SOMERSET INTERNATIONAL

COPPER

Ultra-fines Processing, Tailings Dewatering, and Process Enhancement

info@somersetint.com | www.somersetinternational.com

INNOVATION IN RESOURCE AND TAILINGS MANAGEMENT

Somerset International develops and applies innovative technologies to enhance efficiency and sustainability in the mining sector. Specializing in mineral processing and resource recovery, Somerset employs advanced methods to maximize mineral extraction and recovery while minimizing waste and environmental impact. Somerset's world-leading expertise in tailings dewatering and management delivers responsible handling of mining by-products, reducing waste and ecological risks. Somerset enhances operational efficiency, reduces costs, and boosts productivity through tailored, performance-driven solutions. Somerset offers comprehensive services incorporating design, installation, operation, and maintenance delivering long-term value for our valued customers globally.

CLASSIFICATION TECHNOLOGY

Somerset's patent-pending SUB325® classification system significantly enhances mineral processing recovery through precise particle size classification down to < 4 µm. This advanced technology can be utilized to remove unwanted gangue material, thereby enhancing plant beneficiation, and to recover ultra-fine valuable resources and minerals that are typically discarded with tailings.

TAILINGS MANAGEMENT SYSTEM

Somerset's SUB325® Tailings Management System revolutionizes tailings management by maximizing resource recovery and minimizing environmental impact. Somerset's patented solid bowl centrifuge technology enables efficient solid-liquid separation, water recovery, and dry tailings disposal. The system's modular design can be readily applied to meet specific tailings duties across different sites, reducing or removing the need for traditional, environmentally risky wet tailings dams. With ongoing process development, the system is adaptable to a range of minerals, such as coal, phosphate, iron ore, copper, PGMs and gold.

SOMERSET OPERATIONS

Somerset operates and maintains resource recovery and Tailings Management Systems globally with > 95% availability for reliable performance. The modular design allows for cost-effective solutions which can be readily adapted to meet plant requirements and expanded as needed. Somerset's systems, produce low moisture cake with excellent handling properties. Somerset's Tailings Management System provides significant savings in capital expenditure (CAPEX), operational expenditure (OPEX), and footprint compared to conventional dewatering methods. With decades of experience in the mining industry, Somerset's team maintains an exemplary safety record at all locations. Somerset offers innovative and flexible commercial arrangements including investing in, operating, and maintaining systems under performance-based service agreements to meet our customers' requirements.

CHALLENGES IN COPPER PROCESSING

- Contamination of flotation concentrates by hydrophobic gangue minerals such as talc and clays pose a significant challenge. Conventional chemical methods used for talc depression are often expensive and inefficient, leading to lower concentrate grades and increased smelting costs.
- Conventional slurry tailings disposal in copper processing presents substantial ESG risks, with water scarcity in arid regions being a critical challenge.
- Reprocessing copper oxide tailings presents several challenges, including fine particle management, complex mineralogy, and water-related issues. These difficulties often lead to unfavorable economic outcomes, with low copper grades and high acid consumption being significant obstacles.

TECHNICAL SOLUTION

Somerset's technology focuses on ultra-fine contamination removal, process enhancement, and tailings dewatering systems.

- Somerset's technology removes ultra-fine talc and clay particles prior to flotation, eliminating the need for chemical talc depression in Copper/Molybdenum flotation. Removing talc offers several benefits: improved metal grade and recovery in concentrates, reduced smelting costs, and increased throughput in existing operations.
- Somerset's advanced SUB325® dewatering technology achieves 99% solids recovery from copper tailings, returning clean water for reuse and reducing environmental impact, promoting sustainable copper mining.
- Upgrading historic tailings using the SUB325® classification system can enhance the economics of direct leaching by increasing copper feed grade, reducing acid consumption, and optimizing throughput, which directly impacts capital investment.

CASE STUDY

- Somerset has developed systems to extract copper from low-grade historic oxide tailings in Zambia. By upgrading the feed material through classification, we can improve the economics of direct leaching.
- Enhancing copper processing involves increasing the copper grade by concentrating ultra-fines in the feed material, reducing acid consumption required for leaching, and optimizing capital investment by minimizing the scale and cost of downstream hydrometallurgical processes.

Economics (US$/ton Cu)	Unclassified	Classified
CAPEX	18,400	16,400
OPEX	5,054	3,947

Pricing assumption (US$/ton)	
Copper	9,677
Acid	150

- Somerset's innovative technology enhances the recovery of ultra-fine minerals from tailings, minimizing mass generation and chemical usage. This significantly improves economic feasibility by achieving an increase in leachable copper, resulting in a reduction in capital investment and a decrease in operational expenditures.