

209M Moly Universal Marine Gear Lube

Moly Universal Marine Gear Lube is a multipurpose, thermally stable, thermally durable gear lubricant recommended for use in all types of enclosed marine gear drives where extreme pressure characteristics are needed. This product is currently used in Falk, Amarillo, Haley, Volvo, Twin Disc, ZF, Penta, Borg Warner, and Hurth units among others.

The trend among marine gear drive manufacturers is to operate the equipment at higher speeds, loads, power densities and increased torque which results in higher operating temperatures and extreme thermal stress on the gear lubricants.

Moly Universal Marine Gear Lube is blended from 100% pure paraffin base oils and a highly specialized, additive package that provides the following performance advantages:

- **WEAR PROTECTION**
 - Excellent extreme pressure properties to protect from excessive wear and fatigue.
 - Enhanced protection of copper, brass and bronze components from corrosion.
 - Excellent protection of components from rust and corrosion.
- **EXCELLENT STABILITY**
 - Enhanced thermal and oxidative stability to handle operating temperatures of > 300°F
 - Longer lubricant and equipment life
 - Reduced equipment downtime and maintenance costs.
 - Excellent water resistance and water separability characteristics.
 - Excellent resistance to foaming.
- **DEPOSIT CONTROL**
 - Prevention of the formation of sludge and carbon deposits that erode seals.
 - Excellent seal compatibility.
 - Enhanced gear, bearing and seal cleanliness.

Most types of gearing are designed to operate under hydrodynamic lubrication conditions. That is, a full fluid oil film must separate the metal surfaces of the gears and bearings during operation. However, during periods of cold start up, extremely high operating temperatures or high shock loading conditions, this full fluid film can be destroyed. Boundary lubrication is needed to prevent excessive wear when this full fluid film is destroyed.

Molybdenum disulfide is added to Moly Universal Marine Gear Lube to provide boundary lubrication; the molybdenum disulfide plates itself to the metal surfaces of the gears and bearings. Once plated, molybdenum disulfide forms an indestructible, long-lasting, solid lubricant film capable of withstanding pressures up to 500,000 psi. This solid lubricant film, once plated to the gears and bearings, will reduce friction, vibration, and wear, thus extending equipment life.

The moly film also provides a smooth finish surface on all of the moving surfaces of the gear drives. This smooth finish minimizes the action of cold welding and vibration, which can occur during start up after the gears have been standing idle and during periods of high shock loading. This in turn lessens starting loads and peak power demand, thus resulting in a realistic power cost savings.

Moly Universal Marine Gear Lube contains an adhesive-cohesive additive that allows the product to tenaciously stick and cling to the gears and bearings. This ensures that Moly Universal Marine Gear Lube will retain a fine film that “stays put” on the metal surface of the gears and bearings, regardless of how thoroughly it is wiped away.

Moly Universal Marine Gear Lube meets and exceeds the following specifications and manufacturers requirements: API Service Classifications: GL-5, MT-1 and PG-2; United States Military Specifications: MIL-PRF-2105E, SAE J2360; Meritor/Rockwell Standard O-76D; Eaton-Roadranger; Terex EEMS19003; VME Americas Specifications: EEMS19003F, EEMS19107; US Steel 224; David Brown S1.53.101 Type E; AGMA 9005-D94, AGMA 9005-E02, AGMA 250.04, AGMA 251.02; DIN 51517 Part 3 (CLP); and Cincinnati Machine P-34, P-35, P-59, P-74, P-77 and P-78.

TYPICAL PROPERTIES

SAE Grade	90				
ISO Grade	150		220	320	460
AGMA Rating	4EP		5EP	6EP	7EP
Specific Gravity 60°F	.8816	.8984	.898	.9073	.905
Viscosity 100°F SUS (ASTM D445)	785-838.8	976-1261	1050-1261	1518-1857	2223-2623
Viscosity 40°C cSt (ASTM D445)	149-160	185-240	198-240	300-350	415-490.50
Viscosity 100°C CSt (ASTM D445)	14.00-16.00	16.50-22.5	16.5-22.5	22.5-27.50	28.00-33.00
Viscosity Index (ASTM D2270)	95	100	100	100	98
Flash Point °F/°C (ASTM D92)*	435°/224°	440°/227°	440°/227°	450°/232°	470°/243°
Fire Point °F/°C (ASTM D92)*	470°/243°	480°/249°	480°/249°	490°/254°	510°/266°
Pour Point °F/°C (ASTM D97)	-10°/-23°	5°/-15°	5°/-15°	10°/-12°	10°/-12°
Rust Test (ASTM D665)					
Procedure A (Distilled Water)	Pass	Pass	Pass	Pass	Pass
Procedure B (Salt Water)	Pass	Pass	Pass	Pass	Pass
Copper Strip Corrosion (ASTM D130)					
Test, 3 hrs.	1a	1a	1a	1a	1a
Four Ball EP Test (ASTM D2783)					
Weld Point, kg.	400	400	400	400	400
Load Wear Index, kg	60	65.20	65.20	65.20	67
Four Ball Wear Test (ASTM D2266)					
Scar Diameter, mm	.3	.28	.28	.28	.28
Timken EP Test (ASTM D2782)					
OK Load, lbs.	65	65	65	70	70
Fail Load, lbs.	70	70	70	75	75
Falex EP Continuous Load (ASTM D3233)					
Procedure A					
Failure Load, Lbs.	2500	2500	2500	2500	2500
FZG (Four Square Gear Test)					
(ASTM D5182;A/8.3/90)	13 th Stage	13 th Stage	13 th Stage	13 th Stage	13 th Stage
Oxidation Test (ASTM D-893)					
Viscosity Increase after 312 hrs @ 203°F/95°C	3%	3%	3%	3%	3%
L-60-1 Thermal Oxidation Test (ASTM D5704)					
% Viscosity Increase	24.5	24.5	24.5	24.5	24.5
Demulsibility Test (ASTM D2711)					
Free Water, ml	84.9	85	85	85	85
% Water in Oil	.5	.5	.5	.5	.5
Emulsion, ml	Trace	Trace	Trace	Trace	Trace
Foam Tendency (ASTM D892)					
Sequence I 75°F, ml	0/0	0/0	0/0	0/0	0/0
Sequence II 200°F, ml	0/0	0/0	0/0	0/0	0/0
Sequence III 75°F, ml	0/0	0/0	0/0	0/0	0/0

* Base Oil Flash and Fire Points