



TECHNICAL DATA

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527 ECOSHIELD™ BIODEGRADABLE ROCK DRILL OIL ISO 46 through 320

Ecoshield™ Biodegradable Rock Drill Oil is a readily biodegradable, anti-wear, extreme pressure, emulsifiable, low fog generating oil that is primarily formulated to meet the lubrication requirements of pneumatically operated rock drills, drifters, jackhammers, sinkers and other air operated percussion tools and pneumatic equipment used in underground, surface mining, contractor and other industrial applications. Ecoshield™ Biodegradable Rock Drill Oil is also suitable for use in percussive and rotary type tools.

EcoShield™ Biodegradable Rock Drill Oil meets the USDA definition EO 13101 for Biobased products.

EcoShield™ Biodegradable Rock Drill Oil is blended from a unique combination of high oleic vegetable base oils and biodegradable synthetic polyol ester base fluids. This unique base fluid combination provides the EcoShield™ Biodegradable Rock Drill Oil with the following performance advantages:

1. Excellent Oxidative and Thermal Stability.
2. Very good low temperature properties.
3. High natural viscosity index.
4. Very good natural lubricity.
5. Low volatility characteristics.
6. Very good hydrolytic stability.
7. Very low foaming tendencies.

Into this combination of high oleic vegetable base oils and biodegradable polyol ester base fluids is blended a balanced additive system that provides excellent chemical stability and protection against wear and corrosion. EcoShield™ Biodegradable Rock Drill Oil also contains an optimum balance of adhesive agents and emulsifiers that allows the EcoShield™ Biodegradable Rock Drill Oil in conjunction with the products natural polarity to tenaciously adhere to and cling to the metal surfaces of the rock drill especially during atomization in the presence of moisture laden air. This further allows the EcoShield™ Biodegradable Rock Drill Oil to form a wash-off resistant lubricant coating that protects against wear and the corrosive effects of wet environments even during high speed and high temperature operating conditions.

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EcoShield™ Biodegradable Rock Drill Oil atomizes readily in air line lubricators to insure effective lubricant distribution and rapid metal-wetting of all of the parts, especially closely fitted working parts of the equipment in order to maintain a continuous oil film that prevents wear and the build-up of frictional heat. This property in combination with the EcoShield™ Biodegradable Rock Drill Oil's extreme pressure and anti-wear additives protects the equipment against rapid wear during heavy shock loading conditions thus resulting in longer equipment life.

Features and Benefits

EcoShield™ Biodegradable Rock Drill Oil provides the following performance features and benefits which assure long equipment life and minimal maintenance costs:

Features	Advantage and Potential Benefits
Excellent Thermal, Oxidative and Chemical Stability	Reduced sludge and deposit formation Prevention of the formation of gummy deposits Improved valve operation
Excellent Load Carrying and Anti-Wear Protection	Reduced component wear Keeps metal surfaces from galling and welding Withstands heavy shock loads Minimization of frictional heat Lower operating temperature Elimination of erratic operation for smoother and more efficient operation Prolonged equipment life Less equipment downtime Reduced maintenance costs
High Viscosity Index	Provides very good lubrication at both high and low temperatures
Very Good Adhesive Properties	Protects the metal surfaces from corrosion especially during high moisture conditions. Provides a tenacious lubricant film under all operating conditions in order to protect the system from wear.
Reliability in wet conditions	Provides a tenacious film that clings to lubricated parts Resist being washed away by trace water that may be present in the compressed air Emulsification of water and increased oil absorption on the working surfaces
Protection in Wet Environments	Effective lubrication in the presence of water Increased protection of critical parts from rust and corrosion in the presence of water Longer tool and drill life Increased performance

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INSTALLATION

To achieve optimum performance from biodegradable rock drill oils, a system should be as free of contamination as possible before charging with the final fill of these fluids. Contamination of biodegradable rock drill oils can have an adverse effect on their performance.

To prevent biodegradable problems caused by admixtures of other fluids and contaminants, Schaeffer Mfg. recommends a flushing procedure for systems being converted to biodegradable rock drill oil. The degree of flushing depends on the type and condition of the system and the fluid previously used.

New Systems:

Many new systems may have an internal coating of rust preventatives or may have been run on preservative fluids before shipping. Protective coatings on individual components, such as pumps and valves, should be removed and the components cleaned.

To prepare new systems for the biodegradable rock drill oil, Schaeffer Mfg. recommends a six-step procedure:

Step 1 – If the system contains oil, drain as much as possible from the system. Wipe the reservoir and other accessible interior spaces with lint-free rags. Look carefully for pipe scale, weld spatter, threading compound, gasket cement, shavings, and other debris left behind after installation.

Step 2 – Replace filters, if necessary.

Step 3 – Charge the system with sufficient EcoShield™ Biodegradable Rock Drill Oil to assure full circulation to all components.

Step 4 – Operate the system at normal temperatures and loads for a minimum of four hours. Monitor the differential pressure drop across the filter. A filter change may be necessary during this flush because contaminants in the system are incompatible with the EcoShield™ Biodegradable Rock Drill Oil. If this is the case, change the filters and continue to operate the system at normal temperatures, but at reduced loads, until the four hours of flushing are completed.

Step 5 – Drain the system while hot and repeat Step 1. Replace filters if there are any.

Step 6 – Add the final charge of EcoShield™ Biodegradable Rock Drill Oil and begin normal operation.

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Conversion from Petroleum Base, PAO Based and Synthetic Base (Ester) Rock Drill Oils:

Step 1 – Before draining systems containing wet and/or degraded rock drill oils, add five-percent volume of 131 Neutra Fuel Stabilizer or 287 Food Grade Flushing Agent. Circulate under normal operating conditions for at least six hours. If the system is unusually dirty, add a ten-percent volume of 131 Neutra Fuel Stabilizer or 287 Food Grade Flushing Agent to increase the thoroughness of cleaning and to reduce cleaning time. Addition of this much solvent, however, will drastically reduce the viscosity of the rock drill oil. Operating the machine under normal load may cause rapid wear, therefore, operate under light load or no load, and monitor temperature and pressures.

Step 2 – Drain the system while hot.

Step 3 – Install new filters and clean the filter housings.

Step 4 – Fill the system with sufficient EcoShield™ Biodegradable Rock Drill Oil to assure full circulation to all components. If the system was severely contaminated, substitute 127 Moly Rock Drill Oil in the appropriate ISO viscosity grade for this phase of flushing.

Step 5 – Operate the system for not less than two hours under normal operating conditions.

(If the flushing fluid shows any sign of contamination, repeat Steps 2, 3, 4 and 5)

Step 6 – If the previous flushing charge in the system was not EcoShield™ Biodegradable Rock Oil, fill the system with just enough EcoShield™ Biodegradable Rock Drill Oil for good circulation. Operate the system under normal conditions for 30 minutes. Repeat Steps 2 and 3, and then proceed to Step 7. If the previous charge was EcoShield™ Biodegradable Rock Drill Oil, skip to Step 7.

Step 7 – After repeating Steps 2 and 3, fill the system with the final charge of EcoShield™ Biodegradable Rock Drill Oil. Assume normal operation and monitor filters daily.

SPILLAGE AND DISPOSAL

Depending on the contamination and/or degradation levels, small amounts of spilled or leaked EcoShield™ Biodegradable Rock Drill Oil will not adversely affect ground water or the environment. For small spills on the ground uncontaminated product will be readily biodegraded by naturally occurring soil organisms when exposed to air. Nonetheless, spillage of EcoShield™ Biodegradable Rock Drill Oil should be handled similarly to currently accepted methods for conventional mineral oil spills.

EcoShield™ Biodegradable Rock Drill Oil does not contain hazardous substances reportable under CERCLA. Since all oil spills are reportable, even a spill of this vegetable oil-based product must be reported to the National Response Center (the US Coast Guard). Local environmental agencies should also be consulted to clarify local requirements.

Acceptable methods of disposal include use as a fuel supplement, recycling and reclamation (that is, the same disposal practices available for conventional mineral oils). Since EcoShield™ Biodegradable Rock Drill Oil typically will not be a hazardous waste, additional disposal options may be available, including land farming or processing through sewage treatment facilities. If necessary, approvals are obtained from appropriate regulatory authorities.

The flushing solution may not be biodegradable therefore; it should be disposed of in an environmentally safe manner. Follow procedures used for disposing of conventional mineral oils.

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TYPICAL PROPERTIES

ISO Grade	46	68	100	150	220	320
Specific Gravity @ 60°F/15°C	0.9225	0.9225	0.9224	0.9224	0.9588	0.924
Viscosity 40°C (ASTM D-445)	46.49	70.67	103.82	162.31	226.86	322.70
Viscosity 100°C (ASTM D-445)	9.84	12.82	16.86	25.34	29.36	42.61
Viscosity Index (ASTM D-2270)	205	184	174	191	169	189
Flash Point °F/°C (ASTM D-92)	406°/208°	401°/205°	394°/201°	401°/205°	410°/210°	421°/216°
Pour Point °F/°C (ASTM D-97)	-15°/-26°	-5°/-21°	0°/-18°	10°/-12°	15°/-9°	20°/-7°
Copper Strip Corrosion Test (ASTM D-130)	1a	1a	1a	1a	1a	1a
Four Ball E.P. Test (ASTM D-2783)						
Weld Point kg	315	315	400	400	400	400
Four Ball Wear Test (ASTM D-4172)						
Scar diameter, mm	0.3	0.3	0.28	0.28	0.28	0.28

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