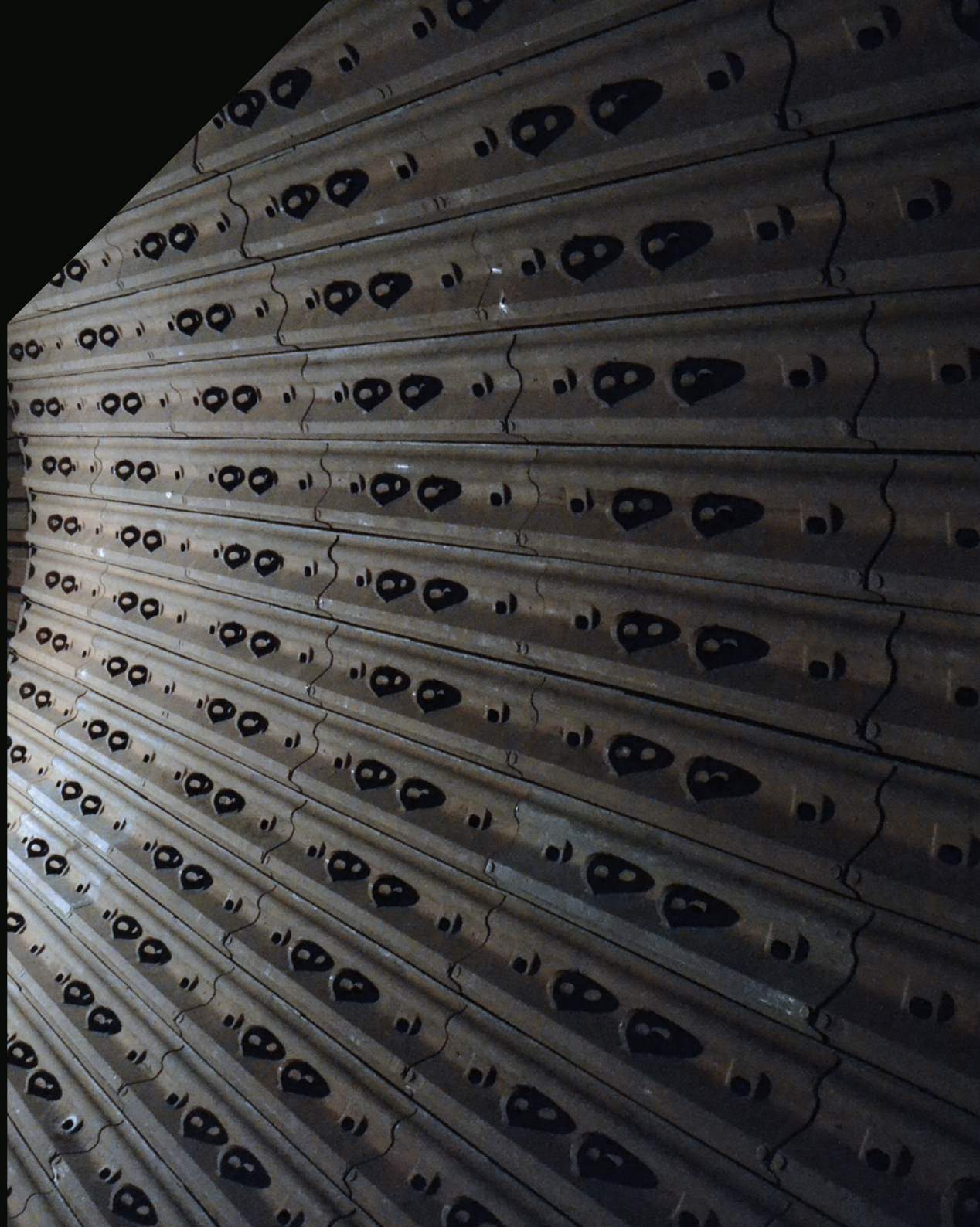
Metso

Mill lining solutions

Maximizing grinding performance with metallic mill linings

3 factors to consider



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Improve uptime and maximize grinding performance

In the demanding world of mining and minerals processing, every minute of uptime counts. That's why choosing the right mill lining material is critical, not just for protecting your equipment, but for optimizing performance and increasing safety and sustainability.

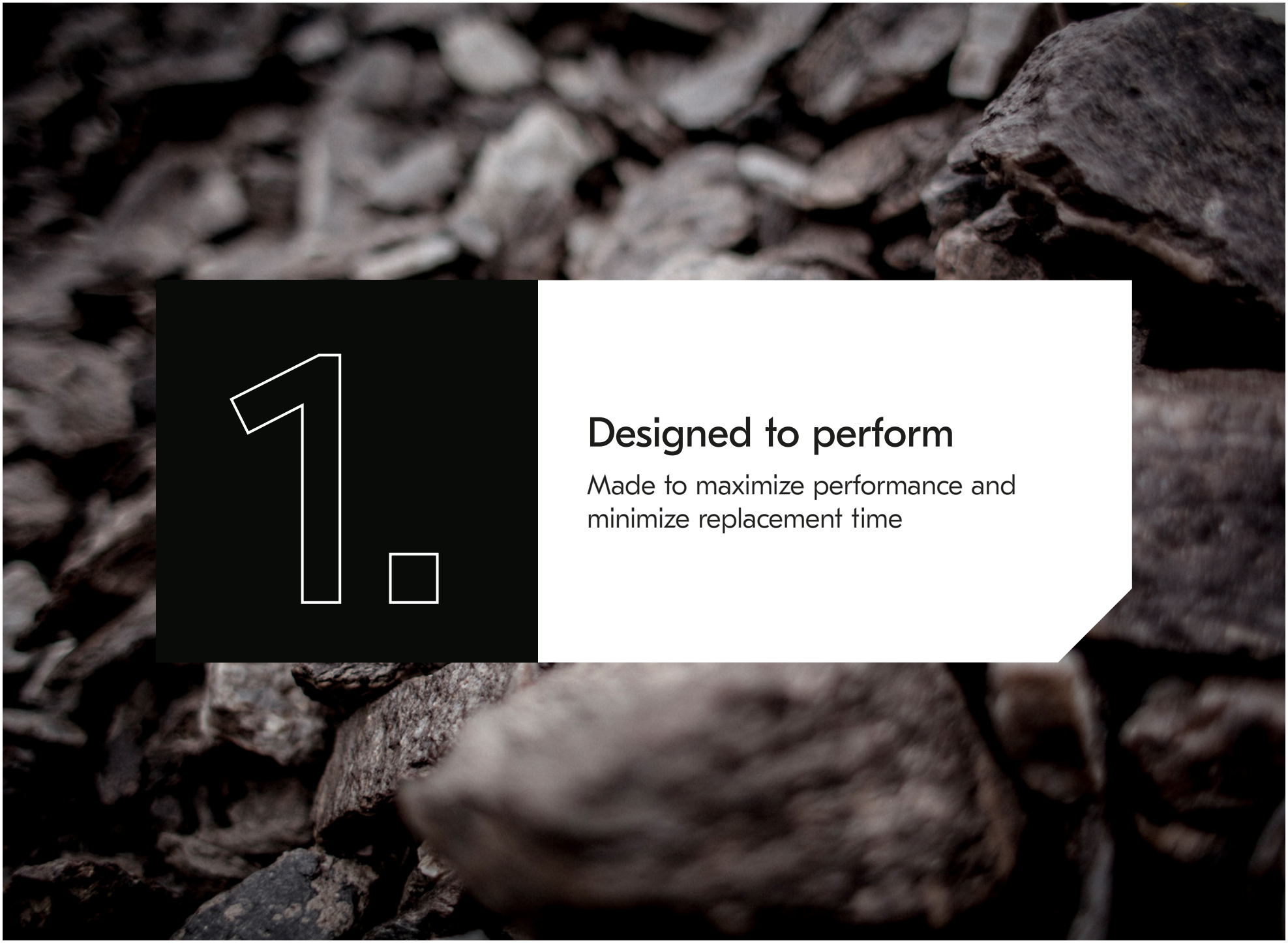
Meeting the demands of modern grinding operations
In today's demanding grinding environments, mill liners must do more than just resist wear, they must actively contribute to operational efficiency, safety, and uptime. Metso's metallic mill liners are engineered to meet these challenges head-on, offering a solution that goes far beyond traditional wear protection.

Tailored solutions through freedom of design
The solution offers total freedom of design and the ability to customize linings based on real operating data and liner handler capacity. This means each solution is tailored to the specific needs of your mill, ensuring optimal fit, function, and durability.

Fewer liners, faster change-outs
By using modern designs and maximizing liner size, the total number of liners required are reduced. Fewer liners mean faster installations, shorter downtimes, and lower overall maintenance costs, delivering measurable value to your operation.

Start with safety
All Metso wear parts are designed with safety as the top priority. We believe that all accidents can be prevented, and we are committed to taking responsibility for our own safety and for the safety of others. Workers' safety is improved by constant development of tools and methods. Installations can be carried out in a safer way by using lighter wear resistant components, guiding markers, a Metso Liner Position System and components designed for a perfect fit.

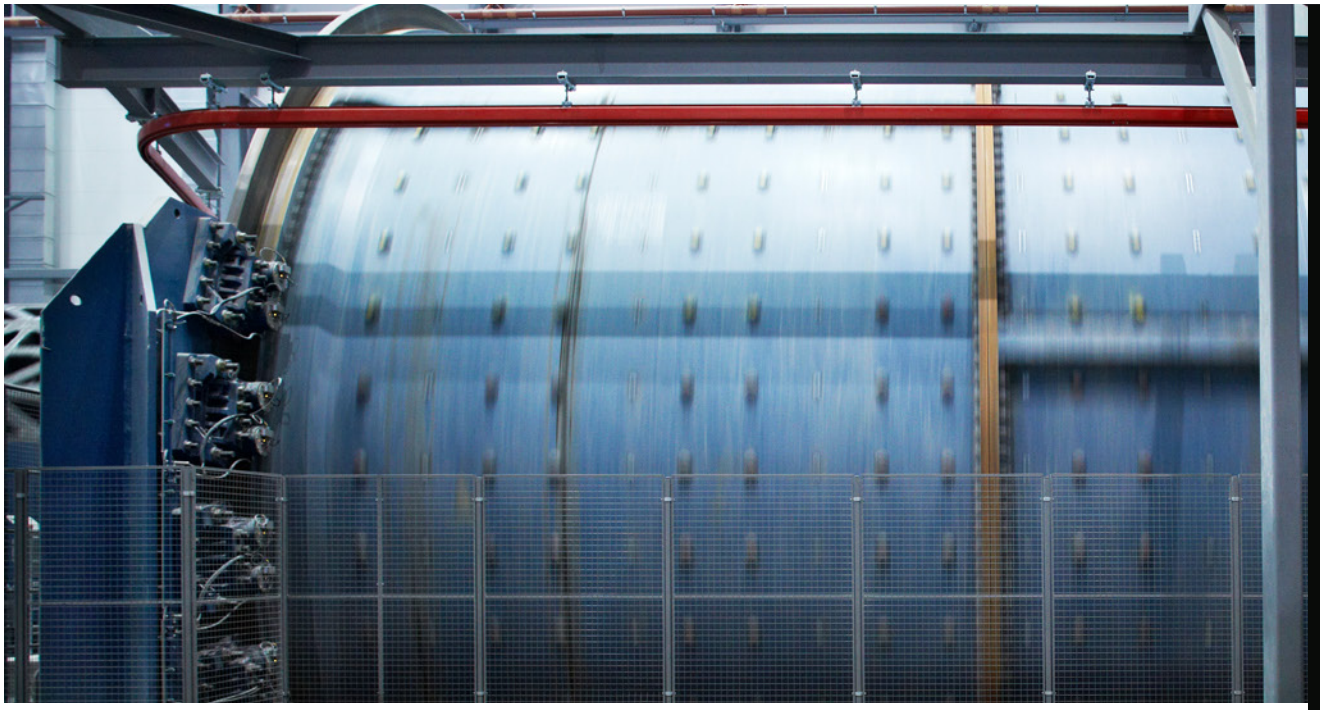
Every mill liner from Metso is designed with all of this in mind, to maximize mill performance while minimizng the replacement time.



1.

Designed to perform

Made to maximize performance and minimize replacement time



Why metallic mill liners?

Metallic mill linings are the traditional and proven choice for autogenous mills, semi-autogenous mills, ball mills, and rod mills. Even the latest composite designs still rely on metal wear components.

Metallic mill liners offer a range of advantages that make them a preferred choice for many grinding operations. Their durability, design flexibility, and performance-enhancing features contribute to improved mill efficiency, reduced downtime, and lower operational costs.

Metso's Metallic mill linings are produced at our own foundries. Our Cr-Mo steel and high-chromium white irons are specifically developed for mill lining applications and are carefully selected based on the operating conditions of each mill.

Steel is the most recycled material globally, and all our metallic liners are fully recyclable. Metso can also fine-tune designs for a minimum end-of-life weight which means fewer loads for the recycler or foundry and less CO2 emissions.

Metso has more than 40 years of experience designing steel liners for maximum uptime and performance.

Optimized design for performance and minimal replacement time.

Custom linings based on operating data, with rapid updates as conditions change

Use of high-quality materials like chromium molybdenum steel and high-chromium white iron

True benefits of metallic mill liners

Metallic mill liners offer a range of advantages that make them a preferred choice for many grinding operations. Their durability, design flexibility, recyclability, and performance-enhancing features contribute to improved mill efficiency, reduced downtime, and lower operational costs.

1.

Extended wear life

One of the most significant benefits of metallic liners is their exceptional wear resistance Made from high-strength alloys like high-chromium white iron or chromium molybdenum steel, these liners are built to withstand the intense abrasion and impact forces inside grinding mills. This translates to:

- Fewer liner replacements
- Longer maintenance intervals
- Reduced total cost of ownership

2.

Increased mill troughput

Metallic liners are typically thinner than rubber or composite alternatives, which allows for more internal volume in the mill. The increase in available volume means:

- More capacity for ore and media
- A bit more charge speed
- Increased efficiency

3.

Customization for optimal performance

Each metallic liner can be custom-designed to suit the specific needs of the mill and the ore being processed. This includes:

- Utilization of materials where it's effective and no where else
- Optimized lifter profiles for better charge motion
- Integration with hybrid systems (e.g., Poly-Met or rubber)

4.

Reliability in harsh conditions

Metallic liners are ideal for mills operating in extreme environments, including:

- High temperatures
- Aggressive chemical conditions
- Heavy-duty grinding applications

Their robust construction ensures consistent performance even under the most demanding conditions.

2.

Combine for best results

Our liners are custom-designed for each application.

Engineered for excellence

Metallic mill linings allow a high level of optimization with possibilities to make very precise design changes by adding or removing material exactly where it is needed.

No "one-size-fits-all"
Metso doesn't believe in one-size-fits-all. Metso's liners are custom-designed for each application, and they offer the unique ability to combine different liner materials within the same mill. This hybrid approach allows for:

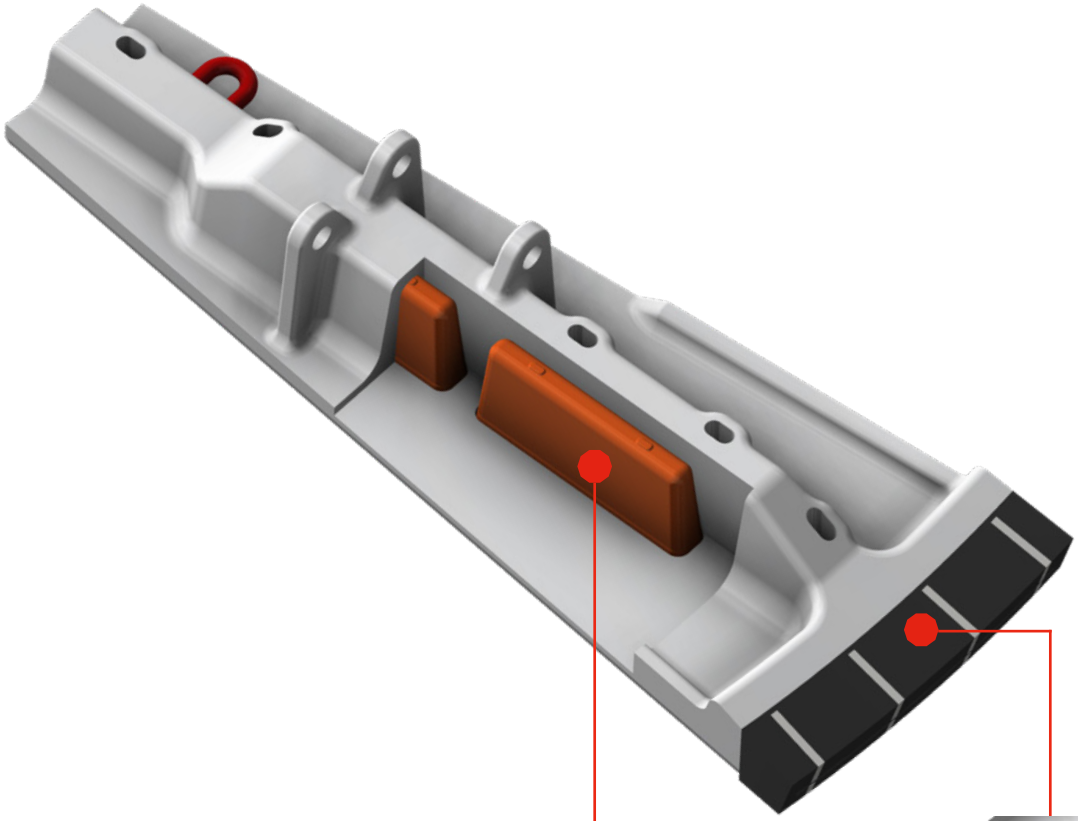
- Reduced overall mill weight
- Balanced wear life for synchronized maintenance
- Minimized risk of cracking and pegging

This adaptability is powered by Metso's own product engineering and production teams, ensuring seamless integration and performance.

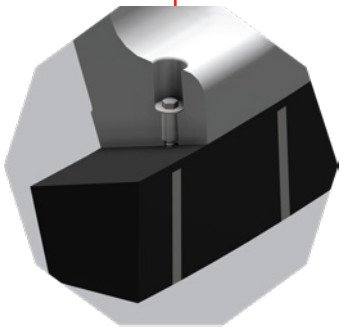
Freedom of design
As a metallic liner is a fully customized product with each new liner requiring its own patterns, there is total freedom of design. It is possible to do almost any shape or size; the only limitation is the maximum allowed weight of the liner and the mill feed end trunnion diameter.

Combine for even better performance
The market's widest range of grinding wear parts and services combined with six decades of mill lining experience mean we can select exactly the right solution for your unique mill. We can offer and combine metallic linings with Poly-Met™, Megaliner™ and rubber mill liners.

Using each material where it performs the best helps you to optimize your grinding process.



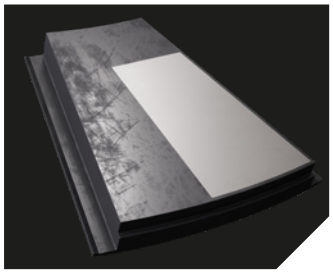
High-performance White Iron 3F1 inserts for added protection



Integrated Poly-Met filling segment for installation and removal ease, improving reline time and safety.

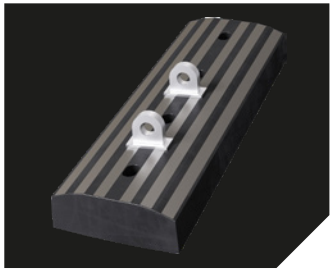
Combine for better performance

By combining metallic and rubber/Poly-Met liners within the same mill you can achieve optimal performance. This unique flexibility reduces weight, balances wear life, and minimizes risks with an efficient and reliabe grinding performance. So use the right liner materials in the right place to get the most from your grinding process.



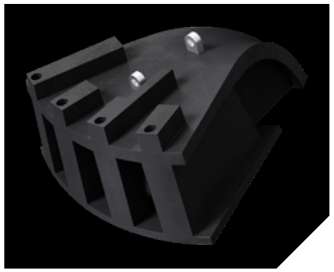
Feed end head plates - balance the wear life
Minimizing downtime and balancing wear life of mill lining components like head plates, lifters, and liner rings is challenging.

Solution: Poly-Met head linings are strategically designed to use a minimum amount of the metallic component, placed in strategic locations, which results in a lightweight, predictable system that minimizes maintenance stoppages.



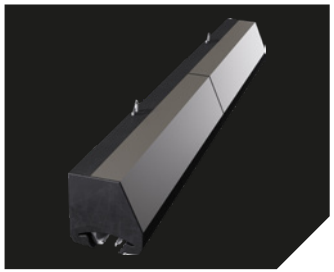
Shell plates - avoid cracking
Cracking and breakage are a common problem that results in big losses.

Solution: Poly-Met shell plates can withstand high impact as they are made of highly resistant alloys in combination with rubber. This results in less cracking and fewer unplanneds stops.



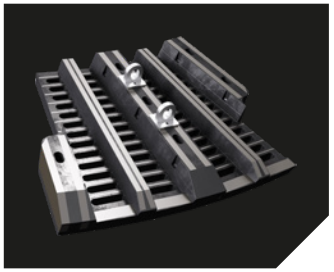
Discharge - save weight and better predict wear life
Replacing discharge systems like pulp lifters and cones in grate discharge mills is difficult and time-consuming.

Solution: Lightweight, steel-reinforced rubber components are easy to install, durable, and can increase mill charge volume by reducing system mass, without risking structural overload.



Lifter bars - maintain the profile
Mines often struggle to reduce lining mass and maintenance stops, while ensuring liner efficiency throughout its lifespan.

Solution: Using Poly-Met with other Metso mill lining offerings provides a balanced solution, where it's possible for complete renewal in one maintenance.



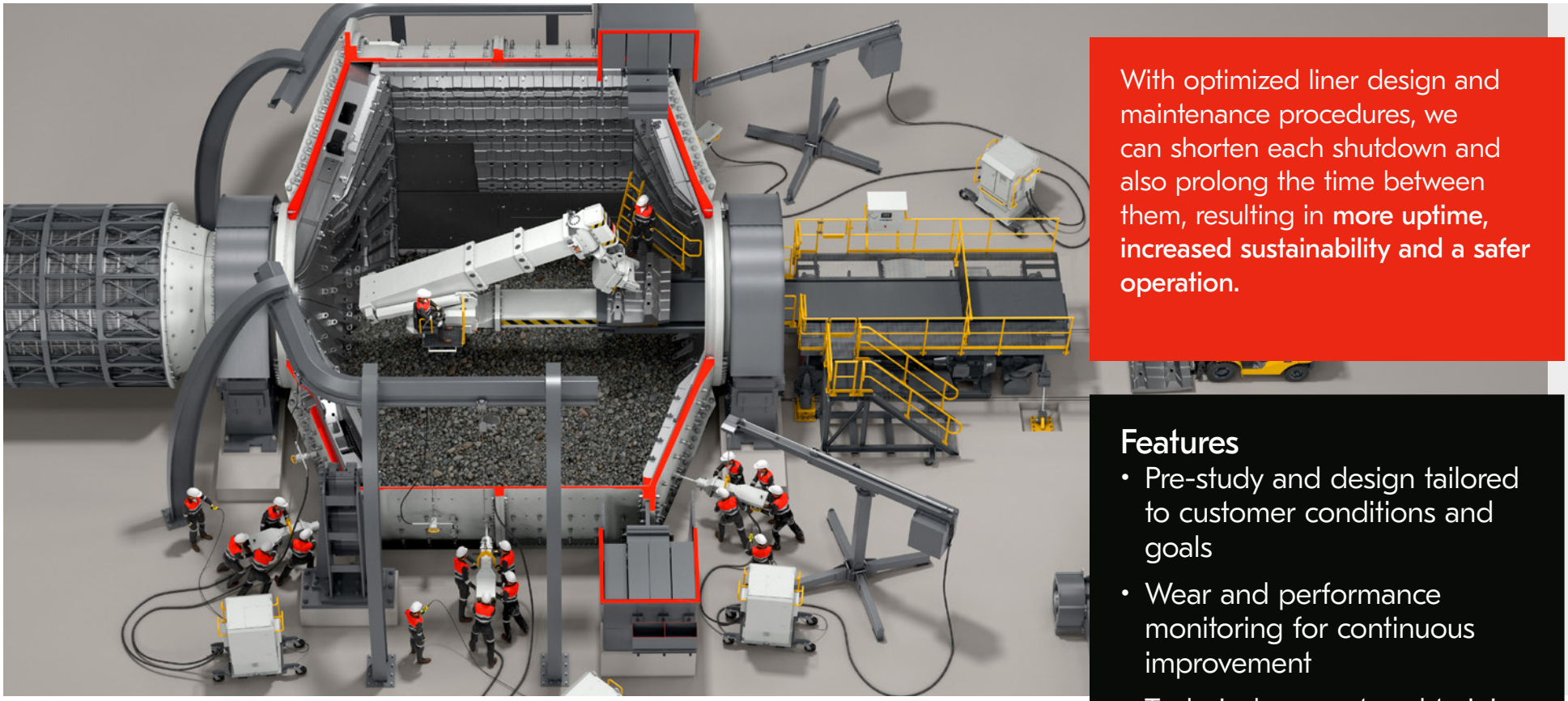
Grate plates - eliminate pegging problems
Some mill operators struggle with pegging problems and grate breakage, resulting in production disruption.

Solution: Poly-Met and rubber grates, made of strong, flexible materials, can reduce or eliminate pegging issue, maintain aperture size and stabilize product size distribution.

3.

Beyond the product: comprehensive services

A solution that delivers more



With optimized liner design and maintenance procedures, we can shorten each shutdown and also prolong the time between them, resulting in **more uptime, increased sustainability and a safer operation.**

Features

- Pre-study and design tailored to customer conditions and goals
- Wear and performance monitoring for continuous improvement
- Technical support and training
- Safe and timely installation by experienced engineers
- Grinding circuit optimization using advanced analytics and control systems
- Life Cycle Services to support the whole operation - from start-up to shutdown

More than mill linings

The comminution circuit has many different elements that can make it challenging to choose the correct operating and control strategies. We have data-driven tools and the expertise to increase throughput and availability to reduce energy consumption in your circuit.

Our specialists use ore characterization data, comprehensive plant surveys and historical operational data to develop site-specific models, used in simulation studies.

Combining this with our benchmarking data and in depth knowledge of improvement areas, priorities can be quickly identified and addressed.

Shutdown service
Safe and efficient shutdowns start with careful planning. We make sure every step is covered, from creating a detailed plan to supervising and executing the work. Our approach focuses on reliable installation methods and continuous monitoring to minimize downtime and keep your operation running smoothly. After the shutdown, we optimize performance to ensure your mill operates at its best.

Mill lining services

Improve your operational efficiency, reduce risks and increase profitability by utilizing our unique knowledge, experienced people and innovative solutions. We provide spare parts, installations and a full set of advanced tools to simplify maintenance, improve safety and optimize operations. Here are a few, contact sales to learn more.

1.

Wear reading solutions

Wear monitoring is the key to constant improvement and optimized performance.

- MillMapper™ patented 3D wear scanning
- Traditional wear readings
- Expert observations
- iPad tool that captures profiles and images

Combining different methods is often very efficient for best results.

2.

3D DEM simulations

The unique wear-progression model predicts the performance of the lining extremely accurately and can be calibrated using wear-monitoring data to further optimize the liner design.

It is the market's most advanced software for comparing different lining alternatives and calculating total costs over lining life cycles.

- Mill shell liner simulator
- Mill discharge simulator (grates, pulp-lifters, trommel)

3.

Reline machines

Successful and safe shutdowns require thorough planning, optimized liner design, reliable installation methods and careful monitoring to achieve the least amount of downtime.

Upgrading your liner handler and liners to optimize future relines is a quick return on investment.

- Decrease your shutdown time
- Improve your mill availability
- Boost your liner utilization
- Increase your total productivity

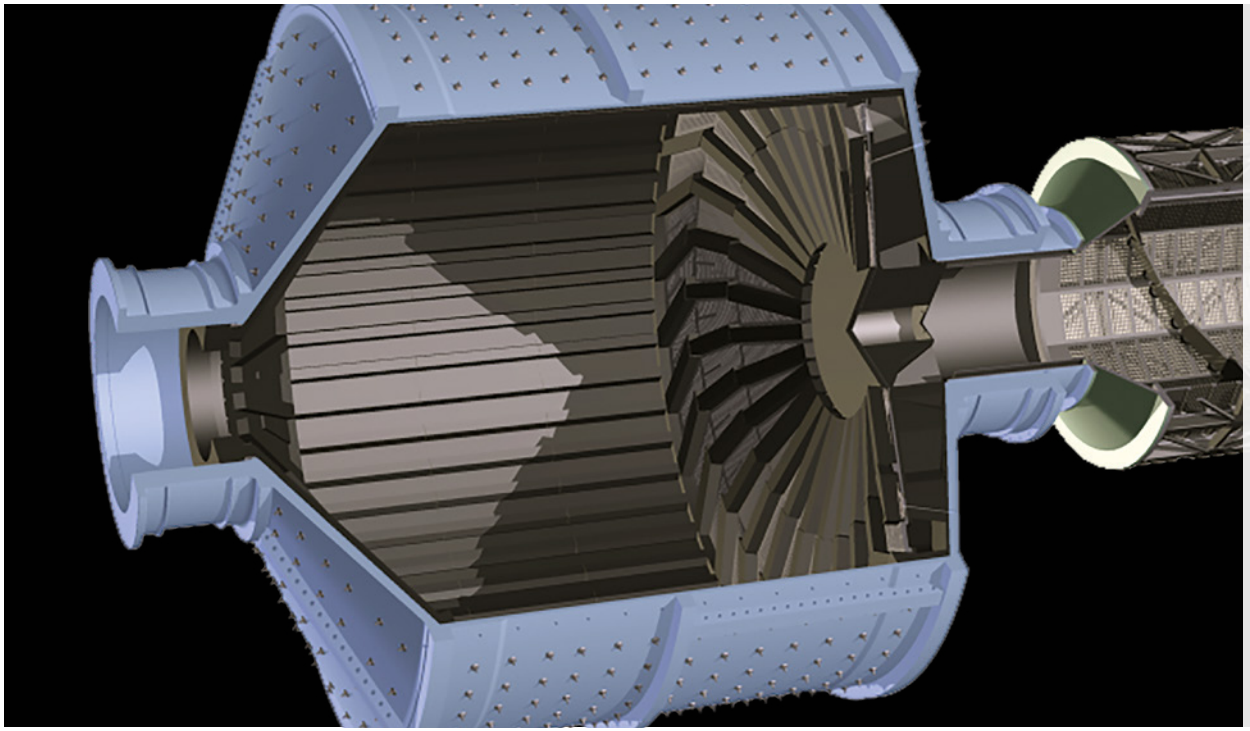
4.

Life Cycle Services

Metso's Life Cycle Services will help you achieve your production goals with tailored, outcome-driven solutions. From parts and equipment, to sharing risk, we partner with you for continuous improvement, flexible payment options, and long-term sustainability.

The LCS partnerships focus on delivering:

- Stability
- Optimization
- Growth



Key takeaways

Proven, reliable and efficient. A solution for the toughest applications

Total design freedom means the right liner materials in the right place to get the most from your grinding process

Metal components can be recovered and re-processed for use in the manufacturing of new products

Conclusion

Metallic mill liners offer a range of advantages that make them a preferred choice for many grinding operations. Their durability, the design flexibility and performance-enhancing features contribute to improved mill efficiency, reduced downtime and lower operational costs.

With a global footprint, Metso experts are always close by, ready to help you find the perfect mill lining solution.

Your #1 service partner from pit to port

Are you looking to optimize production, reduce risks, lower operating costs and improve your sustainability performance?

End-to-end solutions
We carry the industry's most comprehensive aftermarket offering, and it's not limited to Metso equipment. We offer parts, process optimization and everything in between.

Optimized performance
Our expertise covers every stage of the minerals process. We connect the dots and solve bottlenecks in a holistic way, elevating your process performance to a whole new level.

Digital mine
Our 45+ digital solutions help add an extra boost to your performance, identifying hidden improvement areas and modeling the solutions with sophisticated simulations.

Sustainable operations
Responsibly produced, long-lasting parts, designed and optimized to minimize wastage, improve energy efficiency and emphasize safety.

Trusted partner
Our dedicated team of experts bring you the unique advantage of local presence backed up with a solid global network of first-class engineering, manufacturing and service.

- Support, manufacturing and parts stock close by
- Reliable, high-performing parts and services
- High safety/ethical/environmental standards
- Training and expertise

You set the target.
We provide the solution.

Visit our website →

metso.com/mill-liners/

Mill lining brochure →

Read more about our mill lining offering

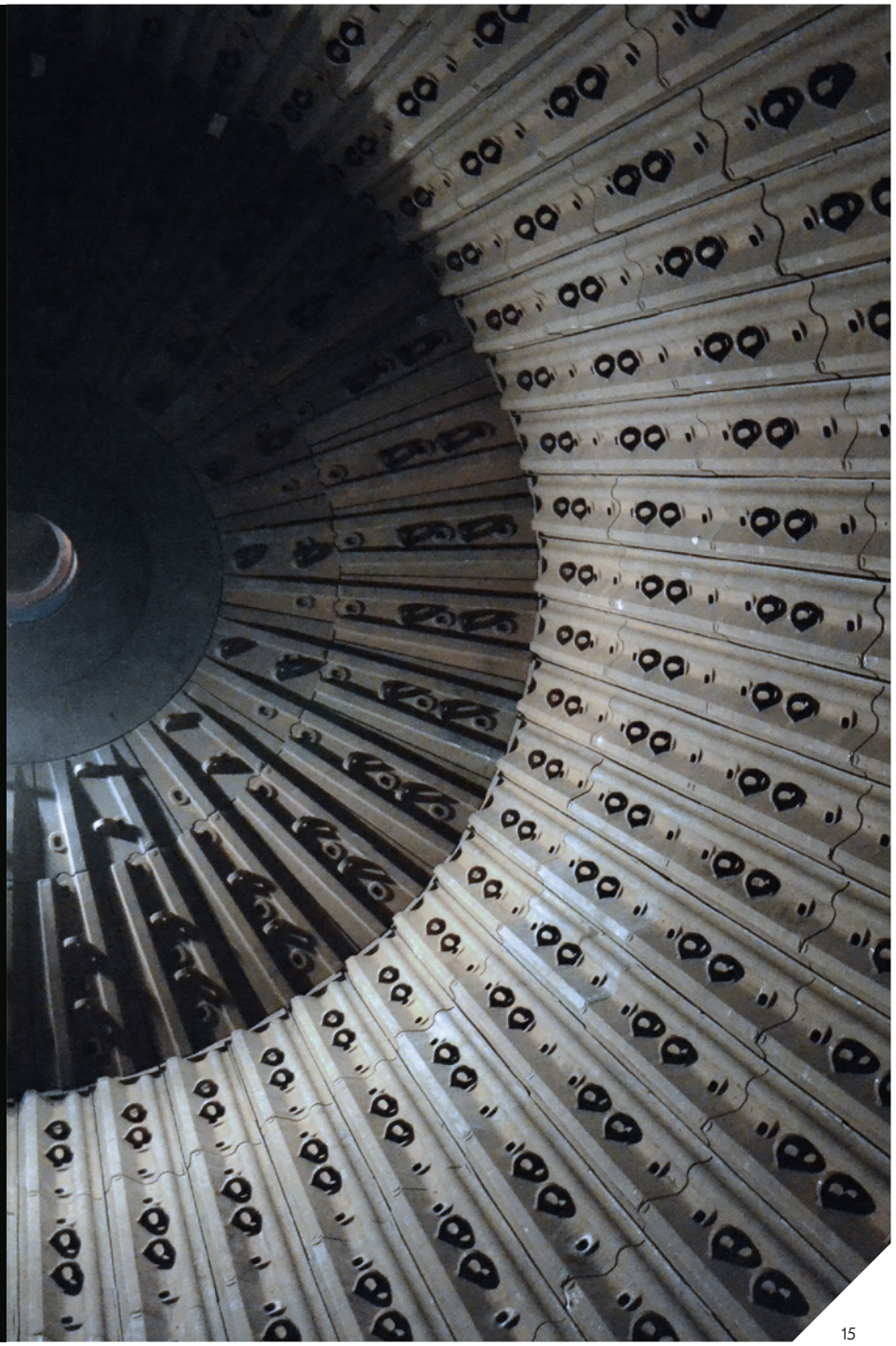
Wear analysis →

Wear monitoring for optimized performance

Life Cycle Services →

Mining services delivering performance and sustainability outcomes

Contact us →



Metso is a frontrunner in sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. We improve our customers' energy and water efficiency, increase their productivity, and reduce environmental risks with our product and service expertise. We are the **partner for positive change.**

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