

MAGNESITE PROCESSING

SGS MINERALS SERVICES

SGS Lakefield Orestest Pty Ltd (SGS) was originally founded in 1993 as Orestest 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

Magnesite ($MgCO_3$) is the main source material for magnesia (MgO) and magnesium metal. Traditionally, these ores have been treated by pyrometallurgical methods. Dead-burned magnesia is a basic refractory, whereas caustic-calcined magnesia, formed from cryptocrystalline magnesite is an active alkali used in water treatment, mineral processing, and in specialised cement products.

Magnesite is separated from impurities such as silica and iron by crushing, grinding, scrubbing, screening and heavy media separation or flotation. Magnesia can then be formed by calcination, or magnesium chloride (a precursor of the metal) can be produced by direct acid leaching, filtration, impurity removal and crystallisation.

FACILITIES AT SGS

The following equipment is available:

Ore Preparation

Ore preparation usually consists of some form of crushing followed by scrubbing, milling and screening to remove fine silica and iron. With certain ores, some upgrading can be achieved by classification or gravity concentration.

- Mills:
 - 500 ϕ x 1500 (5 kW).
 - 1000 ϕ x 1500 (10 kW).
- Cyclones: various sizes from 12 to 100 mm.
- Screens: various sizes.
- Gravity spirals.
- Mixing/storage: slurry tank, 10000 L.
- Trommel scrubber. 750 ϕ x 3000.



Flotation

- Continuous pilot equipment is extensive and flexible; circuits can be constructed using various configurations of flotation cells with feed rates from 50 to 150 kg/h.

Leaching and Precipitation

- Rubber-lined, stainless steel continuous leaching vessels and precipitation trains (20 to 60 L tanks)
- Large-scale semi-batch: 200 L vessels together with steam stripping and scrubber.

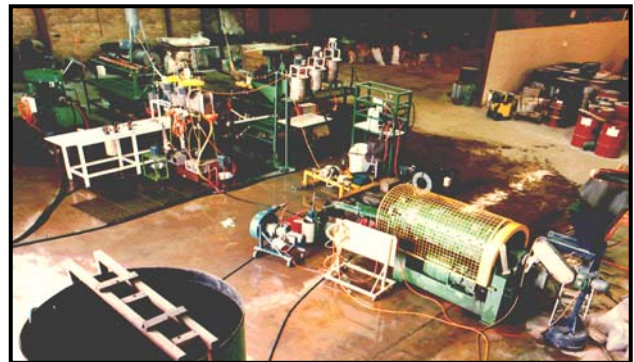


Calcination

- Rotating tube furnaces with controlled atmosphere are available for calcination.

TESTWORK COMPLETED

- Batch Beneficiation, Flotation, Calcination and Leaching; two major projects over the last two years, with individual projects extending up to six months.
- Calcination Optimisation, and Reactivity Testing for the production of active-calcined magnesia; one significant project and one smaller project in the last two years.



THE MAIN CLIENTS HAVE BEEN:

- Tasmania Magnesite
- Golden Triangle Resources
- Amalg Resources

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