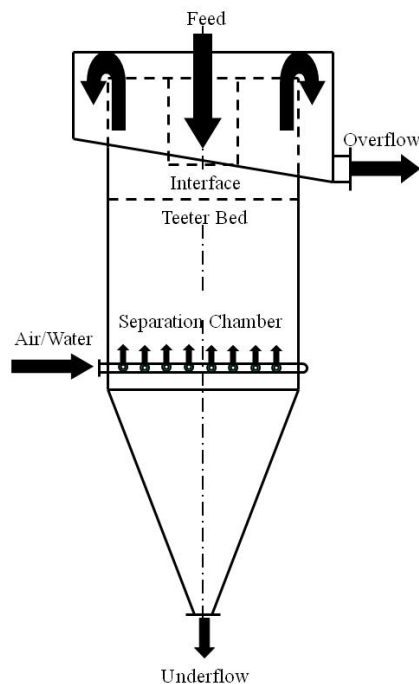




HydroFloat – Coarse Particle Flotation

In order to effectively recover coarse particles, Eriez Manufacturing has combined the advantages of traditional teeter-bed separators with the selectivity of flotation cells to develop a new separation device, the HydroFloat separator.

The HydroFloat separates particles based on the apparent density differences between hydrophilic particles and particle-bubble aggregates after the selective attachment of air bubbles to the hydrophobic component of the feed stream. An operating HydroFloat (fig. 1) consists of: an upper separation chamber and a lower dewatering cone. Pulp feed enters near the top of the separation chamber.



Operating like a conventional hindered-bed separator with the pulp feed settling against an upward current of fluidization (teeter) water, flowing from a network of pipes (teeter ring) that extend across the bottom of the entire cross-sectional area of the separation chamber. Additionally the HydroFloat, is continuously aerated by injecting compressed air and a small amount of frothing agent into the fluidization water. The air is dispersed into small bubbles by circulating the water/air mixture through a high-shear mixer, in a closed loop configuration with a centrifugal pump, prior to entering the teeter ring.

Rising air bubbles will attach to the hydrophobic particles and reduce their effective density. While the lighter bubble-particle aggregates rise to the top of the denser teeter bed and overflow the top of the separation chamber. Hydrophilic particles that do not attach to the air bubbles settle down in the teeter bed and are eventually discharged at the bottom of the dewatering cone.

Retro-fitting pneumatic rougher cells for coarse phosphate, HydroFloat separators, in a single stage, and at an obtainable feed rate of 20 tph/m², were able to; achieve 40 per cent BPL (?)



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recovery increase; treat almost 60 per cent more material and reduce collector consumption by almost 40 per cent.

HydroFloat Advantages:

The HydroFloat separator is both a flotation device and a density separator, which combines the advantages of both froth flotation and gravity separation. For treating coarse particles, the advantage of the HydroFloat cells over traditional flotation processes includes:

Enhanced separation recovery

The use of fluidization water in the Hydrofloat cell can keep particles dispersed in suspension without the intense agitation required by mechanical flotation machines. Consequently, the reduced cell turbulence will decrease the centrifugal force that pulls the particle away from the attached bubble surface, decrease the probability of bubble-particle detachment, and so promote the flotation recovery of the maximum particle size limit.

Higher throughput capacity

The presence of the high-solids teeter bed reduces the turbulence commonly associated in traditional flotation units and therefore enhances the buoyancy of the particles. The teetering effect of the hindered-bed relinquishes the need for bubble-particle aggregates to have sufficient buoyancy to rise to the top of the cell. The low density agglomerates can easily overflow into the product launder. Consequently, the teetering increases the separation capacity.

Reduced reagents and air consumption:

The teeter bed in the Hydrofloat cell can act as an air distributor, which may decrease the probability of air bubble coalescence and reduce the frother consumption. Separation can be achieved even if the buoyancy of the bubble-particle aggregate is too small to lift the particle load, indicating that the diameter or number of air bubbles required to float a given particle can be greatly decreased.