AnoPur™

Continuously purifies aluminum anodizing solutions for lower operating costs & improved performance

ECO-TEC
Advanced Resource Recovery & Purification Solutions
What is an AnoPur™ Unit?
The AnoPur™ Unit is a small, skid mounted device that connects directly to an anodizing tank, continuously removing aluminum as it is dissolved. The AnoPur™ unit has the flexibility to be connected to one tank or several tanks. It employs a simple PLC (programmable logic controller) in a control panel that uses a graphical display to indicate what the unit is doing at any given time.
The heart of the AnoPur™ unit is a column of ion exchange resin that can absorb acid while rejecting metal salts to waste. The acid is recovered from the resin using a simple water wash.

Why use an AnoPur™ Unit?
When aluminum is anodized, a portion of the metal dissolves into the sulfuric acid solution used in the anodizing tank. The aluminum gradually accumulates in the tank and, eventually, the solution must be dumped and replaced with fresh acid. An alternative solution is continuous purification. There are a number of benefits that can be realized by continuous purification:
- Reduction in sulfuric acid purchases
- Fewer line shutdowns
- Reduced treatment and disposal costs
- Lower discharge of dissolved salt
- Improved anodize finish consistency
- Simplified coloring
- Reduced electrical and cooling requirements.

How does the AnoPur™ Unit Work?
A diaphragm pump mounted on the AnoPur™ unit transfers anodizing solution from the bath, through dual stage cartridge filters, to a storage reservoir located on the unit.

An AnoPur™ cycle consists of two basic steps. During the first step, filtered acid is pumped through the resin column. While the acid is absorbed by the resin, metal salt solution passes through the column to waste.

During the second step, water is pumped through the column, removing the acid. This acid stream is returned to the anodizing bath being treated. The cycle lasts two to five (2-5) minutes.

Control panels with simple PLCs employ graphical displays that indicate what the Unit is doing at all times. The panels have provisions for remote on/off switching.

AnoPur™ Flexibility
With the Multi-Tank Selector Manifold, an operator can conveniently select one of up to six (6) different tanks for purification. The manifold consists of six (6) sets of manual valves, each set consisting of valves for both the feed and product lines. The manifold is supplied with mounting hardware and instructions for easy hook-up.

The Mobile Kit includes all the necessary items required to make the AnoPur™ unit completely portable. This option is available for the D8+ - D10 models. Wheels, push handles, hoses and quick connect air fittings are supplied with mounting hardware and instructions for easy installation.

Since 1976, large anodizers everywhere have used a unit called the APU® to purify anodizing solutions. Now, all the benefits of the APU® are available to the smaller anodizer in a cost effective, pre-engineered design.
Cost Savings

It is easy to work out the savings you can expect with the installation of an AnoPur™ Unit. Savings will vary depending on a number of factors such as hours of operation, chemical costs, and disposal methods. These charts show what happens to anodizing acid costs before and after installing the AnoPur™ Unit.

Basis:
- Class II coating (0.4 mil) - 20 minutes @ 129 amps per sq. meter (12 ASF)
- Dissolving rate = 7 grams per sq. meter (1.4 lbs per 1000 sq. feet)
- Dragout rate = 0.1 liters per sq. meter (2.5 US gals per 1000 sq. feet)
- Sulfuric acid = 180 g/l Aluminum = 12 g/l at time of dump
- Sulfuric acid = 180 g/l Aluminum = 10 g/l with the AnoPur™ Unit

Remember that the AnoPur™ Unit also makes it easier to achieve consistent finishes, so you may wish to factor in an allowance for reduction in re-work.
Installation and Use

A detailed operating manual is included with the shipment of the AnoPur™ Unit. These manuals include easy to understand installation instructions that offer helpful details on locating the unit, piping and wiring. Installation and startup of an AnoPur™ Unit is simple and straightforward.

- Remove the crate and packing materials.
- Move the AnoPur™ Unit into position.
- Attach any pipework that has been removed for shipping purposes.
- Connect single phase electrical supply, 5.5 bar/80 psig air supply and water supply.
- Install piping
  - to and from the anodizing tank
  - for the waste line.
- After hookup is complete, the unit can be started. The manual includes checklists and troubleshooting guides.

**No special adjustments are required as the unit is fully tested and calibrated prior to shipment.**

Routine monitoring is recommended and logsheets are provided for this purpose.

Preventative maintenance schedules are also included in the manual.

Regular maintenance primarily involves filter cartridge replacement. The replacement frequency is difficult to predict as solids levels vary from plant to plant. The Unit is supplied with a replacement parts kit that includes a supply of cartridge filters.

AnoPur™ Units also include free access to 24/7 customer service. Onsite training and assistance are available, and a full stock of replacement parts can normally be shipped within twenty-four hours.
Selecting the Appropriate AnoPur™ Unit

It is simple to select the right AnoPur™ for your needs.

1) Determine the metal buildup rate using the guide below.
2) Select an AnoPur™ unit from the performance specifications chart on the following page. Choose a unit that provides enough metal removal capacity to offset the buildup rate.

**Required Information**

| a) Operating hours per week     |
| b) Dump Volume (l/week)        |
| c) Dump Aluminum Level (g/l)   |
| d) Production (m²/h)           |
| e) Anodize Time (minutes)      |
| f) Current Density (amps/m²)   |

*Two methods are available to calculate the aluminum buildup rate.*

**Conversion Factors:**

i) multiply gallons by 3.78 to get liters
ii) divide ft²/hr by 10.76 to get m²/hr
iii) multiply amps/ft² by 10.76 to get amps/m²

**1. Bath Dump Method**

<table>
<thead>
<tr>
<th>Dump Volume (l/week)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Dump Aluminum Level (g/l)</td>
<td></td>
</tr>
<tr>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Operating hours per week</td>
<td></td>
</tr>
<tr>
<td>=</td>
<td></td>
</tr>
<tr>
<td>Build up rate (g/h)</td>
<td></td>
</tr>
</tbody>
</table>

Note:
- Accuracy is important; remember to include any partial decant volumes.
- Ensure that your numbers reflect normal or expected production demands.

**2. Production Data Method**

\[
0.25 \\
\times \ \\
\text{Anodize time (minutes)} \ \\
= \ \\
\text{Dissolving Factor (g/m²)} \ \\
\times \ \\
\text{Production (m²/h)} \ \\
= \ \\
\text{Build up rate (g/h)}
\]

Note:
- This method assumes a standard dissolution rate of 15 grams of aluminum per square meter of production per hour of anodizing time.
- Your current density must be 100 - 150 amps/m². This method is not valid with alternating current (pulse) rectifiers.
AnoPur™ Performance Specifications

Typical Unit Capabilities

Notes:
- Above rates are for solution temperatures greater than 10°C, for temperatures from 0°C to 10°C reduce above values by 25%.
- Removal rates vary with the aluminum level. AnoPur™ can treat any level between 6-20 g/l.
- Models D8+ and D11+ are used where additive recovery is desired. Additives recovered include typical organic acids used to inhibit burning such as oxalic and glycerin / glycolic acids. Contact Eco-Tec for confirmation.
- For applications where the anodizing solution is operated cold (0°C to 4.5°C), a cold temperature adder is required. Temperatures below 0°C can not be utilized with AnoPur™ Unit.

### Typical Stream Compositions with the AnoPur™ Unit (Models D10A - D15A)

<table>
<thead>
<tr>
<th>Composition (g/l)</th>
<th>AnoPur™ Stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed</td>
<td>Recovered Acid</td>
</tr>
<tr>
<td>Sulfuric Acid</td>
<td>160</td>
</tr>
<tr>
<td>240</td>
<td>232</td>
</tr>
<tr>
<td>Aluminum</td>
<td>6.0</td>
</tr>
<tr>
<td>8.0</td>
<td>6.1</td>
</tr>
<tr>
<td>10.0</td>
<td>7.6</td>
</tr>
<tr>
<td>12.0</td>
<td>9.1</td>
</tr>
</tbody>
</table>

### For Additive Recovery (Models D8A+, D11A+)

<table>
<thead>
<tr>
<th>Composition (g/l)</th>
<th>AnoPur™ Stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed</td>
<td>Recovered Acid</td>
</tr>
<tr>
<td>Sulfuric Acid</td>
<td>160</td>
</tr>
<tr>
<td>240</td>
<td>235</td>
</tr>
<tr>
<td>Aluminum</td>
<td>6.0</td>
</tr>
<tr>
<td>8.0</td>
<td>6.3</td>
</tr>
<tr>
<td>10.0</td>
<td>7.9</td>
</tr>
<tr>
<td>Additive</td>
<td>20 - 24</td>
</tr>
</tbody>
</table>
Specifications

The Eco-Tec AnoPur™ Unit includes:

- Frame mounted, dual stage cartridge filters and diaphragm feed pump for feed acid
- 24V control panel with graphics
- Skid mounted design with all piping and valves on a steel frame
- Operating & maintenance manuals (3)
- Spare parts kits
- Remote start/stop (24v signal required)

![Diagram of AnoPur™ unit]

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Dimensions (cm/in)</th>
<th>Electricity</th>
<th>Comp. Air</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length</td>
<td>Width</td>
<td>Height</td>
<td>(110/220, 1, 50/60)</td>
</tr>
<tr>
<td>D8+</td>
<td>112/44</td>
<td>94/37</td>
<td>181/71</td>
<td>5 amps</td>
</tr>
<tr>
<td>D10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D11+</td>
<td>229/90</td>
<td>135/53</td>
<td>193/76</td>
<td></td>
</tr>
<tr>
<td>D13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

- No provision has been made for the removal of oil, grease or submicron particles from the anodizing bath solution or water fed to the AnoPur™ unit.
- Air must be clean, dry, oil free and filtered to 40 microns. Air filters can be supplied, if required, at additional cost.
- Water should contain less than 200 mg/l Total Dissolved Solids, 135 ppm total hardness (as CaCO₃) and must be clean (i.e., municipal source filtered to one micron).
Full-scale Design & Manufacturing

Quality Design and Construction
- ISO 9001 registered design and manufacturing facility in Pickering, Ontario
- Built to global industrial standards
- Compact, skid mounted (including resin installation) and wet tested at Eco-Tec facility

Innovations
- Eco-Tec has been supplying Recoflo® ion exchange systems for industrial treatment and water purification applications since 1970 with more than 2,000 systems installed in over 60 countries
- Eco-Tec continues to develop product improvements and new processes at its in-house Research and Development facility

Technical Service and Support
- On-site commissioning supervision, performance demonstration, and operator training
- Performance monitoring and technical support program (Eco-SERV/Eco-TRAC™/Eco-LINC™)
- 24/7 telephone access to technical services support

For more information, or to request a quick proposal, visit our website or contact:

Eco-Tec Inc.
1145 Squires Beach Road
Pickering, Ontario
Canada L1W 3T9
Phone: (1) 905-427-0077
Fax: (1) 905-427-4477
ecotec@eco-tec.com

Eco-Tec Western Canada
Suite 332, 400 5th Avenue SW
Calgary, Alberta
Canada T2P 0L6
Phone: (1) 403-303-2855
Fax: (1) 905-427-4477
ecotec@eco-tec.com

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