



Renewable Lubricants, Inc.

Distributed By: DM's Bio-Based Fluid Supply Inc.
10 McEwan Dr. W, Unit 4B
Bolton, ON, Canada L7E 1H1
Voice: 905.951.1100 Fax: 905.951.2100
www.dmsbiobased.ca

Bio-Extreme™ High Temperature Oven Lubricants



ISO 46, 68, 100, 150, 220



"Bio-based Lubricants that Perform Like Synthetics"

Bio-Extreme™ High Temperature Oven Lubricants are unique bio-based food grade¹ lubricants fortified with synthetic food grade white graphite ^(note). 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 cleaner lubricating solid film (off-white to white) after the base oils cleanly dissipates. The products are formulated in different viscosities to provide proper penetration and then lubricate with the solid film into links, pins and rollers of different size chains. These (Biopreferredsm), 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. At the lower temperatures (below the flash points) these Bio-Extreme High Temperature Oven Lubricants do not dissipate, but leave a soft semi-solid to solid film on the lubricated surface of the links, pins and rollers. (See proper directions for using Bio-Extreme High Temperature Oven Lubricants.)

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-Many others

Outstanding Advantages:

Exceptional High Temperature Stability- made from white graphite and bio-based biodegradable base oils that reduce tendency to form hard carbon deposits in high temperature applications. (White semi-solid to solid film is soft and easy to keep clean with Food Grade cleaners and wire brushes.)

Cleanliness- helps to eliminate accumulation of hard carbon solids that create maintenance clean-up problems and downtime, cleans and lubricates 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.

STABILIZED by Renewable Lubricants* is RLI's trademark on their proprietary and patented 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.

¹ Products are acceptable as lubricants with incidental food contact (H1) for use in and around food processing areas. Such compounds may be used on food processing equipment as a protective anti-rust film, as a release agent on gaskets or seals of tank closures, and as a lubricant for machine parts and equipment in locations in which there is a potential exposure of the lubricated part to food.

(NOTE) Because of the High Concentration of White Graphite, Agitation is Required Before Use to Ensure an Even Distribution of the Solid Lubricant Particles. Drums are available with and without drum agitators.

Patented Product with Pending and Foreign Patents

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Availability F.O.B. :Bolton, ON, Canada 5 Gallon Pails Drums^(note) Bulk

Typical Specifications for Bio-Extreme™ High Temperature Oven Lubricants (H1, H2)

ISO Grade	46	68	100	150	220
Specific Gravity @ 60°F, (ASTM D-287)	.89	.89	.90	.90	.915
Viscosity (ASTM D-445) @100°C cSt @40°C cSt	9.1 45.5	12.5 67.5	16.7 96.0	24.9 147.1	36.0 219.0
Viscosity Index (ASTM D-2270)	187	187	190	203	214
NOACK Volatility %, 250°C (ASTM D-5800)	2.5	2.5	2.0	2.0	2.5
Evaporation Loss, Wt %, 6.5 hrs, 250°C (ASTM D-972)	3.5	3.5	3.0	3.0	3.5
Flash Point (ASTM D-92)	590°F (307°C)	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)	635°F (332°C)	645°F (337°C)	640°F (335°C)	645°F (337°C)
Pour Point (ASTM D-97)	-28	-28	-25	-25	-25
Rust Prevention A,B (ASTM D-665)	Pass	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	0.40 0.10
4 Ball Weld (ASTM D-2783)	160kg	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



**Nonfood Compounds
Program Listed (H1, H2)**
 (Registration # 140337) ISO-46
 (Registration # 140338) ISO-68
 (Registration # 140339) ISO-100
 (Registration # 140340) ISO-150
 (Registration # 140336) ISO-220

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 100°C.

