



•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

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## Acid Recovery Unit AP– 15 Specifications:

### Specifications:

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



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## Acid Recovery Unit AP- 30 Specifications:

### Specifications:

<b>CAPACITY:</b>	Up to 30 GPD (113.56 LPD)
<b>LENGTH:</b>	42in (106.68 cm)
<b>WIDTH:</b>	30in (76.2 cm)
<b>HEIGHT:</b>	80.5in (204.5 cm)
<b>WEIGHT:</b>	760lbs (344.73 kilos)
<b>TEMP.:</b>	110 F. (43 C.) cooling required above this.
<b>POWER:</b>	115 VAC/15 Amp
<b>UTILITIES:</b>	Water: Up to 40 GPD Air: 30-60 psi
<b>FILTERS:</b>	1.0 micron by 10 inch
<b>ACID INLET:</b>	0.5in NPT
<b>WATER INLET:</b>	0.5in NPT
<b>RECLAIM OUTLET:</b>	0.5in NPT
<b>METALS OUTLET:</b>	0.5in NPT



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## Acid Recovery Unit AP- 45 Specifications:

### Specifications:

<b>CAPACITY:</b>	Up to 45 GPD (170.34 LPD)
<b>LENGTH:</b>	42in (106.68 cm)
<b>WIDTH:</b>	30in (76.2 cm)
<b>HEIGHT:</b>	80.5in (204.5 cm)
<b>WEIGHT:</b>	790lbs (358.34 kilos)
<b>TEMP.:</b>	110 F. (43 C.) cooling required above this.
<b>POWER:</b>	115 VAC/15 Amp
<b>UTILITIES:</b>	Water: Up to 60 GPD Air: 30-60 psi
<b>FILTERS:</b>	1.0 micron by 10 inch
<b>ACID INLET:</b>	0.5in NPT
<b>WATER INLET:</b>	0.5in NPT
<b>RECLAIM OUTLET:</b>	0.5in NPT
<b>METALS OUTLET:</b>	0.5in NPT



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## Acid Recovery Unit AP- 60

### Specifications:

<b>CAPACITY:</b>	Up to 60 GPD (227.12 LPD)
<b>LENGTH:</b>	42in (106.68 cm)
<b>WIDTH:</b>	30in (76.2 cm)
<b>HEIGHT:</b>	80.5in (204.5 cm)
<b>WEIGHT:</b>	820lbs (371.95 kilos)
<b>TEMP.:</b>	110 F. (43 C.) cooling required above this.
<b>POWER:</b>	115 VAC/15 Amp
<b>UTILITIES:</b>	Water: Up to 80 GPD Air: 30-60 psi
<b>FILTERS:</b>	1.0 micron by 10 inch
<b>ACID INLET:</b>	0.5in NPT
<b>WATER INLET:</b>	0.5in NPT
<b>RECLAIM OUTLET:</b>	0.5in NPT
<b>METALS OUTLET:</b>	0.5in NPT



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## Acid Recovery Unit AP- 150

### Specifications:

#### Feed Module:

<b>CAPACITY:</b>	<b>Up to 150 GPD (567.81 LPD)</b>
<b>LENGTH:</b>	<b>48in (121.9 cm)</b>
<b>WIDTH:</b>	<b>48in (121.9 cm)</b>
<b>HEIGHT:</b>	<b>93.5in (237.5 cm)</b>
<b>WEIGHT:</b>	<b>1150 lbs (521.63 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 300 GPD Air: 30-60 psi</b>
<b>FILTERS:</b>	<b>1.0 micron by 10 inch Optional: Duplex Filtration Module</b>

#### Stack Module:

<b>CAPACITY:</b>	<b>Up to 150 GPD (567.81 LPD)</b>
<b>LENGTH:</b>	<b>51.5in (130.8 cm)</b>
<b>WIDTH:</b>	<b>36in (91.4 cm)</b>
<b>HEIGHT:</b>	<b>42in (106.7 cm)</b>
<b>WEIGHT:</b>	<b>720 lbs (326.59 kilos)</b>
<b>TEMP.:</b>	<b>110 F. (43 C.) cooling required above this.</b>



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## Acid Recovery Unit AP- 300

### Specifications:

#### Feed Module:

<b>CAPACITY:</b>	<b>Up to 300 GPD (1135.62 LPD)</b>
<b>LENGTH:</b>	<b>48in (121.9 cm)</b>
<b>WIDTH:</b>	<b>48in (121.9 cm)</b>
<b>HEIGHT:</b>	<b>93.5in (237.5 cm)</b>
<b>WEIGHT:</b>	<b>1150 lbs (521.63 kilos)</b>
<b>TEMP.:</b>	<b>110 F. (43 C.) cooling</b> required above this.
<b>POWER:</b>	<b>115 VAC/15 Amp</b>
<b>UTILITIES:</b>	<b>Water: Up to 600 GPD</b> <b>Air: 30-60 psi</b>
<b>FILTERS:</b>	<b>1.0 micron by 10 inch</b> Optional: Duplex Filtration Module

#### Stack Module:

<b>CAPACITY:</b>	<b>Up to 300 GPD (1135.62 LPD)</b>
<b>LENGTH:</b>	<b>51.5in (130.8 cm)</b>
<b>WIDTH:</b>	<b>36in (91.4 cm)</b>
<b>HEIGHT:</b>	<b>42in (106.7 cm)</b>
<b>WEIGHT:</b>	<b>720 lbs (326.59 kilos)</b>
<b>TEMP.:</b>	<b>110 F. (43 C.) cooling</b> required above this.



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## **Large Scale— Acid Recovery Systems** *(Systems larger than 300 gallons per day)*

Mech-Chem Associates, Inc. is now offering larger diffusion dialysis membrane stack modules. These modules are the basis for the AP-300 and larger Acid Purification Systems with processing capacities of 300 gallons per day or greater.

The AP-300 and larger acid recovery and purification systems utilize a single feed and control module for the systems. Each system is also equipped with a dual train filtration skid to handle solids removal for the larger industrial applications.

The acid purification system integrates the membrane stack modules with the customer's feed tanks and process equipment. This results in the acid recovery and purification being an integral part of their production or processing operation.

The diffusion dialysis membrane technology is used for acid recovery applications such as plating baths, anodizing baths, acid pickling, metal finishing applications, and production of aircraft components.

These membrane systems are also finding new applications for recovering and recycling the spent acid streams in mining applications, production of rare earth metals, stainless steel finishing, chemical machining and recovery of electronic components.

Acid recovery and purification has several advantages including reduced acid purchases, hazardous waste disposal and operating costs. In addition it increases the life of the acid solution, maintains optimum bath uniformity, and improves product quality.



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