

EFD SLAMJET OXYGEN SPARGING IMPROVES GOLD LEACHING

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The dissolution of gold through cyanidation, either Carbon in Pulp (CIP) or Carbon in Leach (CIL), is an oxidizing reaction. Generally added oxygen, in the form of dissolved oxygen in solution, improves the process as the rate of gold dissolution is directly proportional to the amount of dissolved oxygen in solution. Typically oxygen may be added either as a compressed gas or as pure oxygen, depending on cost versus recovery considerations.

An important criterion in the effective mass transfer of the oxygen to the pulp is the oxygen surface area rate. Smaller oxygen bubbles have a larger surface area, compared to total volume, than do larger bubbles thus provide a greater oxygen mass transfer rate. Improving the oxygen mass transfer rate ensures that a greater amount of the available process oxygen is more effectively used within the cyanidation process.

INEFFICIENT SPARGING – LOW DISSOLVED OXYGEN LEVELS

One method of injecting oxygen into the leaching process, i.e. leach tanks, is through sparging. Rudimentary sparging systems, i.e. simple air pipes, perforated pipes, punctured rubber sleeves, air blowers, typically produce large bubbles. Those larger diameter bubbles effectively result in comparatively less bubble surface area, leading to a reduction in the oxygen mass transfer rate which typically results in a much less efficient cyanidation reaction and losses of available oxygen.

Additionally poorly designed aeration systems can lead to other inefficiencies:

INEFFECTIVE AGITATION – REDUCTION OF SOLIDS IN SUSPENSION

Generally, leach tank agitators are designed to keep the pulp in motion, i.e. down the centre, out to the wall and up the tank sides. In some leach tanks air blowers introduce air flow below the agitator blades which can cause an erratic slurry flow and inefficient mixing. In an effort to improve mixing the air flow is typically increased. In some applications increased air flow can lead to cavitation around the agitator blades actually reducing effective pulp mixing and suspension, resulting in a gradual deposition of solids at the bottom of the tank.

INCREASED COSTS – HIGH POWER USE AND HIGH MAINTENANCE

Rudimentary spargers are prone to early failure and more critically partial plugging which ultimately leads to uneven air distribution around the agitator blades. The resultant ‘air burping’ often leads to unbalanced rotation of the agitator blades which can cause both higher power consumption and premature failure of the agitator shaft and bearings. This can become a very costly maintenance exercise particularly as it is often necessary to bypass and drain the leach tank in order to carry out the required repairs and maintenance.

SLAMJET SPARGERS – IMPROVE OXIDATION AND REDUCE COSTS

EFD SlamJet spargers are being used extensively to inject air or oxygen into leach tanks to improve cyanidation. SlamJet sparging systems effectively address and overcome both low dissolved oxygen levels and poor agitator performance.

- Extremely small bubbles generated by SlamJet spargers provide higher mass transfer rate of oxygen to the pulp, resulting in increased dissolved oxygen levels and by extension, improved cyanidation kinetics
- Sparging near the leach tank walls enhances the natural circulation pattern required from the agitator, reducing the probability of solids deposition
- Removing the air from under the agitator blades allows the agitator to function more effectively which in turn leads to more economical power consumption, reduced shut-downs for maintenance and longer operating life.

Summarizing, operators have indicated very real benefits from using EFD SlamJet oxygen spargers specifically:

- Improved leach kinetics
- Higher extraction of gold and silver
- Reduced cyanide consumption
- Higher plant throughput



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