Topseal 693

Silver Anti-tarnish

UYEMURA
USA

Post Treatments for PM Protection

	Sealing 691 EL (electrolytic process)	Sealing 692 EL (electrolytic process)	Topseal 693 (Immersion process)
Application	Technical Applications (Connectors, PCB, Lead frames…)		Non organic post treatment for high temperature resistance (>200°C)
Applied by	Voltage	Voltage	Immersion
Application Time	3 to 10 sec	3 to 10 sec	3 - 30 s
Ph of the solution	Acidic	Basic	Strongly Acidic
Primary Protection	Silver, Gold, PdNi	Silver, Gold, PdNi & Pt	Silver
Secondary Protection	Cu, Ni, …	Cu, Ni,…	NA

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Inorganic post-treatment process protects silver surfaces in high temperature environments

- Aqueous immersion process
- Free from CFCs, CHCs, HCs and chromium
- Thiol-free
- Suitable for high-speed processes
- Non-foaming
- Ideal for technical components such as contacts
- High temperature resistance
- Low contact resistance
- Good adhesion characteristics

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Operating Conditions

	Optimum	Process Range
Type of treatment	Immersion (with agitation)	Immersion (with agitation)
Concentration	150ml/l	150 – 300ml/l
Temperature	50°C	20°C – 60°C
Ph value	Strongly acidic	No control required
Immersion time		
Rack/Barrel	20s	10s – 120s
Reel-to-reel	10s	2s – 10s

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Process Sequences for Rack/Barrel Systems

1. Plated parts
2. Static rinse
3. Rinse
4. Rinse (parts must be active)
5. Topseal 693
6. Rinse in deionized water
7. Dry: up to 150°C

Special note: Topseal 693 electrolyte is strongly acidic. Any residual (cyanide) silver electrolytes from previous process steps should be completely rinsed off before parts come into contact with the post-treatment.

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Properties

Color:	Unchanged
Brightness:	Unchanged
Solderability:	Protected parts can be soldered. Zero cross time: < 1 sec.
Contact resistance:	<10 m Ω with contact force >5 cN
Bondability:	Protected parts can be bonded

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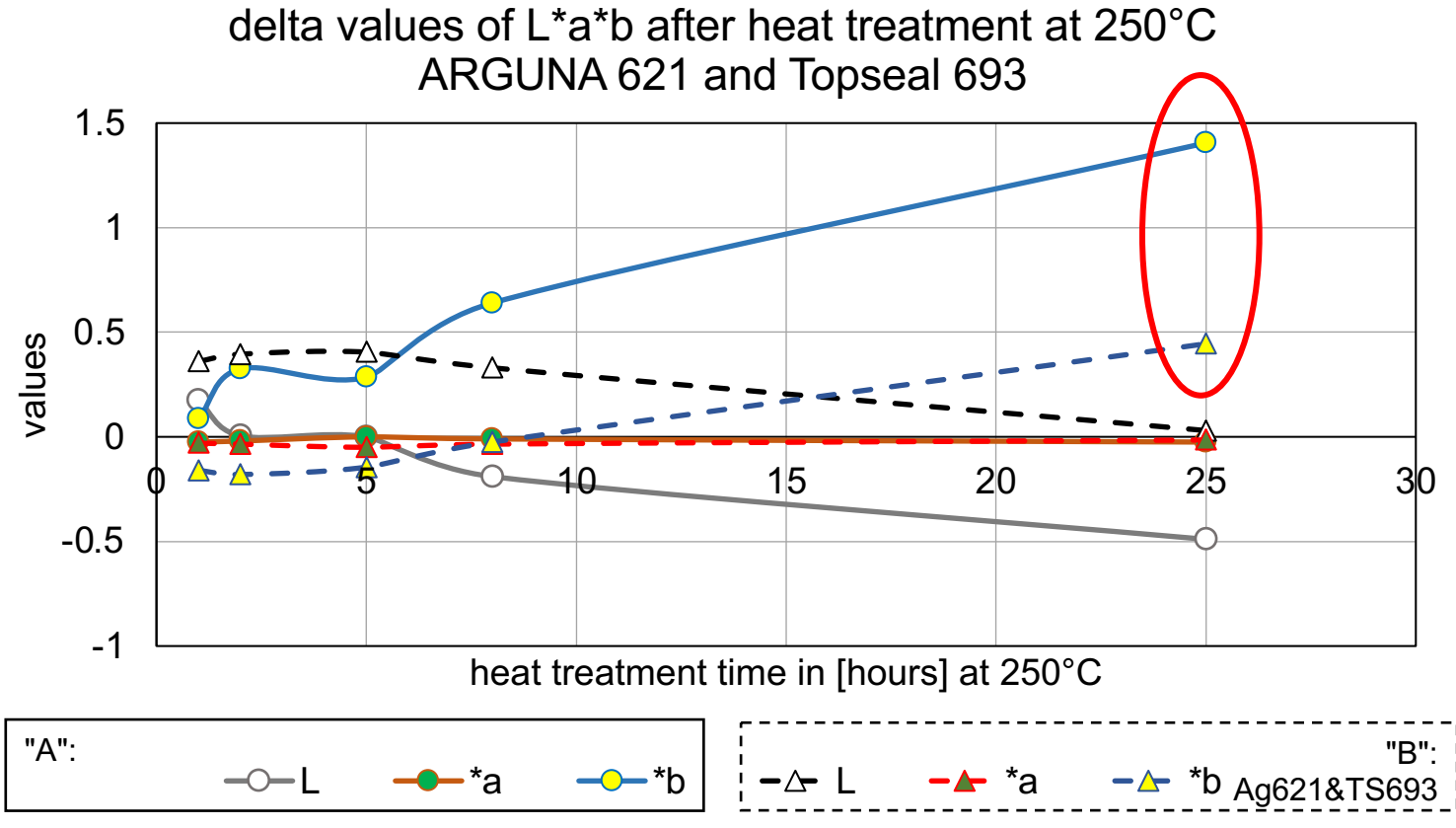
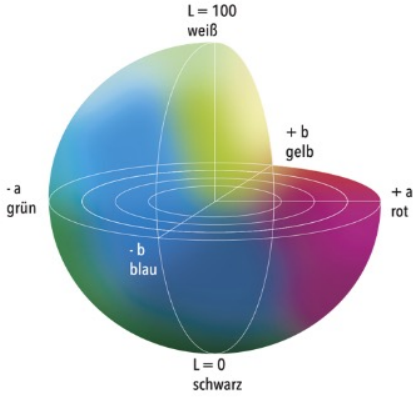
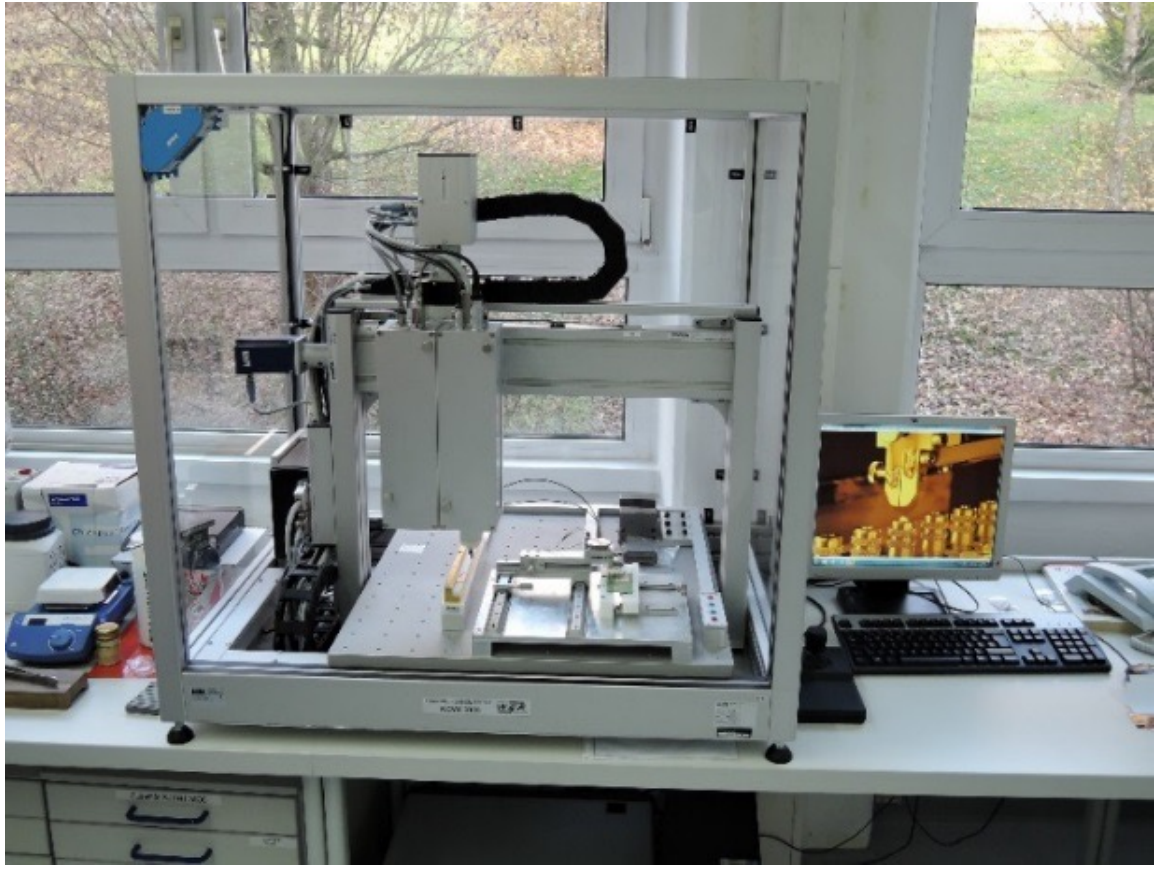
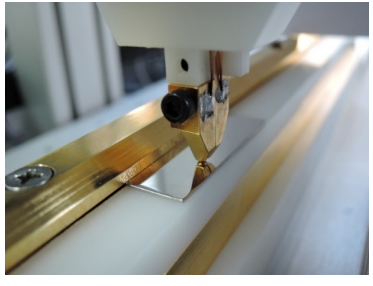
Effects of Heat Treatment

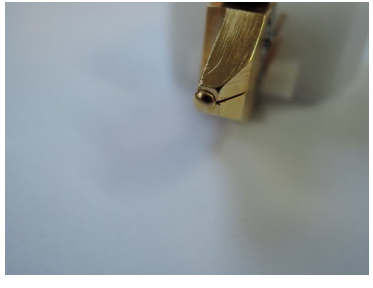




Measurement Device for Contact Resistance







"KOWI 3001“ – Manufacturer: WSK-Mess- und Datentechnik

Contact Resistance

Measuring parameter
Equipment: KOWI 3001 - WSK-Messtechnik
Specimen (measuring probe): Au contact rivet
Measuring current: 10mA
Voltage limitation: 20 mV
Contact normal force: 1 - 50 cN
Test specimen: CuZn/Ni/Ag ET/TopSeal

	Contact Force	Without Antitarnish	Topseal 693
ARGUNA ET (semi-bright pure silver as plated)	1 cN	12.1 mW	**15.0 mW**
	5 cN	6.3 mW	**7.8 mW**
	50 cN	3.2 mW	**3.3 mW**
ARGUNA ET after 200°C for 30min	1 cN	15.1 mW	**12.2 mW**
	5 cN	5.6 mW	**6.6 mW**
	50 cN	2.6 mW	**3.0 mW**

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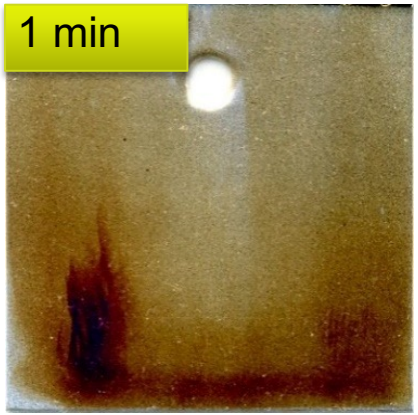
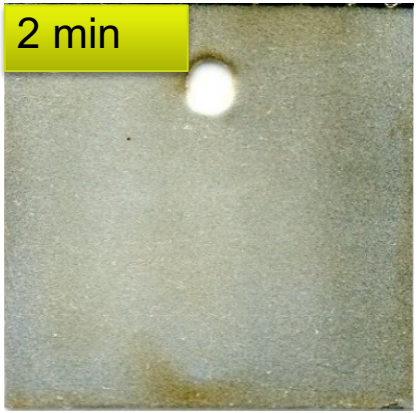
K_2S Test (2%); room temperature

ARGUNA® 621 as plated



ARGUNA® 621 & Topseal 693



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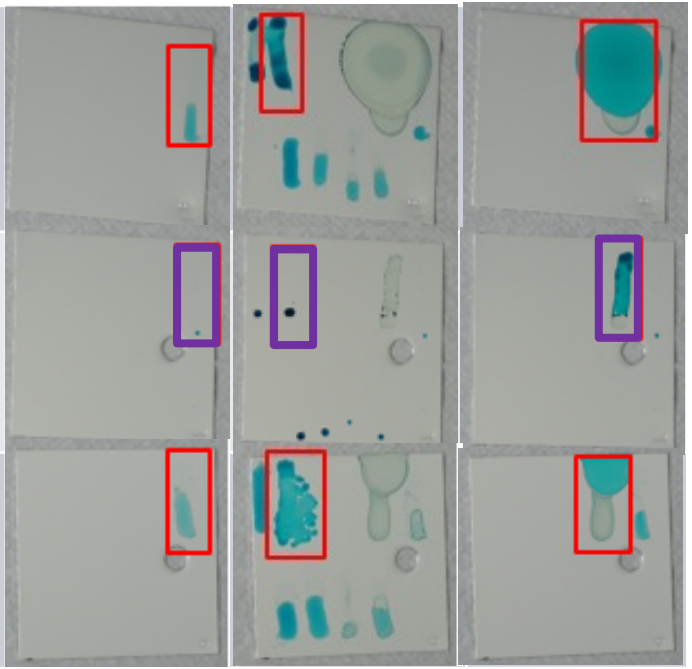
Fischer Test Ink: Arguna® ET With and Without Post Treatments

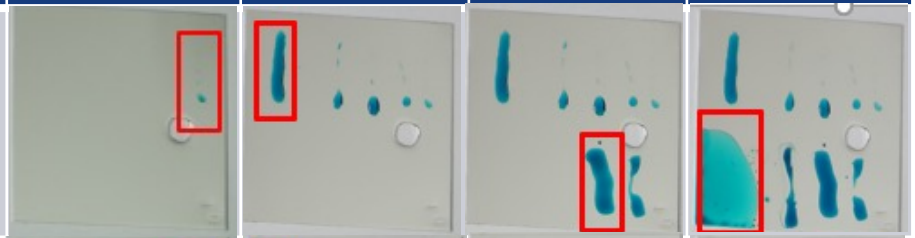
Time	70 mN/m	40 mN/m	24 mN/m
As plated			
Sealing 691EL			
Topseal 693			

Thin, invisible layer does not affect surface energy or the reactivity of pure silver. It also provides significant anti-tarnish properties.

The inherent high solderability of silver is retained.

Topseal 693

Fischer Test Ink: Arguna® 621 With and Without Post Treatments

Time	70 mN/m	50 mN/m	40 mN/m	24 mN/m
As plated				
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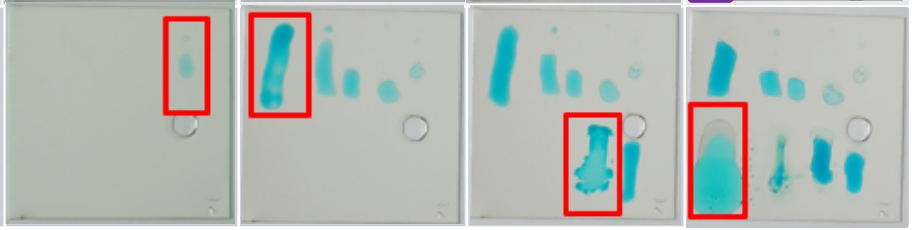
Topseal 693				

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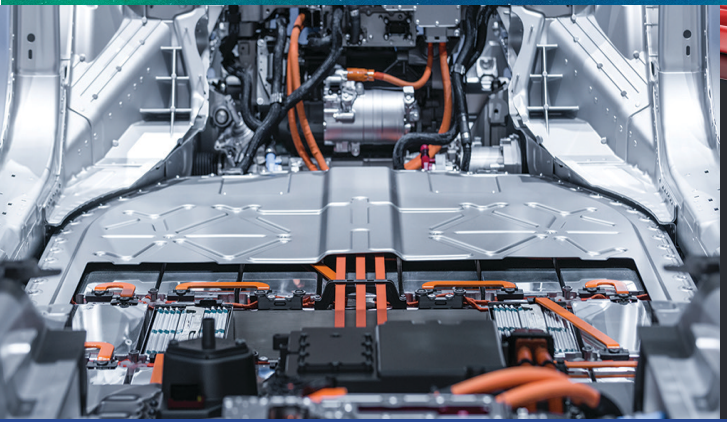

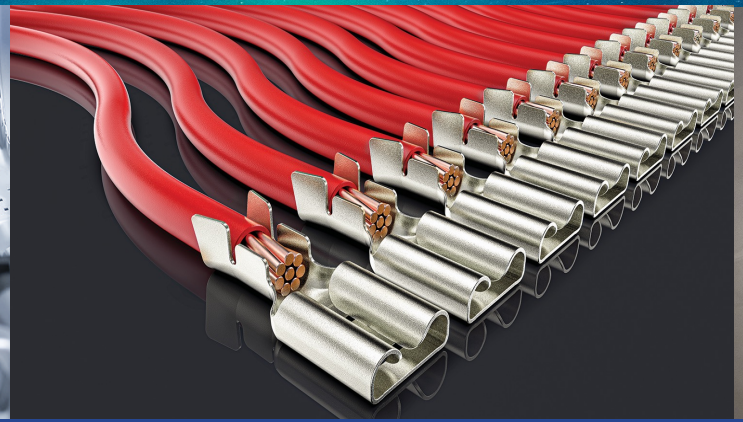

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