MAGNETIC AND ELECTROSTATIC SEPARATION

SGS MINERALS SERVICES

SGS Lakefield Oretest Pty Ltd (SGS) was originally founded in 1993 as Oretest Pty Ltd. SGS has since developed into a major metallurgical services organisation located in a purpose-built laboratory in Perth, Western Australia.

The laboratory is dedicated to providing high quality metallurgical testing across the broad spectrum of the minerals industry including:

- Gold ores
- Nickel laterites
- Base metal
- Iron ore
- Mineral sands
- PGM ores
- Rare-earths and other exotics
- Diamond ores
- Environmental services

SGS provides a comprehensive range of test work capabilities including bacterial leaching, crushing, screening, grinding, ultra fine grinding, gravity, magnetic & electrostatic separation, solvent extraction, electrowinning, flotation, pressure leaching, pressure oxidation, pressure acid leach and cyanide speciation. Pre-feasibility studies, on-site diagnostic metallurgical services, environmental testing and analytical services are also included in our range of capabilities.

INTRODUCTION

Magnetic separation as the name suggests is based on differences in the magnetic susceptibility of various minerals. These range from highly magnetic (eg magnetite) through to paramagnetic (eg ilmenite) and non-magnetic (eg quartz).

Magnetic separation is a well established separation technique, and has become increasingly popular with new equipment enhancing the range of separations possible, which when coupled with generally low capital and operating costs and lack of chemicals to cause environmental concerns, often provides an attractive process.

The ease and efficiency of magnetic separation is dependent on a number of factors including relative susceptibility, particle size and shape, liberation etc, all of which affect the selection of equipment type.

Electrostatic separation is a dry separation technique, which is based on the reaction of mineral grains with differing surface conductivities when exposed to a high tension or electrostatic field. Conductor grains lose their charge, while non-conductor grains retain their charge thus bringing about a separation. The process is normally carried out at an elevated temperature and involves splitters, and either plates or rolls.

The process is commonly used in the mineral sands industry, but also has applications in the tantalum, tin and garnet industries.

FACILITIES AT SGS

SGS has a wide range of magnetic and electrostatic separators available for test work applications, both wet & dry:

Cross belt magnet

An older design high intensity electromagnet, using belts to feed the sample and lift off magnetics. Our model is a Readings 3 pole.

Induced roll magnet (IRM)

Another high intensity electromagnet, using the throwing action of a turning induced roll to separate magnetics & non-magnetics.

Rare Earth Roll Magnet

This is a permanent high intensity magnet, using a belt and the throwing action of a turning rare earth roll to separate magnetics and non-magnetics. Our model is a Magnapower, with Eriez and Readings models available.

Rare Earth Drum Magnet

This unit is a permanent high intensity magnet, using the throwing action of a turning rare earth drum to separate magnetics and non-magnetics. Our model is a Magnapower again with Eriez and Readings models available.

Wet High Intensity Magnet (WHIMS)

A wet high intensity electromagnet, using the induced matrix to capture magnetics, which are then washed off. Our models are Eriez and Readings.

Ferrous Wheel Magnet

We have a laboratory version of the Eriez Ferrous Wheel. This unit incorporates interchangeable permanent rare earth magnets and is gravity fed. Several matrix types are available for testing.

Davis Tube Separator

This is a well-known laboratory separator, using the shaking action of a tube in an electromagnetic field.

Electrostatic Plate Separator

SGS has both a single pass and multiple pass plate separators available.

High Tension Roll Separator

SGS has a single pass HT roll separator available.

Ultra Stat and Corona Stat Separator

SGS has access to these “new generation” separators, which have been proven to offer enhanced separation over previous machines.

MAJOR CLIENTS HAVE BEEN:

- Dominion Mining Limited – Balla Balla Mine Vanadium upgrading in magnetite
- Western Mining Corp. – Olympic Dam hematite recovery from flotation tailings
- Newcrest Mining Ltd – Cadia Ridgeway recovery of magnetite from flotation feed
- Kingstream / An Feng – Kooloonooka Mine production of saleable magnetite product
- BHP Iron Ore – Pilbara Ore upgrading of hematite
- Star Resources – Western Australia production of staurolite for sand blasting
- Hamersley Iron – Upgrade of low grade hematite fines stream
- Olympia Resources Ltd – processing garnet ore
- Gippsland Ltd – processing tantalum ore

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