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Tailings - Paste Thickening

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The WesTech **Deep Bed™ Paste Thickener** produces non-settling and non-segregating underflow with the maximum rheology (density) possible. WesTech is a leader in paste technology with diverse application experience and a large installation base. Our Deep Bed™ paste thickeners maximize water recovery, enable surface stacking, reduce tailings impoundment size, improve CCD circuit product recovery, all while reducing environmental impact.

Tailings Paste Thickening

The advantages of paste thickeners in tailings circuits have been well-established for most minerals. The type of paste thickener underflow generally used for surface stacking of tailings is called “thickened tailings.” Thickened tailings are a suspension of solids which are relatively non-settling and non-segregating and which have a higher concentration and viscosity than that of conventional tailings.

Common applications include a thickener with underflow pumps that are typically centrifugal and transfer pumps that can be either centrifugal or positive displacement.

Paste vs. Conventional

Paste thickeners thicken tailings to higher underflow solids concentrations than conventional and high-rate thickeners. For example, a tailings stream in an iron ore application could be thickened to 45–50% solids Newtonian slurry in conventional or high-rate thickeners. Conversely, the same tailings stream could be thickened to 65–70% solids non-Newtonian suspension using a paste thickener.

Water Recovery

Increased water recovery is important to many countries throughout the world due to the scarcity of fresh water. The more water that can be recovered from a tailing stream and, in turn, used again upstream in the plant reduces the amount of fresh water a mine needs. The cost of water is frequently one of the primary drivers for implementing a thickened or paste tailings disposal system.

Stacking

Surface stacking is the disposal of tailings on the surface of the ground. As a non-settling, non-segregating suspension of solids, minimal water is released into the impoundment and the stacked tailings dries significantly faster than conventional ponds where fines (slimes) segregate and can seal the surface of the deposit, preventing drying.

Stacking as a method of tailings disposal offers significant advantages over ponding. These advantages include: smaller impoundment area, less water in the pond, improved water or chemical recovery, a lower risk of containment breach, less groundwater contamination, and easier final reclamation of the site.

Extend Pond Life

When tailings ponds reach their capacities, the construction of a new dam is usually the solution for the deposition problem. This solution is very expensive and is not always an option if there are environmental, licensing and space constraints.

By utilizing a paste thickener, the thickened tailings stream is deposited into the existing pond, increasing the life of the impoundment. The existing free water in the pond will be displaced and available for recovery and the higher concentration and drying properties of the paste will take up less space, extending the life of the pond.