

# Pure Cycle Environmental LLC

*The sensible solution for recovery technology*

## **Acid Recycling System**

### **Use Process Acids Indefinitely**

Pure Cycle's Acid recycling system provides a logical way for metal finishers and anodizers to deal with today's strict disposal requirements while conserving resources and saving money.

The system is simple and economical to operate. Our unique technology recovers nitric, hydrochloric, fluoboric, hydro-fluoric, and sulfuric acids from concentrated baths that would have been discarded in the past. The acid is returned to the process for continual use, while only an acid depleted metal containing concentrate is removed for disposal.

### **Maintain Process Integrity**

The system is sized to maintain an optimum level of dissolved metals. The results are a dependable process with predictable results. Oxide removal rates and metal dissolution rates are predictable throughout the bath life for greater process control. Anodizers can maximize production rates without the fear of burning or loss of color uniformity.

### **Acid Recycling Advantages**

- **Process acids used indefinitely**
- **Reduced waste treatment costs**
- **Up to 95% reduction in new acid purchases**
- **Maintain bath uniformity for optimum performance**
- **Functions on most commonly used acid baths**
- **Reduced long term liability**



### **Diffusion Dialysis**

Our proprietary recycling system uses an advanced separation technology known as Diffusion Dialysis. This system is engineered and designed for the metal finishing industry to avoid concentrated acid bath dumping and the associated liabilities.

### **Recover rather than destroy acids**

Avoid the costly problem of treatment, disposal, reporting, and liability. Reduce caustic soda use and soluble salt generation, which can adversely affect aquatic toxicity.

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## Design Features

The efficiency of a membrane system to recover acids and reject metallic ions depends on the membrane surface area, the concentration gradient, and the contact time. The design of the Aqualogic acid recycling system features an extended membrane configuration that promotes metal rejection while recovering up to 95% of the original acid.

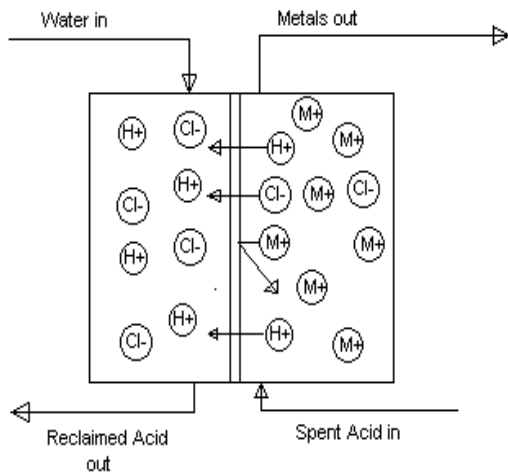


Fig.1 Diffusion dialysis schematic

## System Operation

The spent acid is metered through the system in contact with one side of an anion exchange membrane. Water is metered counter-current to the acid flow on the recovery side of the membrane. The acid passes through the membrane into the water, leaving the heavy metal contaminants behind. The reclaimed acid is directed back to the original process while the metal laden spent acid stream flows to metal recovery or wastewater treatment. A small amount of virgin acid is added to the process tank to make up for the acid consumed in process.

## Performance Features

The ion exchange membranes are resistant to strong acids, enabling the system to handle strong mineral acids at high concentrations. Common metals such as copper, chromium, nickel, iron, and aluminum may be economically removed allowing acids to be used indefinitely. Once equilibrium is reached where the rate of metal removal equals the rate of introduction quality is improved through process consistency.

## Simplified Operation

Operation is automatic and may be run unattended 24 hours per day. The acid recycling system has very low energy consumption and few moving parts.

The systems come modularized, with the necessary holding tanks, membrane stack, feed pumps, metering pumps, filters, and control instrumentation. All components are preplumbed and prewired on a polypropylene frame for the smaller models and an epoxy coated steel frame for the larger units. A spill containment pan is included in the base of each unit to provide secondary containment. Components are hard piped using PVC material with unions for ease of maintenance.

## Sizing

Systems are designed to process the acid volume in the tank once in the normal dump cycle. Therefore a 100 gallon bath which was dumped once a week would require an acid recycling system that processes 20 gallons per day. Available sizes will process 5 GPD to 700 GPD.