



LUBRICATION ENGINEERS, Inc.[®]

**LE PRODUCTS MANUFACTURED UNDER
AN ISO 9001 CERTIFIED QUALITY SYSTEM**



LUBRICANTS OF ADVANCED ENGINEERING

FOR

PULVERIZING/GRINDING EQUIPMENT

**(BALL-ROD-PEBBLE MILLS/BOWL
MILLS/KILNS)**



Internationally known and respected, LE is dedicated to maximizing equipment life and uptime, as well as, reducing maintenance and energy costs by emphasizing: Complete Product Line – Advanced Technology – Quality – Customer Service & Support – Prompt Delivery of Product. From its beginning in 1951, LE has recognized and filled the need for heavy-duty, high performance quality lubricants which exceed the capabilities of ordinary, commercial quality lubricants. Field experiences and customer testimonials have shown that LE lubricants consistently deliver higher performance than other premium grade lubricants. They extend lubrication intervals and equipment life, and significantly reduce wear and energy requirements, downtime and maintenance costs, thereby recovering the initial cost of the lubricant many times over. These lubricants have been successfully used for many years by industrial, commercial, governmental, institutional and agricultural customers in a wide variety of applications throughout the United States and many other countries.

Many plants such as electric generating, mineral and manufacturing facilities require materials to be ground or pulverized prior to fueling generator sets or to be used in final product processing. Much of this material is ground in Ball, Pebble, Rod, Breaker, Autogenous or Semiautogeneous (SAG) mills. Many of these mills have large, open bull or ring gear and pinion gearsets as drive mechanisms.

Lubrication of these expensive, large open gear systems presents a unique challenge due to harsh environmental considerations, as well as heavily loaded conditions. Grinding or pulverizing mills are exposed to cement dust, mineral dust, coal, dust, temperature extremes and heavy loads. These severe conditions magnify the need for superior lubricating products.

Other types of grinding/pulverizing mills are the Bowl Mill and Roller Mill, commonly used in the pulverizing of coal to fire steam boilers in electric power generating stations. The large, enclosed gearboxes, driven by electric motors and the grinding roll journals are the key lubrication points of their equipment. Heavy loads, shock loads and jars are typical of this type of pulverizing. Grit and dust are always present and if allowed to penetrate bearings and gear housings, may quickly ruin bearings and gears.

LE uses highly refined 100% paraffinic base oils and superior quality synthetic base stocks. These oils have vastly superior lubricating characteristics – greater oxidation resistance, tougher film strength, better lubricity and greater compatibility with hoses and seals. LE lubricants contain no hazardous ingredients, offering an environmentally friendly alternative to commercial quality lubricants.

LE's own additive research and manufacturing company continually develops more effective and efficient high technology additives proprietary to LE. All this technology is incorporated into LE lubricants so that they are the finest available.

- **ALMASOL®** - reduces friction, wear and chemical attack while withstanding extremely high loads and temperatures to 1900°F.
- **MONOLEC®** - vastly increases oil film strength and reduces friction, heat and wear by separating moving metal components and minimizing metal-to-metal contact.

Lubrication Engineers, Inc. developed the PYROSHIELD line of lubricants with exceptional load carrying ability, outstanding adhesiveness and ease of application at various temperatures. These revolutionary lubricants were developed especially for open gears which operate in the most severe service such as pulverizing/grinding equipment.

- **PYROSHIELD®** - offers excellent lubricity for extreme heavy-duty sliding, open gear and shock loaded applications.



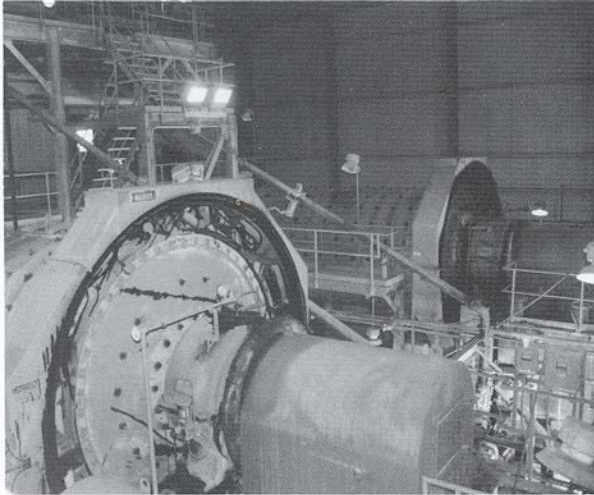
BENEFITS OF LE'S PYROSHIELD LUBRICANTS

- No health and safety hazards in use.**
- No waste product disposal problems. May be disposed of as other nonhazardous petroleum products. No expensive special requirements are necessary, and there is no need for expensive equipment modifications.**
- As a nonasphaltic lubricant, PYROSHIELD does not cause problems with automatic lubrication systems and provides an additional safety margin in case of system fault-off.**

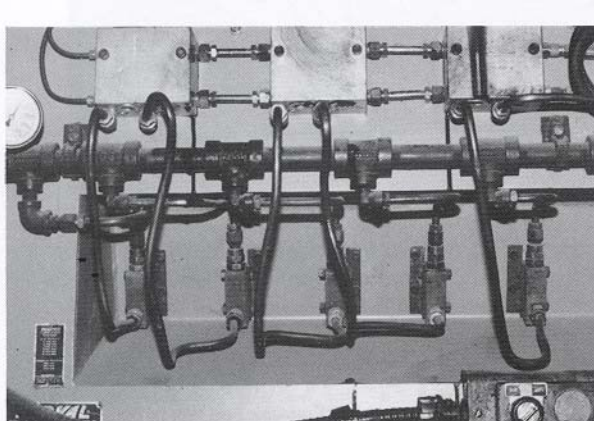


BENEFITS OF LE'S PYROSHIELD LUBRICANTS

- ❑ **Less equipment downtime because of no product build up in the roots of the gears or in the shroud.**
- ❑ **Reduced gear temperatures. Lower temperatures mean less friction and less wear.**



- ❑ **Reduced lubricant usage. PYROSHIELD Lubricants require 50-80% less lubricant to provide protection. This reduces the quantity of used lubricant requiring disposal.**
- ❑ **Reduced lubricant usage also means reduced housekeeping. No black, sticky mess to remove as with asphaltic-type products.**
- ❑ **LE's PYROSHIELD Lubricants provide a continuous washing of the gears, actually cleaning asphaltic lubricants from gears while the mill is in service. This continuous flushing of abrasive contaminates on the gears is especially important in the dusty, dirty operating environment of pulverizing/grinding equipment.**



- **For lubrication of large open gear systems we recommend:**
 - LE's 5100-5193 PYROSHIELD® - A revolutionary lubricant developed for open gears which operate in the most severe service. An extreme pressure (EP) lubricant which is lead free and ideal for open gears and other sliding mechanisms in both mobile and stationary equipment. It contains ALMASOL, LE's exclusive wear-reducing additive.
 - LE's 9000-9001 PYROSHIELD® Syn-Gear Lubricant – Unique, extremely heavy synthetic open gear fluid. Developed specifically for pulverizing/grinding mill applications which call for an extreme pressure (EP), lead free, nonasphaltic lubricant. Ideal for automatic spray systems. Contains ALMASOL, LE's exclusive wear-reducing additive. 9001 contains a USDA H1 rated diluent for lower temperature pumpability and sprayability.



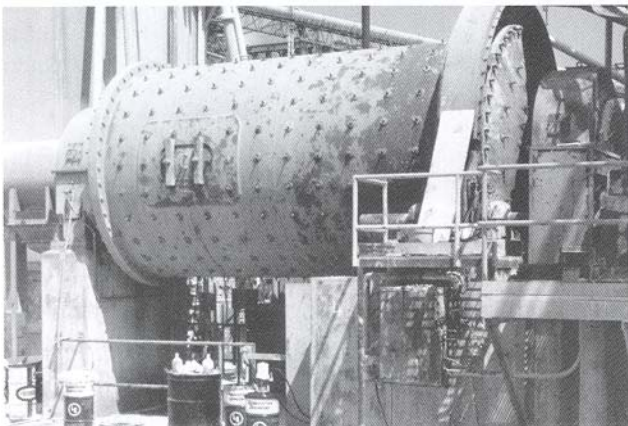
- **For lubrication of enclosed gear systems we recommend:**
 - LE's 604-609 ALMASOL® Vari-Purpose Gear Lubricant – Formulated for heavy-duty service in industrial gearing. Contains ALMASOL, LE's exclusive wear-reducing additive. Has extreme pressure (EP) characteristics, long lasting in service, water resistant and nonfoaming. This very adhesive gear lubricant protects against corrosive wear and can reduce overheating. Available in ISO Grades from 100 to 680.
- **For lubrication of oil lubricated motor bearings, roll journal hydraulic systems and some enclosed gear drives:**
 - LE's 6401-6407 MONOLEC® R & O Compressor/Turbine Oil – Formulated for gear and bearing applications and circulating system. Contains MONOLEC®, LE's exclusive wear-reducing additive. Offers excellent oxidation resistance, does not emulsify with water and protects against corrosive wear. Long-lasting in service and nonfoaming.



- LE's 6801-6807 MULTILEC[®] Industrial Oil – A truly multi-functional heavy-duty R&O (rust and oxidation) and AW (anti-wear) industrial oils suitable for air compressors, hydraulics, bearings, industrial turbines, and R&O gear applications. Compounded with premium paraffinic base stocks for greater lubricity. Outstanding rust and oxidation resistance. Excellent water separation ability. Anti-wear additive for increased gear and bearing life. Formulated to combat acid hydrolysis in rotary screw compressors. Contains MONOLEC[®], LE's exclusive wear-reducing additive.

■ **For miscellaneous applications in pulverizing/grinding equipment we recommend:**

- LE's 1724-1275 ALMAPLEX[®] Industrial Lubricant – General purpose EP lubricant for industrial use. Contains ALMASOL, LE's exclusive wear-reducing additive. Very effective in severe operations caused by moisture or high temperatures, seals out dirt and water, and protects against corrosive wear. Excellent in electric motors. 1274 can be used in centralized lubrication system.
- LE's 2300 L-X[®] Heavy-Duty Chemical Supplement – This multi-functional supplement safely cleans out deposits caused by use of asphaltic lubricants in automatic lubrication systems.
- LE's 3751-3752 ALMAGARD[®] Vari-Purpose Lubricant – Multi-functional EP lubricant for extended service under extreme conditions. Very tacky, has excellent water resistance, will not pound out. Rust and corrosion inhibited.



CONVERTING YOUR MILLS TO LE LUBRICANTS

Qualified LE personnel are available to assist you in the conversion of your Ball mills or Bowl Mills. These individuals will work directly with you to assure that the conversion to LE Lubricants is documented, and you will be presented with an Engineering Service Report detailing the conversion and making recommendations concerning your mills and the lubricants needs.

For more information, contact you local Representative or Lubrication Engineers, Inc., Fort Worth, TX.

- **PYROSHIELD[®] Lubricants provide a revolutionary nonlead lubricant to protect open gears and pinion teeth in ball, rod, breaker, autogenous, semiautogenous mills and kilns.**

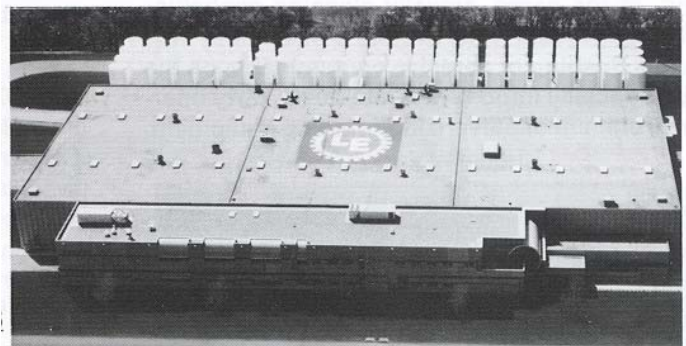
- **ALMASOL[®] Gear Lubricants meet the severe demands placed on pulverize main drives, roller journals, and oiled exhauster bearings in bowl mills and trunnion bearings and enclosed gearings in ball, rod or breaker mills.**

- **ALMASOL[®] Greases withstand higher temperatures and heavy loads in pinion shaft bearings, greased drive motor bearings in ball, rod or breaker mills and greased drive motor bearings and stud, nuts, bolts, seals and valve shafts in bowl mills.**

- **MONOLEC[®] Industrial Oils are long lasting in service for roll journals hydraulic systems and oil lubricated drive motor bearings in bowl mills.**

- **LE SERVICES include**

- **Complete Product Line**
- **Quality Control**
- **Bulk Tanks – eliminates worry with drum disposal.**
- **Local LE Representative to assist with your lubrication needs.**



LE has the finest, most modern lubricant manufacturing facility in the world, dedicated to the production of lubricants which provide the greatest possible value to our customers.

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