IONNET®

Electrowinning Metal Recovery System

PMPC

Precious Metals Processing Consultants, Inc.
430 Bergen Blvd.
Palisades Park, NJ 07650
Tel: 201-944-8053 Fax 201-944-8003

E-Mail info@preciousmetals-pmpc.com
website: www.preciousmetals-pmpc.com

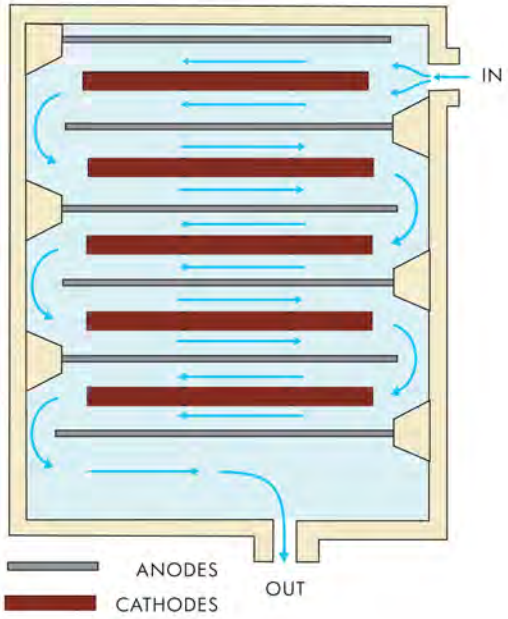
THE PROBLEM

- Removing the metal content from large volumes of solutions that contain either heavy or precious metals dissolved within them.
- Recovering these metals easily and economically for reuse or sale.

THE SOLUTION

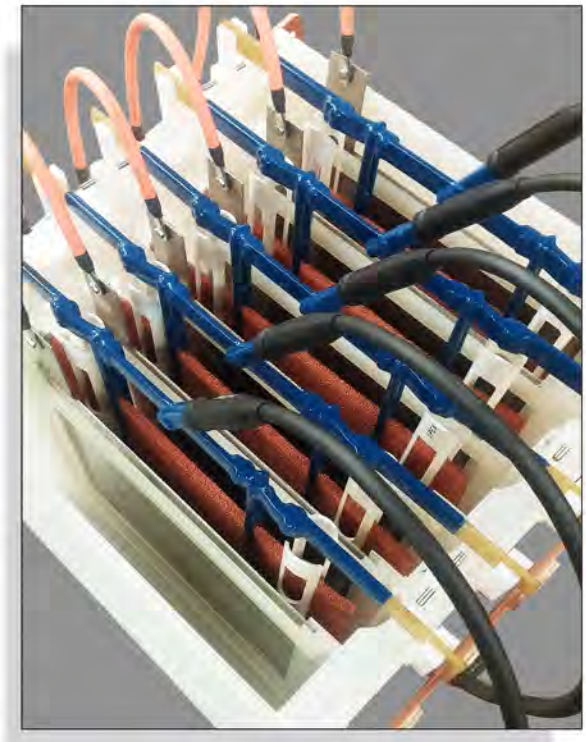
The Ionnet® system. A serious recovery system without the bells and whistles. Just pure recovery power in an elegantly simple design, inexpensively priced.

TOP VIEW



What distinguishes the Ionnet® from other electrowinning systems?

Two things: The expanded surface area cathodes and the unique solution flow design.



Oblique Top View

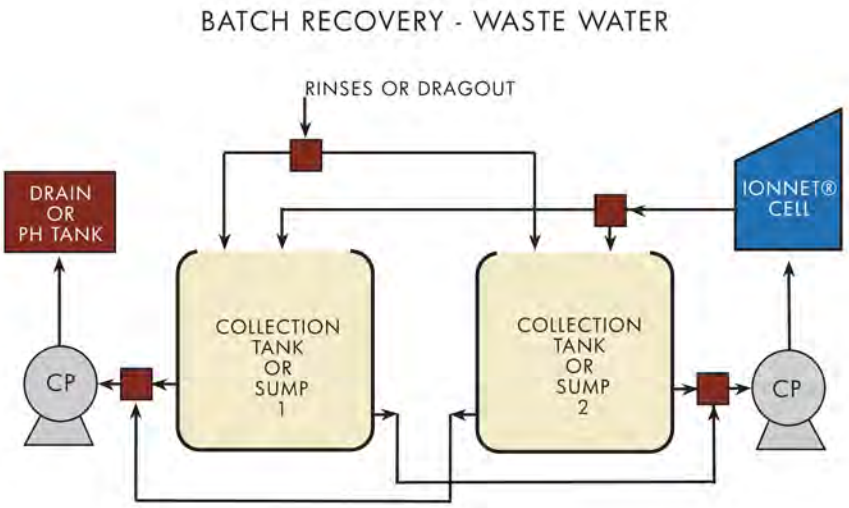
How does it work?

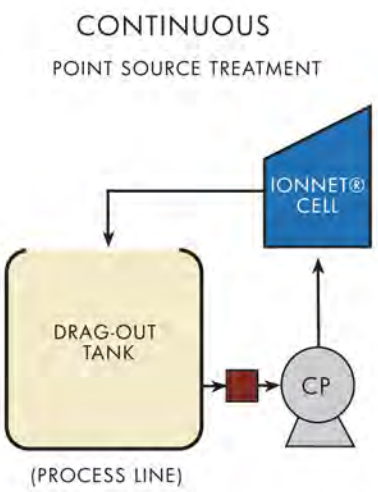
As the metal bearing stream enters the Ionnet® cell, it is channeled in a serpentine path through a series of electrolytic chambers, each containing two anodes sandwiching a cathode. The turbulence created at the cathode interface insures high plating efficiency, translating into fast plate-out to very low concentrations. The metal deposits on and within the cathode. Any non-adherent solids which tend to accumulate during the electrowinning process are swept to the cell bottom and contained for convenient draining (the electrodes are raised 3" above the cell floor to eliminate the possibility of the solids causing a short circuit). Each Ionnet® cathode can hold up to thirty pounds of metal (150 lbs. for the whole cell). The system is designed for easy access to all electrodes.

What are some of the applications for the Ionnet®?

The Ionnet® can be used to remove and recycle metals in the following ways:

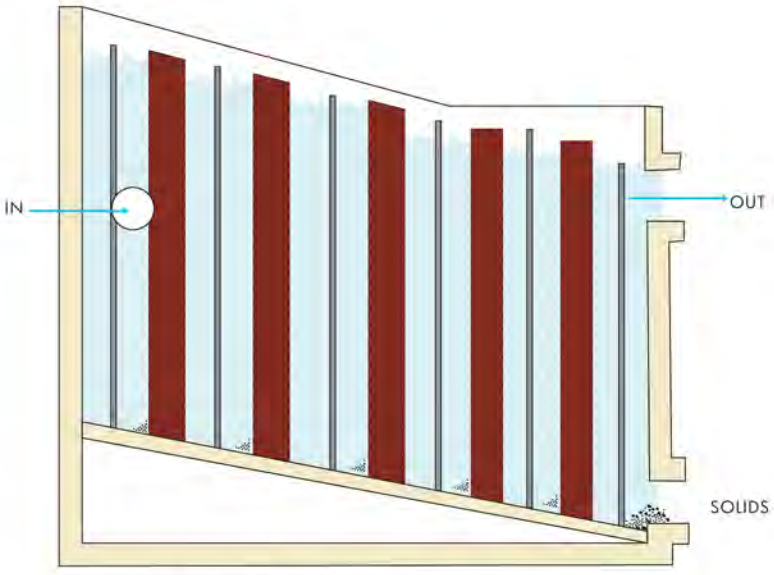
1) On a batch basis from a spent plating bath or other metal-bearing solution
2) On a continuous basis from a primary drag-out rinse in order to ameliorate or completely preclude precipitation or ion-exchange
3) On a batch basis to recycle ion-exchange regenerant





What are some of the various solution types for typical applications?

Copper sulfate, copper cyanide, cadmium cyanide, gold cyanide (stripper solutions), various nickel solutions, palladium, palladium nickel, silver cyanide, electro-less copper



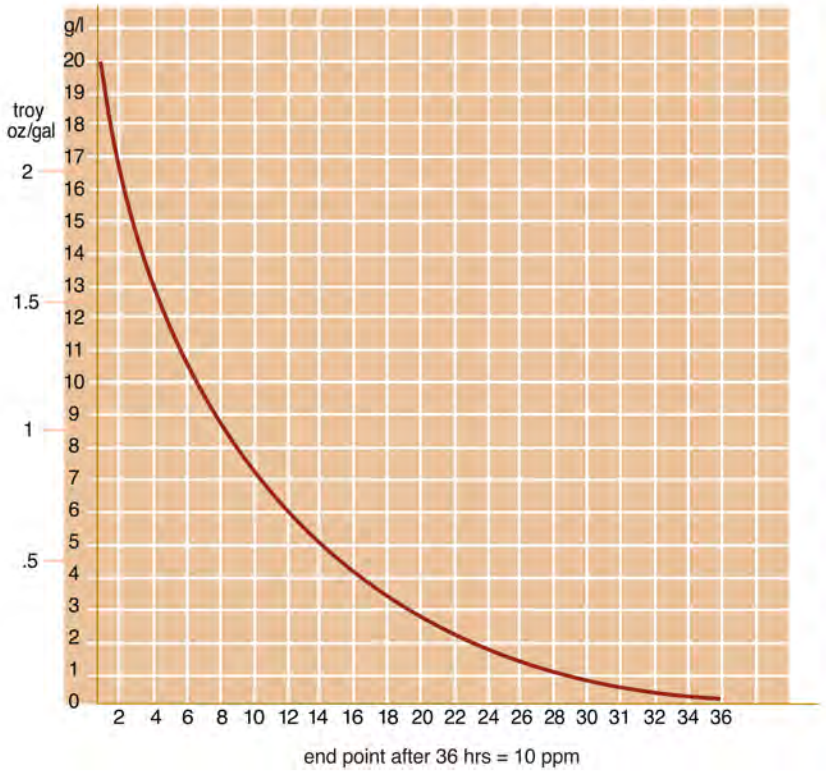
CROSS SECTIONAL SIDE VIEW

Where are my cost savings using the Ionnet® system as opposed to sludging?

Waste disposal costs are rising due to limited landfill sites, administrative costs, transportation costs, etc. Any metal that can be electrolyzed as opposed to sludged, immediately turns a liability into an asset. The metal-laden electrodes are saleable as scrap metal. Also important is the reduced possible future liability associated with shipping to a landfill.

792 Gallons - 3,000 liters @ 450 A.

CYANIDE GOLD STRIPPER SOLUTION



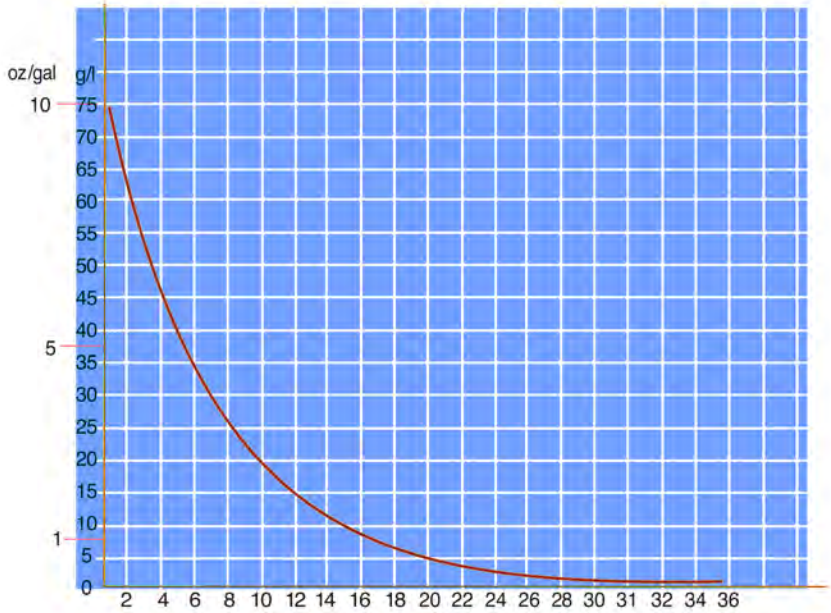
end point after 36 hrs = 10 ppm

How low can you go?

Dependent upon solution, treatment time, solution volume, and current; concentrations below .5 ppm are attainable.

106 Gallons - 400 liters @ 400 A.

ACID COPPER



end point after 36 hrs = .5 ppm

Is the concentration of cyanide affected by use of the Ionnet®?

Yes, it has been reported that 99+% of the total cyanide in a 500 gallon solution was destroyed in 96 hours of operation at 400 amps. In fact, some of our customers have reported that the "external economy" of cyanide destruction is more important to them than the metals recovery aspect. Any cyanide destruction is helpful to the ultimate disposal of the solution.

Individually Fused Cells

What about safety?

There are two risk factors associated with electrolytic systems: The possibility of a fire resulting from short-circuiting of the electrodes and the possibility of explosion from the combustible gases that can sometimes accumulate. Every individual cell in the Ionnet® system is fused. In addition to this, the rectifiers that we can provide have a DC overload relay circuit that we consider important. With regard to explosion, our system is designed to eliminate any confined area where gases can accumulate. As a result, this risk is minimal.

OPERATING INFORMATION	
Power Requirements:	220 V. AC 3 Phase
Maximum Output Current:	500 AMPS. DC
Maximum Output Voltage:	9 V.
Total Cathode Surface Area:	Approx. 100 ft^2
Operating Temperature:	Room Temp to 135° F
Dimensions :	24" x 22' x 28"
Recovery Capacity:	> 150 lbs.
Shipping Weight:	Approx - 170 lbs.

CONCLUSION

Wherever possible, the first line of attack should be electrolysis. Even if electrolysis can not completely solve the problem, any reduction of sludge attained through electrolysis will mean a large cost saving. The Ionnet® system is by far, the least expensive alternative to attain this goal. Even though the price of our system is less than half that of competitive systems, do not let the price fool you. Call us to arrange a trial unit for a nominal rental charge.

Letters From A Few Of Our Customers

Central Metal Finishing, Inc. 80 Flagship Drive, North Andover, MA 01845,
978.291.0500

www.cenmet.com

Randy Epner
Precious Metals Processing Consultants, Inc.
430 Bergen Blvd.
Palisades Park, NJ 08750

Dear Randy:

Central Metal Finishing, Inc. is an AS9100 and Nadcap approved metal finishing facility. We operate in a very fast paced buisness enviroment and can't afford to have down time that can impact delivery to our customers. We have been using your lonnet system on our cadmium barrel line for approximatley 8 months now to reduce levels of cadmium drag-outs to sub ppm levels. Our cyanide level is reduced nearly as low.

As a result our labor costs and down time for changing rinses has signifigantly reduced. Waste treatment costs have also dropped substantially and we are using less water. We are also using your "Gold Bug" technology as part of our silver reclaim process with equally satisfactory results and plan to purchase additional Gold Bugs. Both systems are low on maintenance and highly reliable.

Sincerely,

Peter Cox
CMF Technical Director

High Performance Conductors, Inc.

James G. Chandler
1570 Campton Road
Inman SC 29349
*Phone (864) 472-0436 * Fax (864) 472-0403*

Randy Epner
Precious Metals Processing Consultants Inc.
430 Bergen Blvd.
Palisades Park, NJ 07650
*Phone 201-944-8053 * Fax 201-944-8003*

August 24, 2006

Dear Randy,

In the spring of 2006 we were looking for a better way to recover our silver from our spent plating baths. The current practice was to send the baths out for reclamation. There were exorbitant costs associated with both the processing and the transportation of this practice.

After viewing several units we made the decision to try the lonnet system made by Precious Metals Processing Consultants, Inc. Once the unit was set up and running in a production environment it literally paid for itself within a few weeks. We started toying with the idea of purchasing multiple units but then we came to the realization that this one unit was capable of handling all our needs. Thanks Randy for inventing a product that far exceeded our expectations.

Sincerely

James G. Chandler

Precious Metals Processing Consultants, Inc.
430 Bergen Blvd.
Palisades Park, NJ 07650
Attn: Randy Epner

Dear Randy:

At American Electro Products, Inc., we do a very significant volume of silver plating. As a result, we need to change our silver dragouts frequently. Because they contain a relatively low concentration of silver for which we had no effective process to recover, we were unable to recover all of the silver. When we heard about your lonnet system, we were uncertain if it would be cost effective. But since you offered to let us try it with no obligations, we did.

We're glad we did! The lonnet unit works very quickly and efficiently. We batch treat 300 gallons of silver dragout at a time containing about 1000ppm. It takes about 8 hours to reduce the concentration to <10ppm. We are recovering far more silver than we expected and the unit paid for itself within several months. Because the expanded surface area cathodes you provide melt easily, our refiner is able to easily recover the silver.

As a bonus, it takes very little labor. We pump in the solution, turn the unit on, and we're done. When we come back, the silver is removed. The lonnet unit has definitely been a product well worth our investment.

Best regards,

Armand J. Daigle
Process Engineer

American Electro Products, Inc. 1338 Thomaston Avenue, Waterbury, CT 06704 (203) 756-7051

EPNER TECHNOLOGY INC

April 22, 2016

Dear Randy,

I know, I know! It took me 3 years to finally try your Lonnet System on our electro-less copper bailout, after using it for years on our silver rinses, and of course, your Gold bugs, everywhere.

Yeah…I should have done it 20 years ago, but even you did not know how well it would work back then. So let me tell you just how well it works:

In the past, we had been treating this constant waste by standard means, with all the concomitant labor, chemicals, and other costs. Now, we put 400 gallons of the deep dark blue bail-out solution in a tank, just turn a switch, and within 24 hours the solution appears to be crystal clear, and the concentration of copper is down below .3 ppm! If we wanted, we could bring it down to .1 ppm or even lower. With just the formaldehyde left we could easily oxidize this, pH adjust the solution, and dispose directly to the sewer…if we had a sewer! That is how well this system works. It's so straight forward and simple, and of course maintenance free. This has changed everything! Kudos to you.

Best Regards,

Stephen Candiloro

25 Division Place Brooklyn, N.Y. 11222
Phone (718)-782-8722 Fax (718)-782-4999
Website www.EPNER.com
Email Info@Epner.com