

BACTERIAL LEACHING

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

Bacterial leaching or Bio-leaching is a commercial technology that exploits the natural ability of certain types of bacteria to catalyse the oxidation of sulphide minerals. Well-mixed, aerated slurries of sulphide minerals can be oxidised at temperature of about 30 – 40°C at reasonably fast rates. Bacteria are also extremely useful in heap leaching processes to assist with the oxidative breakdown of sulphides.

For a number of years SGS has been requested by various clients to establish bacterial leaching testing facilities. There are two main reasons for these requests:

- A need for an independent testing facility not associated with any processing or engineering interests.
- A need for an independent “one-stop-shop” providing facilities to test a number of alternative oxidation processes including bacteria, pressure oxidation, Activox[®] and roasting.

SGS has carried out testwork for almost all the major suppliers of bacterial leaching and bioheap leach technologies.

Facilities at SGS For Bacterial Leaching

The main facilities at SGS for providing bacterial leaching testing are:

- **Stock Cultures.** These are maintained in an incubator in special growth medium. Cultures are mixed strains adapted to various conditions of temperature, mineralogy (copper, arsenic), etc.
- **Flasks.** Small-scale batch leaching (to 1 L) can be carried out in flasks.
- **Agitated Tanks.** Batch leaching can be carried out in agitated tanks (2 L – 200 L).
- **Column leaching.** A range of column sizes is available for heap leaching testwork; e.g.

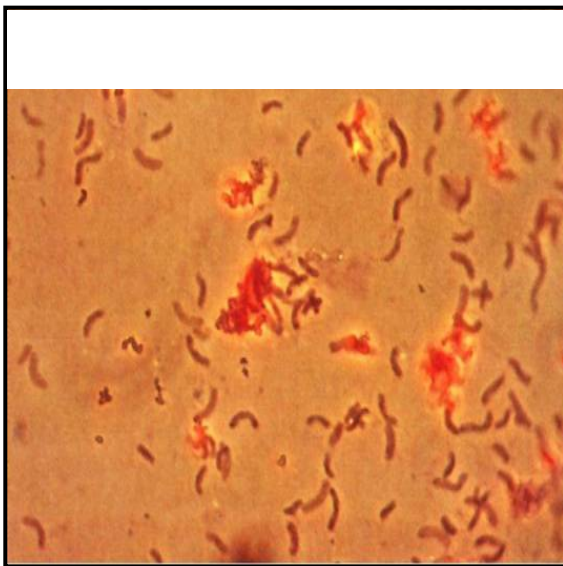


Diameter (mm)	Height (m)
100	1
140	6
150	2,3,6*
300	4
1800	8



*These columns are jacketed for temperature control.

- **Continuous leaching.** Continuous leaching can be carried out in tanks in series, (e.g. three to five stages) with approximately 0 - 1 L/h throughput.



BACTERIAL TESTWORK COMPLETED

- Leaching of refractory gold concentrates containing gold locked in pyrite and arsenopyrite (both agitated tank and agglomerated column leaching).
- Leaching of refractory gold ore containing gold locked in pyrite and arsenopyrite; (both agitated tank and agglomerated column leaching).
- Leaching of low-grade cobaltiferous ore locked in pyrite (agitated tank leaching).
- Leaching of nickel ore locked in pyrite arsenopyrite (agitated tank leaching).
- Leaching of sulphur locked in ilmenite (both agitated tank and column leaching).
- Leaching of secondary copper sulphides from low-grade ore.

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