**Renewable Lubricants, Inc.**
476 Griggy Rd., P.O. Box 474
Hartville, Ohio 44632-0474
330.877.9982 Fax 330.877.2266
Web: www.renewablelube.com

# Bio-Food Grade™ Gear Oils

**(ISO 32, 46, 68, 100, 150, 220, 320, 460, 680) NSF H1, H2**

STABILIZED™ by Renewable Lubricants

## *"Biobased Lubricants that Perform Like Synthetics"*

Bio-Food Grade™ Gear Oils are biosynthetic formulations for gear drives and right angle gear drives commonly used in food processing equipment. These fluids provide exception benefits in environmentally sensitive areas such as in agriculture, marine, water treatment and food processing plants. They are recommended where DIN 51517 Part 3 or AGMA Mild-EP gear oil specifications are required for lubricating bearings, reduction units, and gear set. These gear sets do not require Hypoid level of EP and because of this the lubricants most commonly specified by makers of gear reducers are R&O or ashless API GL-3 type antiwear fluids. ISO Viscosity Grades 32, 46, 68, and 220 meet and exceed *"Military Specifications DOD-L-24651 Lubricating Oils, Food Grade, and Food Processing Equipment."* This specification is approved for use by the Departments and Agencies of the U.S. Department of Defense. ISO Viscosity Grades 32, 46 and 68 meet DOD-L-24651 Type I and ISO Viscosity Grade 220 Meet DOD-L-24651 Type II for general purpose and gear oil lubricants. This food grade specification also requires a rating of USDA H-1 for incidental food contact. They are compatible with the same seals, filters, materials and components that are designed to operate on petroleum oil based formulations.

Bio-Food Grade™ Gear Oils have combined patented biosynthetic technology and food grade mild EP/anti-wear additives that meet and exceed the load stage 12 in the FZG (DIN51354) requirement for gear drive lubricants. Incorporating the super high viscosity index of the Stabilized™ High Oleic Base Stocks (HOBS) into the formula, increases the viscosity index past synthetic levels (Energy Conserving Formulas). These Food Grade[1] formulas have improved performance over conventional food grade products in terms of antiwear, oxidation, thermal shear, biodegradability[2], and fluid film value (viscosity index). This super high viscosity index allows these products to be energy conserving in the startup mode, provide improved load protection, and reduce wear during operation. They are highly inhibited against moisture and rusting in both fresh and sea water and passes both A and B Sequences of the ASTM D-665 Turbine Oil Rust Test. The products also provide double the oxidation stability over the US Steel 127 test requirement of >125 minutes and shows excellent performance in ASTM D-1401 Turbine Oil Demulsibility with a rating of 40/40/0 in ten minutes. The results are high performance, patented biobased products which have long life and heat stability.

**Features**

(1) Recommended for DIN 51517 Part 3, AGMA Mild-EP, and API GL-1, GL-2, GL-3 applications
(2) Super high viscosity index and low pour point for wide temperature usage
(3) Energy Conserving Formulas (Because of the natural lubricity and super high viscosity index (VI) of the Stabilized HOBS these products are more energy efficient in the startup mode at temperatures up to 40°C, but provide a more protective heavier fluid film than mineral based formulas at operating temperatures
(4) Fortified with food grade additives to resist wear, oxidation, rust and foam
(5) More fire resistant and improved heat dissipation
(6) ISO14000 compliant
(7) Contains no animal byproducts and are manufactured under kosher supervision

[1]The 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.

Bio-Food Grade™ Gear Oils **(ISO 32, 46, 68, 100 and 150)** meet the Environmental Protection Agency (EPA) 2013 Vessel General Permit (VGP) guidelines for **ENVIROMENTALLY ACCEPTED LUBRICANTS (EALs)**, and should be used where **LOW TOXICITY**, **BIODEGRADABILITY** and **NON-BIOACCUMULATION** properties are required. They exceed the acute toxicity (LC-50 / EC-50 >1000 ppm) criteria adopted by the US Fish and Wildlife Service and the US EPA. Bio-Food Grade™ Gear Oils are ENVIRONMENTALLY RESPONSIBLE lubricants that are formulated from renewable agricultural biobased resources. We believe Earth's environmental future rests in the use of renewable materials.

[2] **Based on previous ASTM D-5864 studies and ASTM D-7373 Calculations, ISO 32, 46, 68, 100, and 150 are Ultimate/Readily Biodegradable >60% within 28 days in Aerobic Aquatic Biodegradation of Lubricants and 220, 320, 460, 680 provide Inherent Biodegradation.**



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

## Typical Data

| NSF REGISTRATION # | | ISO 46<br>14040<br>H1, H2 | | | ISO 150<br>140441<br>H1, H2 | ISO 220<br>140442<br>H1, H2 | ISO 320<br>140443<br>H1, H2 | | |
|---|---|---|---|---|---|---|---|---|---|

| ISO grade Replacement | 32 | 46 | 68 | 100 | 150 | 220 | 320 | 460 | 680 |
|---|---|---|---|---|---|---|---|---|---|
| AGMA Replacement | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| ASTM Grade | 150 | 215 | 315 | 465 | 700 | 1000 | 1500 | 2500 | 3000 |
| VISCOSITIES: | | | | | | | | | |
| @100$^{O}$C., cSt. (D-445) | 7.0 | 9.3 | 13.3 | 20.0 | 27.0 | 37.1 | 48.4 | 62.8 | 84 |
| @40$^{O}$C., cSt. (D-445) | 31.6 | 45.0 | 65.4 | 97.9 | 142.0 | 212.5 | 306.8 | 442.5 | 640 |
| Viscosity Index (D-2270) | 193 | 196 | 210 | 229 | 228 | 226 | 221 | 216 | 219 |
| Flash Point, COC, $^{O}$C (D-92) | 230 | 241 | 249 | 257 | 264 | 270 | 273 | 275 | 275 |
| Pour Point, $^{O}$C (D-97) | -40 | -38 | -33 | -31 | -27 | -25 | -22 | -20 | -18 |
| Copper Corrosion 3hr @ 100$^{O}$C (D-130) | 1A | 1A | 1A | 1A | 1A | 1A | 1A | 1A | 1A |
| Acid Number (D-974) | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| 4-Ball Wear (D-4172) | .35 | .35 | .35 | .35 | .35 | .35 | .35 | .35 | .35 |
| 4-Ball EP Weld Point (kg) | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 4-Ball EP Load Wear Index | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| FZG A/8.3/90 (DIN 51354 Part 2) | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Demulsibility (D-2711) | 40/40/0 | 40/40/0 | 40/40/0 | 40/40/0 | 40/40/0 | 40/40/0 | 40/40/0 | 40/40/0 | 40/40/0 |
| Foam Sequence I, II, III (D-892) | < 30/0 Foam | < 30/0 Foam | < 30/0 Foam | < 30/0 Foam | < 30/0 Foam | < 30/0 Foam | < 30/0 Foam | < 30/0 Foam | < 30/0 Foam |
| Rust Prevention (D-665 A&B) | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass |
| Dielectric Strength, kV (D-877) | >45 | >45 | >45 | >45 | >45 | >45 | >45 | >45 | >45 |
| RPVOT Oxidation Stability (D-2272), Minutes | >250 | >250 | >250 | >250 | >250 | >250 | >250 | >250 | >250 |
| Biodegradation Classification | [2]Ultimate | [2]Ultimate | [2]Ultimate | [2]Ultimate | [2]Ultimate | *Inherent | *Inherent | *Inherent | *Inherent |
| Meets US EPA VGP | Yes | Yes | Yes | Yes | Yes | No | No | No | No |
| **RLI Product Item #** | 87200 | 87210 | 87220 | 87230 | 87240 | 87250 | 87260 | 87270 | 87280 |

RLI's Products have been analyzed by the USDA to meet the biobased content guidelines for BioPreferred Procurement by the U.S. Federal Agencies. The Biobased Content Guidelines are listed in law H.R. 2646 Section 9001