



## LE's Pyroshield® Products Provide Extreme Protection for Open Gears

### Introduction

Many electric generating, mineral mining and manufacturing facilities require materials to be ground or pulverized prior to fueling generator sets or prior to being used in final product processing. Much of this material is ground in ball, pebble, rod or breaker mills. Many of these mills have large open gearsets (bull or ring-and-pinion) as drive mechanisms. Large kilns, some as long as a football field, are also rotated by using open gearsets.

Lubricating these large open gears presents a unique challenge due to the heavy loads and harsh environmental conditions. Grinding or pulverizing mills are exposed to cement dust, silica or mineral dusts like limestone and coal dust. These conditions magnify the need for superior lubricating products. Empty grinding mills can weigh in excess of 400,000 pounds. Add product and a charge of grinding medium, and the gear system can be moving more than half a million pounds or more. Open gear systems on kilns face the additional difficulty of high operating temperatures.

### History

Traditionally, operators of open gear systems have relied upon asphaltic compounds to provide a cushioning effect. However, asphaltic lubricants create a major problem with housekeeping due to the large amount of product that must be used to provide a continuous coating to the gears. In addition, wherever asphaltic lubricants have been in use for an extended period, the eventual result is a buildup of hardened lubricant in the roots of the gears. This is difficult to eliminate and causes mechanical interference that can result in gear misalignment or stress on the pedestal mountings.

Many large open gear systems are lubricated using automatic spray systems manufactured by Farval, Trabon, Lincoln and others. These systems function by providing the lubricants to the gear teeth at set intervals in metered amounts. The solids in many of these asphaltic compounds have caused abrasion or erosion of the closely machined parts in the



**Above:** A ball mill pinion gear is coated with a thick accumulation of asphaltic open gear lubricant. **Below:** After conversion to LE's Pyroshield synthetic lubricant, the pinion is clean.

metering blocks. They also tend to plug the spray nozzles. The result is uneven or inadequate lubrication of the gearset. The remedy is periodic maintenance and cleanup. Whether scheduled or unscheduled, this can result in lost production – a very costly problem.

In the past, operators had no choice but to use asphaltic compounds. However, Lubrication Engineers, Inc. has designed and developed a product line that addresses the demanding needs of open gear lubrication. LE's Pyroshield



lubricants provide superior lubrication for this application and solve the many lubrication problems that confront operators of large open gear driven equipment.

## Product Line

- Pyroshield® Syn Open Gear Grease (5182, 5180 & 5100)
- Pyroshield® Syn Hvy & XHvy Open Gear Lubricants (9000 & 9011)

## Pyroshield Benefits

### ▪ Improved Cleanliness

The housekeeping costs associated with the use of asphaltic-based products are difficult to estimate. Operators have reported labor requirements in excess of four man-days to clean some units. Due to the volume of product used, buildup around the shrouds and the local area can be sticky, messy and dangerously slippery. With Pyroshield lubricants, less volume is required to provide far superior gear protection while maintaining system cleanliness.

### ▪ Elimination of Hazardous Waste Disposal Costs

LE's Pyroshield products can be treated as ordinary used lubricants and can often be added to the fuel or coal burned in the normal operation of many plants. The asphaltic compounds can contain polycyclic aromatic hydrocarbons (PAH) that require disposal as a hazardous waste. Costs for disposal of hazardous waste range from \$0.50 per pound to more than \$2 per pound in some areas, not to mention the cost and bother of recordkeeping for these products. In these times of environmental protection, the choice of using a safe, nonhazardous lubricant like LE's Pyroshield is surely the wise choice.

### ▪ Improved Gear Protection

Asphaltic-based compounds typically have Timken load ratings of 20 to 25 lbs and rely on excessive volume for adequate protection. The Timken ratings for LE's Pyroshield lubricants exceed 70 lbs for Pyroshield 9000 series oil and exceed 90 lbs for Pyroshield 5100 series grease. This added protection reduces gear wear and extends the life of the gear system. Pinion gears can cost

from \$10,000 to \$35,000 to replace. Extending the life of your gear train adds profit to the bottom line.

### ▪ Lower Lubrication Costs

Although Pyroshield lubricants may cost more per pound to purchase, reduced consumption often results in an overall reduction in lubrication cost. Many asphaltic compounds leave a 5- to 8-inch layer of product in the bottom of the drum that cannot be used. Hardening of LE's Pyroshield products does not occur, meaning none of the lubricant goes to waste.

### ▪ Unique Conversion Process

Converting to Pyroshield lubricants is accomplished by using a proven, effective and safe procedure that provides no interruption in production or operation. Protection of your gear system is provided throughout the process. Engineering support is provided by the local LE consultant, who in turn is supported by LE's Technical Services Department.

### ▪ Reduced Electrical Consumption

Because of the superior lubricating qualities of the Pyroshield open gear lubricants, many operators have experienced up to a 2 to 2.5 percent reduction in electrical costs. Reduced friction resulting from superior lubrication can be reflected in reduced energy consumption. LE has documented substantial temperature drops, some exceeding 30°F, during the conversion process and continuing during normal operation. The source of heat is friction in an open gearset. Lower friction means less energy required to overcome that friction, thereby reducing electrical consumption.

Consider the advantages of converting to LE's Pyroshield open gear lubricants. The choice should be clear. Your local LE lubrication consultant can provide the assistance to set up your conversion and determine which Pyroshield lubricant best fits your particular open gear setup.

**Pyroshield lubricants 5180, 5100 & 9011 contain a nonchlorinated solvent as a diluent.**