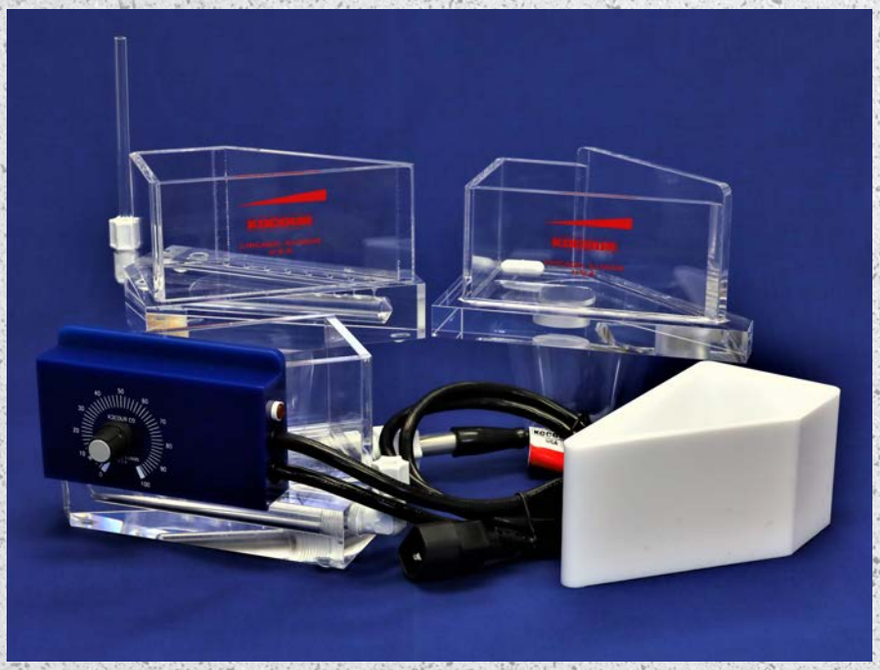
KOCOUR

Pioneers in Control for the Plating Industry Since 1923

Control and Test Equipment

Hull Cell Testing Equipment



In 1935, the E.I. Dupont De Nemours Co. asked Kocour Company to manufacture a plating test cell just developed in their laboratory. The cell, called a Hull Cell, is a miniature plating unit designed to produce a cathode deposit that records the character of electroplate at all current densities within the operating range. It is among the most useful tools available to the plating chemist for control of plating electrolytes. They provide an indispensable adjunct to standard analytical methods, enabling the skilled operator to determine and control the effects of additives, impurities and purification treatments on the plating electrolyte, many of which can be determined by no other method. Practically every plating solution can be controlled or evaluated to varying degrees by the use of the Hull Cell. Kocour Company offers a complete selection of Hull Cells, accessories and related equipment to enable the progressive plater to make the most of this useful method of plating process control.

Plain Lucite Hull Cell
267 ml. and 1000 ml.

Constructed of ¼" thick Lucite for use with room temperature plating baths. Models are available with no agitation as well as a built in manifold for air agitation.

Heated Lucite Hull Cell
267 ml. and 1000 ml.

The heated Lucite Hull Cell is constructed with a special base that accommodates a PTFE coated stainless steel immersion heater (100 watt, 115/220V AC) and thermostatic control. Models are available with no agitation as well as a built in manifold for air agitation.

Toshi Cell
500 ml.

A special cell designed for zinc-nickel bath analysis.

Solid PTFE Hull Cell
267 ml.

This cell is recommended for use with hexavalent chromium plating solutions, but it will work well for general use.

Stir Bar Lucite Hull Cell
267 ml.

The stir bar Hull Cell is constructed with a special base that has a bore to accommodate a 1" stir bar. The cell needs to be placed on a magnetic stir plate to use the stir bar. Models are available with no heater for use with room temperature baths or with a heater and thermostatic control.

Hull Cell Cathodes

Kocour Hull Cell Cathodes are highly polished to a mirror finish and surface the is fully protected. Available for both the 267 ml. and 1000 ml. Hull Cells in brass, copper and steel. Sold in packages of 50 panels.

Hull Cell Anodes

Offered in one size that fits both the 267 ml. and 1000 ml. Hull Cells. Anodes are available in the following metals:

- Brass (260)
- Cadmium
- Copper
- High Phosphorous Copper
- Lead
- Nickel
- Silver
- Tin/Lead (60/40)
- Stainless Steel (316)
- Platinized Titanium

Titanium Baskets

Allow the use of chips or buttons to duplicate actual shop conditions.

Anode Bags

Poly bags are available for anodes and baskets to provide protection against roughness.

Universal Timers

GRALab's Universal Timers feature an 8" dial with large numerals for elapsed time. Two separate 3-wire outlet receptacles are provided for automatic switching of external appliances.

Hull Cell Agitator

Designed to simulate cathode bar agitation in the Hull Cell. Available in 110V and 220V.

Air Supply

Adjustable air supply to be hooked up to the air agitation manifold on the Hull Cell.

Power Supplies – Rectifiers

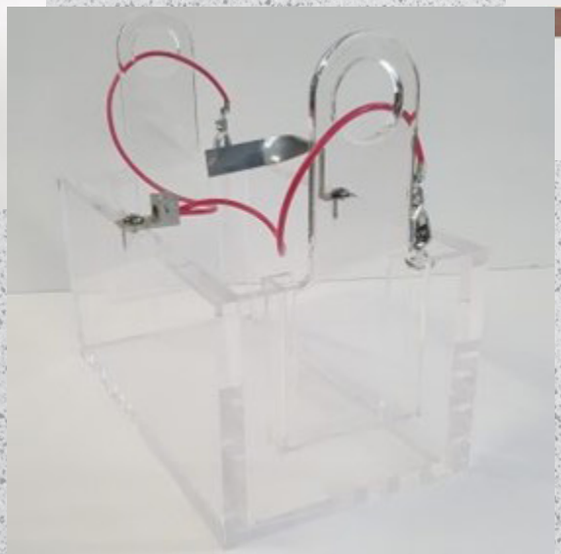
The Kocour Rectifiers for the Hull Cell Test are expressly designed units which utilize filtered circuits capable of continuously producing minimum AC ripple. This filtered current output is essential for testing many plating baths. All rectifiers are SCR with digital ammeter and voltmeter displays. They are controlled with a constant voltage and produce a ripple less than 3%. Available in 3 sizes:

- 0-9 Volt DC at 5 Amps
- 0-12 Volt DC at 15 Amps
- 0-12 Volt DC at 25 Amps

Deposit Stress Analyzer

The Deposit Stress Analyzer is an effective method of testing the internal stress of the thin metallic coatings, such as those deposited by electrolytic or electroless plating and electrocoated deposits. The testing can be done in a laboratory or on the line in the plating bath.

The internal deposit stress can be easily calculated, whether the stress is tensile or compressive, using the deposit stress analyzer and the system meets the requirements in ASTM B975. The test is run using copper or nickel test strips that are coated so only a defined area of the test strip is plated. The strips are mounted in a special plating cell and then plated in the laboratory or on the line. After the strips are plated, they can be measured using the Stress Measurement Stand and the stress can be calculated.



Analytical Control for Plating Solutions

Analytical control for the plating industry is a Kocour concept which has influenced plating throughout the world. It was pioneered during the early days when plating was more of an art than a science.

The Kocour concept is reflected in equipment designed so that even the man with "no knowledge of chemistry" can use it to obtain dependable analytical control for the plating room. On the other hand, trained chemists and skilled technicians use the same equipment for its time and labor saving features.

Kocour Analytical Sets are used to keep production plating baths at optimum operating conditions. Standardized Kocour Methods of Analysis are utilized to provide the most direct control with consistently dependable accuracy and at a minimum cost to you. All reagents are carefully prepared and checked to assure dependibility.

Anodizing & Surface Treatment

TEST SET STS	Determines total and free sulfuric acid, and aluminum content in sulfuric acid anodizing solutions
TEST SET PS	Determines nitric acid and sodium dichromate in passivating solutions
TEST SET IR-14-14	Determines Iridite 14-14 concentration
TEST SET CHROM	Test for the presence of chromate conversion coating on zinc or cadmium
TEST SET PHOSPH	Test for the presence of phosphate coatings

Cadmium & Zinc

TEST SET AZ-24	Determines zinc metal, chlorides and boric acid in acid zinc plating
TEST SET C-16A7	Determines cadmium metal, sodium carbonate, total sodium cyanide and sodium hydroxide in cyanide cadmium plating
TEST SET Z-167	Determines zinc metal, sodium carbonate, total sodium cyanide and sodium hydroxide in cyanide zinc plating
TEST SET CZ-167-6A	Combination of test sets C-16A7 and Z-167
TEST SET KZA-9	Determines zinc metal and caustic in alkaline non-cyanide zinc plating

Chromium

TEST SET KSTS/1	Determines sulfate in hexavalent chromium plating by centrifuge (110V)
TEST SET KSTS/2	Determines sulfate in hexavalent chromium plating by centrifuge (220V)
TEST SET CA	Determines Chromic acid in hexavalent chrome plating
TEST SET FEC	Determines iron contamination in hexavalent chrome plating

Centrifuge

The Kocour centrifuge is built to accommodate the specially designed Kocour centrifuge tubes. Using the Test Set KSTS (includes the centrifuge, glassware and all necessary reagents) the sulfate concentration in a hexavalent chrome bath can be read directly from the centrifuge tube.

Centrifuges come in both 110V and 220V. Replacement centrifuge tubes are available for purchase as packs of four. We also offer a thicker more durable wall “N” series centrifuge tube.

Cleaners & Pickles

TEST SET U	Determines sodium hydroxide, sodium carbonate and trisodium phosphate in cleaner solutions
TEST SET V	Determines % by weight or volume of acid (sulfuric, hydrochloric, or nitric acid) in an acid pickle solution
TEST SET UV	Combination of test sets U and V
TEST SET W	Determines the iron concentration in an acid pickle solution
TEST SET WV	Combination of test sets W and V
TEST SET UWV	Combination of test sets U, V and W
TEST SET CTS	Determines relative alkaline cleaner strength
TEST SET APTS	Determines relative acid pickle/activator strength

Copper & Brass

TEST SET AC-2	Determines chlorides in sulfate based acid copper plating
TEST SET AC-3	Determines sulfuric acid and copper sulfate in acid copper plating
TEST SET AC-4	Determines copper metal and free fluoroboric acid in acid copper plating
TEST SET H-13	Determines copper metal, free cyanide and sodium carbonate in cyanide copper plating.
TEST SET H-137	Determines copper metal, free cyanide, sodium carbonate and caustic soda in cyanide copper plating and high speed copper plating
TEST SET HY-13	Determines copper metal, zinc metal, free cyanide and sodium carbonate in cyanide copper plating and brass plating
TEST SET HY-137	Combination of test sets H-137 and HY-13

Gold & Silver

TEST SET AU	Determines gold metal in gold plating
TEST SET AU-37	Determines gold metal, free cyanide, caustic and carbonates in cyanide gold plating (less nitric reagent)
TEST SET AU -H13	Combination of test set AU and H13 (cyanide gold and copper plating)
TEST SET AU-R13	Combination of test set AU and R-13 (cyanide gold and silver plating)
TEST SET R-13	Determines silver metal, free cyanide and carbonates in cyanide silver plating
TEST SET RH-13	Combination of test sets R-13 and H-13
TEST SET AU-RH-13	Cyanide gold, silver and copper
TEST SET RH-137	Combination of test sets R-13 and H-137

Nickel

TEST SET E-24	Determines nickel metal, chlorides and boric acid in nickel plating
TEST SET EN	Determines nickel metal and hypophosphite in electroless nickel plating
TEST SET EKV-10	Determines nickel metal and hydrochloric acid in nickel strike
TEST SET NS	Determines saccharin in bright nickel plating

Tin, Tin-Zinc, Lead-Tin

TEST SET AT	Determines stannous tin and sulfuric acid in sulfuric acid tin plating
TEST SET KS-24	Determines lead, fluoroboric acid, stannous and total tin in acid lead and tin-lead plating
TEST SET T-5	Determines tin metal and sodium or potassium hydroxide in alkaline tin plating

Wastewater Analytical System

Quantofix Test Strips

Part Number	Determines	Range (ppm)	Number of Tests
CTL91301	Chromate	0-100	100
CTL91304	Copper	0-300	100
CTL91318	Cyanide	0-30	100
CTL91330	Iron	0-1000	100
CTL91305	Nickel	0-1000	100
CTL91313	Nitrate/Nitrite	0-500	100
CTL91329	Sulfate	0-1600	100
CTL91306	Sulfite	0-1000	100
CTL91310	Zinc	0-100	100

Visocolor Environmental Test Kits

Part Number	Determines	Range (ppm)	Number of Tests
CTL931020	Chromate (Hexavalent)	0.02-0.5	140
CTL931022	Cyanide	0.01-0.2	100
CTL931037	Copper	0.1-1.5	100
CTL931040	Nickel	0.1-1.5	150

pH Paper

Paper No.	pH Range
FC 0018	0.0-1.8
FC 1028	1.0-2.8
FC 1838	1.8-3.8
FC 2846	2.8-4.6
FC 3855	3.8-5.5
FC 5268	5.2-6.8
FC 6081	6.0-8.1
FC 7288	7.2-8.8
FC 8097	8.0-9.7
FC 95120	9.5-12.0
FC 10513	10.5-1.0
FC 111	1-12
CTL92110	0-14

Specialized Test Equipment

Hydrometers & Thermometers

Model	Part Number	Description
Baumé Hydrometer, 0-35 °Be	75911	Scale reads °Be and specific gravity 1.000-1.350, 12 inches long
Baumé Hydrometer, 0-70 °Be	75912	Scale reads °Be and specific gravity 1.000-2.000, 12 inches long
Platers Floating Thermometer	075914 NM	Scale reads 0-220°F and 20-110°C, 12 inches long (non-mercury)
Pocket Thermometer	75916	Range 0-220°F, 6 inches long
Dial Thermometer, Stainless Steel	75917	Range 50-300°F, 8 inch long stem
Chrometer	75918	Reads 15-55 oz/gal chromic acid

Stalagmometers

Model	Part Number	Desciption
Stalagmometer (2.5mL)	75920	Used to measure the surface tension and control of wetting agents for nickel, acid copper, acid zinc and acid dip tanks.
Stalagmometer (5.0mL)	75922	Used to measure the surface tension and control of wetting agents for hexavalent chrome.
Stalagmometer Kit (2.5mL)	75921	Kit includes stalagmometer, stand, bulb, beaker, counter and clamp
Stalagmometer Kit (5.0mL)	75924	Kit includes stalagmometer, stand, bulb, beaker, counter and clamp
Accessories Only	75025	Stand, bulb, beaker, counter and clamp

General Laboratory Equipment

Kocour offers a variety of general laboratory equipment including beakers, bottles, burets, flasks and pipets. A complete list of equipment and pricing can be found on our website (www.kocour.net).

Thickness Testing System – Model 6000

More experience equals more versatility. This is why Kocour packs more capability into its thickness testers than anyone, and Kocour hands it all to you in a compact, easy to-use, quick-learning instrument. The 6000 breaks new ground and sets new standards in accuracy and performance with an exceptional combination of capability and price. Recognized as the developer of the first commercial coulometric tester, more Kocour testers are in use today than all other competitors models combined.

The 6000's microprocessor based circuitry offers access to over 300 coating/substrate applications. From parts as small as a #2 screw to as large as an electro-galvanized coil, or from multilayer coatings to alloy layers formed during or after manufacturing, the 6000 meets the demands of modern industry with unmatched precision.

Specification

- Models for 115V and 230V, 50 or 60Hz
- 98%+ Accuracy
- Meets requirements of ASTM Specifications B504, B298, B355 and ISO Standard 2177.

Applications

- Measures almost all electro-deposited metals on metallic or nonmetallic substrates.
- Measures multiple coatings and gives individual readings.
- Measures thin coatings such as decorative chrome and gold with readings in the millionths of an inch.
- Measures the electro chemical potential difference between duplex and triplex nickel layers (STEP).
- Measures plating thickness on wire.

NF6M Stand
Versatile and simple with connecting cable and air agitation system.

Wire Accessory WT
Stand WT plugs directly into the 6000 and measures the thickness of plating on wire from 8 to 45 gauge.

Thickness Standards

To ensure accurate performance of the 6000, a periodic check should be made utilizing Kocour Thickness Standards. The standards are uniformly plated disks that guarantee and accurate measurement. When necessary, calibration adjustments are easily made. All standards are N.I.S.T. traceable.

Kocour offers Stock Standards that are common plating/substrate combinations and thicknesses. Plating layers and substrates not listed in the Stock Standards table can be made upon customer request, as well as varying thicknesses. Standards with multiple plating layers can also be made upon request.

Stock Standards

Part No.	Plating/Substrate	Nominal Thickness	
350-D01	"STEP"/Steel	600 µ-in	(15.0 µm)
350-D02	"STEP"/Copper	600 µ-in	(15.0 µm)
350-S01	Cadmium/Brass	500 µ-in	(12.7 µm)
350-S02	Cadmium/Copper	500 µ-in	(12.7 µm)
350-S03	Cadmium/Steel	500 µ-in	(12.7 µm)
350-S04	Chromium/Brass	200 µ-in	(5.0 µm)
350-S05	Chromium/Copper	200 µ-in	(5.0 µm)
350-S06	Chromium/Nickel	20 µ-in	(0.5 µm)
350-S07	Chromium/Steel	200 µ-in	(5.0 µm)
350-S08	Copper/Steel	500 µ-in	(12.7 µm)
350-S09	Copper/Zinc	250 µ-in	(6.2 µm)
350-S10	Gold/Brass	25 µ-in	(0.6 µm)
350-S11	Gold/Copper	25 µ-in	(0.6 µm)
350-S12	Gold/Nickel	25 µ-in	(0.6 µm)
350-S13	Nickel/Brass	500 µ-in	(12.7 µm)
350-S14	Nickel/Copper	500 µ-in	(12.7 µm)
350-S15	Nickel/Steel	500 µ-in	(12.7 µm)
350-S16	Silver/Brass*	500 µ-in	(12.7 µm)
350-S17	Silver/Copper*	500 µ-in	(12.7 µm)
350-S18	Silver/Steel	500 µ-in	(12.7 µm)
350-S19	Tin/Copper*	500 µ-in	(12.7 µm)
350-S20	Tin/Brass*	500 µ-in	(12.7 µm)
350-S21	Tin/Steel	500 µ-in	(12.7 µm)
350-S22	Tin/Steel	30 µ-in	(0.8 µm)
350-S23	Zinc/Brass	500 µ-in	(12.7 µm)
350-S24	Zinc/Copper	500 µ-in	(12.7 µm)
350-S25	Zinc/Steel	500 µ-in	(12.7 µm)

*These standards are only accurate for six months due to formation of copper-tin or copper-silver inter-metallic layer

Notes:

- All thicknesses are listed on the standards in Mils and Microns.
- Stock Standards are certified to ±5% of the listed thickness. All Specialty Standards will be certified to ±10% of the listed thickness.

STEP Testing

Special equipment is required to run the STEP test using the 6000. The NF6MS Stand is used along with the Chart Recorder to plot the potential difference between the nickel layers.

Chart Recorder

Used with the NF6MS Stand to measure the STEP of duplex and triplex nickel plating.

Test Solution and Standard Applications

• Applicable, samples required for evaluation.

Substrate / Coating	Brass	Cadmium	Chromium	Cobalt	Copper	Gold	Indium	Iron	Lead	Nickel	Electroless Nickel	Nickel-Iron Alloy	Tin	Tin-Lead	Tin-Zinc 78/22	Silver	Zinc
Aluminum	R-44	R-45	R51	•	R-44			•	R-55	R-54	R-57	•	R-51	R-49		R-44	R-46
Aluminum Bronze		•	•	•	R-44					•	•	•	•	•	•	•	•
Beryllium Copper		•	•	•	R-52	•		•		•	•	•	•	•	•	•	•
Brass		R-45	R-47	R-54	R-52	R-56	R-59		R-55	R-54	•	R-54	R-47	R-49	R-47	R-48	R-46
Cadmium			R-47		R-52								R-47				
Chromium	•	•		•						R-54							
Cobalt	•	•	R-47										•		•	•	•
Copper	R-44H	R-54	R-47	R-54		R-56	R-59	R-51	R-55	R-54	•	R-54	R-47	R-49	R-47	R-48	R-46
Copper Tungsten Alloy	•	•		•	•	•				•				•		R-48	•
Electroless Nickel	•	•	•	•	•	R-50		•		•		•	•		•	•	•
Inconel	•	•	R-51	•	•	•		•		R-54	•	•	•	•	•	•	•
Inconel 600	•	•	R-51	•	•	•		•		•	•	•	•	•	•	•	•
Kovar	•	•	•		R-44	•		•	R-55	R-53	R-57		•	•	•	•	•
Lead					R-52			•								•	•
Magnetic Stainless Steel		•	•	•	•	•		•		•	R-57	•	•	•	•	•	•
Molybdenum					R-44					R-54			•				
Nickel		R-45	R-51		R-44	R-56	R-59		R-55				R-47	•	•	R-48	R-46
Nickel-Iron Alloy	•	•	R-51	•	R-44			•			•		•	•	•	•	
Nickel-Silver		•	R-47		•			•		R-54			R-47			R-48	
Non-metallic	R-44	R-45	R-51	•	R-44	•		•	R-55	R-54	R-57	·	R-47	R-49	R-47	R-44	R-46
Silver					R-44				R-55	R-54							
Silver-Tungsten Alloy																R-48	
Stainless Steel	•	•	R-51	•	•	•		•		•	•	•	•	•	•	•	•
Steel	R-44	R-45	R-51	R-54	R-44		R-59	•	R-55	R-54	R-57	R-54	R-47	R-49	R-47	R-44	R-46
Tin									R-55							R-48	R-46
Tungsten		R-45			R-44					R-54							
Zinc Alloys			R-58		R-52												

Pioneers in Control of the Plating Industry Since 1923
ISO 9001:2015 Certified

KOCOUR

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