



604-609

ALMASOL®

VARI-PURPOSE GEAR LUBRICANT

The EP gear lubricant for severe service in hypoid gears, transmissions and all types of industrial gears.

LE's 604-609 ALMASOL® Vari-Purpose Gear Lubricants are specially formulated to meet the most demanding requirements of all types of enclosed gears such as spur, worm, hypoid and all of their many variations.

Available in six ISO grades, these heavy-duty, purple gear lubricants are manufactured using the finest, selected high VI paraffinic base oils. They contain ALMASOL, LE's exclusive wear-reducing additive plus superior rust and oxidation inhibitors, antifoaming additives and EP additives. In addition, a special metal adhesion additive has been added to provide the extra protection required in today's severe applications.

USER BENEFITS

- **LONGER GEAR AND EQUIPMENT LIFE** - Save capital expense money through:
- **REDUCED FRICTION AND OPERATING TEMPERATURES** - achieved with ALMASOL. Users often observe a drop in gearbox operating temperatures from 10°F - 50°F and more. ALMASOL reduces friction and can withstand contact temperatures up to 1,900°F. Less frictional drag also means less energy required to operate the equipment.
- **NON-FOAMING IN ACTION** - because a potent antifoaming additive breaks up entrapped air bubbles to keep the operating temperatures low.
- **REDUCED WEAR** - is realized because a microscopic layer of ALMASOL creates a film on contacting metal surfaces, thus preventing destructive metal-to-metal contact.
- **CLINGABILITY** - is achieved with these lubricants because of the excellent cohesive qualities and the ability to cling tenaciously to metal surfaces.
- **LESS OIL USED** - friction reduction, oxidation resistance and cooler operation prolong effective oil life to provide extended drain intervals with less make-up oil between drains.
- **OXIDATION RESISTANCE** - is assured by the natural high oxidation resistance of the selected paraffinic base oils coupled with oxidation inhibitors.

- **LESS SEAL LEAKAGE** - through extended seal life.
- **SEPARATES READILY FROM WATER** - to provide effective lubrication when moisture is present. Ordinarily gear oils will emulsify and foam, causing increased frictional heat and poor lubrication.
- **LOWER OPERATING COSTS** - LE's gear lubricants perform better and last longer than ordinary lubricants under today's difficult operating conditions. This insures trouble-free operation, fewer failures, less downtime and lower maintenance costs for repairs (parts and labor) which ultimately means lower expense and increased profits.
- **LESS POWER CONSUMPTION** - Users experience up to 30% reduction in amperage.
- **REDUCED INVENTORY ITEMS** - One type of gear lubricant may be used in differentials, transmissions and most types of industrial gearboxes. This reduces your inventory requirements and chances for misapplication.
- **EXCEEDS PERFORMANCE REQUIREMENTS FOR -**

604	SAE	90	ISO	150	AGMA	4EP
605			ISO	320	AGMA	6EP
606	SAE	80W	ISO	100	AGMA	3EP
607	SAE	90	ISO	220	AGMA	5EP
608	SAE	140	ISO	460	AGMA	7EP
609	SAE	250	ISO	680	AGMA	8EP

TYPICAL APPLICATIONS

- Differentials and transmissions in over-the-road, stop-and-go fleets and off-highway equipment.
- Heavily loaded industrial gearboxes
- Bowl Mills
- Rock and coal crushers
- Machine tool gearboxes
- Soybean extractors
- Chains, rollers, bushings, slides, pins and cams
- Gang rip saw mandrel bearings
- Shaker screen gearboxes
- Aerator agitator gear units
- Extruder gearboxes
- Paper board cutter gears

WHAT IS ALMASOL®?

ALMASOL is LE's exclusive wear-reducing additive which has an affinity for metal similar to polar attraction. It attaches itself to working surfaces in a single microscopic layer, yet it will not build on itself or affect clearances. This microscopic layer possesses tremendous load carrying capacity, is impervious to acid attack and minimizes metal-to-metal contact and the resulting friction and wear. When added to LE lubricants, it gives an extra dimension of protection available in no other lubricants.



LUBRICATION ENGINEERS, Inc.®

LEADERS IN LUBRICANTS

LE Products manufactured under an ISO 9001:2000 Certified Quality System

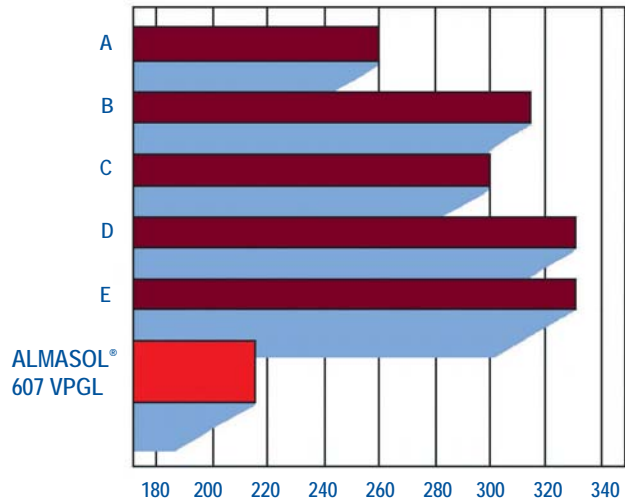
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ALMASOL® GEAR LUBRICANTS DRAMATICALLY REDUCE GEARBOX OPERATING TEMPERATURES

Graph I dramatically illustrates that ALMASOL Heavy-Duty Gear Lubricants provide the protection that gear units need. In this test, various gear oils were subjected to extremely heavy loads while the increase in bulk oil temperature was monitored. The modified Four-Ball EP test was used to more closely approximate the actual severe conditions normally experienced in gear unit applications.

Ordinary commercial grade gear oil temperatures ran 50°F to 120°F hotter than LE's ALMASOL Heavy-Duty Gear Lubricants. The significantly lower gear oil temperatures of ALMASOL Heavy-Duty Gear Lubricants translate to important benefits for you, the user: **less friction and wear for longer gear life, longer oil life with more protection and less energy required.** This test confirms what users have experienced over the years.

GRAPH 1: LE Modified Four-Ball EP Test



Bulk oil temperature, °F
Speed: 1760 rpm
Load: 100 kg
Duration: 60 minutes
Initial Oil Temperature: Ambient

ALMASOL GEAR LUBRICANTS SIGNIFICANTLY REDUCE WEAR

Originated in Germany, the FZG (Forschungstelle für Zahn- rader und Getriebebau) test is one of the very few laboratory tests that can evaluate the extreme pressure and antiwear performance of gear lubricants and correlates with actual field performance. As such, it is an extremely valuable method to compare the performance of various gear lubricants.

With most gear units operating under increasingly severe conditions, it is critical that the test parameters closely duplicate those experienced in actual applications. For this reason, LE has used an accepted FZG test modification to increase the test severity. This modification increases the severity of the test by the equivalent of two load stages over the standard conditions for the test. This maximizes the boundary (metal-to-metal contact) conditions that are frequently seen in actual gearbox applications.

The superiority of ALMASOL Heavy-Duty Gear Lubricants in reducing wear is clearly demonstrated in Graph II. In the 10th stage, the commercial gear oils had 88% to 263% greater wear. And in the 13th stage, they had 39% to 178% more wear.

ALMASOL Heavy-Duty Gear Lubricants give you, the user, the assurance that these gear oils will protect your equipment under the most severe operating conditions.

GRAPH II: SPECIFIC WEAR RATE, MG/KWH

PRODUCT	10th STAGE	13th STAGE
1	.15	.27
2	.29	.34
3	.24	.25
4	.29	.50
5	.20	.26
6	.26	.33
7	.19	.43
8	.19	.35
607	.08	.18

FZG -- German Test Method Din 51354 (Modified)
 Test Conditions: Circumferential Gear Speed - 20.0 Meters/Sec.
 Initial Oil Bath Temperature - 90°C (194°F)

Test: The motor is started and the test run for 21,700 revolutions per load stage. The oil bath is drained and saved for subsequent test runs. The gear assembly is then dismantled and the test gears are washed, dried and weighed. Test results are reported in weight changes and visual inspection, noting scuffing, scoring or pitting. A weight loss of 10 mg. greater than the average weight loss for all previous stages, constitutes failure at that load stage. Other evaluation parameters include wear rates at various load stages.



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