

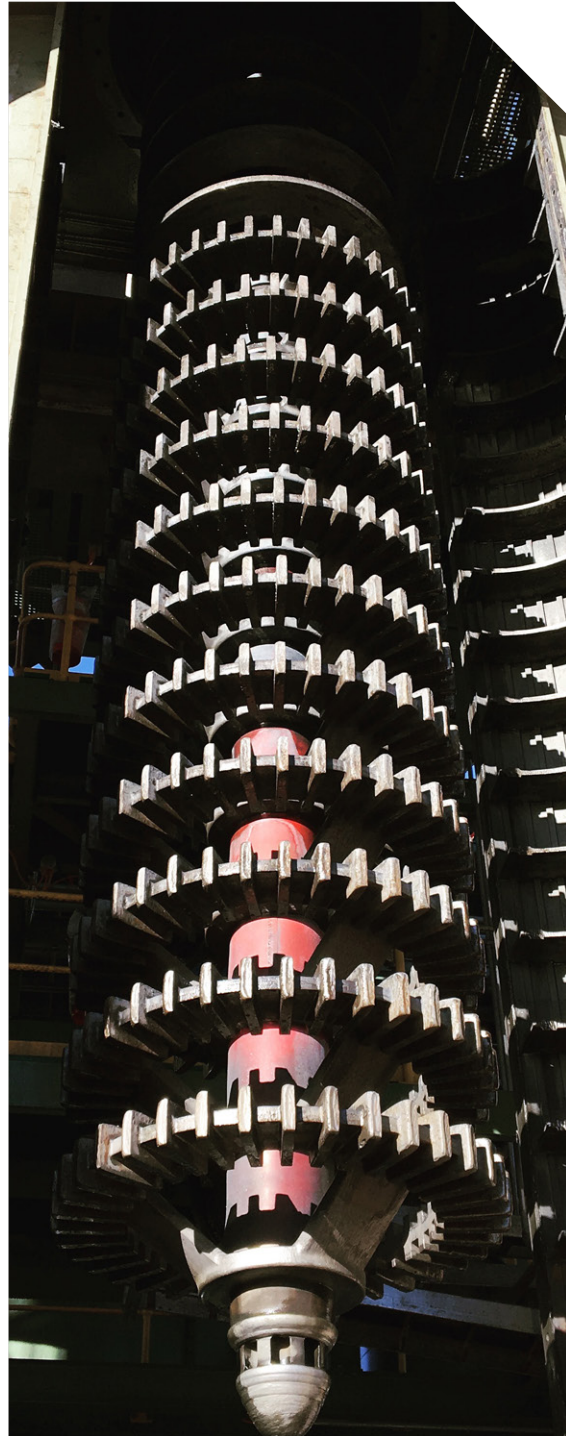
Metso:Outotec

Stirred Mill inspections

# 3 Audit packages for your Stirred Mills

Catch issues earlier for highest equipment reliability





# 3 Audit packages for your Metso Outotec Stirred Mills

These packages are designed to reduce unplanned downtime, equipment failure and risks associated with operating faulty equipment.

While operating a Stirred Mill, issues that are not caught early can lead to breakdowns, unplanned downtime, significantly increased repair costs and production losses.

Get fast, accurate information about the condition of your equipment, recommendations for maintenance and improved operation with our audit packages.

The information provided will assist in minimizing unscheduled downtime and reduce long-term operating expenses. Our specialists also recommend service agreements and spare parts.

## 1. Visual and Vitals

An overall inspection while the mill is running, and an internal visual inspection with borescope for the HIGMill™.

## 2. Mechanical Verification

An overall inspection while the mill is running as well as a detailed inspection including measuring protocol for internals.

## 3. Comprehensive Inspection

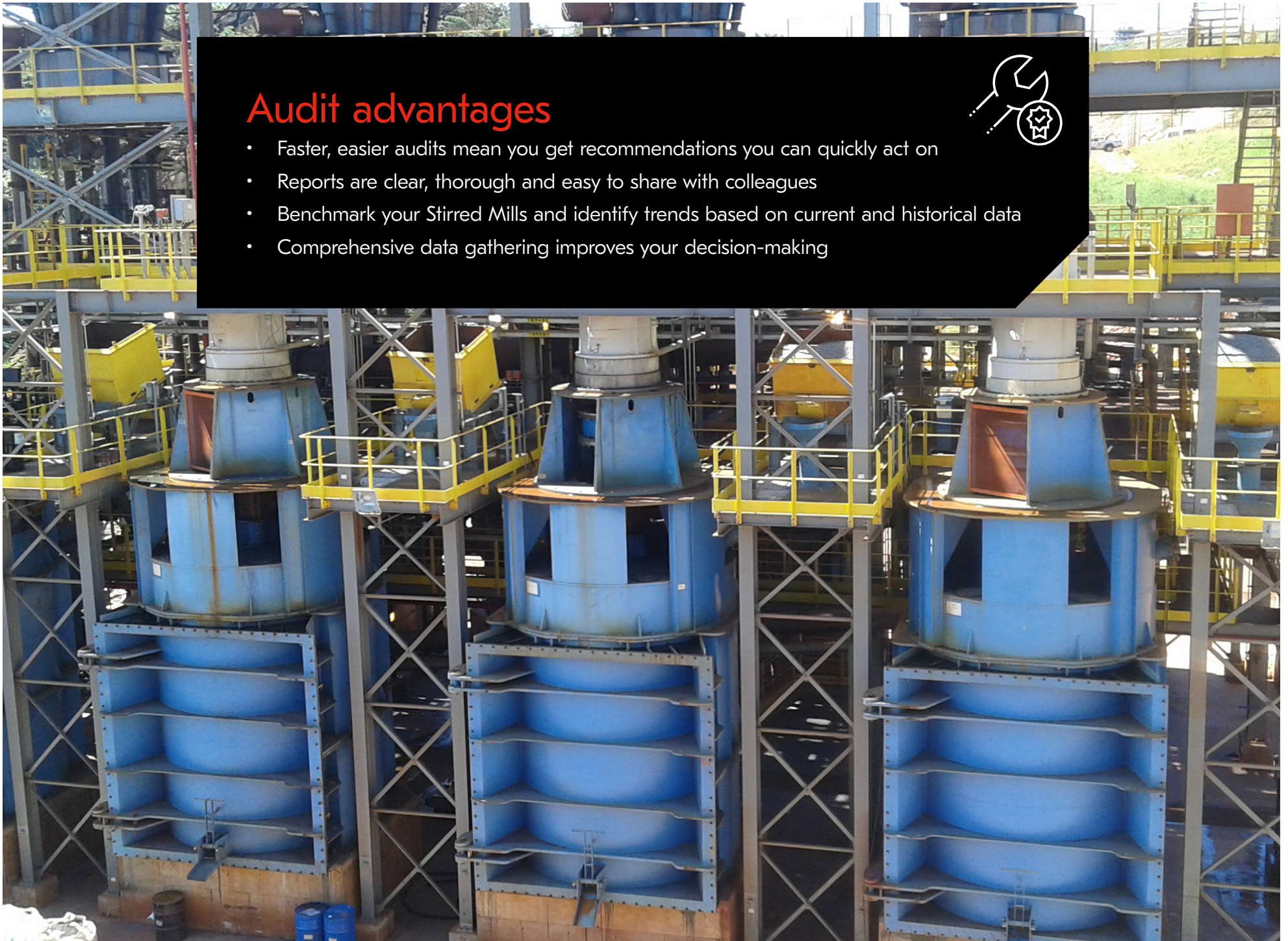
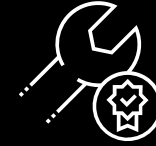
A complete in-depth package including annual inspection.

## Benefits

- Minimize downtime
- Increase capacity
- Lower cost per ton
- Improve efficiency
- Increase safety

## Audit advantages

- Faster, easier audits mean you get recommendations you can quickly act on
- Reports are clear, thorough and easy to share with colleagues
- Benchmark your Stirred Mills and identify trends based on current and historical data
- Comprehensive data gathering improves your decision-making



# Stirred mill inspections

## Packages at a glance



	1. Visual and Vitals	2. Mechanical Verification	3. Comprehensive Inspection
Core benefit	A quick way to understand your mill's overall condition for peace of mind	Maximized mill availability through a more detailed inspection with additional adjustments and services	Maximized mill performance and equipment longevity
Grinding chamber status	Full chamber, main door closed	Emptied and flushed, main door open	Emptied and flushed, main door open
Inspection frequency recommendation	3-4 times a year	During maintenance shutdowns for relining	During maintenance shutdowns for relining
Inspection offering	<ul style="list-style-type: none"> <li>• OEM visual inspection of the mill with temperature, pressure and flow readings</li> <li>• Catch safety hazards, maintenance intervals, leakages and hydraulic pressures</li> <li>• Detailed future inspections are recommended if needed</li> <li>• Specific adjustments if required and requested by the customer</li> </ul>	<ul style="list-style-type: none"> <li>• Visuals and Vitals, plus OEM inspection with clean grinding chamber</li> <li>• Detailed measuring of wear parts according to specified Metso Outotec protocol</li> <li>• Historical data analysis helps predict mill component performance over time</li> <li>• Detailed report provided with remaining wear parts lifetime expectation</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanical verification plus electrical and automation inspections</li> <li>• Customizable on demand</li> </ul>

# Vertimill® (VTM) inspection packages

Location	Component	Task	Mill status	Package 1	Package 2	Customized
				Visuals and Vitals	Mechanical Verification	Comprehensive
Main mill motor	Lower body (closed door)	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Grounding	Visual inspection	Operating or stopped	•	•	•
	Lubricant	Verify oil level, pressure and flow	Operating	•	•	•
Gearbox	Housing	Visual inspection, check oil level, check oil replacement interval	Operating and stopped	•	•	•
	Breather	Visual inspection, check replacement interval	Operating or stopped	•	•	•
Gearbox lubrication unit	Filter element	Visual inspection of clogging indicator, check replacement interval	Operating or stopped	•	•	•
	Cooler	Check for jamming and abnormal sounds (air-oil), check for leakages (water-oil)	Operating	•	•	•
Main mill motor	High speed coupling	Visual inspection	Stopped		•	•
	Installation	Hold down bolts torque check	Stopped		•	•
Gearbox	Low speed coupling	Visual inspection	Stopped		•	•
	Installation	Hold down bolts torque check	Stopped		•	•
Gearbox lubrication unit	Hoses, seals, gaskets	Visual inspection, check for leakages, corrosion spots or missing/damaged hardware	Operating or stopped		•	•
Upper body / drive shaft / grease system	Hoses, seals, gaskets	Visual inspection, check for leakages, corrosion spots or missing/damaged hardware	Operating or stopped		•	•
Lower body (closed door)	Ball level	Follow the static ball charge measurement performed by customer	Stopped		•	•
Lower body / Grinding chamber (after full cleaning)	Orebed body and door liners	Check for missing and/or damaged liners, correct installation	Shutdown		•	•
	Port plates and inlet pipes	Check wear status of inlet pipe and/or damaged port plates	Shutdown		•	•
	Product discharge outlet / splash guard	Check for worn spots	Shutdown		•	•
Screw shaft and liners	Drive shaft / screw shaft flanges and hardware	Visual inspection	Shutdown		•	•
	Inspect bottom section of screw shaft	Check for wear spots, condition of threaded hole at the bottom, shaft lining	Shutdown		•	•
	Inspect and measure worn screw shaft liners	Visual inspection, take photos of wear profile, measure liners according to the specific procedure	Shutdown		•	•
Main mill motor	Brushes	Check general condition, compartment cleanliness, lifting systems	Stopped			•
	Winding	Visual inspection	Stopped			•
Gearbox	Monitoring	Check functionality of RTDs and vibration sensors	Stopped			•
Gearbox lubrication unit	Settings	Check functionality of pressure relief valves, regulators, gauges and switches	Operating and stopped			•
Liquid rheostat starter	General	Check for electrolyte level, abnormalities at electrical connections, overheat indications	Shutdown			•
Grease system	Settings	Check functionality of instrumentation	Operating and stopped			•

# High Intensity Grinding mill (HIGMill™) inspection packages

Location	Component	Task	Mill status	Package 1	Package 2	Customized
				Visuals and Vitals	Mechanical Verification	Comprehensive
General	Control room data	Collect basic operating data (tonnage, power draw, speed, etc.)	Operating or stopped	•	•	•
	Operation and maintenance staff	Interviews with operation and maintenance staff about mill operational features and possible issues	Operating or stopped	•	•	•
	Internal procedures / routines	Check for customer internal procedures/routines for operation and maintenance	Operating or stopped	•	•	•
	Inventory	Spares and wears inventory survey	Operating or stopped	•	•	•
Walkthrough	Main mill motor	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Gearbox	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Gearbox lubrication unit	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Body (external)	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Media addition system	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
Main mill motor	Cooling unit	Visual inspection	Operating	•	•	•
	Grounding	Visual inspection	Operating	•	•	•
Gearbox	Housing	Visual inspection, check oil level, check oil replacement interval	Stopped	•	•	•
	Oil Unit	Visual inspection of breather, check replacement interval	Operating or stopped	•	•	•
Media addition system	Hopper	Visual inspection, check for leakages, corrosion spots or missing/damaged hardware	Operating	•	•	•
	Level switch	Check functionality	Operating	•	•	•
	Bulk filling valve	Check functionality	Operating	•	•	•
	Dosing injection valve	Check functionality	Operating or stopped	•	•	•
	Media dosing system	Visual inspection, check for worn spots	Operating	•	•	•
Chain blocks	Chain blocks	Visual inspection	Operating	•	•	•
Trailer	Trailer	Visual inspection	Not applicable	•	•	•
Internal inspection for wear (after full cleaning)	Mill internal	Visual inspection with borescope (through the inspection hatch)	Shutdown	•		
	Grinding media	Visual inspection	Shutdown		•	•
	Mill internal	Inspection and measurements (split of shell and bottom plate removal)	Shutdown		•	•
Chain blocks	Slipping clutch	Functional testing	Shutdown		•	•
	Brake setting	Check air gap	Shutdown		•	•
	Clutch setting	Check release limit	Shutdown		•	•
	Hook tackle and hock block	Check lubrication	Shutdown		•	•
Motor coupling	Coupling pins	Visual inspection	Shutdown		•	•
Mill feed and drain valves	Rubber insert of valve	Visual inspection, check for leakages or missing/damaged hardware	Shutdown		•	•
	Valve	Check functionality	Shutdown		•	•
Trailer	Bearings	Visual inspection	Not applicable			•
Shell split system	Rails and sensors	Visual inspection	Operating			•
	Linear drives of the mill shell trolleys	Visual inspection	Operating			•
	Wheel block	Visual inspection, check for lubrication	Operating			•

# Stirred Media Detritors (SMD) inspection packages

Location	Component	Task	Status	Package 1	Package 2	Customized
				Visuals and Vitals	Mechanical Verification	Comprehensive
General	Control room data	Collect basic operating data (tonnage, power draw, speed, etc.)	Operating or stopped	•	•	•
	Operation and maintenance staff	Interviews with operation and maintenance staff about mill operational features and possible issues	Not applicable	•	•	•
	Internal procedures / routines	Check for customer internal procedures/routines for operation and maintenance	Not applicable	•	•	•
	Inventory	Spares and wears inventory survey	Not applicable	•	•	•
Walkthrough	Main mill motor	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Gearbox	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Gearbox lubrication unit	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Body (external)	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
	Media addition system	Check for abnormal sounds, temperatures, vibrations, leakages	Operating	•	•	•
Mill body (external)	Launder	Visual inspection, check for corrosion spots, missing fasteners	Operating or stopped	•	•	•
	Access panels	Visual inspection, check for corrosion spots, missing fasteners	Operating or stopped	•	•	•
	Discharge screens	Visual inspection, check replacement interval, rotation interval	Operating or stopped	•	•	•
Main mill motor	Grounding	Visual inspection	Operating or stopped	•	•	•
Gearbox	Housing	Visual inspection, check oil level, check oil replacement interval	Stopped	•	•	•
	Breather	Visual inspection, check replacement interval	Operating or stopped	•	•	•
Gearbox lubrication unit	Filter element	Visual inspection of clogging indicator, check replacement interval	Stopped	•	•	•
	Cooler	Check for jamming and abnormal sounds (air-oil), check for leakages (water-oil)	Operating	•	•	•
Main mill motor	High speed coupling	Visual inspection	Stopped		•	•
	Installation	Hold down bolts torque check	Stopped		•	•
Gearbox	Low speed coupling	Visual inspection	Stopped		•	•
	Installation	Hold down bolts torque check	Stopped		•	•
Gearbox lubrication unit	Hoses, seals, gaskets	Visual inspection	Operating or stopped		•	•
Media addition system	Valves	Visual inspection, check for leakages, corrosion spots or missing/damaged hardware	Operating and stopped		•	•
Grinding chamber (after full cleaning)	Body liners	Visual inspection, take photos of wear profile, measure liners according to the specific procedure	Shutdown		•	•
	Floor liners	Visual inspection, take photos of wear profile, measure liners according to the specific procedure	Shutdown		•	•
Drive shaft / impeller arms	Drive shaft	Visual inspection, check for abnormal wear spots or missing/damaged hardware	Shutdown		•	•
	Impeller arms	Visual inspection, take photos of wear profile, measure liners according to the specific procedure	Shutdown		•	•
Main mill motor	Winding	Visual inspection	Stopped			•
Gearbox	Monitoring	Check functionality of RTDs and vibration sensors	Stopped			•
Gearbox lubrication unit	Settings	Check functionality of pressure relief valves, regulators, gauges and switches	Operating or stopped			•
Media addition system	Settings	Check functionality of pneumatic valves and signals from/to drive train	Operating or stopped			•

