emew clean technologies

Advanced liberators for copper refineries

Advanced emew cells significantly improve performance, byproduct credits and control of copper liberators.

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Some of the key benefits of using emew for copper refinery liberator circuits include:

- Continuous and easy control of copper concentration
- Recycling of acid
- Reduction of effluents and recycles
- Lower operating cost and working capital
- Production of high purity (>99.99%) copper cathode
- Reduction in acid consumption
- No lead anodes to dispose of
- Small and compact footprint
- MCDR process control to optimize performance
- Flexible operation to handle electrolyte change
- Improved health and safety performance

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Lower Operating Costs

- N o copper sludge produced
- Less inventory
- Lower recycles
- Less off-spec copper to anode furnace and smelter
- Lower ventilation requirements
- Low maintenance
- Nickel by-product credits

Improved Copper &Impurity Control

- Bleed impurities to emew
- Recover copper &nickel as saleable cathode
- High quality cathode from high impurity solutions
- Maximum Current Depletion Rate (MCDR) linked with emew copper monitor

Health and Safety Benefits

- No black copper/arsenic laden sludge
- No arsine or acid mist
- No lead anodes

Enhanced Profitability

- More saleable copper cathode
- Convert existing liberators to refining cells
- Lower working capital

Improved Mass Transfer

- Improves cathode purity
- Improves cathode strength
- Improves current and energy efficiency
- Improves control over a range of copper concentration
- Eliminates dead zones

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emew vs conventional copper liberators

Criteria	emew Cu Liberator Circuit	Conventional Cu Liberators
Technology	emew and Acid	Conventional electrowinning and Effluent Treatment Plant (ETP)
Products	Saleable copper cathode, acid for recycle to refinery, saleable nickel cathode	Off-spec copper cathode, tertiary liberator sludge, crude copper/nickel sulphate, black acid
Current Efficiency	90–95% current efficiency in emew cells	~ 60% current efficiency in liberator cell
Power Consumption	High current efficiency, 50–60% power reduction	Low current efficiency, high power consumption
Material Requirements	Stainless steel starter sheets, titanium anode	Pure copper starter sheet, lead for anode, and cell lining
Safety	No toxic gases or acid mist, no liberator sludge	Tertiary liberator sludge to clean out, carcinogenic acid mist, potential for arsine gas production
Waste Generation	Very minimal	Liberator sludge (hazardous waste) with 55–65% copper, copper/nickel sulphates, black acid, lead anodes
Recycle Load	Low recycle load due to high first pass copper recovery, purified sulphuric acid back to refinery	High recycle load due to copper sludge recycled back to smelter and anode copper to anode furnace
Environmental Concerns	Acid is recycled, little waste generation, reduced effluent load, eco-friendly	H_2SO_4 to ETP, consuming carbide sludge, generates solid gypsum sludge, acid mist
Expansion Capacity	Can convert existing liberator cells into refining cells to increase refining capacity, modular set up	Challenging for brownfield
Control	MCDR optimizes process, emew is partially manual	Manual
Nickel Recovery	Saleable nickel cathode	Crude nickel sulphate (waste product)
Copper Product Quality	~ 80% is LME Grade Cu ~ 20% is >99% Cu	Copper deposits are high in impurities, ~ 60–90% Cu
[Cu] Required for 99.99% Cu Product Purity	> 10 g/L	> 35 g/L
Payback	< 12 months	> 2 years

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