

# Metso:Outotec

## Grinding retrofits

Significantly improve **reliability, efficiency,** and **safety** with our range of customized retrofit solutions for your horizontal and vertical mills.



As your production goals evolve, so should your equipment. For the latest technology and efficiency, you don't have to look very far. Your existing assets have the potential to take on significant improvements. Our team of experts can support you throughout, from identifying retrofit options to implementation.

### The Metso Outotec solution

Whether you want to improve maintenance efficiency, safety, or equipment reliability, we have you covered. Discover our range of customengineered retrofits for your mills.

- Gear guard upgrade
- Trunnion bearing lubrication system
- Inching drive
- Locked charge detection system
- Vertimill® door actuator

As an OEM, Metso Outotec has been designing equipment, parts, and retrofit solutions for over 150 years. With the use of detailed drawings and advanced engineering tools, we ensure accurate and high-quality manufacturing that meet Metso Outotec's strict standards and tolerances.

### Brands we support

- Metso Outotec
- Metso
- Outotec
- Allis Chalmers
- Allis Mineral Systems
- Boliden Allis
- Denver Equipment
- Dominion
- Hardinge
- Koppers
- Kennedy Van Saun (KVS)
- Marcy
- Morgardshammer
- MPSI
- NEI
- Nordberg
- Outokumpu
- Sala
- Scanmec
- Svedala
- Thune

### Benefits

- Maximize equipment performance with a cost-efficient solution
- Gain new functionality with modern technology
- Ensure equipment reliability and longevity
- Improve ease and timeliness of maintenance activities
- Reduce safety risk to your personnel and prevent major structural damage to your equipment

Ask about our full range of retrofit options and custom grinding solutions.

*\*Also available for non-Metso Outotec equipment*

Improve reliability, efficiency, and safety with

# Metso Outotec grinding retrofits

Incorporating modern technology without major investment



## Gear guard upgrade

Ensure the health and longevity of your gears with a gear guard upgrade. This includes support columns for safer maintenance, a gear spray system for optimal lubrication, infrared monitoring to track health, and a pressured and sealed system to prevent contamination.



## Trunnion bearing lubrication systems

Extend bearing and trunnion life with an automatic lubrication system. Our retrofit ensures that oil temperature, flow, and cleanliness is maintained with a custom-sized reservoir, filtration system and heat exchanger, as well as temperature, flow, and pressure instrumentation.



## Inching drive

An inching drive slowly rotates your mill to ensure safety throughout maintenance work and prevent a dropped charge. Our retrofit includes a custom designed drive and power unit, safety interlock system and accessory kits to make the inching drive portable and adaptable to suit all your mills.



## Locked charge detection system

A locked charge detection system can be used to prevent a dropped charge and structural damage to your mill. Our retrofit includes a pinion shaft encoder that measures mill velocity and position at start-up, as well as a control panel with a program logic to disengage the clutch when a locked charge is detected.

## Metso Outotec services for grinding mills

### Parts and upgrades

Redesigns and parts supply for shells, heads, trunnion liners, feed chutes and more

### Inspections

From quick visual and vitals to detailed custom inspections for your mill and it's key components

### Gears and pinions

A complete range of gear and pinion sets, design, installation, and alignment services

### Mill re-powering

Evaluation of mill loads and drive train capacity to propose mill power increase through retrofit components and installation

### Field service support

1500+ global team of service experts to carry-out installations and perform repairs

### Life Cycle Services

Custom, progressive, service packages focusing on parts supply and inventory, maintenance, process optimization and more

# Metso:Outotec

Grinding retrofits

## Gear guard upgrade

Ensuring the health and longevity of your gears



### Your challenge:

Contamination, extreme heat, and insufficient lubrication all pose risks to your gears and pinions. If not prevented, these will cause accelerated wear and decreased operating life.

### Metso Outotec solution:

A gear guard upgrade featuring:

- Self-support system
- Gear spray system
- Infrared temperature monitoring
- Pressurized and sealing systems

## Self-support system for safer and more efficient maintenance

- Support columns hold the gear guard in place and allow for the removal of gear guard sections for easy gear and pinion inspection
- System improves safety, simplifies and accelerates maintenance, and reduces downtime

## Gear spray system for even and optimal lubrication

- Systems are custom engineered for your individual gear set and lubricant
- PLC system is fail safe and interlocked with your mill
- Minimizes waste and cost by ensuring that the exact lubrication quantity needed is metered, dispensed and continuously monitored

## Infrared monitoring system to track gear and pinion health

- The pinion temperature monitoring system uses differential temperature checks across the pinion face to ensure proper alignment
- Automatic sensing and continuous condition monitoring is accomplished through infrared sensor technology

## Pressurized and sealing systems to prevent contamination

- Minimize fine particle contamination using pressurized filtered air and a sealed gear guard
- A non-contact mud guard ring is used to protect against coarse particle contamination



Metered lubrication is precisely applied to the teeth



An infrared temperature system tracks the readings continuously



Protecting the gear with a pressurized guard

## Why Metso Outotec services?

- As the OEM of your mill, Metso Outotec has the expert knowledge to maximize its life
- With detailed drawings, design expertise and field service personnel, Metso Outotec's services are reliable, accurate and timely

# Metso:Outotec

Grinding retrofits

## Trunnion bearing lubrication system

Automated system to extend bearing and trunnion life



### Your challenge:

Maintaining oil temperature, flow, and cleanliness is vital for the health of your mill. If not controlled, fluctuations can shorten the life of key components.

### Metso Outotec solution:

A trunnion bearing lubrication system retrofit featuring:

- Custom-sized reservoir
- Filtration system and heat exchanger
- Temperature, flow, and pressure instrumentation

## Reservoir to separate contaminants from lubricant

- Sized for proper retention time, allowing dirt and air to separate from the oil
- To reach desired viscosity, oil is preheated in the reservoir before being pumped to the next phase

## Filtration and heat exchanger to eliminate dirt and cool the oil

- Oil is pumped through a filtration and cooling system to ensure that oil being distributed to bearing is clean and at optimal temperature

## Instrumentation to monitor oil condition

- Oil condition is monitored via pressure, temperature, and flow instrumentation
- Modern instrumentation is compatible with existing DCS or PLC, and is mounted on the reservoir/base

## Multiple retrofit options available

- Replace entire system or only selected components
- Available as a water or air-cooled system
- With the addition of a valve or flow divider, oil can be evenly distributed to the pinion bearings
- Hydrodynamic or hydrostatic system based on your mill's existing trunnion bearing configuration

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Hydrostatic lubrication system



Hydrostatic lubrication system with high pressure pumps



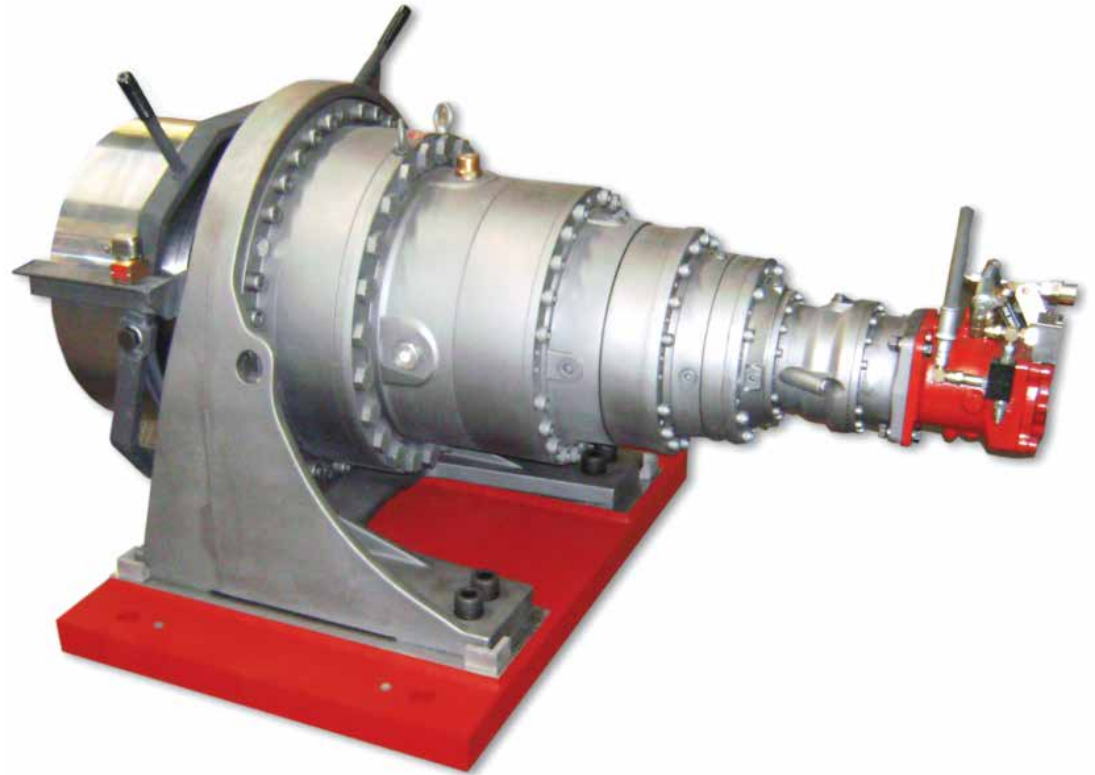
Hydrodynamic lubrication system

# Metso:Outotec

Grinding retrofits

## Inching drives

Slowly turning your mill to ensure safe and optimal maintenance work



### Your challenge:

Positioning and rotating a loaded mill can be difficult. If not performed correctly, your equipment and team can be put at risk.

### Metso Outotec solution:

An inching drive retrofit featuring:

- Custom designed drive and power unit
- Safety interlock system
- Accessory kits

## Custom designed inching drive to help during maintenance work

- Capable of positioning and rotating a loaded mill at low speeds
- Typically used to balance the charge inside a mill during maintenance activities, such as liner replacements, inspection, and alignment of major components
- Plays a key role in preventing drop charges when starting up the mill after a prolonged downtime
- Customized to fit your existing drive train layout, either by direct coupling to the pinion shaft or to the reducer's high speed shaft
- Design can include different mounting types, such as bracket-mounted with the use of a sole plate or mounted to a torque arm with the use of a reaction bracket



Drive unit assembly

## Safety interlock system to prevent accidental mill start-up

- An additional safety measure for maintenance work, when the inching drive is engaged



Safety interlocks

## Accessory kits to make the drive adaptable to other mills

- Allows the inching drive to be portable and adaptable for additional mills
- The kit includes: a sole plate, driven gear hub for mounting, coupling guard, and a set of interlocks to connect the inching drive to the drive motor

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Manual coupling



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## Locked charge detection system

Prevent a dropped charge and structural damage to your mill



### Your challenge:

When left sitting idle, the charge inside a mill can solidify, posing significant risk of a dropped charge at start-up.

### Metso Outotec solution:

A locked charge detection system retrofit featuring:

- Pinion shaft encoder
- Control panel and custom program logic

## Pinion shaft encoder

To measure velocity and positioning

- As the primary measuring device to detect mill start-up acceleration, the encoder is mounted on the pinion shaft
- Connected to the PLC, the encoder provides feedback on the mill position and velocity
- Proper installation and modification procedures for the pinion guard are provided



Housing for pinion shaft encoder

## Control panel and program logic

To identify a locked charge and disengage the clutch

- As the clutch is engaged during mill start-up, the control logic analyzes mill acceleration parameters and determines if start-up should be aborted or continued. This will be indicated on the operator interface
- If the mill starts successfully, the system will disable itself after 180° mill rotation. However, if a locked charge is detected, the system will trip the mill
- Operators will need to take the proper actions to break up the frozen charge. Metso Outotec recommends using an inching drive
- The control logic is configured within a PLC located in the locked charge detection system control panel. Both local and remote system controls are



Exposed pinion shaft encoder

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Locked charge detection system screen