SINCE 1839 Schaeffer MANUFACTURING COMPANY

ISO 9001 CERTIFIED

TECHNICAL DATA

102 Barton Street, St. Louis, Missouri 63104

In-State (314) 865-4100/Out of State 800-325-9962/Fax (314) 865-4107 http://www.schaefferoil.com

#209 MOLY UNIVERSAL GEAR LUBE

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

Moly Universal Gear Lube is blended from the finest grade, high quality, severely solvent refined, severely hydrofinished, 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, thermally durable, multifunctional, extreme pressure additive package that provides Moly Universal Gear Lube with the following performance advantages:

1. **Enhanced thermal and oxidative stability and durability to handle operating temperatures of 300°F 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 separatibility 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 which results in higher operating temperatures and extreme thermal stress on the gear lubricants.

Therefore, it is important that gear lubricants possess thermal stability and thermal durability characteristics. Gear lubricants without these properties rapidly oxidize and decompose at high temperatures which results in: the formation of sludge, varnish, and carbon deposits on the gears, bearings and seals; abraded seals, premature seal hardening and brittleness; and loss of the extreme pressure additives' ability to protect against excessive wear, spalling and overall distress to the gears and bearings.

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Moly Universal Gear Lube resists oxidation and thermal stress at operating temperatures 100°F to 150°F higher than conventional gear lubricants because of the use of severely solvent refined and severely hydro-finished, high viscosity index, 100% pure paraffin base oils and a thermally stable, thermally durable, multifunctional, extreme pressure additive package. This combination provides the following benefits:

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 and equipment life**
9. **Reduced equipment downtime and 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 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 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 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 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 Gear Lube contains the proper additive system to 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-J; Clark MS-8 Rev. 1; Ford Specifications: M2C105A, M2C108C, M2C154-A, M2C158-A; General Motors Specifications: 9985290, 9985476, 9985044; Chrysler Specifications: MS-8987, MS-9020; John Deere J11D; Komatsu/Dresser B22-0003, B22-0005; Meritor/Rockwell Standard O-76D; Eaton-Roadranger; Terex EEMS19003; VME Americas Specifications: EEMS19003F, EEMS19107; White Motors MS0016; Volvo; Volkswagen; 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.

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TYPICAL PROPERTIES

SAE Grade		90			140			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)	13th Stage	13th Stage	13th Stage	13th Stage	13th Stage	13th Stage	13th Stage	13th 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