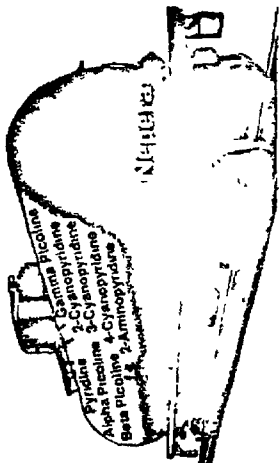


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ever, the new membrane has not been as efficient electrically as asbestos diaphragms.

"The trouble is that the Nafion membrane permits more hydroxyl ions to migrate from the cathode compartment into the anode compartment. Every time that happens, you lose an electron," says John M. Watkins, venture specialist in Du Pont's Plastic Products and Resins Dept.

Finding methods of cutting down that migration is the aim of much of the current development work. Du Pont, Diamond Shamrock, Hooker and several Japanese companies are hard at work on the improvements.

Diamond isn't talking about the modifications it has made, but the firm does say it will produce high-strength caustic with minimal salt concentration directly in the electrolyzer at high current efficiencies at its Muscle Shoals installation. The new membrane will be used in conjunction with DSA anodes. (DSA is Electron Corp's trademark for dimensionally stable anodes.)

Hooker's Currey explains that power consumption is strongly affected by current density. And depending on the density, either the membrane or the diaphragm cell can be shown to be more efficient. In the amperage ranges now being considered for commercial equipment, the asbestos diaphragm unit has some advantages in power consumption. For example, Hooker's MX cell consumes 2,800 kwh/short ton of chlorine, compared with a typical asbestos diaphragm cell's consumption of 2,500 kwh.

Asahi Glass, which became the first Japanese chlorine-caustic producer to switch from mercury cells to diaphragm units, in March 1974, believes it is ahead of other firms in that country in its research effort. Its interim reports on its new membrane indicate chlorine and caustic quality is comparable to that made in mercury cells. Moreover, Asahi Glass says the process will prove economically competitive because there is no need for evaporation.

Asahi Glass test data show that current efficiency is between 90 and 92% with caustic soda concentrations of 40-41%. The company says the technique can be applied to potash production as well, with current efficiencies of 90-96%, product concentration of 40-41% and 10-20 ppm of potassium chloride in the product.

Building Plans: All Japanese producers have research programs going at top speed to meet the government deadline for switching to diaphragm cells. Most

engineering

are building test installations to compare their own membranes with Du Pont's.

For example, Tokuyama has a 3,000-metric-tons/year test operation at Tokuyama City for comparing its membrane with Nafion.

Toyo Soda hopes to build a 2,000-mt/month plant at Sakata City, Honshu, by spring 1977, using Hooker technology. Meanwhile, it is testing its own membrane as well as Du Pont's at a pilot plant in Shin-Nanyo City, Honshu.

Asahi Chemical Industry built a 40,000-mt/year plant at Nobeoka, Kyushu, last April to test the Nafion membrane. It also has been developing its own membrane. And the company says its plant can be expanded to 100,000 mt/year by adding cells.

The Nafion membrane also will go to work in a 60,000-mt/year unit that Denki Kagaku Kogyo is building at its Omi works, Honshu, under licensing agreement from Asahi Chemical.

And Asahi Glass plans to replace its 5,000-mt/month plant at Osaka City with its new membrane. Its 1,400-mt/month plant completed in March 1974 at Kita Kyushu on Kyushu Island, uses diaphragm-cell technology supplied by Diamond. Last fall, it started up new units, each of 15,000 mt/month, at Kashima and Chiba, near Tokyo, using PPG technology.

Automatic VCM sampler

A new idea in monitoring vinyl chloride monomer emissions has been put to work at Pantasote's Passaic, N.J., plant. Pantasote and Eocom Corp. (Irvine, Calif.), developers of the system, say it is much faster than gas chromatograph sampling systems ordinarily used.

The new system, which combines a mini-computer and a Fourier multiplex spectrometer, can assess the quality of air at a specific sampling point once each minute. Plant personnel are alerted when instantaneous exposure is above prescribed Occupational Safety and Health Administration limits.

Pantasote and Eocom, which are offering the system to others, say it has a pay-out time of about two years because it eliminates charcoal-tube personnel samplers.

The systems, installed at Pantasote's two Passaic plants, cost about \$350,000 for 48 sampling points. The computer program uses plant physical features, properties of airborne vinyl chloride monomer and work profiles to automatically determine employee exposures.

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