

**Delivering  
Optimal  
Engineering  
Solutions**



**Grinding  
Media**

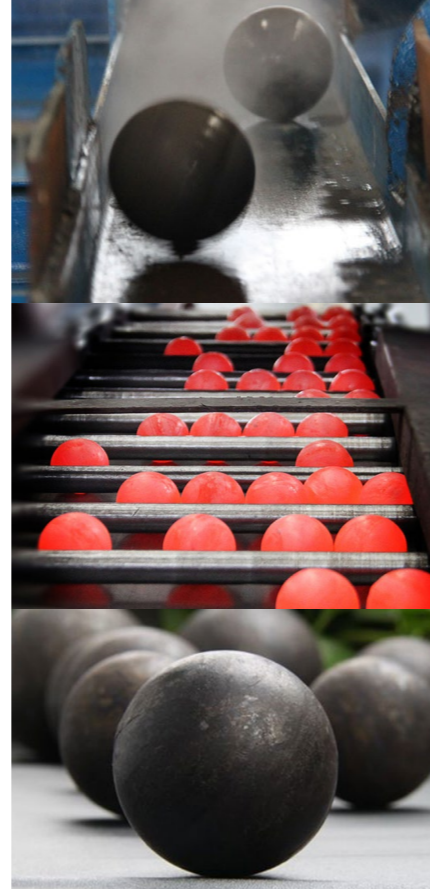
**GRADIENT  
SERVICES**

[www.gradient.net.au](http://www.gradient.net.au)

# Rolled Balls

## Reliable, High-Volume Performance

- **Advanced Manufacturing:** Our hot-rolled balls are produced using rotary cutting and roll-forging processes. This cutting-edge approach ensures uniform surface hardness (HRC 58–65) and volumetric hardness (HRC 56–63).
- **Proven in Global Mining:** Rolled steel balls have replaced traditional cast-iron balls in ball mills and are now the primary grinding medium for large-scale mining operations such as Minmetals, Shandong Gold, Zijin Mining, China Gold, BHP, Codelco, Vale, OT, and others.
- **Large Capacity & Customization:** With an annual steelmaking capacity of 500,000 tons, IRAETA sources raw materials directly from reputable steel mills in China.
- **Superior Wear Resistance:** Thanks to our advanced heat-treatment technology, rolled balls feature uniform hardness distribution and excellent impact toughness (>15 J/cm<sup>2</sup>), with a crushing rate of less than 0.5%.



# Forged Balls

## Exceptional Toughness for Larger Dimensions

- **Ideal for Special Requirements:** IRAETA forged balls are the perfect choice for diameters over 125 mm or other unique specifications.
- **Uncompromising Quality:** We have over five years of manufacturing expertise in forging technology. Each ball undergoes strict quenching and tempering processes, ensuring uniform outer hardness (HRC 58–65) and impact toughness above 15 J/cm<sup>2</sup>.
- **High Durability:** Smooth surface finish, uniform size, and excellent impact resistance. Our quality control drop-tests exceed 10,000 cycles and real-world breakage rates stay below 0.5%.



# GRINDING MEDIA

## Cast Balls

### Versatile Solutions for a Wide Range of Industries

- **Wide Applications:** Our chromium casting balls excel in powder preparation and ultra-fine powdering of cement, metal ores, coal slurries, and more. They serve a variety of industries including thermal power, chemical engineering, ceramics, paint, papermaking, and magnetic materials.
- **Proven Performance:** Casting balls maintain excellent toughness, shape retention, low wear rates, and a low crushing rate. Depending on chromium content:
  - High Chromium: 56–62 HRC
  - Medium Chromium: 47–55 HRC
  - Low Chromium: 45–52 HRC
- **Flexible Sizing:** Available in diameters from 20 mm up to 120 mm, suitable for a broad range of dry mill environments.



## Grinding Rods

### Enhanced Wear Resistance and Stability

- **Special Heat Treatment:** IRAETA grinding rods undergo a rigorous quenching and tempering process to achieve hardness levels of 45–55 HRC, delivering 1.5–2 times the wear resistance of ordinary materials.
- **Consistent Quality:** Advanced production techniques ensure straight rods, free from tapering at both ends, minimizing breakage and bending.
- **Customized Specifications:** We offer precision sizing and tailored lengths to optimize performance in your specific milling environment.
- **Cost Savings:** Excellent wear resistance and reduced breakage lower your total operational costs, while flexible order quantities help eliminate unnecessary waste.

**IRAETA**  
伊莱特股份

**IRAETA** is a leading global manufacturer of grinding media for mining. We produce hot-rolled steel balls, forged balls, casting balls, and grinding rods to meet rigorous mineral processing demands. With integrated steelmaking and advanced technology, we ensure consistent quality, large output, fast turnaround, and cost efficiency—your ideal long-term partner worldwide.

# GRADIENT

## Why Gradient

### Design and Innovation

- Local Engineers & Metallurgists
- Design & Material Improvement
- Reverse Engineering

### Processes

- Casting
- Forging
- Machining
- Fabrication
- Finishing Services

### Supply Chain

- Key Partner:
- Y&J Industries (Chengdu)
- 200+ Suppliers
- Complete Logistics
- Weekly Updates

### Quality

- Dedicated QC team
- Local & International staff
- Comprehensive NDT
- Reporting & Traceability



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