

High pressure grinding rolls
HRC™

A step
change in
energy efficiency



Our comminution technology

Minerals processing is changing. With diminishing ore grades and rising energy costs, ensuring that a plant has the lowest total cost of ownership is vital. Comminution of ore is one of world's most energy intensive stages and accounts for up to 40 percent of the total energy used in mineral processing operations. More sustainable technologies & practices are required to make these hard, variable and low-grade ore bodies viable. Metso has an extensive history of technological development and is recognized as the world leader in engineering and innovating comminution circuits that are not only energy efficient but are also lower in operating costs helping our customers achieve maximum production and consistent recovery.

Metso is the
global leader in
comminution
technology

Advanced solutions for maximizing energy efficiency

Ensuring the accuracy and consistency of product size directly affects the profitability of your operation. Efficiently reducing ore size requires the optimum mix of world class equipment. As the leading supplier of crushing, screening and grinding equipment, Metso ensures that you have selected best technology, systems and solutions for your mining operations.

Energy efficient
solutions to
maximize
productivity &
profitability

Crushing

Metso's high capacity, energy efficient crushing equipment delivers superior performance and maximized throughput for the most demanding mining applications.

Screening

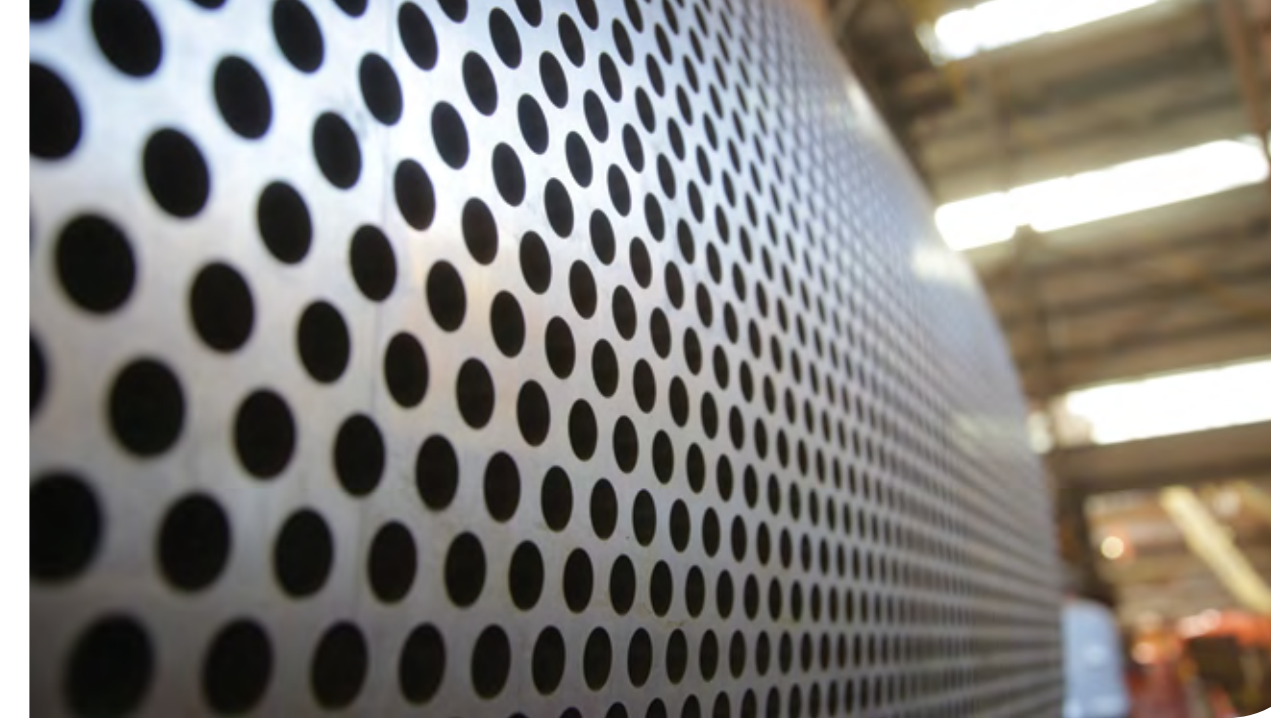
Metso's high efficiency screening solutions provides dependable screening performance for large material volumes with hard and abrasive ores.

Grinding

Metso's comprehensive line of grinding mills and systems provide the most effective and energy efficient technology across wet or dry, horizontal or vertical stirred milling operations

Developing the next generation of HPGR

The **HRC™** is the first and only HPGR designed from the ground up specifically for **hard rock applications** with the singular objective for providing the **lowest total cost of ownership**



HRC™ 3000
is the
**world's
largest** & most
advanced HPGR

Metso HRC™

Pushing the boundaries with pioneering design

Metso's innovative and most advanced HRC™ helps you to get more value from every ton of ore with its sheer production capacity and state-of-the-art industry leading features.

The key in the HRC™ HPGR solution is the patented Arch-frame which eliminates downtime caused by skewing and allows for the use of the flanged tire design. The flange tire design is another unique feature for Metso's HRC™ HPGR. The flanges maximize the amount of material that is crushed by pulling material into the crushing zone and significantly reduces the amount of material that bypasses the tires.

In addition to boosting the equipment's energy efficiency, our single line solution decreases the amount of capital cost and manpower required for routine maintenance, adding value to the customer operations.

Diverse applications:

- › High tonnage, hard rock
- › Diamond
- › Iron-ore
- › Gold
- › Copper
- › Platinum
- › Molybdenum
- › Industrial minerals

Why choose Metso HRC™ ?

A trusted solution bringing a step change in your operations

Metso has made several key innovations to traditional HPGR technology to increase throughput and decrease total cost of operations.

	Higher availability & reliability	- Patented arch-frame eliminates downtime caused by skewing - Anti-skewing arch-frame prevents bearings from being damaged due to misalignment
	Increased efficiency & capacity	- Flanged tire design to direct material to the crushing zone, maximizing the amount of ore crushed - Low circulating load within the circuit
	Reduced operating costs	- Energy-efficient operation - Longevity of wear components - No grinding media required
	Safety & ease of maintenance	- Studded tungsten carbide surface for optimum wear resistance - Flanges for have improved wear life over stationary cheek plates - Dust enclosure for a cleaner & safe working area
	Flexible operating parameters	- Speed and pressure can be adjusted for changing ore conditions and downstream circuit demands - Hydraulic cylinders can be adjusted to provide the optimal crushing force



Maximizing crushing efficiency and circuit capacity

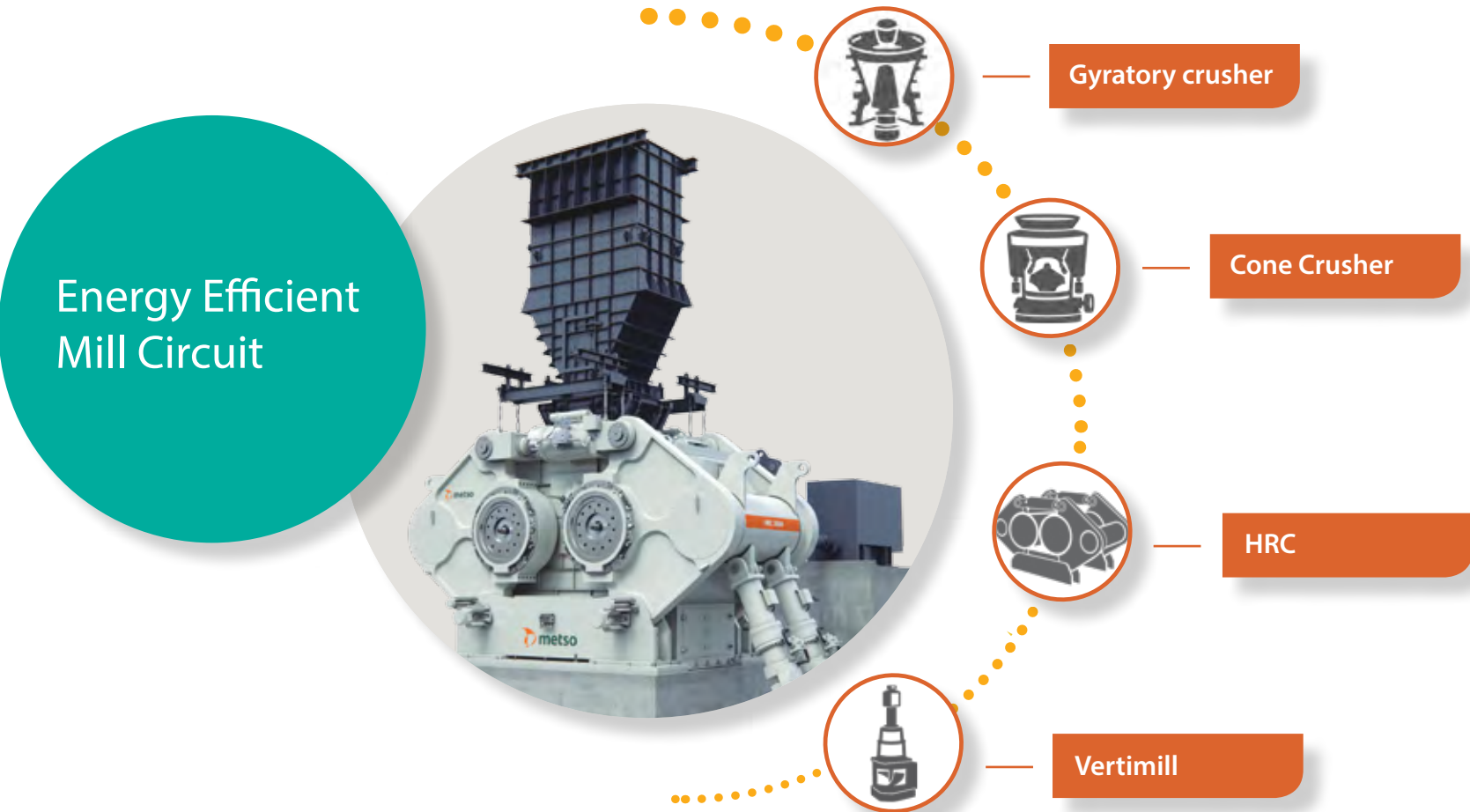
Unleashing the innovative technology, Metso created a revolutionary HPGR crushing circuit that challenges traditional expectations.



-  **+120** million metric ton of processed ore
-  **+60,000** hours of operation
-  **+20%** throughput
-  **-15%** energy consumption
-  **-25%** circulating load



Proven efficiency with Metso HRC™



Over **45%** potential in operating cost savings



Over **36%** potential in energy savings

Promising results

Metso provides an innovative energy efficient solution with the world's largest HPGR-HRC™ 3000 at Freeport-McMoRan's copper mine in Morenci

HRC™ 3000 has been fully operational since May 2014 at Freeport-McMoRan's Morenci copper mine in Arizona.

Challenge

The goal was to develop a highly efficient HPGR crushing circuit for the newly constructed Metcalf concentrator at Freeport-McMoRan's copper mine.

Solution

The HRC™ 3000 is the largest unit in the world, allowing for fewer lines of equipment which reduces the amount of ancillary equipment.

Result

Metso's solution has provided the Morenci mine with several benefits, including an estimated **13.5% increase in energy efficiency over** traditional HPGRs based on pilot scale testing.



HRC™ 3000 crushed its **100,000,000th** short ton of ore in **< 3 years**

Approx **13.5%** increase in energy efficiency over traditional HPGRs

Through our knowledge and experience, we work with our customers to create solutions that enable them to attain their objectives. We call this **The Metso Way**, which focuses on creating value to our customers.

The Metso Way

Knowledge -



We have deep knowledge about our customers' business environment, processes and challenges

People -



Our committed and highly competent people make the difference to our customers

Solutions -



We create the technology and services required to meet our customer needs

The Metso Way -
Making the big difference to our customers

Everything we do is based on deep industry knowledge and expertise that makes the big difference to our customers. Decades of close customer collaboration and adapting the our customers' ever changing needs have transformed us into a knowledge company





Metso Inc.,
www.metso.com/hrc