Renewable Lubricants, Inc.
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Bio-Extreme™ High Temperature Oven Lubricants

(ISO 46, 68, 100, 150, 220)
NSF H1

Bio-Extreme™ High Temperature Oven Lubricants are unique biobased food grade[1] lubricants fortified with synthetic food grade white graphite[2]. 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 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.

Benefits

- NSF H1 Food Grade/Kosher
- Readily biodegradable, environmentally non-toxic, not bioaccumulative
- Exceptional High Temperature Stability protection from white graphite
- Improved cleanliness, limiting hard carbon solids and reducing maintenance clean-up costs
- Cleans and lubricates chains already dirtied by inferior lubricants
- Prevents wear, rust, oxidation, and corrosion; extends equipment life

Application / New Filling

- High temperature food and industrial ovens
- Commonly used on pizza conveying ovens
- Perfect for bread baking operations
- All high temperature food processing equipment
- Kilns and metal casting/forging

F.O.B: Hartville, Ohio
Availability: 1 Gallon, 5 Gallon Pail, Drum, Bulk

Bio-Extreme™ High Temperature Oven Lubricants Typical Specifications

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	9.1	12.5	16.7	24.9	36.0
@40°C cSt	45.5	67.5	96.0	147.1	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)	580°F (304°C)	570°F (299°C)	565°F (296°C)	560°F (293°C)
Fire Point, COC (ASTM D-92)	650°F (343°C)	650°F (343°C)	650°F (343°C)	645°F (340°C)	645°F (340°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	0.40	0.40	0.40	0.40	0.40
(ASTM D-2266), Coefficient of Friction	0.10	0.10	0.10	0.10	0.10
4 Ball Weld (ASTM D-2783)	200kg	200kg	200kg	200kg	200kg
RLI Product Item #	81920	81850	81860	81870	81880

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

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 100^0C.

NSF

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

[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.

[2] 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.