



# PROPER LUBRICATION AND **SUCCESS STORIES** FOR POWER PLANT EQUIPMENT





## AVOIDING TROUBLE CRITICAL BEARINGS: PROPER LUBRICATION

Equipment in fossil power plants are often pushed to the limit in wet, corrosive, and dusty environments. At its worst, this can mean frequent bearing issues leading to emergency downtime and even catastrophic equipment failure. And at a minimum, many plants routinely experience premature failures and shorter-than-desired component life that can cost tens of thousands of dollars each year



### 5 Cs for Proper Lubrication

1. Correct technology for area of use
2. Correct quantity of grease for bearing
3. Correct frequency based on operational environment
4. Correct procedure to regrease
5. Correct monitoring of equipment

### The Primary Cause of Bearing Failure

There are a number of factors that go into overall bearing performance and equipment life, but bearings and proper lubrication of those bearings play a larger role than many think. According to the American Bearing Manufacturers Association (ABMA), 64% of bearing failures are caused by insufficient or improper lubrication.



Source: ABMA (American Bearing Manufacturers Association)

### Challenges for Fossil Power Industry

The fossil power plant environment has factors that plague bearings the most: high temperatures, high loads, humidity, and human error. However, with some relatively simple changes in lubrication technology and application, many pre-mature motor failures can be avoided. Let us show you how with some real-life success stories from our customers in the field.

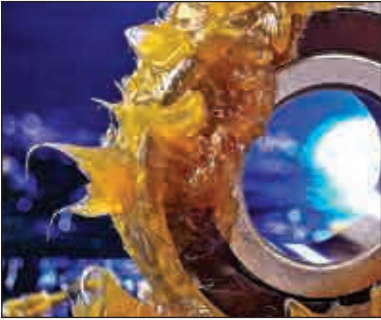
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## Choose the Right Grease

Conventional greases do not survive environmental exposure to water, heat, load, and vibration. Bearing life is compromised.

**Instead lubricate bearings with an industrial grease that provides:**

- Superior water and corrosion resistance
- Shock load and vibration resistance
- Consistent performance over time
- Minimal oil separation



## Application: Automatic Lubrication Dispensers

Too much or too little lubrication is often the root cause of bearing failure issues. You can remove human error as well as maintain better consistency by using automatic lubrication dispensers as part of your maintenance program. This tool **delivers the ideal amount of grease at optimal intervals** for maximum bearing performance.

**This application method also offers:**

- Reduced lubricant consumption
- Corrosion protection
- Maintenance for areas that are difficult to reach and service

Chesterton's most advanced automatic lubricator is micro-processor controlled and electro-mechanical. The Chesterton Lubri-Cup™ EM can also be combined with a divider block to lubricate multiple bearings.

**Automatic lubrication dispensers are also useful for:**

- Fans and blowers
- Conveyors, hoists, and cranes
- Pumps, compressors, and mixers



## Success Stories

What follows are five case studies that prove the validity of the “right grease with the right application” in often saving tens of thousands of dollars in equipment replacement and downtime each year.

# Lubrication Saves Pump Bearings

Fossil Power  
Chesterton 615 HTG #2, Lubri-Cup EM, and 1830 SSP  
Case Study 028 LMRO

## Challenge

### Background

Coal burning power plant has large conventional cooling towers. For one unit they have four large Allis Chalmers circulating water pumps. The pumps operate at 95 TDH, 150,000 gal/min to recirculate the water from the cooling tower bottom to the steam condensers.

### Goal

Upgrade the stuffing box packing and improve bearing lubrication to enhance reliability and lower the maintenance cost of critical pumps.



The customer wanted improved reliability of the packing and lubrication.

## Solution

### Product

- Install **Chesterton 1830 SSP Graphite/PTFE** packing with seven rings per box, 7" x 9" x 1". There was virtually no leakage after startup
- Lubricate the eight bearings with a **Lubri-Cup™ EM Automatic Grease Dispenser** applying **Chesterton 615 High Temperature Grease (HTG) #2**
- The dispensers provide a precise amount of grease at the necessary times. They are set for six months



Chesterton Lubri-Cup™ EM solution installed with Chesterton 615 HTG.

## Results

### Savings and Improved Reliability

- After six months the **Lubri-Cups** were serviced with a new grease pack and battery
- On inspection after nine months, the eight **Lubri-Cups**, eight bearings, and stuffing boxes are functioning well
- Virtually no leakage from the stuffing box. The bearing housing temperature is normal at 120°F



Safe, reliable, and easy to maintain.  
Eliminated pump bearing issues.

# Bearing Related Motor Replacement Down 90%

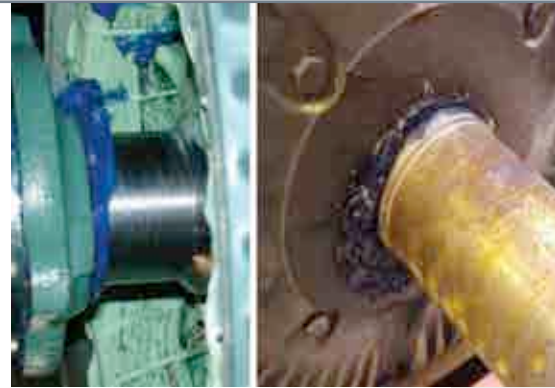
Power - Fossil  
Chesterton 635 SXC, 630 SXCF, Lubri-Cup™ EM  
Case Study 035 LMRO

## Challenge

### Background

This power plant replaced many motors each year. The performance of electric motors in wet, corrosive, and dusty environments is often challenged by bearing and winding failure.

Typical polyurea grease does not survive environmental exposure, vibration, and high speed shear. Bearings become corroded, while oil and “thinned” grease contaminates windings.



Power plants have challenging environments for reliable motor performance.

## Solution

### Product

Chesterton solves this issue with the use of **Chesterton 630 SXCF** and **635 SXC** high-performance greases applied using **Chesterton Lubri-Cup EM™** Automatic Lubricant Dispensers. Chesterton QBT™ Quiet Bearing Technology grease is water- and corrosion-resistant. It offers shear stability and thermal resistance to maintain grease consistency and eliminate potential winding contamination



A high-performing grease applied consistently can significantly extend the life and performance of motors.

## Results

This combined solution reduced bearing related motor replacement at this plant by up to 90%.

A typical mill replacing 15 to 30 motors a year can reduce electric motor replacement and save up to \$400,000 in motor-related costs.



Chesterton Lubri-Cup™ Automatic Lubricant Dispenser provides peace of mind maintenance.

# Lubrication Solves Slurry Pump Failure

Power  
Chesterton Lubri-Cup™ EM and 635 SXC  
Case Study 036 LMRO

## Challenge

### Background

Slurry pumps operate continuously at this power plant. Moisture, corrosive chemical, and abrasives contaminate bearings. The plant team used typical lithium complex grease which separated/liquefied due to heat and shear. Re-greasing was required monthly to keep adequate grease in the bearing.

Over greasing created heat and bearing failure in 8-14 months.



*Bearing failed frequently in slurry pumps.*

## Solution

### Product

**Chesterton 635 SXC** was selected due to thermal, moisture, and corrosion resistance. Bearings were surveyed and the correct volume and frequency for re-greasing was determined by the Chesterton lubricant specialists. The grease was applied using the **Chesterton Lubri-Cup™ EM** Automatic Lubricant Dispenser. It applies the right amount of grease at specific intervals.



*Chesterton Lubri-Cup EM applied the new, high-performance grease.*

## Results

Six slurry pumps were fitted with **Lubri-Cup™ EM** and **635 SXC**. Service kits are installed every six months. No oil separation or excess heat was noted.

After 36 months of use, no slurry pump bearings have failed. Vibration monitor/trending indicates MTBR is exceeding the life of the casing.



*After three years there was still no bearing failure.*

# Klinker Grinder Upgrade Saves \$47,000 Per Year

Power Generation  
Chesterton Lubri-Cup™, 615, 785, 1730, and 5500  
Case Study 039 LMRO

## Challenge

### Background

- Power plant was experiencing damage that resulted in loss of efficiency and productivity in a klinker grinder unit.
- Damage to the klinker was caused by water exposure, abrasive conditions, shock loading, and the lack of lubrication.
- The klinker presented constant leakage
- Typical unit rebuild costs due to bearing failures were \$23,600 annually per grinder unit.



Initial condition of klinker grinder.

## Solution

### Product

Complete grinder rebuild and upgrade using **Chesterton 1730 Mill Pack**, SpiralTrac type "P" stuffing box bushing, and **Chesterton style 5500 Live Load disk spring washers**. The bearing housings were also upgraded to labyrinth seal bearing protection and **Chesterton Lubri-Cup™** Automatic Lubricant Dispensers with **615 HTG #2** grease.

All fasteners were coated with **785 Parting Lubricant** throughout for ease of assembly and disassembly.



Klinker after Chesterton solutions were applied.

## Results

### Increased Efficiency

- After three months, the klinker grinder had minimal leakage, smooth operation, and no maintenance issues
- It is estimated that this upgrade will double the grinder's service life and drastically reduce on-going routine maintenance costs.
- Based on parts and labor savings it is estimated this will save the plant over \$47,200 yearly per grinder unit.



Closeup of Chesterton Lubri-Cup Automatic Lubricant Dispenser.

# Motor Bearing Failure Avoided

Power - Fossil  
Chesterton 635 SXC, 630 SXCF, Lubri-Cup™ VG Mini  
Case Study 040 LMRO

## Challenge

### Background

The staff at this plant attempted to control bearing contamination of equipment in wet and dusty parts of the facility by frequent greasing, but this turned out ineffective.

The practice led to over greasing of bearings, leading to frequent bearing and motor failure. In addition, some areas were in hard-to-reach locations.



*Over greasing led to frequent bearing failure.*

## Solution

### Product

Installed a **Chesterton Lubri-Cup™ VG Mini** Automatic Lubricant Dispenser to apply **Chesterton 630 SXCF**, a synthetic, high-load, corrosion-resistant grease on each electric motor bearing.

Based on bearing size and speed, the **Lubri-Cup™ VG Mini** was set for six months. It applies the correct amount of grease at the necessary intervals.



*A combination of high-performance grease applied in a controlled manner via the Chesterton Lubri-Cup.*

## Results

This combined solution resulted in a 75% reduction in electric motor failures on ash, coal, and scrubber areas.

It dramatically increased productivity and reduced significant repair costs.



*The plant experienced a 75% reduction in motor failures.*



# Reduced Bearing Failure for Conveyors

Power  
**Chesterton 615 HTG #2, Lubri-Cup™ EM**  
Case Study 002 LMRO

## Challenge

### Background

The coal handling conveyor system is a critical piece of equipment for a coal-fired power plant. Reliable delivery of the coal is crucial to plant uptime.

- There are up to 10 critical areas of bearing reliability with issues that typically include load, vibration, and abrasive contamination.
- Premature failure is not an option. Bearing change consumes many hours and dollars annually.
- The cost of bearing failure can be \$20,000-30,000/each *plus* loss of production.



*Chesterton 615 HTG #2 resists chemical attack in the coal yard.*

## Solution

### Product

#### Upgrading the Grease

**Chesterton 615 High-Temperature Grease (HTG) #2** was chosen to lubricate head, tail, tension, and snubber pulley bearings. This product increased corrosion protection, load/vibration handling, and decreased oil separation.

#### Deliver Grease Automatically

The **Chesterton Lubri-Cup™ EM** system was chosen to dispense the high-performance grease to the bearing.



*Chesterton 615 HTG #2 handles load and vibration and protects against corrosion on tension pulley bearings.*

## Results

- The plant has installed 400 **Chesterton Lubri-Cup™ EM** units over a 3-year period.
- Bearing failures in the coal handling system are almost non-existent.
- Worker safety issues associated with icy wintertime lubrication maintenance have been reduced.
- The estimated cost savings to this plant is approaching \$100,000/year.



*Remote-mounted Lubri-Cup™ EM dispensers for hard-to-reach areas on the head pulley.*

## ABOUT OUR PRODUCTS

### Chesterton Lubri-Cup™ EM Series

*Electro-Mechanical Automatic Grease Dispensers: Eliminates Under and Over Greasing*

Chesterton's most advanced automatic lubricator is micro-processor controlled and electro-mechanical. The Chesterton Lubri-Cup EM can also be combined with a divider block to lubricate multiple bearings.

This uniquely designed tool automatically dispenses Chesterton grease to critical areas and eliminates over and under greasing. These robust units have a compact, convenient and sturdy design that is simple to install, operate and maintain.



#### Chesterton Lubri-Cup EM comes in four models:

- **EM:** Primary unit, micro-processor "pulse" delivery system
- **EM-X:** Certified for use in potentially hazardous environments
- **EM-S:** Operation is machine synchronized
- **EM-SP:** Machine synchronized, external machine powered

**Lubri-Cup EM Product Availability:**  
North America, South America, Asia and Australia

**EMEA Region:** Contact local distributor

### Chesterton 615 HTG #1, #2, and #2-460

*High Technology Grease, Extreme-Pressure, Corrosion-Resistant*

High performance, corrosion inhibited grease with outstanding extreme pressure capabilities and excellent water washout resistance. The 615 HTG #2-460 is designed for use on slower moving, heavily loaded bearings.

- QBT™ Quiet Bearing Technology
- Speed Factor  $D_m$  40°C – 100°C (104°F – 212°F) 70,000 – 300,000
- Superior water resistance
- Compatible with most popular greases
- Exceptional shear resistance
- Outstanding extreme pressure and temperature characteristics
- HTG #1 is easily pumpable in automatic grease dispensing systems



### Chesterton 630 SXCF/635 SXC

*Synthetic, Extreme-Pressure, Corrosion-Resistant Grease*

High-performance, corrosion-inhibited grease with outstanding extreme pressure capabilities and outstanding water washout resistance. Chesterton 630 SXCF and 635 SXC is synthetic based and offers superior high temperature stability as well as resistance to steam and corrosive chemicals. Temperature limit -40°C – 240°C (-40°F – 464°F).

- Superior water washout resistance
- Excellent corrosion protection
- Compatible with most popular greases
- Exceptional shear resistance
- Dropping point 318°C (604°F)
- QBT™ Quiet Bearing Technology
- Anti-oxidants prevent hardening or crystallization
- Use 630 SXCF for high speed or extreme cold conditions





## Global Solutions, Local Service

Since its founding in 1884, the A.W. Chesterton Company has successfully met the critical needs of its diverse customer base. Today, as always, customers count on Chesterton solutions to increase equipment reliability, optimize energy consumption, and provide local technical support and service wherever they are in the world.

Chesterton's global capabilities include:

- Servicing plants in over 100 countries
- Global manufacturing operations
- More than 500 Service Centers and Sales Offices worldwide
- Over 1200 trained local Service Specialists and Technicians

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