

Copper SX/EW Basic Principles and Detailed Plant Design

Basic Process

Key SX functions

- Simplified flowsheet
- Simplistic chemistry & Implications
- Applications
- History

Reasons for Growth

Alternative Processes

- Precipitation of cement copper with scrap iron
- Direct electrowinning
- Copper powder production
- Copper oxide production
- Cuprous chloride precipitation
- Precipitation of copper sulphide with H₂S or sodium sulphide
- Replacement of SX by ion exchange (IX)
- Replacement of EW by copper sulphate production

Organic Liquids in SX

- Extractants
- Modifiers
- Diluents
- Organic stability
- Organic selectivity

Typical Flowsheets

- SX
- EW
- Ancillary facilities:
 - Crud treatment
 - Solutions holding tank
 - Reagent facilities
- Variations in SX circuits:
 - Series-parallel
 - Split circuit

SX Contactors

- Mixer-Settlers:
 - Types used for commercial copper SX
 - Types used for commercial non-copper SX
 - Types piloted for copper SX
- Column contactors
- Centrifugal contactors

SX Ancillary Facilities

- SX Crud
- Clay treatment of organic
- Electrolyte clean-up
- Loaded organic clean-up
- Raffinate clean-up

SX Fire Protection

At ALTA 2017 this section of the course will be presented by Larry Moore, FM Global (USA). Larry brings his considerable expertise and experience in this area, covering the topics of:

- Loss case studies
- Inherent safe design
- Fire prevention systems
- Fire protection systems

Copper SX/EW Basic Principles and Detailed Plant Design (cont)	
EW Cells	<ul style="list-style-type: none"> • Principle of Operation • Alternative Designs • Anodes and Cathodes
EW Materials Handling	<ul style="list-style-type: none"> • Harvesting • Washing and stripping • Sampling, weighing, and banding
EW Ancillary Facilities	<ul style="list-style-type: none"> • Rectiformers • Acid mist control • Iron control
Plant Arrangement and Layout	<ul style="list-style-type: none"> • Key Considerations • Various SX Arrangements • Various EW Arrangements
Materials of Constructions	<ul style="list-style-type: none"> • SX area • EW area
Testwork	<ul style="list-style-type: none"> • Overall test program strategy • Leach solution samples • SX test procedures
Scale-Up and Design Criteria	<ul style="list-style-type: none"> • Recommended Guidelines for Scale-Up • Typical design criteria
Plant Operation	<ul style="list-style-type: none"> • Operating characteristics • Personnel • Instrumentation/Controls • Sampling/Analytical
Performance and Risk	
Industry Trends	
Example Plant Design	<ul style="list-style-type: none"> • Plant Design Criteria • Basic Process Design Calculations • Mixer-Settler Design • EW Cell Design • Tank and Pond Design • Other Equipment Design • Plant Arrangement • Engineering Notes • Equipment List • Design Sketches
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SHORT COURSES

Course Outlines

- Fire protection systems