Metal Finishing

Improved Efficiencies Through Acid Purification

eco-Tec

A Kovalus Company

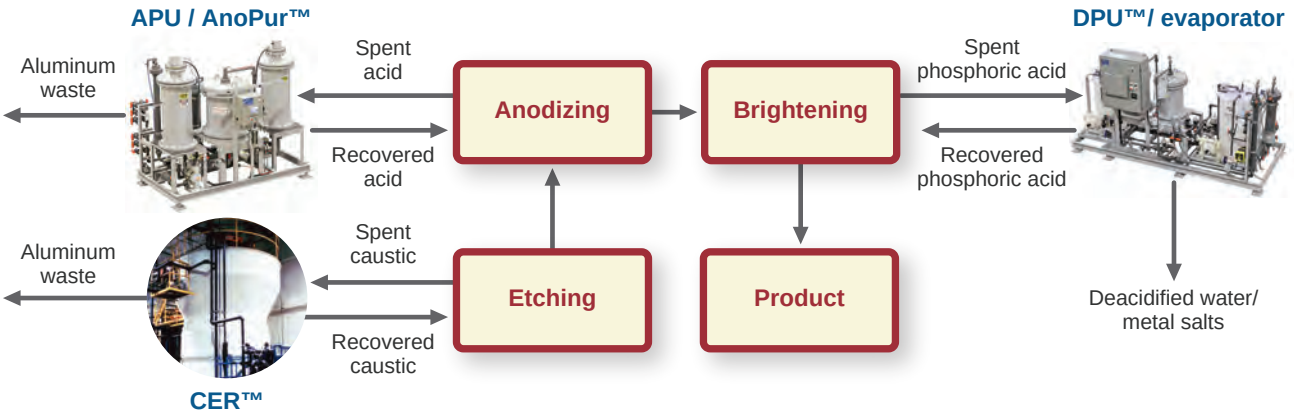
How can KSS help you?

Proven, Innovative and Unique Ion Exchange Experience

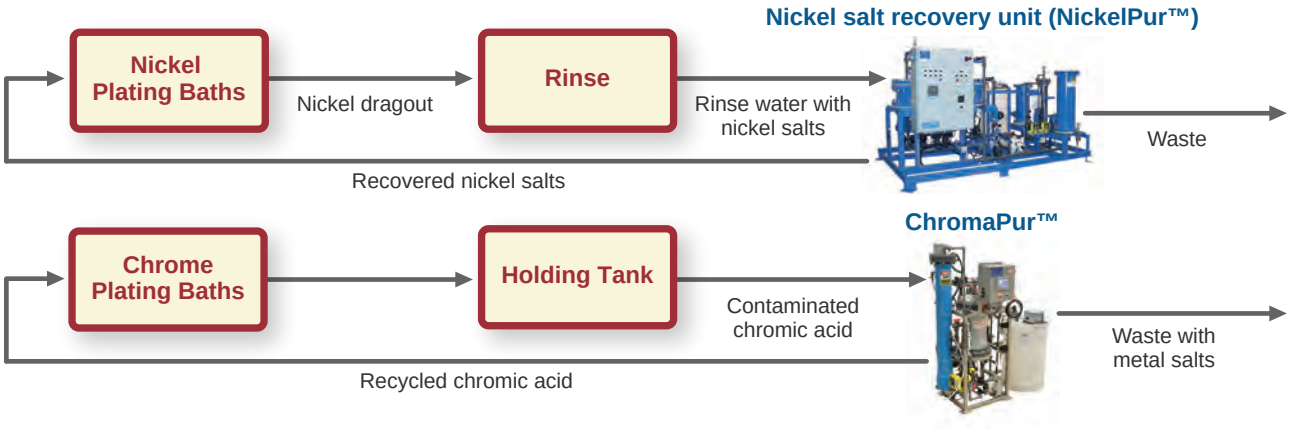
KOVALUS SEPARATION SOLUTIONS™ (KSS) is a global leader in innovative process separation technology. In addition to the world's largest membrane-based product portfolio, we have expanded to incorporate the proprietary ion exchange systems developed by Eco-Tec, a leader in water treatment and chemical recovery and purification.

Established in 1970 in Ontario, Canada, Eco-Tec engineers a range of ion exchange systems based around the proprietary Recoflo® fine mesh resins. Recoflo relies on a compressed shallow resin bed and short cycles of loading and counter-current regeneration for a smaller footprint and resin volume, lower costs, and longer resin lifetime.

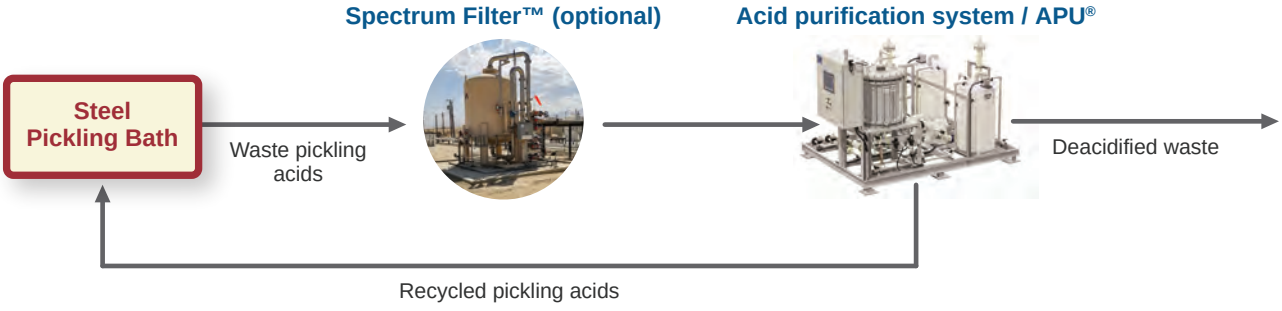
Aluminum Anodizing Process



Nickel and Chrome Plating Process



Steel Pickling Process



Major Applications

Acid Purification in Aluminum Finishing

Aluminum provides an ideal base for surface finishing for a number of consumer goods, automotive trim, and architectural building products, among many others. The majority of aluminum finishing wastes are treated with pH neutralization and solid separation processes. Eco-Tec has developed a range of products specifically designed to recover and purify acid in the aluminum finishing process, ultimately reducing acid purchases and neutralization costs, eliminating bath dumping, and improving product quality and consistency.

The Acid Purification Unit (APU™) is used to continuously remove dissolved aluminum from acids to minimize aluminum concentration in the bath and maintain stability. It uses a resin sorption process to separate acid from the dissolved aluminum before it contaminates the anodizing acid. The APU can be used for purification of various acids and mixtures, including hydrochloric acid, hydrochloric and acetic acid, nitric acid, phosphoric acid, and sulfuric acid.

Benefits

- Reduced acid and waste neutralization costs
- Consistent quality and chemical composition
- Pre-assembled, pre-programmed, skid-mounted, and pre-tested units
- Conversion of recovered waste aluminum to by-product of commercial value
- Reduced waste sludges and waste salt concentration

Major Applications

Purification of Sulfuric Acid from Aluminum Anodizing Baths

Sulfuric acid is commonly used in aluminum anodizing to dissolve aluminum oxide which gradually accumulates until the solution needs to be dumped and replaced with fresh acid. Eco-Tec technology continuously removes dissolved aluminum from sulfuric acid to maintain consistently low concentrations. This eliminates bath dumping, minimizes replacement acid costs, and ensures a reliable and predictable operation leading to overall product quality and production improvements.

Based on Eco-Tec's APU, the AnoPur™ unit is specifically adapted for the purification of sulfuric acid in aluminum anodizing. This small, factory assembled, skid-mounted equipment package features a resin bed, piping, valves, and controls. It is connected to one or more anodizing tanks to continuously remove dissolved aluminum in the tank. This is achieved using a simple process where the anodizing solution is passed through a resin bed where the sulfuric acid and dissolved aluminum are separated. The resin is periodically and automatically regenerated using only water.

Benefits

- Reduction in acid purchases
- Fewer shutdowns
- Less treatment and disposal costs
- Reduced electrical and cooling requirements
- Lower discharge of dissolved salt
- Improved product finish and simplified coloring

Major Applications

Caustic Etch Recovery in Aluminum Anodizing

Etching or chemical milling uses caustic soda – an aggressive and corrosive alkaline chemical – as a precursor to aluminum anodizing to remove grease, oil, dirt, and contaminants from the product surface. This is often the greatest operating expense in the aluminum finishing process, being associated with significant environmental impacts. Many plants opt to recycle these chemicals to reduce chemical, waste treatment and labor costs, and enhance product quality.

Based on the Bayer process, the Eco-Tec Caustic Etch Recovery (CER™) system continuously crystallizes and removes dissolved aluminum from caustic soda etchants and recycles the caustic. Automatic precipitation of aluminum liberates caustic soda which is returned to the bath. The resulting aluminum trihydrate crystal material is periodically removed from and sold to aluminum manufacturers

The CER system can reduce caustic soda purchases by up to 95% and dramatically reduce aluminum waste sludge generation.

Phosphoric Acid & Mixed Acid Recovery

Phosphoric brightening provides a highly reflective finish to aluminum items like automotive and appliance trim, lighting fixtures, bathtub enclosures, and shower doors. Most plants collect their phosphoric acid after rinses at a 35% solution that is reused as fertilizer feedstock, but Eco-Tec developed the Phosphoric Acid Recovery System to purify the rinses of aluminum and return phosphoric acid to the bright dip.

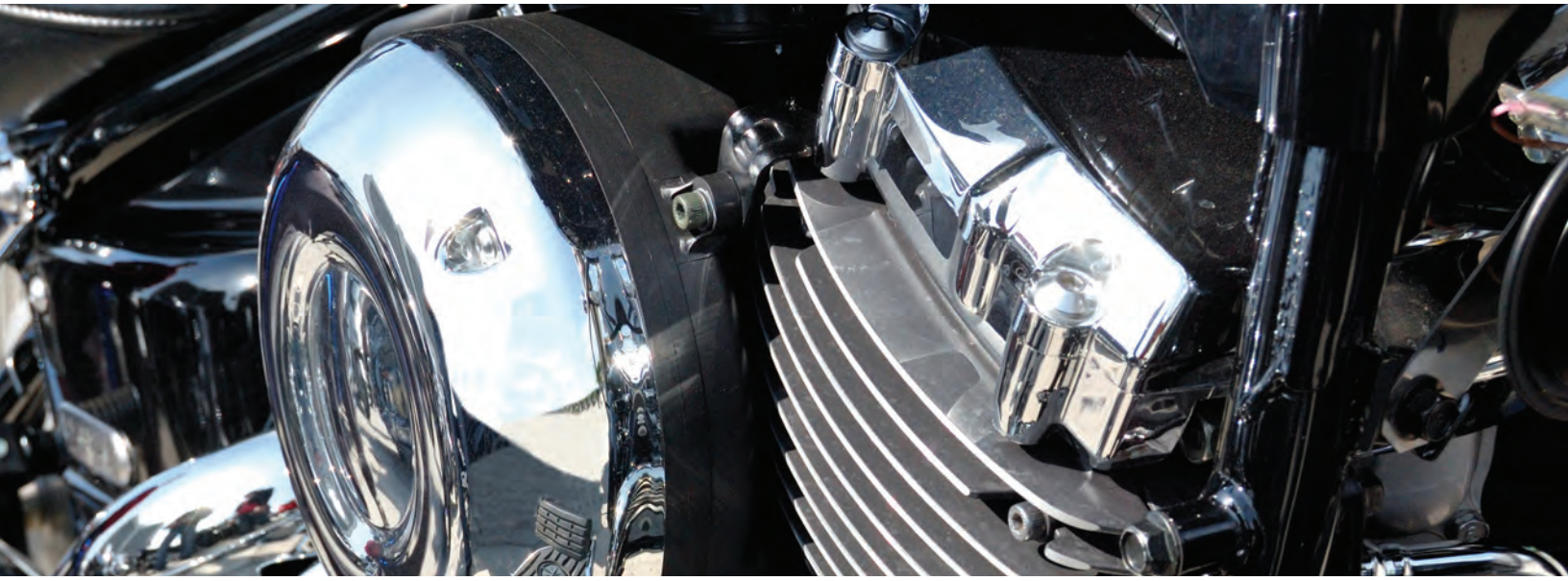
The Eco-Tec DPU™ is a factory assembled, skid-mounted unit featuring two resin beds with piping, valves, and controls. It uses high efficiency cation exchange with acid sorption to minimize regenerant acid consumption. The DPU uses only about 15% of the sulfuric acid for regeneration compared to conventional cation exchangers,resulting in up to 85% reductions in phosphoric acid purchases for aluminum brightening.

Major Applications

Contaminant Removal in Chrome Plating

In hard chrome plating processes, metal contaminants build up in the plating bath leading to a decline in performance as measured by longer plating times, higher voltages, and frequent plating defects. Bath replacement becomes necessary, a costly and time-consuming procedure.

Eco-Tec's ChromaPur™ is a small, skid-mounted device that automatically processes chromic acid plating solution from one or more plating tanks. It is based off the Recoflo ion exchange bed, which removes metallic contaminants and allows purified chromic acid to pass through for reuse. The system can be further optimized by selecting the most suitable range of metal contaminants between 5 and 15 g/L.



Benefits

- Reductions in chromic acid purchases
- Minimized waste treatment costs
- Elimination of bath dumping
- Improved plating performance for better product quality
- Enhanced solution conductivity reduces electrical requirements

Major Applications

Nickel Recovery in Electroplating

Nickel drag-out is a normal operational occurrence that results in nickel salt loss and sludge generation. Both the replenishment of the nickel and sludge waste disposal can increase operational costs and impact operational efficiency.

Eco-Tec's NickelPur™ nickel recovery unit utilizes Recoflo ion exchange technology to recover over 95% of nickel dragged out from plating baths into the rinses. It does not recover brighteners, allowing for the recycle to semi-bright tanks. Sodium from rinse water is also rejected to prevent buildup in the plating tank. The recovered nickel chloride/ nickel sulfate product is concentrated, purified, pH adjusted and recycled to the plating bath.

Stainless Steel Pickling Acid Purification

Stainless steel pickling is used to remove a thin layer of metal off of stainless-steel parts using acid. For an efficient process, the metal concentration must be controlled within a specific range. This is commonly achieved by decanting or dumping the acid and making up with fresh acid, resulting in high costs of acid disposal or treatment and replacement acid, as well as variations in product and production and quality.

Eco-Tec adapted its proven APU to provide continuous purification of stainless-steel pickling acids, resulting in significant cost savings. This MicroPur™ system uses a resin sorption process and simple water wash to recover acid. The system is comprised of a high-performance Spectrum Filter and APU unit itself, to minimize acid losses during solids removal and acid cooling to prevent the dangerous reaction of hot nitric acid and resin.

Benefits

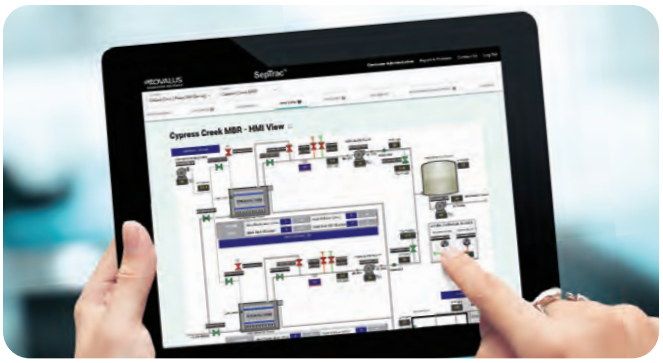
- Dramatically reduce pickle line downtime
- Eliminate acid dumping and sludge clean-out
- Consistent pickling acid composition
- Low metal concentrations
- Reduced nitrate in waste effluents (up to 70%)
- Enhance operator safety
- Improved downstream wastewater treatment operation

KOVALUS SEPARATION SOLUTIONS

KOVALUS SEPARATION SOLUTIONS™ (KSS) is a global leader in separation technologies. With best-in-class domain expertise, technologies and systems, KSS is uniquely positioned to help customers purify and recover valuable process streams and achieve sustainability goals across food and beverage, life science, and general industrial markets.

Services & Support

After-Sales Services & Maintenance Programs • SepTrac™ Smart System



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