



Engineering a  
**GREENER**  
Tomorrow



**Mech-Chem**  
Associates, Inc.

## ACID RECYCLING SYSTEM MODEL AP-15

## *Specifications*



|                        |  |
|------------------------|--|
| <b>CAPACITY:</b>       | <b>Up to 15 GPD (56.78 LPD)</b>                    |
| <b>LENGTH:</b>         | <b>37in (94.0 cm)</b>                              |
| <b>WIDTH:</b>          | <b>27in (68.6 cm)</b>                              |
| <b>HEIGHT:</b>         | <b>66.5in (168.9 cm)</b>                           |
| <b>WEIGHT:</b>         | <b>640lbs (290.3 kilos)</b>                        |
| <b>TEMP.:</b>          | <b>110 F. (43 C.) cooling required above this.</b> |
| <b>POWER:</b>          | <b>115 VAC/15 Amp</b>                              |
| <b>UTILITIES:</b>      | <b>Water: Up to 20 GPD<br/>Air: 30-60 psi</b>      |
| <b>FILTERS:</b>        | <b>1.0 micron by 10 inch</b>                       |
| <b>ACID INLET:</b>     | <b>0.5in NPT</b>                                   |
| <b>WATER INLET:</b>    | <b>0.5in NPT</b>                                   |
| <b>RECLAIM OUTLET:</b> | <b>0.5in NPT</b>                                   |
| <b>METALS OUTLET:</b>  | <b>0.5in NPT</b>                                   |

### **SIZING:**

Divide the volume of spent acid solution generated by the number of calendar days between make-up and waste generation. e.g., 450 gallons being discarded once per month equals 15 GPD, equals Model AP-15.

•Design •Engineering •Construction  
•Installation •Start-Up

# Acid Purification Systems

Acid Purification Systems utilize an easy-to-use, dependable, and economical purification membrane technology known as Diffusion Dialysis.

Mech-Chem manufactures a line of Acid Purifications Systems that utilize the process of diffusion dialysis to remove dissolved metal impurities from used or spent acid solutions and produce a clean, useable acid from what would have otherwise been waste.

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.

## Advantages of Acid Recycling

- ◆ **Reduced acid purchases**
- ◆ **Reduced waste neutralization costs**
- ◆ **Increase acid bath life**
- ◆ **Maintain optimum bath uniformity**
- ◆ **Increase production/reduce downtime**
- ◆ **Reduced hazardous waste disposal costs**
- ◆ **Reduce long-term liability**
- ◆ **Simple, reliable, economical**
- ◆ **Units are self-contained, easily maintained, and require very little floor space**

## 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 .

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