

## Acid Recovery & Purification Systems

### Acid Purification Systems

Mech-Chem's Acid Purification Systems utilize a dependable and economical anion membrane technology known as Diffusion Dialysis.

Mech-Chem manufactures a line of Acid Purification Systems that utilize the process of diffusion dialysis to remove dissolved metal impurities from used, spent or waste acid solutions. This produces a clean acid solution that can be reused in production operations.

Diffusion Dialysis is a very effective technology for the recovery and purification of used, spent, or waste acid solutions that contain low levels of dissolved metals and still contain a large fraction of the acids. This membrane technology is used for acid recovery applications such as plating baths, anodizing baths, acid pickling and metal finishing applications.

With new emphasis on cost reduction and green technologies, these membrane systems are also finding new applications for recovering and purifying spent or waste acid streams in mining applications and battery acid recycling.

### Advantages of Acid Recycling

- ◆ Increase acid bath life
- ◆ Maintain optimum bath uniformity
- ◆ Reduce acid purchases
- ◆ Reduce waste treatment costs
- ◆ Reduce hazardous waste disposal costs



*Picture of an AP-60 Acid Purification System.  
Models AP-15, AP-30, and AP-60 systems are fabricated as  
self-contained modular units as shown in the picture.*



***This Acid Purification Lab Unit is designed for testing on small volumes of acid solutions to provide users with an introduction to the technology. The test data is very accurate for sizing the full-scale acid purification system.***

### **Acid Purification System Overview**

In the recovery of acids with diffusion dialysis, an anion exchange membrane acts as a semi-permeable barrier between a flowing water stream and a flowing acid solution that contains the dissolved metals. The anion exchange membrane has fixed positive charges located on its surface. These positive charge locations attract the negatively charged anions in the solution that come in close contact with the anion exchange membrane surface. As a result, the acids in the spent or waste acid solution are attracted to the membrane.

The metal ions which are larger molecules and positively charged are repelled by the positively charged membrane. This allows the acid molecules to diffuse through the membrane at a much faster rate than the dissolved metals. The result is that the water entering a diffusion dialysis system exits as the recovered acid solution containing most of the acid. The spent or waste acid solution entering the diffusion dialysis exits as an acid depleted solution containing most of the dissolved metals. Normal acid recovery is 80% to 90% with removal of 70% to 90% of the dissolved metals .



***Picture of an AP-300 (300 GPD) Acid Purification Systems with a modular feed and control unit. This modular unit can feed from one to six diffusion dialysis stacks making this system expandable from 300 GPD to 1800 GPD***



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