

## Chloralkali technology

### Proven chloralkali plant specialists

Chemetics' chloralkali plant design combines proven technology with experienced engineering backed by close technical support to ensure security of product supply and a long plant life.

Chemetics is a leader in the supply of chlor-alkali plants working closely with its customers over the life of their projects to define and design optimum chlor-alkali production facilities. The finished product is a plant which is safe, reliable and efficient. Particular emphasis is placed on optimizing capital and operating cost. The plants include numerous innovative features unique to Chemetics' designs.

A chloralkali facility consists of three main areas: brine preparation and purification; electrolysis; and product handling.

The brine system is a critical part of the membrane cell chloralkali plant – it must produce extremely pure, nearly saturated brine, on a consistent basis. Chemetics has the know-how, technology and experience to design and supply a modern, reliable and efficient brine

treatment system specifically tailored to each customer's salt supply.

The long term performance of the plant depends upon maintaining brine impurities at a low level. Salt is dissolved and the saturated brine is purified by a two-stage brine purification process. Purification uses an optimized method of precipitation treatment followed by ion exchange to remove brine impurities.

In the electrolysis area, the saturated brine is converted to chlorine and caustic in a divided electrochemical cell using direct current. Chlorine gas evolves at the anode electrode while hydrogen gas and hydroxyl ions are generated at the cathode. A fluoropolymer membrane selectively permits the sodium ions to pass through from the anode to the cathode to combine with the hydroxyl ions to form caustic soda. A number of cells connected in a series is commonly referred to as an electrolyzer.

Chemetics works closely with the major international electrolyzer equipment suppliers to configure an optimum cell room design for the customer's exact requirements. Chemetics is experienced with monopolar and bipolar membrane electrolyzers, diaphragm cells, and mercury cells.

Chemetics is an active member of the Chlorine Institute which meets at least twice a year on issues related to industry stewardship, safety, design, and plant operation. All of Chemetics designs adhere to Chlorine Institute guidelines, thus chlorine processing, storage, and handling systems meet or exceed regulatory requirements. In addition, every Chemetics supplied plant undergoes a rigorous hazard and operability study (HAZOP) to identify and correct potential safety and operational issues during the early stages of design.

Chemetics has been successful in assisting our valued customers in leveraging a competitive advantage by supplying safe, reliable, and price competitive plants throughout the world for close to 40 years. Chemetics, with its in-depth technical expertise and experience in chlor-alkali technology, plant design, and project execution has what it takes to deliver successful projects on time and within budget to meet or exceed customer expectations.

Chloralkali plant



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#### **Brine area**

- Salt storage and handling
- Brine preparation
- Primary brine purification
- Treatment of brine sludge
- Sulphate removal using Chemetics' patented SRS system
- Removal of chlorate from brine
- Removal of mercury from brine
- Secondary brine purification with ion exchange
- Primary brine dechlorination
- Secondary brine dechlorination

#### **Electrolyzer area**

- Complete cell room basic and detail engineering for:
  - New greenfield installations
  - Membrane plant expansions
  - Monopolar to Bipolar conversions
  - Plant modernizations
  - Mercury cell conversion and/or expansion
  - Diaphragm cell conversion and/or expansion

#### **Chlorine area**

- Cooling (direct and indirect)
- Drying
- Compression of the chlorine gas
- Liquefaction and storage of liquid chlorine
- Liquid chlorine loading and shipping facilities
- Vaporization of liquid chlorine

#### **Hypochlorite area**

- Absorption of chlorine vents and reliefs
- Manufacture of market grade sodium hypochlorite
- Decomposition of sodium hypochlorite liquors
- Recovery of chlorine from sodium hypochlorite liquor

#### **Hydrogen area**

- Cooling and pressure control of hydrogen gas
- Compression and delivery of hydrogen

#### **Sodium hydroxide area**

- Cooling, handling and storage of 35% caustic prods
- Production, handling and storage of dilute caustic
- Evaporation of cell product caustic to 50% or 73%

#### **Hydrochloric acid area**

- Safe manufacture of hydrochloric acid
- Handling, storage and shipment of hydrochloric acid

#### **Utility areas**

- Collection and treatment of aqueous effluents
- Systems for the supply of dry, instrument and utility air
- Systems for the supply of water systems
- Steam generation and distribution systems
- Inert gas purging systems
- Alternating current distribution and control systems
- Electrical power rectification systems
- Aluminum and copper bus bar systems
- Emergency power generating systems