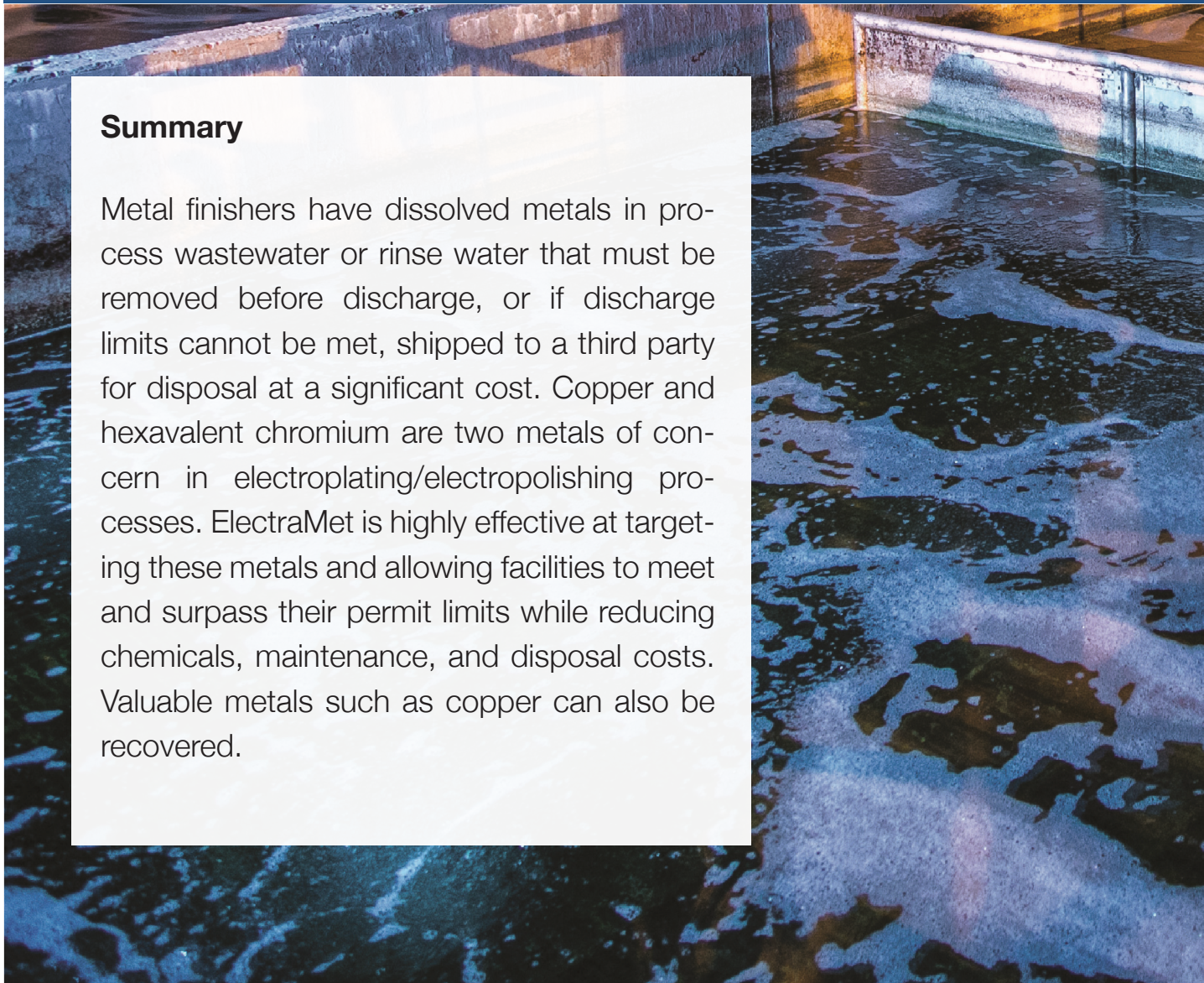


## ElectraMet™ Removes Dissolved Metals from Metal Finishing Rinse Water and Wastewater to Meet Discharge Compliance

### Summary

Metal finishers have dissolved metals in process wastewater or rinse water that must be removed before discharge, or if discharge limits cannot be met, shipped to a third party for disposal at a significant cost. Copper and hexavalent chromium are two metals of concern in electroplating/electropolishing processes. ElectraMet is highly effective at targeting these metals and allowing facilities to meet and surpass their permit limits while reducing chemicals, maintenance, and disposal costs. Valuable metals such as copper can also be recovered.



## Project Background

ElectraMet and three clients worked together to evaluate the ElectraMet system, a chemical-free metals separation process, for metals removal from wastewater. For these clients, we demonstrated:

- ElectraMet removal rates up to 99% for dissolved copper and hexavalent chromium.
- The ability to recover trace copper from complex streams as a copper sheet.
- A fully automated and chemical-free process to meet discharge compliance.

## Results

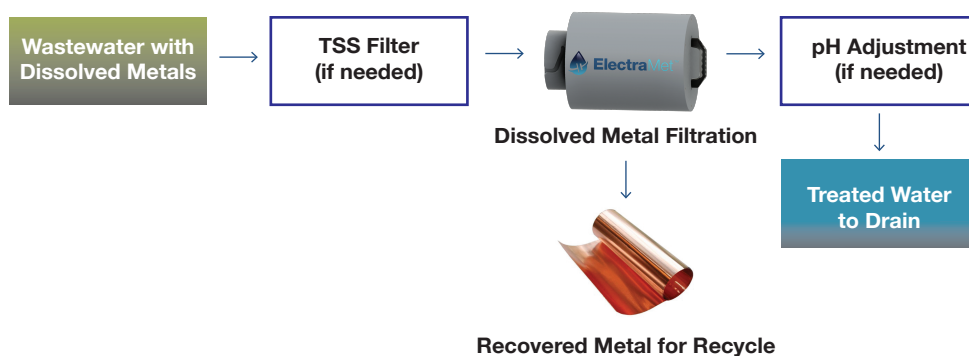
ElectraMet can replace, or be installed as a post-treatment to, a manufacturer's existing chemical wastewater treatment system, reducing overall chemical treatment cost and improving consistency to meet discharge requirements. ElectraMet successfully treated various customers' wastewater streams to meet discharge compliance for hexavalent chromium and/or copper. Pure copper sheets were recovered from a complex wastewater stream being generated at an electroplating facility while also meeting the client's discharge limits.

Customer Application	Contaminant	Wastewater Input (ppm)	Treated Output (ppm)
Steel Coatings	Cr(VI)	2000	0.02
Electroplating	Cr(VI)	115	0.292
	Cu	3000	1.4
Electropolishing	Cr(VI)	178	0.08

## How ElectraMet™ Works

The ElectraMet process uses a small amount of electricity to attract and target specific metals for removal and/or recovery. Clean water is sent to the drain or reused in the plant. Copper is collected within the ElectraMet cartridge and can be recovered as a copper sheet and sold as a new revenue source. Hexavalent chromium is converted to trivalent chromium for further processing and disposal downstream.

## Process for Electrochemical Separation of Dissolved Metals



## ElectraMet Dissolved Metal Filtration System



**ElectraMet Metals Separations: Effective Regions**

1 IA TA																		2 IIA 2A												18 VIIIA 8A					
1 H Hydrogen 1.008																		2 He Helium 4.003												10 Ne Neon 20.180					
3 Li Lithium 6.941				4 Be Beryllium 9.012						5 B Boron 10.811		6 C Carbon 12.011		7 N Nitrogen 14.007		8 O Oxygen 15.999		9 F Fluorine 18.998		16 S Sulfur 32.066		17 Cl Chlorine 35.453		18 Ar Argon 39.948											
11 Na Sodium 22.990		12 Mg Magnesium 24.305		3 III B 3B		4 IV B 4B		5 V B 5B		6 VI B 6B		7 VII B 7B		8 VIII 8		9 VIII 8		10 VIII 8		11 IB 1B		12 IIB 2B		13 Al Aluminum 26.982		14 Si Silicon 28.086		15 P Phosphorus 30.974		16 S Sulfur 32.066		17 Cl Chlorine 35.453		18 Ar Argon 39.948	
19 K Potassium 39.098		20 Ca Calcium 40.078		21 Sc Scandium 44.956		22 Ti Titanium 47.88		23 V Vanadium 50.942		24 Cr Chromium 51.996		25 Mn Manganese 54.938		26 Fe Iron 55.833		27 Co Cobalt 58.933		28 Ni Nickel 58.693		29 Cu Copper 63.546		30 Zn Zinc 65.39		31 Ga Gallium 69.723		32 Ge Germanium 72.61		33 As Arsenic 74.922		34 Se Selenium 78.09		35 Br Bromine 79.904		36 Kr Krypton 84.80	
37 Rb Rubidium 84.468		38 Sr Strontium 87.62		39 Y Yttrium 88.906		40 Zr Zirconium 91.224		41 Nb Niobium 92.906		42 Mo Molybdenum 95.94		43 Tc Technetium 98.907		44 Ru Ruthenium 101.07		45 Rh Rhodium 102.906		46 Pd Palladium 106.42		47 Ag Silver 107.868		48 Cd Cadmium 112.411		49 In Indium 114.818		50 Sn Tin 118.71		51 Sb Antimony 121.760		52 Te Tellurium 127.6		53 I Iodine 126.904		54 Xe Xenon 131.29	
55 Cs Cesium 132.905		56 Ba Barium 137.327		57-71 Lanthanide Series		72 Hf Hafnium 178.49		73 Ta Tantalum 180.948		74 W Tungsten 183.85		75 Re Rhenium 186.207		76 Os Osmium 190.23		77 Ir Iridium 192.22		78 Pt Platinum 195.08		79 Au Gold 196.967		80 Hg Mercury 200.59		81 Tl Thallium 204.383		82 Pb Lead 207.2		83 Bi Bismuth 208.980		84 Po Polonium [208.982]		85 At Astatine [208.987]		86 Rn Radon 222.018	
87 Fr Francium 223.020		88 Ra Radium 226.025		89-103 Actinide Series		104 Rf Rutherfordium [261]		105 Db Dubnium [262]		106 Sg Seaborgium [266]		107 Bh Bohrium [264]		108 Hs Hassium [269]		109 Mt Meitnerium [268]		110 Ds Darmstadtium [269]		111 Rg Roentgenium [272]		112 Cn Copernicium [277]		113 Nh Nihonium [278]		114 Fl Flerovium [289]		115 Uup Ununpentium [289]		116 Lv Livermorium [293]		117 Uus Ununseptium [294]		118 Uuo Ununoctium [294]	
57 La Lanthanum 138.905		58 Ce Cerium 140.115		59 Pr Praseodymium 140.908		60 Nd Neodymium 144.24		61 Pm Promethium 144.913		62 Sm Samarium 150.36		63 Eu Europium 151.966		64 Gd Gadolinium 157.25		65 Tb Terbium 158.925		66 Dy Dysprosium 162.50		67 Ho Holmium 164.930		68 Er Erbium 167.26		69 Tm Thulium 168.934		70 Yb Ytterbium 173.04		71 Lu Lutetium 174.967							
89 Ac Actinium 227.028		90 Th Thorium 232.038		91 Pa Protactinium 231.036		92 U Uranium 238.029		93 Np Neptunium 237.048		94 Pu Plutonium 244.064		95 Am Americium 243.061		96 Cm Curium 247.070		97 Bk Berkelium 247.070		98 Cf Californium 251.080		99 Es Einsteinium [254]		100 Fm Fermium 257.095		101 Md Mendelevium 258.1		102 No Nobelium 259.101		103 Lr Lawrencium [262]							

ElectraMet system shown includes filter cartridges, PLC box, 5 µm particle filter, and pump.

To learn more about this and other ElectraMet applications, please visit our website at [www.electramet.com](http://www.electramet.com) or contact us at [sales@electramet.com](mailto:sales@electramet.com).