



● Mineral Technologies Worldwide

## Global Capability

Mineral Technologies delivers Iron Ore beneficiation process solutions worldwide.

Key regions that have benefited from our expertise in metallurgical testing, process plant design and product offerings include: Australia, Brazil, Canada, India, Russia and South Africa.

Our clients include many of the worlds largest Iron Ore producers :

- ArcelorMittal
- BHP Billiton
- Bhushan Power & Steel
- Companhia Siderurgica Nacional
- Essar Steel
- Ferrominera Orinoco (FMO)
- Fortescue Metals Group
- Herculano Mineracao
- Iron Ore Company of Canada
- Metalloinvest
- OneSteel
- Rio Tinto
- SNIM
- Vale
- VG Quenim
- Wabush Mines



### ArcelorMittal, Canada

ArcelorMittal's order for over 2,880 Iron Ore spirals for Mont Wright was the largest spirals order in Mineral Technologies' 70 year history. The order comprised 6 lines of wash water spiral assemblies and followed an extensive 3-year testing program. In addition to delivering spirals, Mineral Technologies also re-engineered the banks of spirals to suit specific plant requirements.



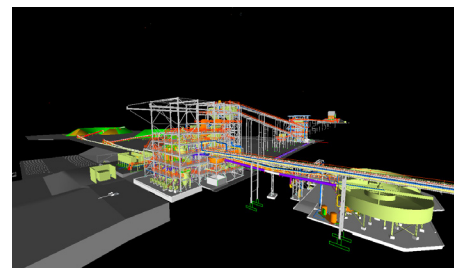
### Bhushan Power & Steel, India

Mineral Technologies supplied one of India's largest steelmakers, Bhushan Power and Steel Limited, with 960 MD Spirals configured across 40 spiral banks incorporating HG 10S 5-turn double start spirals and WW6E 5-turn double start spirals.



### Herculano Mineração, Brazil

Mineral Technologies provided a fully integrated technology package including flowsheet design, process engineering, a process guarantee, plant design, procurement support and operator training.



### OneSteel, Australia

Mineral Technologies conducted detailed metallurgical testwork evaluating numerous process options for OneSteel's Iron Baron project. This was followed by detailed design for a 1M tpa hematite beneficiation plant, processing material in the range of -32mm to +45 microns. The plant incorporates 2-stages of jigging and a 3-stage spiral concentration circuit.



# CPG Resources – Mineral Technologies

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# Iron Ore Beneficiation

**CPG Resources – Mineral Technologies**

*Leaders in Mineral Separation*



# Expertise. Experience. Superior Technology.

Mineral Technologies is a global leader in processing solutions for Iron Ore Beneficiation.



## Core Capabilities

- Testing and process design
- Process optimisation
- Engineering services
- Design, manufacture and supply of iron ore beneficiation equipment
- Equipment commissioning and training

## Testing & Process Design

Mineral Technologies undertakes professional sample and pilot plant test work for a wide range of minerals including iron ore.

Our metallurgists are experienced in the complete range of analytical, bench, pilot and industrial-scale testing using wet and dry processing techniques.

Testing services include:

- Characterisation
- Metallurgical separation testwork utilising gravity and magnetic equipment
- Bench and pilot scale crushing and grinding
- Density fractionation by heavy liquid separation and pycnometry
- Metallurgical data evaluation
- Preparation of bulk concentrates for market evaluation

## Process Optimisation

Our process optimisation services ensure operations achieve optimal results. Experienced process engineers identify bottlenecks and use detailed process flow analysis to develop circuit modifications that deliver grade and recovery improvements.

## Engineering Services

Mineral Technologies' engineering expertise can be applied to:

- scoping and feasibility studies
- capital cost estimates
- basic plant engineering
- detailed design

Our expertise covers all engineering disciplines applied to plant refurbishments and upgrades, test rigs and pilot plants, and new beneficiation plants.

Engineering design is undertaken in 3D to ensure greater accuracy and efficiency, and to minimise potential errors.

Underpinning our engineering expertise is our wet and dry, specialised processing equipment. This unique combination of services and equipment supply enables our teams to deliver plant designs of any size or complexity that go way beyond standard engineering outcomes.



## Gravity Spirals

Mineral Technologies' proprietary range of Spiral Separators is manufactured in-house using highly wear resistant polyurethane and fibreglass to deliver long wear life. The underlying quality of the metallurgical profile, materials of manufacture, manufacturing technique, quality control and ongoing after sales support, set our spirals apart from the competition and ensure both trouble free operation and optimum separation performance.

### Iron Ore Spirals Range

#### HG Series

Used for high grade feed material generally greater than 25 per cent and as high as 90% heavy mineral.

#### HC Series

These super-high capacity spirals have been specifically designed for more economical and compact plants. Some models are supplied with wash-water.

#### WW Series

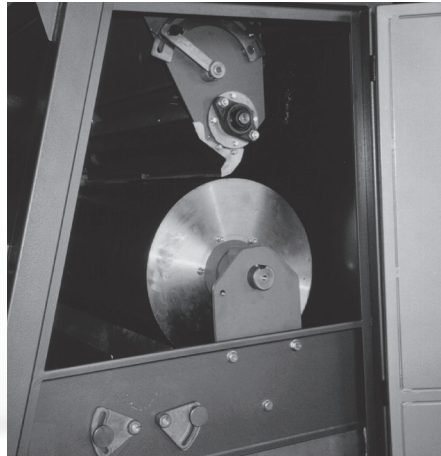
Utilises wash water addition for enhanced grade control in specific applications.

#### FM Series

This fine mineral spiral series is used for valuable heavy mineral particles in the range of 30 to 150 microns.

#### VHG Model

A recently developed model specifically designed for feeds with very high levels of heavy mineral.



## Magnetic Separators

### Rare Earth Magnetic Separators

Reading rare earth magnetic separators incorporate recent advances in magnet technology, using high quality rare earth alloy permanent magnets. These magnets, combined with innovative engineering, achieve the most effective dry separation of paramagnetic minerals at high throughput rates.

### Rare Earth Drum Separator Configurations (REDS)

Non-magnetic, middlings and magnetic retreat configurations are available in machines with 400 millimetre drum diameter and 300, 1,000 and 1,500 millimetre drum widths. These are single feed point machines with either one, two or three re-treat stages and an optional low intensity scalper drum for removal of highly magnetically susceptible minerals.

### Rare Earth Roll Separator Configurations (RERS)

Non-magnetic, middlings and magnetic retreat configurations are available in machines with 100 millimetre roll diameter and 300, 1,000 and 1,500 millimetre roll widths. These are single feed point machines with one, two or three re-treat stages and various magnet/pole ratios.

### Dry Rare Earth Drum and Roll Separators

For high efficiency dry processing when water is scarce.



### Low and Medium Intensity Magnetic Separators

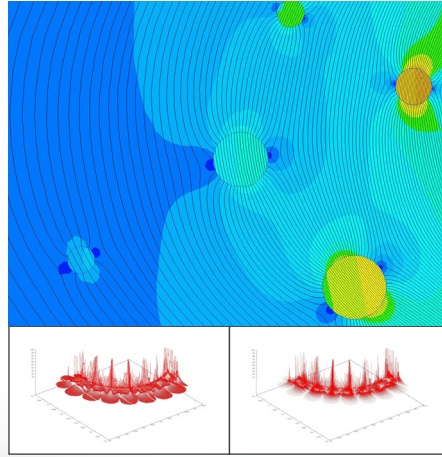
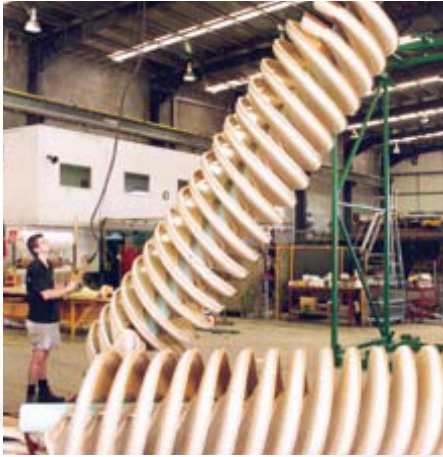
Reading low and medium intensity wet and dry drum magnetic separators can be used for the removal of highly susceptible iron ores such as magnetite.

### Wet High Intensity Magnetic Separators

Reading WHIMS provide a low cost solution for magnetic separation of fine minerals for the extraction of iron ores with low magnetic susceptibility. They afford the most efficient separation of minerals in slurry form, when drying of the material is undesirable or uneconomical.

#### Features and Benefits

- Beneficiation of iron ore fines from 10 microns to 1.5mm
- Capable of treating 160TPH per machine
- Extensive use of stainless steel to minimise maintenance
- Choice of water or air cooling of the magnetic coils
- Variable magnetic field intensity (0 – 14,500 G)
- Substantially lighter with small floor area requirement for reduced CAPEX
- Simple scale up from laboratory tests for confidence in plant performance



## Equipment Design, Manufacture & Supply

Proven technologies and experience enable Mineral Technologies to deliver the world's most technically advanced Iron Ore processing equipment utilising gravity and magnetic techniques.

Our proprietary technologies comprise the MD gravity separation range of spirals and Reading magnetic separators.

Our experience in Iron Ore beneficiation projects worldwide has resulted in new applications for equipment in the processing of iron ore. In particular, we have introduced the use of dry Rare Earth Drum and Roll separators in remote and dry environments.

Our Australian manufacturing facility houses the world's largest spiral manufacturing facility and produces over 6,000 starts annually. In 2010/11 we delivered our largest single order for spirals to Arcelor Mittal's Mont Wright Iron Ore mining operations in Canada.

## Research & Development

Our dedicated program of research and development consistently delivers state-of-the-art technology that improves separation efficiencies. Pioneering breakthroughs for iron ore beneficiation include:

- High capacity spirals enabling 40% reduction in plant footprint for the same throughput
- Modifications for high wear applications
- High capacity Readings WHIMS units offering low capital and installed costs.

## Commissioning & Training

Our experienced product and process engineers are skilled at achieving optimum performance from process equipment and operating systems, and delivering on-site training.

The commissioning process includes thorough testing of all equipment and processes to ensure mineral product achieves the target specified in the design process.

Our core capabilities include:

- Equipment and process commissioning
- Performance testing
- One-site training for operations, engineering and maintenance teams