

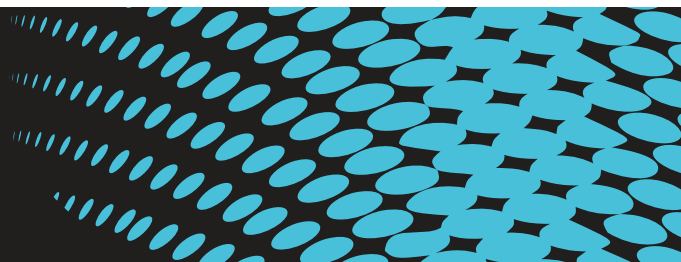
# ACI Data Sheets

Stretchable Screen-Printed Inks & Pastes  
SE1109, SE1502, and SE3104 Combination



# SE1109

## Stretchable Printed Silver Conductor



### Product Description

ACI SE1109 is a silver filled conductor for printed interconnects for devices on elastomeric substrates. After drying, the ink has excellent conductivity and offers excellent elongation and flexibility. SE1109 has been formulated for superior adhesion to thermoplastic urethanes (TPU). It is compatible with ACI's other stretchable materials. SE1109 is used in stretchable electronics and e-textile applications to power components/devices, and carry signals from embedded devices and sensors. Contact our engineering team for application specific questions.

### Product Benefits

- Superior stretch performance on TPU offering elongation greater than 200%.
- Excellent resistivity and rapid return after strain.
- Excellent adhesion to TPU.
- Washable with ACI stretchable insulator.
- Compatible with other products in ACI's stretchable electronics platform.

### Typical Performance

Volume Resistivity 135°C for 15 min in box oven	<0.017 $\Omega$ /square/mil <4.5.0 x 10 <sup>-5</sup> $\Omega$ .cm
Maximum Elongation <sup>1</sup>	>200%
Adhesion <sup>2</sup>	5B

<sup>1</sup> 2 mm wide trace cured on TPU substrate

<sup>2</sup> ASTM D3359 Method B

### Typical Properties

Physical State	Paste
Color	Silver
Viscosity <sup>3</sup>	40 Pa·s
Density	2.39 g/mL
Percent Solids <sup>4</sup>	69%
Shelf Life at 20°C	6 Months

### Typical Processing Parameters

Deposition methods	Screen printing, syringe dispense/Direct Write
Curing Time and Temperatures	5 min box oven $\geq$ 135°C 5 min in industrial conveyor oven at $\geq$ 120°C
Recommended Screen Mesh	200/230 stainless steel
Recommended Cured Thickness <sup>5</sup>	10-20 $\mu$ m
Coverage	9/11 m <sup>2</sup> /kg
Thinner/Diluent	SE8106
Clean Up Solvents	Acetone, MEK, and similar Solvents

<sup>3</sup> Anton Paar MCR302 10-1 at 25°C

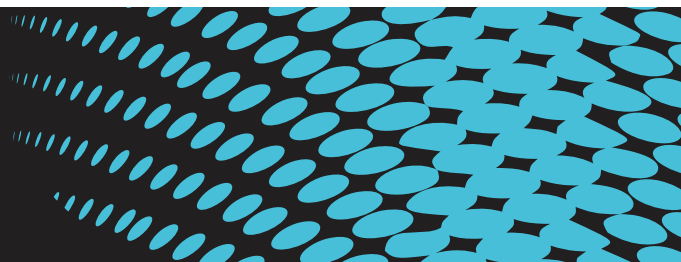
<sup>4</sup> 150 °C for 120 minutes in box oven

<sup>5</sup> Double print wet on wet or dry can be used to build thickness



# SE1502

## Stretchable Printed Carbon Conductor



### Product Description

ACI SE1502 is a carbon filled conductor for printed circuitry and devices on elastomeric substrates. It can be dried at low temperatures to accommodate sensitive substrates and devices. After curing, the ink has good conductivity and offers excellent elongation and flexibility. SE1502 has been formulated for superior adhesion to thermoplastic urethanes (TPU). It is compatible with ACI's other stretchable materials and can be printed over the silver grades in sensor applications to limit silver migration.

### Product Benefits

- Superior stretch performance on TPU offering elongation greater than 200%.
- Excellent resistivity and rapid return after strain.
- Excellent adhesion to TPU.
- Low cure temperature (80°C) is possible for temperature sensitive materials.
- Compatible with other products in ACI's stretchable electronics platform.

### Typical Performance

Volume Resistivity-120°C for 15 min in box oven	<200 Ω/square/mil < 0.5 Ω·cm
Maximum Elongation <sup>1</sup>	>200%
Adhesion <sup>2</sup>	5B

<sup>1</sup> 2 mm wide trace cured on TPU substrate

<sup>2</sup> ASTM D3359 Method B

### Typical Properties

Physical State	Paste
Color	Black
Viscosity <sup>3</sup>	37 Pa·s
Density	1.08 g/mL
Percent Solids <sup>4</sup>	20 %
Shelf Life at 20°C	6 Months

### Typical Processing Parameters

Deposition methods	Screen printing, syringe dispense/Direct Write
Curing Time and Temperatures	15 min box oven ≥ 120°C < 5 min in industrial conveyor oven at ≥120°C
Recommended Screen Mesh	200/230 stainless steel
Recommended Cured Thickness <sup>6</sup>	6-12 μm
Coverage	43/33 m <sup>2</sup> /kg
Thinner/Diluent	SE8106
Clean Up Solvents	Acetone, MEK, and similar Solvents

<sup>3</sup> Anton Paar MCR302 10 s<sup>-1</sup> a 25°C

<sup>4</sup> 150 °C for 120 minutes in box oven

<sup>5</sup> Double print wet on wet or dry can be used increase deposition thickness



# SE3104

## Stretchable Printed Insulator

### Product Description

ACI SE3104 is a screen printable, thermally cured ink that is stretchable when cured and compatible with ACI's stretchable inks. SE3104 can be used as an insulator and/or crossover dielectric. When cured, the ink displays exceptional durability, excellent flexibility, and high insulation resistance. SE3104 has excellent adhesion to TPU, and is fully compatible with ACI's suite of products engineered for stretchable and flexible electronics.

### Product Benefits

- Excellent adhesion to elastomeric substrates.
- Maintains flexibility and stretchability to more than 100% elongation.
- Good dielectric breakdown strength.
- Fully compatible with ACI's stretchable inks and conductive adhesives.

### Typical Performance

DC Breakdown <sup>1</sup>	250 V/mil
Adhesion <sup>2</sup>	5B
Maximum Elongation	100%

### Typical Properties

Physical State	Paste/Ink
Color	Translucent White
Viscosity <sup>3</sup>	33 Pa·s
Density	1.15 g/mL
Percent Solids <sup>4</sup>	32%
Shelf Life at 20°C	6 Months

### Typical Processing Parameters

Deposition methods	Screen printing		
Ideal Curing Times and Temperatures	5-15 min in box oven at 135°C 5 min in industrial conveyor oven at 135°C		
Recommended Screen Mesh Range TPI/Wire diameter	150/0.0026" – 200/0.0016" Stainless Steel 110/43µm – 140/55µm PET		
Emulsion Over Mesh (EOM) Thickness	15 µm		
Squeegee Durometer	70A – 80A		
Recommended Meshes - Theoretical Dry Film Thickness - Coverage	150/0.0026"	14 µm DFT	12 m2/kg
	200/0.0016"	9 µm DFT	15 m2/kg
	110/43µm	14 µm	12 m2/kg
	140/55µm	10 µm	15 m2/kg
Recommended # Layers	3		
Thinner/Diluent	SE8106		
Storage	In sealed containers provided in cool dry location		
Clean Up Solvents	Acetone, MEK, and similar solvents		

<sup>1</sup> Three layers printed with 180.0018 Stainless Steel mesh (ACI DC Voltage Breakdown Test)

<sup>2</sup> Method based on ASTM D3359 Method B tested on 0.005" Melinex® ST506 PET

<sup>3</sup> Measured on Anton Paar MCR302 at 10-1 sec shear rate at 25°C after pre-shearing at 100<sup>-1</sup> sec for 5 min

<sup>4</sup> 150 °C for 120 minutes in box oven





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SE1109, SE1502, and SE3104 Combination

## Contact ACI

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## Caution

Proper industrial safety precautions should be exercised in using these products. Use with adequate ventilation. Avoid prolonged contact with skin or inhalation of any vapors emitted during use or heating of these compositions. The use of safety eye goggles, gloves or hand protection creams is recommended. Wash hands or skin thoroughly with soap and water after using these products. Do not eat or smoke in areas where these materials are used. Refer to appropriate SDS information.

## Disclaimer

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