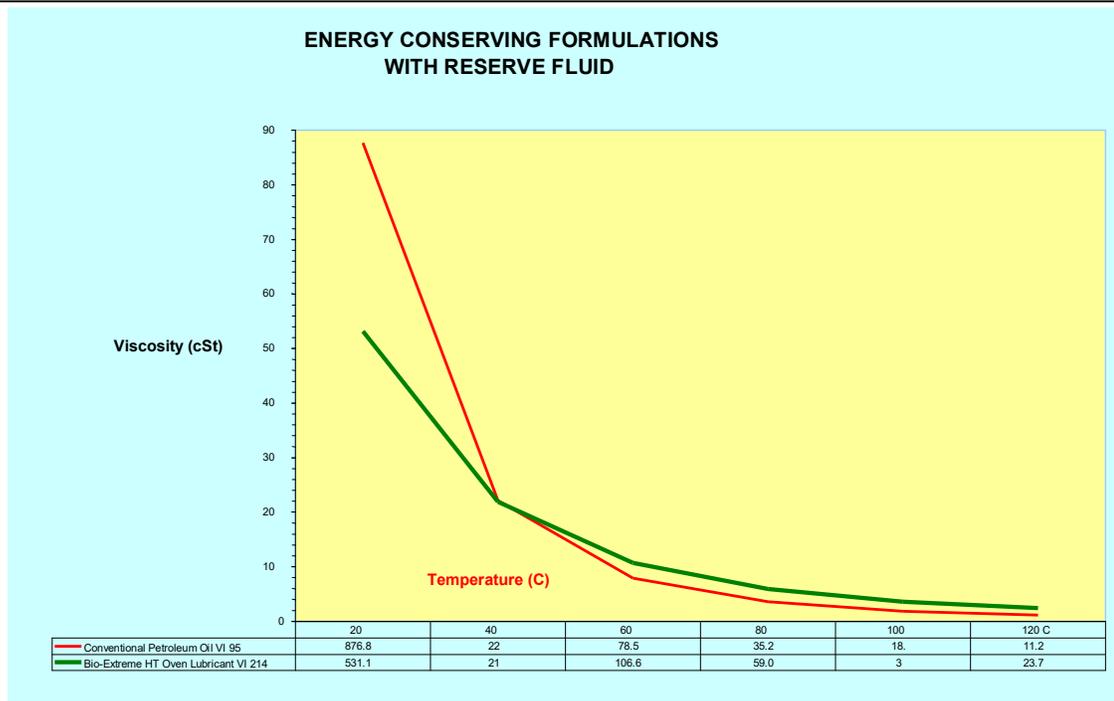


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Apply directly to moving surfaces of the chain links, pins and rollers using proper viscosity that stays on chain, and penetrates into pins and rollers.

Apply normal rate for first few hours or until links, pins and rollers are wet with lubricant. Check that lubricant has penetrated into links, pins and rollers.

In most ovens after normal rate is applied automatic lube systems can be reduced to approximately $\frac{1}{4}$ the normal rate of most oven lubricants.

Steady rate lube systems and lube systems with timers can be adjusted down by monitoring amperage increases of the chain drive unit.