PINNED BED CLARIFIERS

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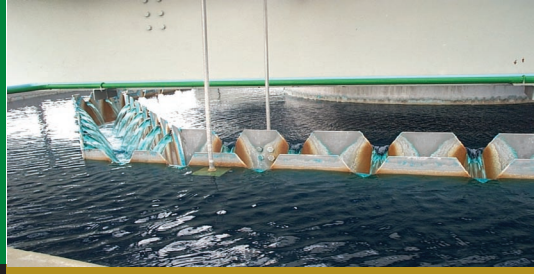

Clarification

A technology for polishing feed solutions for solvent-extraction plants.

The Delkor Pinned Bed Clarifier is a unique process for hydrometallurgical plants where solution clarity is important. Offering very low suspended solids counts in the overflows, the clarifier regularly achieves clarities of less than 50ppm solids, and even as low as 20ppm.

Each clarifier comprises a cylindrical tank, conical tank bottom, feed well and screen. A narrow aperture wedge wire screen is fitted inside the tank just below the overflow launder with a centrally located circular vacancy to accommodate the feed well. The feed well is inserted through the centre of the screen down to the level of the back flush pipe, which is located just above the junction of the tank's cylindrical and conical sections. When liquor containing less than 5000ppm flocculated solids is fed into the feed well of the clarifier, the low density polystyrene beads, which are situated between the outside of the feed well and the inside of the tank wall are pinned against the screen by the up flow of the liquor and form a 'pinned bed'. Fine flocculated solids in the liquor soon aggregate as a further layer below the pinned bed. This bed of agglomerated flocculated solids is extremely effective in trapping further fine solids rising with the liquor in the clarifier, thus performing the polishing filtration action.

Faster settling solids, which are present in the feed, are withdrawn through the base of the cone after a suitable amount of solids has accumulated at the tank bottom. Upon bed breakthrough or high differential heads between feed well and tank fluid levels, the bed is flushed, without interruption to the feed. The flushing action, which is provided by draining of the vessel fluid through the back flush pipe, results in the rapid expansion of the pinned bed of beads and the resultant flushing of the flocculated solids, which have broken through the pinned bed.

After a site-determined flush time, flushing is stopped. The pinned bed is re-established and the process described above is repeated, with acceptable overflow clarities being established quickly.

Benefits

- Robust and stable performance
  - An auto regulatory process capable of handling wide ranges of flows and solids in the feed liquor without close supervision
- Many and varied operating benefits
  - Extremely low crud formation in solvent-extraction circuits fitted with the pinned bed clarifier
  - Low solids-residence times, minimising slimes build-up
  - Optimal usage of chemicals, such as flocculants
  - On line backwashing
- Simple, yet effective clarifier design
  - Small footprint
  - Low comparative capital expenditure
  - No moving parts, virtually eliminating the need for maintenance

Applications

- Cu / Co PLS Clarification
- Gold Merrill Crowe Clarification
- Uranium PLS Clarification
- Au Scrubber Off gas Clarification
- Zn PLS Clarification

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