

# COLUMN FLOTATION

## THE COLUMN FLOTATION ADVANTAGE

Flotation columns work on the same basic principle as mechanical flotation equipment – mineral separation takes place in an agitated and/or aerated water mineral slurry where the surfaces of selected minerals are made hydrophobic (water-repellent) by conditioning with selective reagents. However, in column flotation, there is no mechanical mechanism causing agitation and separation takes place in a vessel of high aspect ratio (the cell height is much greater than the cross section of the cell). Air is introduced into the slurry through spargers creating a countercurrent flow of air bubbles. Column flotation offers many advantages including:

- Improved metallurgical performance
- Improved control
- Less energy consumption
- Reduced footprint
- Reduced capital requirement

SGS's column flotation cells are used in various applications – cleaning, roughing, and scavenging. However the main purpose of the column cell is to improve the final concentrate grade to a level that would not be possible using only conventional flotation. In many cases, the use of column flotation enables a concentrate to achieve separation that is closer to perfect than any other type of froth flotation device.

The true advantage of the column comes in the form of profitability. Columns allow mineral processing plants to achieve higher profits for their concentrate by purifying concentrates, lowering shipping costs, decreasing plant footprint and lowering smelter penalties. This solution is also very low risk since flotation is the most widely used method to clean concentrates.

## COLUMN OPERATION

The column achieves efficient separation and high upgrading mainly by two methods. Firstly, by using wash water, entrained minerals can be washed from the froth before reporting to the concentrate. Secondly, columns achieve high froth levels that encourage draining and dampening of entrainment caused by high gas rates.

Columns cells also differ in the way gas bubbles are generated. Air is either injected directly into the cell with use of internal spargers, or is carried into the cell through a high velocity recirculated stream of tailings. The air input can then be controlled depending on concentrate grade or varying throughputs.

## DESIGN & SUPPLY

SGS Minerals Services provides all the advantages of a single source for design and supply. Yet we go one step further by fabricating the columns near the mine site. We take full responsibility for your flotation project. Rely on our extensive experience in integration, engineering, fabrication, instrumentation, and commissioning. You can count on a worry-free start-up that is on time and in budget.



### CIRCUIT DESIGN & SCALE-UP

Our team puts their unsurpassed knowledge of flotation circuit design to work for you. We combine new and conventional technologies to assure you the best results at the lowest possible capital and operating costs.

You get a custom design incorporating column flotation cells of the proper size, number, and configuration. Our design will assure you'll meet the grade and recovery targets required by your operation. We use the most comprehensive and reliable column flotation scale-up simulator in the world. This exclusive design tool incorporates over 15 years of fundamental research and twenty years of circuit operations experience.

SGS Minerals Services provides unique designs for gas injection spargers, feed distribution, froth removal, process control, start-up and shut-down. This assures you of the highest caliber flotation vessel.

SGS Minerals Services has been involved in the design and construction of over 150 columns (including contact cells) across the world.

### CONTACT INFORMATION

Email us at [minerals@sgs.com](mailto:minerals@sgs.com)  
[www.sgs.com/mining](http://www.sgs.com/mining)

### SGS MINERALS SERVICES HAS BROUGHT MANY 'FIRSTS' TO THE FLOTATION INDUSTRY

- The first computer controlled multi-column/mechanical cell portable pilot plant for on-site evaluation of flotation circuits.
- The first proper model of column flotation for understanding scale-up.
- The first waterless jet action sparger (both variable gap and fixed orifice) which, in conjunction with scale up technology above, was the most significant innovation in making columns mainstream technology.
- The first successful application of expert process control of a large copper flotation plant based on froth vision systems (Escondida).