

SPARGERS FOR AIR/O₂ INJECTION INTO CIP/CIL GOLD LEACH TANKS

Eriez Flotation Division

Delta, B.C. Canada

“The most cost effective injection system for leaching processes”

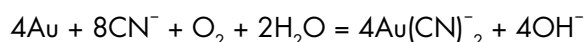
The EFD *SlamJet* gas sparging systems has proven to be highly effective in producing the optimally sized bubbles required for maximising oxygen mass transfer rates.

Benefits of the SlamJet gas sparging systems include:

- Higher dissolved oxygen (DO) levels than with conventional systems
- Most economical system available to produce these high DO levels
- Increased leach kinetics
- Increased gold dissolution rates
- Reduced cyanide consumption
- Reduced oxygen consumption (if used as a main source) to obtain higher DO than produced by air-only addition
- Improved metal dissolution
- Reduced operating and maintenance costs

THE PROCESS:

In the cyanidation process for most gold ores, metallic gold must be oxidised during the process of dissolution according to the following reaction:



The rate of dissolution may be limited by transport of either of the reagents, cyanide or oxygen, depending on their relative concentrations. In practise it is common to operate with an excess of cyanide, simply because DO levels are too low as a result of an inefficient aeration system.

THE SOLUTION:

The *SlamJet* sparger may be used to raise DO levels in the leach or adsorption tanks. Millions of micro bubbles produced by the sparger ensure rapid transfer of oxygen to the pulp.

Benefits derived from using EFD SlamJet spargers:

- Simple on-line installation
- Easy Removal and on-line maintenance
- Two-year guarantee against premature wear
- Reduced agitation power
- Increased carbon loading
- Increased throughput due to improved leach kinetics
- Improved and more uniform air/O₂ distribution
- *No high pressure recycle pumps and piping required*

SLAMJET

Automatic Gas Sparging System... the latest development in automatic gas injection technology

The SlamJet is an automatic, self-regulating gas injection system, addressing two of the most common problems associated with operating a plant, that is, fluctuating air-line pressures and power failures.

Maintaining desired flotation air bubble size is a critical parameter in obtaining optimum processing performance. The SlamJet sparger continuously self-adjusts to accommodate for supply-air pressure fluctuations ensuring consistent bubble resulting in optimum separation efficiencies.

As well, in the event of loss of air pressure, due to power failure or line bursts, the needle valve automatically "slams-shut" at the nozzle end, preventing process fluids from plugging the sparger or fouling the air-line or supply manifold.

The ceramic lined, single orifice nozzle has been proven in thousands of installations world-wide, and is thus guaranteed against wear by the best warranty system in the industry.

Benefits include:

- Improved metallurgy
- No plugging or fouling
- Reduced maintenance

SlamJet air sparger features:

- Self-adjusting air-flow control system
- Continuous pressure compensation
- "Slam" closed on loss of supply air
- Rubber tip for positive seal
- Low nozzle wear characteristics means no gradual decrease in performance
- Available in various materials for specific applications

OPERATING CONDITIONS:

The SlamJet is designed to operate at air pressures ranging up to 100psi, but typically pressures of 30 to 80psi are used in the field.

SLAMJET REMOVAL:

Removing the sparger for inspection is quick and simple, and may be removed on-line without shutting down the process.

QUESTIONNAIRE FOR AIR/O₂ INJECTION INTO GOLD LEACH TANKS

| Information Requested | |
|--|--|
| Leach process (CIP, CIL, other) | |
| Number of tanks | |
| Ore type | |
| Tonnage of ore treated | |
| Gold content (g/ton) | |
| Slurry flow rate (m ³ /hr) | |
| Recovery (%) | |
| Cyanide consumption (kg/ton of ore treated) | |
| Concentration of free cyanide in tanks (g/litre) | |
| Lead - or other nitrates, (kg/ton of ore) | |
| Air flow rate (m ³ /hr/tank) | |
| Current air injection system used | |
| Current DO levels | |
| Gauge air pressure (kPa) | |
| Plant altitude | |
| Pulp density | |
| Ore SG | |
| Tank duties: Adsorption tanks and leach tanks | |
| Tank diameters and liquid height (m) | |
| Tank material and lining | |
| Height of mixer blades from tank bottom | |

PARTIAL LIST OF EFD SPARGERS IN Ag LEACH OPERATIONS:

| Mining Company | No. of Spargers | Application | Tank Size (ø by H) m |
|--|------------------------|---|-----------------------------|
| Minera Aurífera S.A. (MARSÁ) | 10 | Leach Tank | 6 by 6 |
| Minera Aurífera S.A. (MARSÁ) | 4 | Leach Tank | 6 by 6 |
| Minera Aurífera S.A. (MARSÁ) | 8 | Conditioning tank | 1955 mm |
| Consortio Minero Horizonte | 4 | Leach tank | 6 by 6 |
| Cia. de Minas Buenaventura (Orcopampa) | 4 | Au/ Ag Leach tank | 1.8 by 7.2 |
| Mina de San Luis Corp. | 4 | Au/ Ag Leaching tank | 9 by 9 |
| Minera Laytaruma S.A. | 4 | Leach Tank | 3.3 by 4.2 |
| Lepanto Consolidated Mining Co. | 8 | Adsorption | 5.7 by 6.3 |
| Philex Gold Philippines inc. | 10 | Leach Tank | 9 by 10.5 |
| Minera Aurífera S.A. (MARSÁ) | 8 | Conditioning Tank | 30 cm |
| Cia. Minera Nukay S.A. | 4 | Conditioning Tank | 6 by 6 |
| Kinross Candelaria Mining Co. | 8 | Leach Tank | 9 by 9 |
| Minera Aurífera S.A. (MARSÁ) | 8 | Conditioning Tank | 1955 mm |
| Lepanto Consolidated Mining Co. | 76 | Adsorption Tanks Au Leach tanks | 12.3 by 12.9 5.7 by 6.3 |
| Mina de San Luis Corp. | 8 | Au leach tanks | 9 by 9 |
| Mineras Bonanza, C.A. | 23 | Ag Leaching Tank Au pre-leach tanks | 4 by 8 7 by 8 |
| CMDC/Svedala Mexico | 6 | Au leach tanks | 9 by 9 |



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