

# THICKNESS STANDARDS

ISO 9001:2000 Certified



## *Kocour Standards For the New Millennium*

Pioneers in Control for the Plating Industry Since 1923



- ❑ CERTIFICATION — All Standards are certified as to average thickness
- ❑ STANDARDS TRACEABLE TO NIST — Standards are traceable to N.I.S.T. by the weight per unit area method
- ❑ CONFORMANCE TO ASTM AND ISO STANDARDS — Standards are produced to conform to applicable ASTM and ISO standards, controlled to  $\pm 5\%$  of the certified thickness
- ❑ STEP STANDARDS — A variety of Standards are available to measure Simultaneous Thickness and Electrochemical Potential to meet Automotive requirements
- ❑ MULTIPLE COATINGS STANDARDS — Kocour Company can provide a wide variety of multiple coating Standards to enable calibration on a single "spot"
- ❑ ALLOY STANDARDS – VERIFICATION OF ALLOY — Standards with alloy or co-deposition can be provided with verification of alloy or minor metal co-deposition content within  $\pm 2\%$  desired content
- ❑ THICKNESS MAPPING — Through mapping techniques, Kocour Company can provide detailed thickness distribution data to enable more precise and reliable calibrations for your instruments

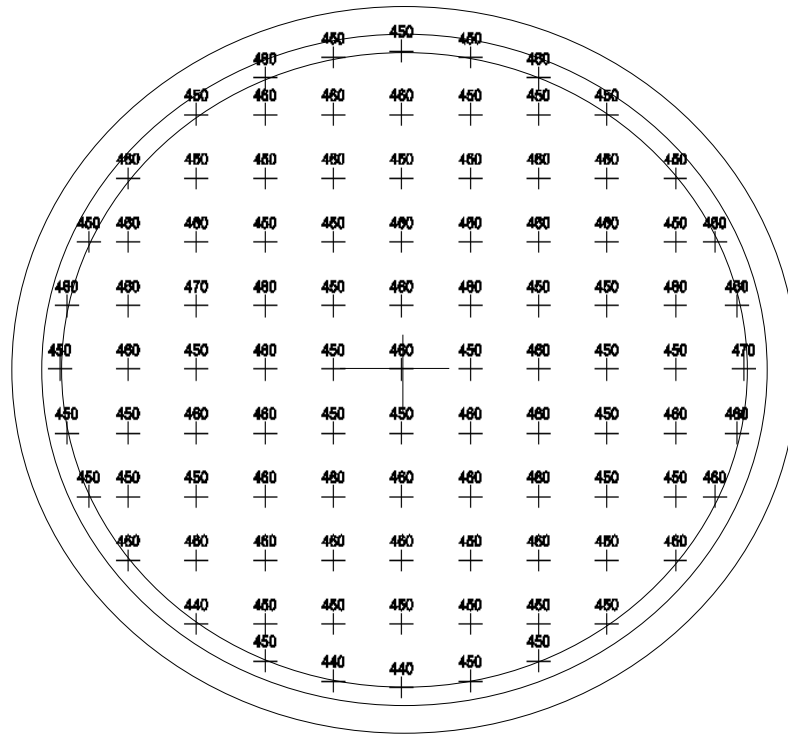
Preparing the Coatings Industry for the 21<sup>st</sup> Century



## Introducing Standards Mapping

With the advent of quality systems, it has become increasingly critical to properly calibrate Thickness Testing instrumentation. This improvement in identifying more precisely the thickness across the face of the Kocour Thickness Standard will assist you in meeting the more stringent requirements of your Quality System elements.

Kocour Company is pleased to introduce "grid" mapping to provide you with a more precise evaluation of thickness across the face of the Kocour Standards. With this added benefit you can more accurately calibrate your Kocour Thickness Testers. More rigorous requirements under various certification programs (QS 9000 and ISO 9001 ) require your thickness measurements to be more accurate and reproducible.



POINT MAP: ZN(460 µinch) over Steel

The mapping as illustrated above will help in your calibration requirements by identifying slight variations in thickness and guiding you to those specific areas of the calibration standard. This map will allow you to more narrowly (precisely) calibrate your instrument, resulting in more accurate and reproducible subsequent production part thickness measurements. The outer circle represents the standard 2.50" base disc. The next circle in represents the plated area with a diameter of 2.31". The inner most circle represents the outermost mapped points which are 1/16" inside the plated perimeter.



# Standards Capability List

TOPCOAT <sup>D J G</sup>											
	BRASS <sup>H</sup>	CADMIUM <sup>H</sup>	CHROMIUM <sup>K</sup>	COBALT	COPPER <sup>H</sup>	GOLD <sup>K</sup>	INDIUM	IRON	LEAD <sup>H</sup>	NICKEL <sup>H</sup>	NICKEL - IRON ALLOY
THICKNESS <sup>E</sup> SUB-STRATE <sup>F</sup>	0.025-1.0 mil 0.635-25.4 μM	0.025-1.0 mil 0.635-25.4 μM	0.025-0.40 mil 0.635-10.2 μM	0.025-1.0 mil 0.635-25.4 μM	0.025-1.0 mil 0.635-25.4 μM	< 0.020-0.20 mil < 0.508-5.1 μM	0.025-0.40 mil 0.635-10.2 μM	0.025-1.0 mil 0.635-25.4 μM	0.025-1.0 mil 0.635-25.4 μM	0.025-1.0 mil 0.635-25.4 μM	0.025-0.40 mil 0.635-10.2 μM
Aluminum <sup>A</sup>	●	●	●	○	●	●		○	●	●	○
Brass	●	0.50	0.20	○	●	0.025	○		●	0.50	○
Copper	●	0.50	0.20	○	●	0.025	○	○	●	0.50	○
Phos. Brz. or Be Cu	●	●	●	○	●	●		○	●	●	○
Kovar <sup>C</sup>	●	●	●		●	●		○	●	●	
Solid Nickel	●	●	●		●	●	○		●	●	
Nickel, 0.2 mil over Steel	●	●	●		●	25	○		●	●	
Nickel, 2.0 mil over Steel	●	●	●		●	●	○		●	●	
Solid Silver	●	●	●		●	●		○	●	●	
Stainless Steel	●	●	●	○	●	●		○	●	●	○
Steel	●	●	●	○	0.50	●	○		●	0.50	○
Solid Zinc			●		0.25				●		
Tin											
Other Base ➡	Aluminum Bronze	Cadmium	Chromium	Copper-Tungsten Alloy	Electroless Nickel	Inconel	Inconel 600	Lead	Magnetic Stainless Steel	Silver-Tungsten Alloy	
Other Base ➡	Molybdenum	Nickel-Iron Alloy	Nickel-Silver	304-Stainless Steel	Tungsten	Uranium	Zinc Alloys				

"0.50" Value in a given box represents a Stock Standard  
 ● Special Standards -- Call for pricing and delivery  
 ○ Special Application Standards — Call to discuss application and/or specific topcoat/substrate combinations

## NOTES:

- A. Specify flash coating. Copper, Nickel and Electroless Nickel are available.
- B. Certification of % tin available at added cost.
- C. Invar and Tungsten bases available.
- D. Alloys: Sn-Ni, Zn-Ni, Sn-Co, Sn-Zn and Pd-Ni are available as a special order.
- E. All thicknesses are listed in mils (mil).  
 Multiply mils by 1000 to get μm  
 Multiply mils by 25.4 to get Micrometers (μM)  
 Divide mils by 1,000 to get inches
- F. Standard steel base metal thickness is 0.030". Other thicknesses are available for many substrate materials.
- G. All special standards will be prepared to within ± 10% of the requested average thickness. Standards within ± 5% of the requested average thickness are available at added cost.
- H. For coatings in excess of 1.01 mil, call for pricing.
- I. Tin and Tin-Lead plated copper and copper alloy standards deteriorate after 6 months due to the formation of a copper-tin inter-metallic layer.
- J. Multiple coatings are available at added cost.
- K. Call Kocour Company for prices of coating thicknesses under 0.025 mil (25 μm) or that exceed maximum listed values.
- L. Tin-Lead Alloy compositions other than 60/40 or 90/10 are available at added cost.
- M. Phosphorus content Standards other than 6 - 8% are available at added cost.



# Standards Capability List

TOPCOAT <sup>D J G</sup>											
	ELECTRO- LESS NICKEL <sup>K M</sup> (6-8%)	PALLADIUM <sup>K</sup>	RHODIUM <sup>K</sup>	SILVER <sup>H</sup>	TIN <sup>H I</sup>	TIN- LEAD 60/40 <sup>B H I</sup>	TIN- LEAD 90/10 <sup>B H I</sup>	TIN-ZINC 78/22	ZINC (ALK, CHL,CN) <sup>H</sup>	ZINC SULFATE <sup>H</sup>	STEP (TOTAL)
THICKNESS <sup>E K</sup> SUB- STRATE <sup>F</sup>	0.025-0.40 mil 0.635-10.2 µM	< 0.020-0.20 mil < 0.508-5.1 µM	< 0.020-0.20 mil < 0.508-5.1 µM	0.025-1.0 mil 0.635-25.4 µM	0.025-1.0 mil 0.635-25.4 µM	0.025- 1.0 mil 0.635- 25.4 µM	0.025- 1.0 mil 0.635- 25.4 µM	0.025-1.0 mil 0.635-25.4 µM	0.025-1.0 mil 0.635-25.4 µM	0.025-1.0 mil 0.635-25.4 µM	0.40-1.0 mil 10.2-25.4 µM
Aluminum <sup>A</sup>	●	●	●	●	●	●	●		●	●	●
Brass	●	●	●	0.50	0.50	●	●	○	●	0.50	●
Copper	●	●	●	0.50	0.50	●	●	○	●	0.50	0.60
Phos. Brz. or Be Cu	●	●	●	●	●	●	●	○	●	●	●
Kovar <sup>C</sup>	●	●	●	●	●	●	●	○	●	●	●
Solid Nickel	●	●	●	●	●	●	●	○	●	●	
Nickel, 0.2 mil over Steel	●	●	●	●	●	●	●	○	●	●	
Nickel, 2.0 mil over Steel	●	●	●	●	●	●	●	○	●	●	
Solid Silver	●	●	●	●	●	●	●		●	●	●
Stainless Steel	●	●	●	●	●	●	●	○	●	●	●
Steel	0.20	●	●	0.50	0.500/ 0.030	●	●	○	●	0.50	0.60
Solid Zinc											
Tin				●						●	
Other →	Aluminum Bronze	Cadmium	Chromium	Copper- Tungsten Alloy	Electroless Nickel	Inconel	Inconel 600	Lead	Magnetic Stainless Steel	Silver- Tungsten Alloy	
Other →	Molybdenum	Nickel-Iron Alloy	Nickel-Silver	304- Stainless Steel	Tungsten	Uranium	Zinc Alloys				

SEE PRIOR PAGE FOR NOTES.

### CHROMIUM OR NICKEL ON STEEL STANDARDS FOR CALIBRATION OF MAGNETIC TYPE COATING THICKNESS GAGES

The standards are Solid Chromium on a 0.050" steel base. The solid chromium provides excellent resistance to wear and guarantees minimum variance for the life of the standard. The density used for calculation of the thickness is 6.94 g/cm<sup>3</sup>.

One set consists of a bare base and four (4) chromium over steel standards at approximately 0.2, 0.5, 1.0 and 2.0 mils. (Stock No: 3-55-MG1).

Nickel on Steel Standard sets consist of a bare base and four (4) nickel over steel standards at approximately 0.1, 0.4, 0.6 and 0.8 mil. (Stock No: 3-55-MG2). The density used for calculation of the thickness is 8.9 g/cm<sup>3</sup>.

The standards are certified on the basis of the weight per area. The manufacturing controls maintained are: Area plated ± 0.9%; Weight plated ± 0.2%; Max. variance over area of disc ± 2.0%.

### Thickness

Thickness	Stock No.
0.24 mil (6.1 µM)	3-75-302
0.50 mil (12.7 µM)	3-75-303
1.00 mil (25.4 µM)	3-75-306

### MYLAR VERIFICATION FOILS

0.75 mil (18.8 µM)	3-75-304
1.00 mil (25.4 µM)	3-75-305
0.20 mil (5.1 µM)	3-75-307
0.38 mil (9.6 µM)	3-75-308
1.50 mil (38.1 µM)	3-75-309
2.00 mil (50.8 µM)	3-75-313
3.00 mil (76.2 µM)	3-75-321
4.00 mil (101.6 µM)	3-75-325
5.00 mil (127.0 µM)	3-75-329
7.00 mil (177.8 µM)	3-75-333
10.00 mil (254.0 µM)	3-75-337
15.00 mil (381.0 µM)	3-75-345
20.00 mil (508.0 µM)	3-75-349
25.00 mil (635.0 µM)	3-75-353
40.00 mil (1016.0 µM)	3-75-360

### BERYLLIUM-COPPER VERIFICATION FOILS



The Kocour Company has manufactured thickness standards since 1952 to satisfy the need for a reasonably priced consumable standard for its' line of coulometric test instruments. Since then, a system has been developed for producing standards with an overall diameter of 2.5" and a useable plated area of at least a 2.125" diameter. The area plated is closely controlled so that the weight per unit area may be determined. This is then converted to thickness with the aid of commonly accepted densities for the plated metal. The distribution of metal throughout the plated area is controlled to  $\pm 5\%$  of the certified thickness.

Kocour Company's continuing commitment to quality is evidenced by its' ISO 9001:200 certification.

In recent years, increasingly stringent quality requirements have created the need for the various thickness gaging systems to agree. This usually requires the use of standards manufactured from the same base material and plated from solutions of the same composition as the item to be tested. The Kocour Company is filling this need.

**The following A.S.T.M. Methods of Test recommend the calibration of thickness testing instruments with the use of thickness standards.**

**B244** — Measurement of thickness of anodic coatings on aluminum and of other non-conductive coatings on non-magnetic basis metals with Eddy-Current Instruments. (ISO 2360)

**B499** — Measurement of coating thicknesses by the magnetic method: Non-magnetic coatings on magnetic basis metals. (ISO 2178)

**B504** — Measurement of thickness of metallic coatings by the Coulometric method. (ISO 2177)

**B530** — Measurement of coating thicknesses by the magnetic method: Electrodeposited nickel coatings on magnetic and non-magnetic substrates. (ISO 2361)

**B567** — Measurement of coating thicknesses by the Beta-Backscatter method. (ISO 3453)

**B568** — Measurement of coating thicknesses by X-Ray Spectrometry. (ISO 3497)

**ALL KOCOUR THICKNESS STANDARDS  
ARE TRACEABLE TO THE  
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY**

This catalog lists most plateable coatings.  
The Kocour Company is pleased to submit quotations for coatings and substrates that do not appear on this list.

*PLEASE NOTE: To the best of our knowledge all Standards are as described and the limit of our liability shall not exceed replacement of a defective Standard.*

**Pioneers in Control for the Plating Industry Since 1923**



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