

Capiro Flotation Mechanism – Proven Performance

Technical overview of the Capiro flotation mechanism, combining proven flotation heritage with refined hydrodynamics, robust materials, and effective particle suspension.



1. Technology Background

The Capiro flotation mechanism is based on a well-proven impeller–stator concept historically known in the industry as the Aker Flotation Mechanism. This mechanism was widely implemented in industrial mineral processing and demonstrated stable operation, high recovery, and low specific energy consumption across a broad range of applications.

Subsequent industrial deployment and further development, including versions marketed by Minpro, established the mechanism as a robust and versatile flotation solution. Capiro builds on this foundation by refining the hydrodynamic principles responsible for air dispersion, bubble generation, slurry agitation, wear performance, and energy efficiency, resulting in improved performance while preserving the robustness of the original concept.

2. Strong Bottom Agitation and Particle Suspension

A defining feature of the Capiro impeller design is the strong agitation generated in the lower part of the flotation cell. This agitation ensures that coarse and high-density particles remain fully suspended and are continuously transported into the active flotation zone. Effective bottom agitation prevents sanding and particle settling, reduces the risk of dead zones, and maintains uniform slurry density throughout the cell. This is particularly important in applications involving coarse particles, high pulp density, or variable feed conditions.

3. Free-flow stator design and low energy consumption

The Capiro flotation mechanism features a free-flow impeller–stator design with low hydraulic resistance to slurry flow. The stator provides the required shear for effective bubble generation while allowing the slurry to pass with minimal restriction.

By reducing pressure losses across the stator, unnecessary energy dissipation is avoided. This free-flow characteristic contributes directly to low specific energy consumption, even while maintaining strong bottom agitation and efficient air dispersion.



4. Balancing Agitation and Air Dispersion

While strong agitation is essential for suspension, flotation efficiency depends on the quality of air dispersion. Capiro balances agitation and air control so that energy is used both to keep particles suspended and to generate fine, uniformly distributed bubbles.

5. Micro-Shear Air Dispersion Technology

Air is transported smoothly along the low-pressure side of the impeller blade, divided into multiple streams at the blade outlet, and subjected to controlled turbulence immediately before the stator. High local shear at the stator breaks the air into a large population of small bubbles.

6. Polyurethane Impeller – Documented Extreme Wear Resistance

The impeller is manufactured from a specially selected polyurethane quality combining abrasion resistance and elasticity. In a Swedish mining operation with extremely high wear rates, conventional impellers were replaced every two months. Minpro polyurethane impellers, made from the same material quality used today by Capiro, were inspected after two years of continuous operation and showed only minimal wear, demonstrating an order-of-magnitude improvement in service life.

7. Operational Benefits

The combination of strong bottom agitation, fine bubble generation, and exceptional wear life results in stable operation, reduced maintenance, lower operating costs, and consistent flotation performance over time.

8. Cell Sizes and Scalability

Capiro flotation cells are documented up to 110 cubic meters. The same hydrodynamic and mechanical principles are scalable, and cell volumes on the order of 200 cubic meters are considered technically feasible.

Conclusion

Capiro delivers a flotation mechanism that combines strong particle suspension, controlled air dispersion, long component life, and proven industrial heritage. The result is reliable performance across a wide range of minerals and operating conditions.

