Energy efficient
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Mining processes require heavy capital investments and generates high operational costs which are mainly due to high energy consumptions. Of all the mining processes, grinding circuits are the most energy intensive component consuming up to 10 times more than crushing and 100 times more than blasting.

On top of energy demands, there are environmental and safety costs considerations. The introduction of CO₂ Cap and Trade policies in some of the developed countries is likely to be adopted by many others in the next years. Health and Safety is of increasing concern for extractive companies who have been meeting this challenge by heavy investment in training, procedures and safe equipment. Taking all these factors into consideration, the circuit configuration and selection of the equipment represents a critical cost saving by maximizes production, minimizes the footprint and achieves optimum energy efficiency.

Metso efficient circuits

Metso has an extensive history of technological development and recognized as the world leader in the supply of grinding mills. Metso is constantly investing in both the improvement of existing technology through the reduction in energy, water and media consumption and development of new technology to meet and exceed customer demands.
Energy efficient equipment

**Crushers**
The Nordberg MP1250 cone crusher was designed to maximize production and improve energy efficiency, while keeping the footprint required to a minimum. The superiority of the MP1250 has been proved by a series of side-by-side evaluations comparing an MP1250 in both secondary and tertiary operations. This superiority is due to an MP1250 performing more work in each crushing cycle and using power more efficiently as a result of a larger throw and a new fulcrum point. An MP1250 can have up to 29% higher capacity and 17% lower specific energy than other tertiary crushers, and 30% higher capacity at a slightly reduced specific energy, while achieving a finer product, than other secondary crushers.

The MP1250 is also available in an upgrade kit to the popular MP1000 cone crusher. Replacing as few as five parts allows for the increases in capacity and reductions in specific energy, while utilizing the existing structures and foundations already in place.

**Screens**
Screening processes consume significantly less energy than crushing and grinding processes. Even though any reduction in energy consumption in screening is also important, the focus should be in increasing screening efficiency. This will indirectly reduce energy consumption in crushing and grinding process. Metso offers a combination of both traditional and newly developed screens each designed from experience to meet specific applications.

- **Linear motion MF (Multi Flo) screens**
  MF screens are best suited for processing ores with a high content of fines.

- **Circular motion RF (Riple Flo) screens**
  Ideal for applications with high content of critical particles (close to media aperture size). Its circular motion reduces clogging in comparison to linear motion screens.

- **Elliptical motion EF (Elipi Flo) screens**
  Ideal for sticky ores, EF screens combines the advantages of linear and circular motion screens with high G force. Its stroke angle control allows the optimization of the screening process. It is recommended for ore with high content of fines or high content of particles of similar size.

- **Linear motion LH (Low Head) screens**
  Due its longer screening time, it is ideal for dewatering and washing application. It is also recommended for installations with vertical space limitations.
Vertimill® grinding mills

VERTIMILL® Grinding Mill are globally recognized as energy efficient grinding solutions and have been proven to grind more efficiently than ball mills processing feeds as coarse as 6 mm to products finer than 15 microns. The higher grinding efficiency, reduced media consumption, lower installation cost, minimal maintenance and minimal liner wear mean that the VERTIMILL® Grinding Mill the lowest total cost of ownership. The VERTIMILL® Grinding Mill is a unique product offered exclusively by Metso that has a long history in the metallic mining industry.

Stirred Media Detritor

The Stirred Media Detritor (SMD) is a fluidized, vertical stirred mill designed for optimum grinding efficiency for fine to ultrafine products. The vertical arrangement does not require any slurry seals or inlet feed pressure. The SMD is a fluidized media mill which means, the stirrer speed is high enough to distribute the media throughout the slurry regardless of media density, forcing particle and media contact. The SMD power intensity is optimized to achieve efficient grinding, limit wear, and allow for heat dissipation in the case of a high energy grind.
HRC™ – The evolution of HPGR technology

HRC™

High Pressure Grinding Roll (HPGR) has been acclaimed as one of the most energy efficient mining solution when used in the right application. The design is energy efficient due to the basic operating principle whereby the rotating rolls compress the feed and achieve breakage through inter particle compaction. The Metso HRC takes HPGR technology to the next level by providing a simple design that offers increased availability, component longevity, ease of maintenance, circuit capacity and safety.
Energy efficient circuits – solving the puzzle

To be energy efficient, a circuit needs not only to have the right equipment but have that equipment optimized. Even the most efficient equipment installed on the wrong application will not be energy efficient. Our expertise extends the supply of single unit equipment with our ability to provide total flowsheet solutions. Below are presented examples of the energy efficient flowsheets recommended by Metso, which the applicability will depend on the ore characteristics, capacity, mine constraints and product requirements of each project.

**AG mill, HRC and Pebble mill**

AG mill is followed by a single deck screen with the oversize being recirculated through a HRC before returning to the AG mill. The undersize from the screen is fed to cyclones with the underflow fed to pebble mill circuit sump. AG mill can be replaceable for a SAG mill, however special care should be used to detect and remove balls from the HRC feed.

**AG mill, Magnetic separation and Vertimill®**

When the ore competency proves to be ideal, autogenous milling can offer significant operational cost savings through the exclusion of grinding media. Metso has installed this circuit configuration in an Iron Ore plant adding a magnetic separator after the AG milling.

**MP 1250, HRC, and VERTIMILL®**

In this scenario, the product from the primary crusher is fed to the MP cone to reduce it’s topsize to acceptable feed for the HRC which produces the required reduction for enrichment with the Vertimill processing the regrind. When applicable, this type of circuit can offer significant energy savings.
The Metso difference

Metso’s comprehensive service offering is an integral part of our mining customers’ efficiency and profitability. Our global resources and industry-leading expertise are backed by service locations all over the world – so you can always count on a local partner to help overcome day-to-day challenges or scheduled, regular maintenance.

Life Cycle Services
Metso implements industry-best practices at each step of your operation to achieve optimum performance and guaranteed results. Our life cycle service offering includes new installations, maintenance services, process improvements, as well as upgrades and rebuilds.

Spare and Wear Parts
Using Metso parts during preventive maintenance reduces the number of unexpected breakdowns, downtime and operating costs. Our parts are manufactured according to specific design parameters using high-quality materials, tools and techniques.

Global Distribution and Logistics
Metso offers comprehensive global spare and wear parts services to ensure that the right part is in the right place at the right time.

Advanced Performance Materials
Metso’s Process Technology and Innovation Group is always working to develop spare and wear solutions that offer extended wear life and maximum performance – even in the most demanding applications. Our team of engineers emphasizes the importance of understanding the problem first, and then developing solutions based on available field measurements, established processes and product knowledge. Our approach can save your operations time and money, providing solutions that offer improved throughput without the investment in new equipment.

Training
Our broad range of training courses help customers significantly increase their competitiveness and improve return on investment by expanding the knowledge of their workforce.

Field Services
Metso can provide an emergency field plan or a customized services solution based on customer needs and priorities.

Preventive Maintenance Agreements
Metso’s maintenance strategy ensures that plants are running at full capacity and accounts for maximum efficiency in the face of scheduled interlocks and shutdowns. Customers can rely on maintenance services for life cycle performance and to minimize operations management workload.

Automation Solutions
Metso offers the right automation system for every level of plant complexity. This custom approach ensures efficient operation in terms of production, cost, equipment life and security.

Equipment Refurbishment
Metso’s technical and manufacturing specialists keep equipment in optimum working order and partner with customers to determine any further enhancements that may increase productivity.

Plant Diagnostics and Upgrades
Our engineers analyze crushing and grinding circuits to help you make smarter upgrade decisions. With expert diagnostics, you’ll benefit from substantially increased production and optimized equipment setup for your application.

Performance Contracts
We work under integrated contracts that guarantee production goals based on vital performance measurements; all measurements are monitored and addressed through a well-planned management program.
Expect results
It is our promise
to our customers and
the essence of our strategy.

It is the attitude
we share globally;
our business is to deliver
results to our customers,
to help them reach
their goals.