

Biodegradable Hydraulic Oil (40, 68, Arctic +15)

We value environmental preservation for our future generations and can help change some of the negative narrative to show that oil lubrication can be Clean and Green.

Our Marinus product line is readily biodegradable by the Organization for Economic Co-operation and Development (OECD) standards. It is derived from extremely high quality renewable base stocks, which are 98% biodegraded after 28 days. These oils do not produce a lasting oily residue on water and do not impact plant and animal life. Marinus can be trusted in all environmentally sensitive areas.

Marinus Biodegradable Hydraulic Oils are made of a blend of natural esters and high-performance formula of premium additives. The natural esters provide excellent rust and oxidation (RO) resistance to metal components.

modifiers provide high viscosity indexes (HVI) resulting in minimal temperature effects on fluid viscosity.

Marinus Biodegradable Hydraulic Oils are formulated with enhanced VI properties that enable equipment to maintain maximum hydraulic efficiency and component protection over a wider temperature range allowing year-round service.

Our proprietary formula readily separates water using advanced demulsibility components that greatly reduces or eliminates hydraulic issues associated with water. This product Meets OEM specifications for hydraulic pumps including Vickers and Dennison Pump tests.

Always practice OEM recommended hydraulic system maintenance procedures.

Exceeds the biological degradation requirements of CEC- L33-A93 and the OECD

ISO 40: Used in hydraulic equipment specifying ISO 32 or ISO 46 grade oils.

ISO 68: Used in hydraulic equipment specifying ISO 68 grade oils.

Arctic +15: Used in hydraulic equipment working at temperatures below -10°C

PART#:

3221-2 (20L Pail-ISO 40)

3223-2 (20L Pail- SO 68)

3331-2 (20L Pail-Arctic +15)

3220-2 (205L Drum-ISO 40)

3222-2 (205L Drum-ISO 68)

3334-2(205L Drum-Arctic +15)

The additive package is designed to provide unequalled anti wear (AW) and load carrying abilities, minimize foaming, enhance demulsibility and maintain a high degree of biodegradability.

Modern high-performance hydraulic systems rely on fluids that can resist changes in viscosity as operating temperatures rise and fall. Shear stable viscosity

Marinus Biodegradable Hydraulic Oils are compatible with mineral based oils; however, the mixing of fluids may reduce overall performance and biodegradability. Where possible drain entire system before adding Marinus Biodegradable Hydraulic Oil.

RECOMMENDED USAGE

Marinus Biodegradable Hydraulic Oils are the ideal choice when working in environmentally sensitive areas especially around water. They are recommended for hydraulic systems in manufacturing facilities, lifts, winches, cranes, ship and submersible systems, heavy equipment working in environmentally sensitive areas, mobile and stationary equipment and pneumatic systems where the lubricant is exhausted into the air.

ADDITIONAL BENEFITS

- Made from high quality canola base stock for advanced biodegradability (Arctic +15 uses synthetic diester base stock)
- High performance additive packages match or exceed performance of mineral and synthetic based oils
- High flash point and wide operating range including extreme cold

- Reduced fluid operating temperatures resulting in extended pump, piston and rod life.
- Longer lasting metal components
- Reduced environmental damage and liability
- Extended hose life, reducing frequency of hose replacement
- Compatible with mineral oil-based fluids

Biodegradable Hydraulic Oil (+15, 40, 68)

| TYPICAL PROPERTIES | ASTM METHOD | ISO40 | ISO 68 | Arctic +15 |
|---|-------------|---------------|--------|------------|
| ISO GRADE | | 40 | 68 | 15 |
| Application Range (ISO) | | 32-46 | 68 | 15 |
| Kinematic Viscosity @ -15°C (cSt) | D 445 | n/a | n/a | 175 |
| Kinematic Viscosity @ 40°C (cSt) | D 445 | 40-46 | 68 | 16.16 |
| Kinematic Viscosity @ 100°C (cSt) | D 445 | 9.0-10.5 | 14.84 | 4.69 |
| Viscosity Index | D 2270 | 200 | 234 | 236 |
| Density @ 20°C (kg/L) | D 1298 | 0.917 | 0.92 | 0.92 |
| Pour Point (°C) | D 97 | -35 | -27 | < -60 |
| Flash Point (°C) | D 92 | 244 | 258 | 196 |
| TAN (mg KOH/g) | D 664 | 0.83 | n/a | n/a |
| TBN (mg KOH/g) | D 2896 | 1.93 | n/a | n/a |
| PERFORMANCE TESTING | | | | |
| Foaming Properties Sequence I - Init/Final (mL) | D 892 | 20/0 @256 sec | n/a | 0/0 |
| Foaming Properties Sequence II - Init/Final (mL) | D 892 | 35/0 @45 sec | n/a | 5/0 |
| Foaming Properties Sequence III - Init/Final (mL) | D 892 | 10/0 @182 sec | n/a | 0/0 |
| Oxidative Stability | D 2272 | 110 min | n/a | >1000min |
| Copper Corrosion | D 130 | I B | n/a | I C |
| Rust Protection | D 665 | Pass | Pass | Pass |
| Water Content (ppm) | D 4377 | 0.03% | n/a | n/a |
| Brookfield Viscosity (cP @ 60 rpm) | D 2983 | 3200 | n/a | n/a |
| Scanning Brook Field Viscosity @ -35°C | D 5133 | 33.88 | n/a | n/a |
| | 5000 cP | D 5133 | -30.9 | n/a |
| | 10 000 cP | D 5133 | -33.2 | n/a |

| | | | | |
|---|------------|-----------|-----|---------|
| 20 000 cP | D 5133 | -34.3 | n/a | n/a |
| 30 000 cP | D 5133 | -34.8 | n/a | n/a |
| 40 000 cP | D 5133 | -34.9 | n/a | n/a |
| Kinematic Viscosity Storage @ -30°C (cSt) | D 2532 | 4748-4359 | n/a | n/a |
| for 24 hours (cSt) | D 2532 | 6431-8783 | n/a | n/a |
| for 72 hours (cSt) | D 2532 | Frozen | n/a | n/a |
| Demulsibility @ 54°C (oil-water-emulsion) | D 1401 | 41-39-0 | n/a | 39-39-2 |
| Separation time | D 1401 | 10 min | n/a | 10 min |
| Dielectric Breakdown (kV) | D 877 | n/a | n/a | 39.25 |
| Primary Biodegradability (%) | CEC-L-33-A | 95 | 95 | 94 |
| Ultimate Biodegradability (% @ 17 days) | OECD 306 | n/a | n/a | 100 |
| Trout Toxicity @96 hrs LC50 (ppm) | OECD 203 | n/a | n/a | > 2300 |

Product Manufactured in Canada to ISO 9001:2015 specifications. 401.PDS.02-0119