

**WESTECH**

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The WesTech **Deep Bed™ Paste Thickener** represents state-of-the-art design for alumina settlers and washers. Paste thickeners produce red mud underflow at densities much higher than conventional high-rate thickeners. This higher density reduces the number of washing stages and wash water flow rate, minimizes residence time to reduce scale precipitation, and produces low soda losses. The final washer thickens to concentrations suitable for stacking, which simplifies impoundment design and extends the life of the impoundment.

Alumina Circuit

The process of refining bauxite to produce alumina (the Bayer process) can traditionally be considered in the following steps:

Extraction → Precipitation → Calcination

Extraction

Bauxite ore is crushed and milled to reduce the particle size, making the extraction step more efficient. The crushed and milled ore is then combined with spent liquor and makeup sodium hydroxide (caustic) and sent in slurry form to heated pressurized digesters where the aluminum-bearing minerals are dissolved.

Hydrocyclones are used to desand the digested slurry. The insoluble bauxite residue (red mud) is separated in hydrocyclones from the aluminum-containing liquor. The overflow from the hydrocyclones is sent to paste thickeners to thicken the solids and recover the liquor. The liquor is sent to the liquor filters and then to the precipitation step.

The red mud is further thickened and washed with fresh water in multiple stages using a countercurrent decantation (CCD) process to recover the caustic and any remaining alumina content. The red mud from the final CCD stage is then collected as a paste and sent to a disposal site, thus eliminating tailings ponds.

Precipitation

The cooled and filtered pregnant supersaturated liquor from the settler is sent to a series of alumina hydrate precipitation tanks. To promote the alumina hydrate precipitation, the liquor is seeded with alumina hydroxide crystals.

The hydrate crystals are classified in hydroseparators to produce a coarse product fraction and a fine seed fraction. The resulting crystals are collected and sent to the next step in the recovery process, while the fine seed fraction is filtered and used as seed in the precipitation stage.

Calcination

The coarse aluminum hydrate crystals are filtered and washed over a horizontal belt vacuum filter to remove contaminating process liquor. It is then calcined to produce the final product, alumina.