

[www.usedplants.com](http://www.usedplants.com)

...where your search for used process plants ends!



# FOR SALE

## Chlorine, Caustic, KOH, Sodium Chlorate Plant and Equipment Liquidations

### **Fuji Rectifiers**

(3) Fuji Thyristor S-Former, Transformer/ Rectifier System, Fuji Electric Co. Inc., Class – FOW, continuous duty, Rating – 33930 KVA, 69,000 primary feed 624V DC secondary outlet voltage, built 1998. In operation less than one year.

### **Sodium Chlorate Plant - Complete**

15,000 t/y, Krebs technology, built 1990: Production of sodium chlorate is by the electrolysis of an acidified sodium chloride solution. Purified brine is acidified with hydrochloric acid and sodium dichromate is added to improve cell efficiency and reduce electrode corrosion. The acidified brine is fed to a bank of electrolytic cells. Chlorate ions form at the anode while hydrogen gas leaves the cell at the cathode. Cell liquor, the solution exiting the electrolytic cells contains a fairly high concentration of chlorate ions and by-products. Subsequent processing removes the sodium chlorate crystals from the solution. The remaining liquor containing chlorate, chloride ions and sodium dichromate returns to the cells for further reaction. The sodium chlorate crystals are washed and dried.

#### Major Equipment:

- (8) Reactors each with 3 Krebs NC 30 cells
  - (1) Toshiba Rectifier
  - (1) Swenson Crystallizer/Evaporator - Titanium
  - (1) Baker Perkins Centrifuge - Pusher type
  - (1) Sulzer Fluid Bed Dryer - Titanium
  - (3) Titanium APV Plate type Heat Exchangers
- Brine Purification Equipment

Scrubber System  
Dust Collection Equipment  
5200 KWH (DC power) per ton full production

## **Titanium Chlorine coolers, chillers, heat exchangers**

(4) 2700 ft<sup>2</sup> (250m<sup>2</sup>) Primary titanium chlorine coolers, shell and tube heat exchangers, titanium tubes and timesheets, 742 tubes ¾ inch OD by 19 ft.

(4) 700 ft<sup>2</sup> (65m<sup>2</sup>) Secondary titanium Chlorine Coolers, shell and tube heat exchangers, titanium tubes and timesheets, FRP heads, 416 tubes ¾ inch OD by 9 ft.

(2) Approx 2000 ft<sup>2</sup>, (200m<sup>2</sup>) Brine Heaters, shell and tube type heat exchangers, Approx 2000 ft<sup>2</sup>, (200m<sup>2</sup>) Titanium tubes and tube sheets, 24" x 24 ft shell, Teflon lined heads, fixed tube sheets

Approx 250ft<sup>2</sup> shell and tube heat exchanger, Titanium tubeside, 12" x 11 ft Titanium tubeside, fixed tube sheets

(2) Approx 150ft<sup>2</sup> shell and tube Heat Exchanger, Titanium tubeside, 10" x 10 ft, Titanium tubeside, fixed tube sheets, 150 psi shellside, 150 & FV tubeside

Approx 1400 ft<sup>2</sup>, Heat Exchanger, Titanium tubeside, Southern Heat exchanger, 24" x 16 ft shell and tube heat exchanger, Titanium tubeside, fixed tube sheets, 50 psi shellside. Shell section only without heads

(2) 700 ft<sup>2</sup> Plate and Frame Heat Exchanger, Titanium plates, 80 psi at 200F, Superchanger, model UX-216-HP-176.

## **Nickel heat exchangers**

(4) 500 ft<sup>2</sup> caustic coolers, nickel tubeside, shell and tube heat exchangers, nickel tubeside, 4 pass, (160) ¾ OD x 16 BWG tubes, 16 ft long, 100 psi shellside, 150 psi tubeside, 1996

## **Titanium Storage Tanks**

(1) 9000 gallon (37m<sup>3</sup>) Depleted brine tank, Titanium, horizontal, dished heads 1999.

(1) 10,000 Gallon (40m<sup>3</sup>) Titanium (Grade 2 B265) Storage Tank. Flat top and bottom. Approx. 12' diameter x 13' high, Vertical. Year Built 1988. Previous use: Sodium Chlorate

## **Titanium centrifugal pumps – Brine Service**

(2) Centrifugal Pumps, 6 x 8 x 16 inch, (150 x 200 x 400mm) solid titanium, Durco, 150 HP

- (3) Centrifugal Pumps, 6 x 8 inch, (150 x 200mm), solid titanium, Durco, 100 HP
- (3) Centrifugal Pumps, 6 x 8 inch, (150 x 200mm) sold titanium, Durco, 60 HP
- (2) Centrifugal Pumps, 4 x 6, (100 x 150mm) solid titanium, Durco, 50 HP
- (2) Centrifugal Pumps, 4 x 6 inch, (100 x 150mm) solid titanium, Durco, 50 HP

## **Liquefaction**

(2) Chlorine Liquefier systems, 325 tons/day each, York/Frick/Reco chlorine liquefaction R-134A liquefier systems, 325 tons liquid Cl<sub>2</sub>, with 272 tons liquid on the primary side and 53 tons of liquid chlorine on the secondary side of the heat exchanger. New in 1998. The liquefier is a split bundle and serves as both the primary liquefier and the secondary liquefier. All skid mounted

(1) Tertiary Liquefier system, 24 tons/day, Mycom R-23 liquefier system serves as tertiary chiller, rated for 24 tons of liquid chlorine, installed in 1994. All skid mounted

## **Evaporation**

(2) 2,300 square feet (2100m<sup>2</sup>) First Effect Steam Chest, 20% nickel clad carbon steel construction, 5 ft. 4 in. in diameter and 14 ft. 6 in. long, 492 tubes, 1½ in. in diameter, 12 ft. long, 16 gauge, o 2,300 square feet of heating surface for each exchanger.

(10) First and Second Effect Bodies - 20% nickel clad carbon steel / 9 ft. in diameter by 27 ft. 7 in. high with a 60° coned bottom.

(10) 3,100 sq. ft. (2,800 m<sup>2</sup>) Second Effect Steam Chest, composed of 20% nickel clad carbon steel, 16 gauge nickel tubes, 1½ in. in diameter by 12 ft.

(8) Barometric Condenser – 4 ft. diameter x 15 ft. 7 in. high, 30 in. vapor inlet. The counter current condenser is 13 in. in diameter x 5 ft. 9 in. tangent to tangent.

First and Second Effect Circulating Pumps – (4) are nickel / (8) are monel, pumps 3,625 gpm at 18.7 ft. TDH / 50 hp motor at 880 rpm. (GPM ranges from a low of 3400 to a high of 14,300).

Durco Polishing Filter – 30 Monel wire plates – 2600 gal @ 75 psi

U. S. Filter – 24 4' x 4' Monel leaves – 85 gpm @ 75 psig

## **Chlorine drying**

Chlorine drying system, 650 ton/day consisting of Titanium coolers (2), Titanium chillers (2), acid brick lined columns (4) two using 78% H<sub>2</sub>SO<sub>4</sub> and two using 98% H<sub>2</sub>SO<sub>4</sub>.

## **Complete KOH plant**

The purpose of the KOH plant is to produce potassium hydroxide solution and by-product chlorine and hydrogen by the electrolysis of KCl brine using membrane cell technology. The brine is produced from solid KCl in a resaturation process. The plant capacity is 92000 t/yr of 50% KOH, 30000 t/yr Cl<sub>2</sub> and 860 t/yr H<sub>2</sub>.

In the cellroom there are 30 FM21 electrolysis cells. These cells consist of 60 anodes and 60 cathodes arranged alternately with membranes between them so forming 120 compartments. 25.5% KCl brine solution is fed into each anode compartment and 28% KOH solution into the cathode compartment and a large electric current is passed between the electrodes through solutions. In the anode compartments under the influence of the electric field, chlorine ions are attracted to the anode where they are liberated as chlorine gas, potassium ions are transported through the membrane towards the cathode. Thus, the concentration of the brine exiting the cells is depleted to 18%. In the cathode compartments water separates into hydrogen and hydroxyl ions. The hydrogen ions are attracted to the cathode where they are liberated as hydrogen gas. The hydroxyl ions balance the influx of potassium ions, thus increasing the concentration of the KOH solution exiting the cell to 32%. This KOH is collected in the Caustic Recycle Tank from where it is pumped back to the cells. Prior to feeding the cells the caustic is diluted to 28% by the addition of demin water. The excess 32% KOH liquor so produced is pumped to a buffer tank in the KOH Evaporator area. The depleted brine leaving the cells is collected in a tank from where it is pumped to the Brine Resaturation area.

## **KOH Evaporator**

(1) KOH Evaporator Package unit by Sulzer, skid mounted, Nickel and stainless steel construction, 1989. 32% KOH pumped from the Cellrooms Caustic Recycle Tank is collected in a buffer tank. From here it is pumped into a two-stage evaporator where water is removed to strengthen the liquor up to 50%.

## **Caustic Briquetting**

One (1) Komarek Greaves briquetting machine, model no. 75 MS 20.5 - 4.7, serial no. 1538707, 50 hp roll drive, auger screw feed with Reeves variable speed, 2 rows of pockets, 72 pockets, staggered pocket design, roll diameter 20.5 inches x 4.625 inches wide, 9.25 rpm, capacity of 30 t/day for KOH.

Industrial Asset Management LLC | 1450 Pakrside Avenue | Suite 27, Ewing, NJ 08638 | USA

PHONE : 609.936.8696

FAX : 609.936.9102

EMAIL : sales@usedplants.com

[www.usedplants.com](http://www.usedplants.com)

...where your search for used process plants ends!