
NATURELUBE 700

NatureLube 700 is a new biodegradable totally biobased-lubricant derived from vegetable oil. It has superior metal wetting properties and improved film strength to provide excellent lubricity and reduce wear of vital metal parts. It is suitable as a base for rust and corrosion preventives formulations to protect metals against the corrosive effects of salt spray, dampness and weather. The balanced chemical structure of NatureLube 700 provides an effective preventive shield and offers excellent lubricity..

Key Benefits Delivered:

- Penetrates cracks, crevices and threads to loosen rust and corrosion
- Excellent metal wetting properties and improved film strength that provides superior lubricity to reduce wear of metal parts.
- Reduces friction.
- Protects from wear and rust.
- Excellent penetration and adhesion.
- Leaves a thin protective film.
- Biodegradable.
- Foodgrade (USDA H-1 approved).
- Easy to use.
- Easy transportation and storage..
- Cost effective

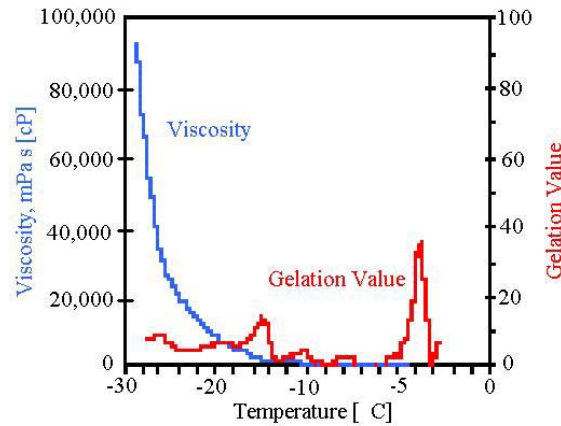
Physical Properties

Specific Gravity	0.9	
Flash Point [°C]	>200	
Viscosity at 40°C	33.86 [cSt]	ASTM D445
Viscosity at 100°C	7.50 [cSt]	ASTM D445
Viscosity Index	225	
Pour Point [°C]	-28	
Gelation Index	94.7@-7.3C	ASTM D5133
Biodegradability	>95%	CEC-L33 A94

Viscosity and Gelation Plot

The result of the Scanning Brookfield Technique (SBT) test is shown below: This test measures the viscosity and tendency to build structure over a temperature range by decreasing the temperature slowly (1°C/hr).

Structure causes an increase in viscosity above the exponential relationship expected from a Newtonian fluid. The presence of the structure is found by taking the derivative of the viscosity-temperature curve.



Oxidation Stability

NatureLube 700 has been engineered to have exceptional thermal and oxidative stability. Unlike other bio-based fluids and lubricants that contain fatty acids and their esters the oxidative stability of NatureLube 700 is similar to high performance synthetic lubricants.

TEOS (Thermo-oxidation Engine Oil Simulation) test results are shown below:

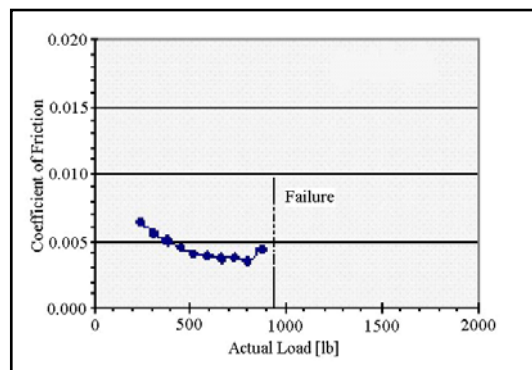
Deposits [mg]			Collected Oils [g]	
Rod	Filter	Total	Volatiles	Residue
7.6	0.2	7.8	0.2628	5.8473

In this test 8.5 grams of oil and catalyst are recirculated continuously over steel rod heated to 285°C. Air is circulated continuously over the rod to increase exposure to oxygen. Volatile material is caught by the walls of a surrounding mantle and collected separately thus increasing the stress on the remaining oil. The focus of the test is to obtain the deposit weight formed on the depositor rod.

The results obtained for EnviroLube 700 is excellent – 7.8 mg. For comparison, 35 mg deposit is the maximum permitted for modern GF-4 engine oil. Regular soybean oil gives around 1590 mgs of deposit.

Viscosity Coefficient of Friction

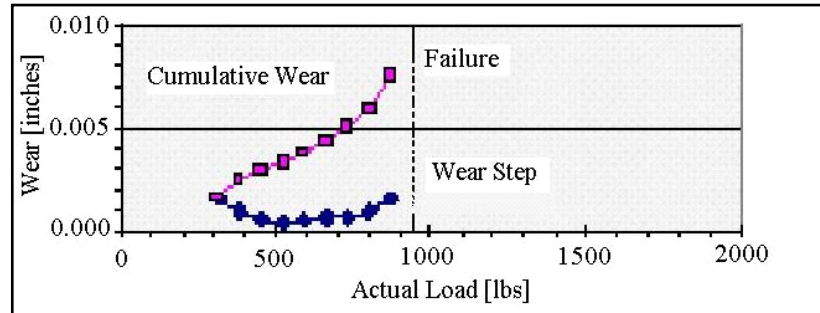
Coefficient of Friction is considered a critical property for lubricating oils. A modified Falex Pin and V-block test



results indicate the exceptionally low values of the friction coefficient under loads of NatureLube 700 as shown in the figure above.

Wear

Step wear and cumulative wear during the tests are shown below. As the load is advanced by use of a ratchet wheel, wear normally occurs on the pin and V-blocks. Under this test, there is a higher level of wear at the beginning of test (as the surfaces of the V-blocks and pin mate with each other) and at the end (as the applied loads begins to approach failure).



Summary:

NatureLube 700 was characterized by an independent facility (Savant Laboratories). The test results as discussed above clearly indicate that NatureLube 700 has exceptional oxidation stability and excellent low-temperature flow response in addition to the inherent lubrication properties of natural oils.

