



**G R O W T H**  
G R I N D I N G  
M E D I A



# FORGED BY EXCELLENCE

As an expert and leading manufacturer of grinding media, we pride ourselves on their performance and quality. Manufacturing is our craft - providing comprehensive technical service to our customers is the core of our ambition.

## OUR DIFFERENCE DEFINES US

- 1 HIGH SUPPLY CAPACITY**

Growth grinding media operates two manufacturing facilities with combined capacity of 120,000 tonnes per year.
- 2 ACKNOWLEDGED BY INDONESIAN MINISTRY OF TRADE FOR OUTSTANDING PERFORMANCE**

Consistently received Primaniyarta Award as 'Best Performing Exporter' and 'New Market Pioneer Exporter' from the Indonesian Ministry of Trade since 2006.
- 3 WORLD LEADER IN SERVICE EXCELLENCE**

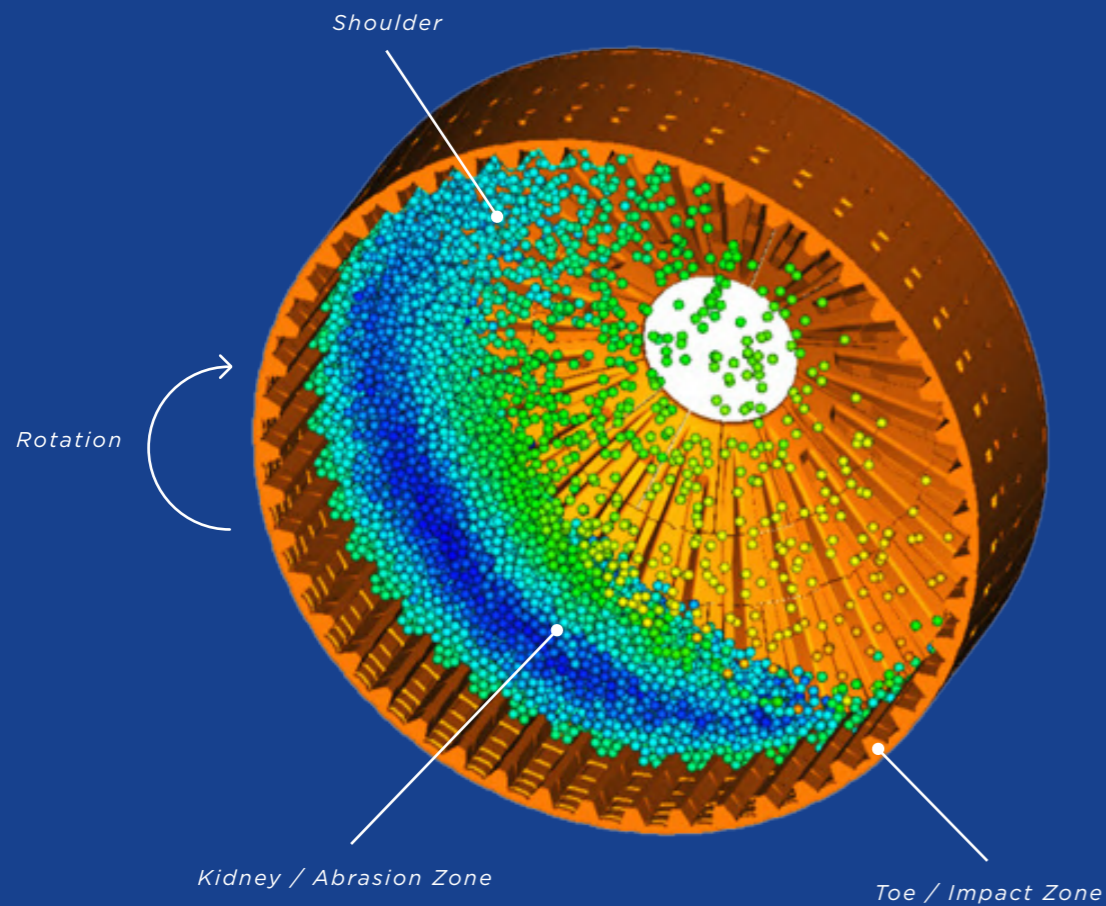
Growth grinding media is part of the Growth Steel Group, an established world leader in service excellence for the design and manufacture of mineral processing wear solutions.
- 4 INTERNATIONAL STANDARD, HIGH-QUALITY STEEL**

The highest quality steel is selected through Growth's stringent specifications.
- 5 WORLD'S BEST PRACTICES**

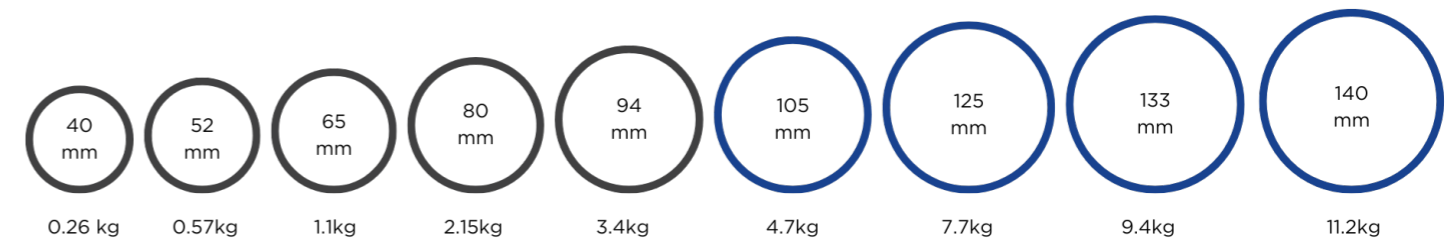
All our equipment, practices and procedures are carried out in accordance with ISO standards.
- 6 MANUFACTURING FACILITY**

Our operations are purpose built and equipped with the latest technology and process controls.

# GRINDING CHARGE MOTION



# GRINDING MEDIA PRODUCT RANGE



## BALL MILL RANGE

### APPLICATION ENVIRONMENT

In ball milling applications, the diameter of the balls, mill and throw action of the charge provides a low-impact environment - hence maximum abrasion resistance of steel balls is the desired characteristic.

### CHEMISTRY & HARDNESS

High carbon contents and high hardness levels affect abrasion resistance in steel balls. Selection of alloy content and hardness is made after careful consideration of the customer's mill operating conditions. Chemistry, hardness and ball size are interrelated.

## SAG MILL RANGE

### APPLICATION ENVIRONMENT

For SAG milling applications, the diameter of the balls, mill and throw action of the charge provide for a high impact environment - therefore a balance must be achieved between abrasion resistance and impact resistance in SAG balls to avoid excessive breakage.

### CHEMISTRY & HARDNESS

Selection of alloy content and hardness is made after careful consideration of the customer's mill operating conditions - particularly the impact environment.

For this reason SAG grinding balls undergo further heat treatment processes to ensure the impact performance capability.

# MANUFACTURING PROCESS

Balls are manufactured using a roll forging method with a variety of heat treatment techniques depending on the final product requirements.

## STEEL SELECTION FOR OPTIMAL GRINDING MEDIA QUALITY

Production of quality grinding media is contingent on the quality of steel used. To ensure consistent performance of grinding media, we implement very specific specification and criteria to our specially selected steel suppliers.

# QUALITY CONTROLS

Strict quality process controls are observed by steel bar suppliers to ensure our steel meets very specific and detailed requirements - Mill compliance certificates are then issued to Growth after each heat of steel supplied.



### HARDNESS

Hardness defines both abrasion resistance and impact performance in our grinding media. Our process controls test for:

- ASH - average surface HRc
- AVH - average volumetric HRc



### IMPACT PERFORMANCE

Product impact performance is evaluated through our drop ball tests.



### BALL DIMENSIONS

Mass, diameter, roundness and surface appearance of every ball are closely monitored to ensure product consistency.

# GRINDING MEDIA PACKAGING



## BAGS

Balls can be provided in 1 or 2 tonne polypropylene bags fitted with secure lifting straps. Bags are strapped onto wooden 1m x 1m pallets for transport.



## DRUMS

Balls can be provided in 200 litre steel drums, which can either be directly loaded onto truck trailers or secured via strapping onto wooden pallets.



## BULK

Balls can be supplied loose in half height containers, standard 20ft. containers or via open top trucks..

# OUR GRINDING MEDIA RODS

Our grinding rods are accurately rolled for straightness and length from a special high-carbon alloyed steel to ensure maximum wear life.



## GRINDING RODS



## APPLICATION ENVIRONMENT

Media to media contact for rod mills is linear rather than point to point (as with balls) and are much heavier. The larger feed tends to separate rods at the feed end such that larger particles are preferentially abraded. This leads to a narrower size distribution and significantly less slimes compared to ball mills.

Lower critical speeds of 50 - 65 % and coarser product size (i.e. 50 mm v < 15 mm) results in a lower impact environment but decreased abrasion resistance due to the feed size.

## CHEMISTRY & HARDNESS

High carbon grinding rods are manufactured from specifically designed steel with varying alloy content to optimise the physical properties and performance of our grinding rods.

## DIMENSIONAL TOLERANCE

Growth high carbon grinding rods are produced with exacting tolerance of straightness and length.

## PACKAGING OPTIONS

Our grinding rods can be cut to any length and are supplied in strapped bundles with bundle weights or rod counts to suit customer requirements.

# TECHNICAL SUPPORT



Due to the ever-changing nature of ore types and operating requirements at mine sites, there is a constant need to fine-tune operating conditions to maximize throughput and metal recovery from the resource.

Our balls are already made to maximise wear life and minimise cost. Let us assist you to further minimise consumption, maximize throughput and increase productivity and grinding efficiency with our technical support team.

## OPTIMAL GRADE SELECTION FOR SPECIFIC GRINDING DUTIES

Ensures a low wear rate for the specific operating conditions resulting in cost minimisation.

## OPTIMAL BALL SIZING TO MAXIMISE THROUGHPUT AND FINAL GRIND

Improves productivity by optimising power usage, maximising throughput and ensuring the optimal surface area is provided to achieve the target grind size, resulting in increased revenue.

## TRAJECTORY ANALYSIS TO OPTIMISE GRINDING ACTION AND MINIMISE BALL/LINER IMPACTS

Optimising the charge motion to ensure grinding media is hitting the toe of the charge will result in the maximising of ore breakage rates and therefore mill throughput. Trajectory analysis also ensures grinding media is not being over thrown onto mill liners where the impact can lead to breakage of balls and liners therefore minimising operational cost.

## PRODUCT TRIAL DESIGN TO EVALUATE GRINDING MEDIA PERFORMANCE

Evaluating grinding media performance at full plant scale is a difficult task. Our technical staff can provide the expertise to carefully plan and design a trial process to provide the best opportunity to measure media performance.

## ADVICE ON THE DESIGN OF BULK BALL HANDLING, CHARGING AND STORAGE

Advice on the design of bulk ball handling, charging and storage - converting to bulk ball supply can provide significant savings, HSE, and environmental benefits.

## CONTACT US

### HEAD OFFICE / MANUFACTURING FACILITY

Jl. K.L. Yos Sudarso Km 10,5  
(Medan Industrial Estate 1),  
Medan 20242, Indonesia

**T** +62 (0) 61 685 0206  
+62 (0) 61 685 0207  
**F** +62 (0) 61 685 0208  
**E** enquiry@growthsteel.com

**GROW WITH US**



[WWW.GROWTHSTEEL.COM](http://WWW.GROWTHSTEEL.COM)