



TECHNICAL DATA

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#209 MOLY UNIVERSAL GEAR LUBE

Moly Universal Gear Lube is a multipurpose thermally stable and thermally durable gear lubricant that is recommended for use in all types of enclosed industrial and automotive gear drives where an extreme pressure characteristics are needed.

Moly Universal Gear Lube is blended from the finest grade high quality severely solvent refined, severely hydro-finished high viscosity index 100% pure paraffin base oils available. Blended into these 100% pure paraffin base oils is a highly specialized non-corrosive thermally stable and thermally durable multifunctional extreme pressure additive package that provides the Moly Universal Gear Lube with the following performance advantages:

1. Enhanced thermal and oxidative stability and durability to handle operating temperatures of 300° to + 350°F.
2. Excellent extreme pressure properties to protect the gears and bearings from excessive wear and fatigue.
3. Prevention of the formation of sludge and carbon deposits that can erode seals.
4. Excellent seal compatibility.
5. Enhanced protection of copper, brass and bronze components from corrosion.
6. Non-corrosivity to brass, bronze and other non-ferrous metal parts.
7. Excellent protection of components from rust and corrosion in dry conditions and in the presence of moisture.
8. Excellent resistance to water and moisture.
9. Excellent water separability characteristics.
10. Enhanced gear, bearing and seal cleanliness.
11. Excellent resistance to foaming.

The trend among automotive and industrial gear drive manufacturers is to operate the equipment at higher speeds, loads, power densities and increased torque. This trend has resulted in automotive and industrial gear drives being subjected to higher operating temperatures. These higher operating temperatures have resulted in today's gear lubricants being subjected to extreme thermal stress.

Therefore, it is important that a gear lubricant possess thermal stability and durability characteristics. Gear lubricants that do not possess these properties rapidly oxidize and decompose when subjected to high temperatures, resulting in the formation of sludge, varnish, and carbon deposits on the gears, bearings and seals, abraded seals, premature seal hardening and brittleness, and a loss of the gear lubricant's extreme pressure additive chemistries ability to protect against excessive wear, spalling and overall distress to the gears and bearings.

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The use of severely solvent refined, severely hydro-finished high viscosity index 100% pure paraffin base oils and thermally stable and thermally durable multifunctional extreme pressure additive package in the product's formulation enables the Moly Universal to resist oxidation and thermal stress at operating temperatures of 100°F to 150°F higher than conventional gear lubricants. This results in:

1. A vast reduction in the formation of deposits.
2. Better heat transfer.
3. Excellent protection to the gears and bearings even under the most extreme thermally stressed operating conditions.
4. Less wear to gears, bearings and seals.
5. Increased oil seal life.
6. Lower operating temperatures
7. Less energy consumption
8. Longer lubricant life
9. Less equipment downtime
10. Longer equipment life
11. Reduced maintenance costs

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 bearing during operation. However, during periods of cold start up, extremely high operating temperatures or high shock loading conditions this full fluid can be destroyed. Unless a boundary lubricant is present in the gear lubricant when this full fluid film is destroyed, excessive wear can take place.

To prevent this wear, Molybdenum Disulfide is further blended into the Moly Universal Gear Lube. Molybdenum Disulfide provides the boundary lubrication that is needed by plating itself to the metal surfaces of the gears and bearings. Once plated, Molybdenum Disulfide forms an indestructible long lasting solid lubricant film that is 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 Gear Lube contains an adhesive-cohesive additive that allows the product to tenaciously stick and cling to the gears and bearings. This ensures that the Moly Universal Gear Lube to 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 Gear Lube contains the proper additive system that allows the product to properly function and lubricate limited slip, positraction, and high offset hypoid gear rear ends and differentials.

Moly Universal 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, Mack GO-H, Clark MS-8 Rev 1, Ford Specifications M2C105A, M2C108C, M2C154-A, M2C158-A; General Motors Specifications 9985476, 9985044; Chrysler; John Deere J11D, Komatsu-Dresser B22-003, B22-005; Rockwell Standard O-76D; Eaton-Fuller's Lubricant Specifications, Terex EEMS19003, VME American's Specifications EEMS19003F, EMS19107, White Motors MS0016, Volvo, Volkswagen, US Steel 224, David Brown S1.53101 Type E, AGMA 9005 D-94, AGMA 9005-E02, AGMA 250.04, AGMA 251.01, DIN 51517 Part 3 (CLP), Cincinnati Millicron P-59, P-74 and P-78.

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TYPICAL PROPERTIES

SAE Grade	90	220	320	140	460	680	250	
ISO Grade	150	220	320	460	680	1000		
AGMA Rating	4EP	5EP	6EP	7EP	8EP	8EP		
Specific Gravity 60°F	.8816	.8984	.898	.9073	.9028	.905	.9006	.8984
Viscosity 100°F SUS (ASTM D-445)	785-838.8	976-1261	1050-1261	1518-1857	1575-2284	2223-2623	3316-3896	4952-5334
Viscosity 40°C cSt (ASTM D-445)	149-160	185-240	198-240	300-350	298-430	415-490.50	620-730	905-989.50
Viscosity 100°C CSt (ASTM D-445)	14.00-16.00	16.50-22.5	16.5-22.5	22.5-27.50	25.00-32.50	28.00-33.00	32.00-49.00	42-56.00
Viscosity Index (ASTM D-2270)	95	100	100	100	100	98	98	98
Flash Point °F/°C (ASTM D-92)*	435°/224°	440°/227°	440°/227°	450°/232°	465°/241°	470°/243°	525°/274°	540°/282°
Fire Point °F/°C (ASTM D-92)*	470°/243°	480°/249°	480°/249°	490°/254°	500°/260°	510°/266°	570°/299°	580°/293°
Pour Point °F/°C (ASTM D-97)	-10°/-23°	5°/-15°	5°/-15°	10°/-12°	15°/-9°	10°/-12°	25°/-4°	30°/-1°
Rust Test (ASTM D-665)								
Procedure A (Distilled Water)	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Procedure B (Salt Water)	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Copper Strip Corrosion (ASTM D-130)								
Test, 3 hrs.	1a	1a	1a	1a	1a	1a	1a	1a
Four Ball EP Test (ASTM D-2783)								
Weld Point, kg.	400	400	400	400	400	400	400	400
Load Wear Index, kg	60	65.20	65.20	65.20	67	67	67.5	67.5
Four Ball Wear Test (ASTM D-2266)								
Scar Diameter, mm	.3	.28	.28	.28	.28	.28	.28	.28
Timken EP Test (ASTM D-2782)								
OK Load, lbs.	65	65	65	70	70	70	70	70
Fail Load, lbs.	70	70	70	75	75	75	75	75
Falex EP Continuous Load (ASTM D-3233)								
Procedure A								
Failure Load, Lbs.	2500	2500	2500	2500	2500	2500	2500	2500
FZG (Four Square Gear Test)(ASTM D-5182;A/8.3/90)	13 th Stage	13 th Stage	13 th Stage	13 th Stage	13 th Stage	13 th Stage	13 th Stage	13 th Stage
Oxidation Test (ASTM D-2893)								
Viscosity Increase after 312 hrs @ 203°F/95°C	3%	3%	3%	3%	3%	3%	3%	3%
L-60-1 Thermal Oxidation Test (ASTM D-5704)								
% Viscosity Increase	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Demulsibility Test (ASTM D-2711)								
Free Water, ml	84.9	85	85	85	85	85	85	85
% Water in Oil	.5	.5	.5	.5	.5	.5	.5	.5
Emulsion, ml	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace
Foam Tendency (ASTM D-892)								
Sequence I 75°F, ml	0/0	0/0	0/0	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	0/0	0/0	0/0
Sequence III 75°F, ml	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0

* Base Oil Flash and Fire Points

Packaging: #209 Moly Universal Gear Lube is available in (net weights) 425 lb. Drums, 225 lb. Half drums, 120 lb. Kegs, and 40 lb. Pails.