

# EL-90038

Highly Conductive Bus Bar Tape for Photovoltaic Applications/  
EMI Shielding Tape



## PRODUCT DESCRIPTION

EL-90038 is a highly conductive pressure sensitive adhesive (CPSA) supported by a tin coated copper foil carrier. The EL-90038 product was developed for use in photovoltaic and EMI shielding applications. It is suggested for use as a bus bar in many thin film photovoltaic designs. The tin coated copper is an electronic grade foil and possesses oxidation and corrosion resistance to undesirable byproducts generated during elevated temperature encapsulation of photovoltaic modules and over the life of said modules. Adhesives Research's patented approach to creating an interpenetrating network of adhesive and filler makes the adhesive itself conductive and eliminates possible insulating effects inherent to an acrylic adhesive. The conductive filler package also allows for direct Z axis contact between the tin coated copper backing and the substrate of interest. EL-90038 provides an ideal balance of adhesion and electrical performance.

The acrylic adhesive is a firm high performance PSA, which resists creep and maintains excellent electrical and adhesive properties at elevated temperatures, in humid environments, and upon exposure to thermal shock when encapsulated in a photovoltaic module.

## FEATURES

- 1.0 mil (25  $\mu$ ) highly conductive adhesive
- 1.4 mil (35  $\mu$ ) electronic grade tin coated copper foil
- Low resistance in the XY plane
- Suitable for small contact applications (6 mm X 6 mm)
- Metal oxide penetration for direct electrical contact with metal substrates
- Adhesion to a wide range of substrates including Kapton, tin, copper, aluminum, stainless steel, ITO and other metals substrates
- Able to be slit to narrow widths (~ 5 mm)

## BENEFITS

- Conductive PSA forms strong immediate bonds
- Able to withstand elevated temperature and thermal cycling when encapsulated in photovoltaic module
- No pre-tack step required
- Thin consistent bond line
- Conforms to the topography of 'imperfect surfaces' providing excellent contact
- Adhesive provides numerous electrical contact points on small contact areas ( 6mm X 6mm)
- Conductive adhesive disperses charge over large area to address high current density and arcing related issues
- Low liner release prevents bunching or stretching of adhesive and a reliable transfer to substrates
- Liners won't tear

## PRODUCT APPLICATIONS

Suggested for use as a bus bar for photovoltaic applications. However, it is also suggested for use in EMI shielding for cellular phones, computers, PDA's, disk drives, modems and automotive electronics. It may also be used for cable assembly shielding for satellites, electronic vehicles and robotics and for seaming in architectural applications. Users should assure the product meets the specific needs of their application(s). Adhesives Research, Inc. can tailor the product to meet the needs of specific applications as requested by customers.

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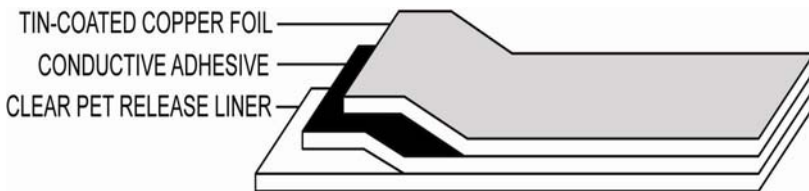
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## PRODUCT PROFILE AND DIAGRAM

<u>COMPONENT</u>	<u>THICKNESS</u>
Clear polyester release liner	2.0 mils (50 $\mu$ )
Electronic grade tin coated copper foil	1.4 mils (35 $\mu$ )
Highly conductive PSA	1.0 mils (25 $\mu$ )
Total adhesive thickness:	2.4 mil (60 $\mu$ )
Total thickness with liner:	4.4 mil (110 $\mu$ )

Test Method: ART 5006, PSTC-133, ASTM-D1000



## PHYSICAL PROPERTIES - TYPICAL VALUES

### PEEL ADHESION <sup>1</sup>

<u>Substrate</u>	<u>Result</u>
302 Stainless Steel	61.1 oz/in (17.2 N/ 25 mm)
Glass	63.5 oz/in (17.8 N/ 25 mm)

### COHESIVE STRENGTH <sup>2</sup>

<u>Test</u>	<u>Result</u>
500 Gram Static Shear	98 min

### LINER RELEASE <sup>3</sup>

<u>Test</u>	<u>Result</u>
Liner Release	32.8 g/2" (0.46 N/ 50 mm)

### FLAME RETARDANCY <sup>4</sup>

<u>Test</u>	<u>Result</u>
Per UL 510	PASS

- 12" per min. after 1 hour dwell time, Substrate mounted to Panel, PSA peeled away from the substrate of interest  
Test Method: ART 1005, PSTC-102, ASTM-D3330
- 2.0 mil polyester support, 1/2" x 1/2" contact area, Stainless Steel panel, Test Method: ART 2054
- 180° Release / 300" per min, Test Method: ART 1034
- Flame Retardant per UL 510, OANZ2, E318981

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Insight<sup>®</sup>  
Adhesives Research

## ELECTRICAL PROPERTIES – TYPICAL VALUES

<u>Test</u>	<u>Result</u>
Current Carrying Capability <sup>1</sup>	~ 5 Amps
Z-axis Resistance <sup>2</sup>	1.82 milliOhm
Sheet resistance <sup>3</sup>	4.8 X 10 <sup>-4</sup> Ω/□

1. Approximate value based on 0.50" X 0.25" area.
2. 1" X 1" Gold Electrodes @ 5 psi, Test method: ART 3035
3. Four point probe placed on adhesive surface of 0.5" wide sample. Probes spaced 0.5" apart.

## ACCELERATED AGING PERFORMANCE

Conditioning	180° Peel Stainless Steel <sup>1</sup> (oz/in)	180° Peel Glass <sup>1</sup> (oz/in)	Volume Resistance <sup>2</sup> (milliOhm)
RT-1 Week Age	78.7	79.2	4.96
65°C-1 Week Age	84.8	91.2	5.37
120°C-1 Week Age	66.1	63.2	3.82

1. Samples conditioned for 1 week @ specific temperature. Samples tested @ room temperature. 12" per min.  
Substrate mounted to Panel  
PSA peeled away from the substrate of interest  
Test Method: ART 1005, PSTC-102, ASTM-D3330
2. 1" X 1" Gold Electrodes @ 5 psi, Test Method ART 3035

## SLIT PARTS

Can be slit to 1" at Adhesives Research per customer specifications.  
Can be slit to narrower widths (> 5 mm) by convertors specializing in slitting foil tapes.

## STORAGE AND SHELF LIFE

One year when stored at 70°F, 50% R.H.

(Revised 7/22/10)

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### APPLICATION AND STORAGE OF PRESSURE-SENSITIVE ADHESIVE TAPES

Pressure-sensitive adhesive tapes function as a mechanical product; however, the adhesive itself is a chemical composition that can be sensitive to environmental conditions. A purchaser of pressure-sensitive adhesive products should be aware of the shelf life of each product and not purchase more than it can use before the expiration date. Shipping and storage conditions affect shelf life. The optimum storage temperature is 70°F (21°C). Cool, dry storage is recommended.

#### For best results...

- 1) The surfaces you wish to bond should be clean and free of oil, moisture and dust. If the surface temperature is below 40°F, it may be difficult to achieve a proper bond.
- 2) Do not use a pressure-sensitive adhesive product where it will be exposed to temperatures lower or higher than those designated for each product. Heat can destroy the effectiveness of the bond and extreme cold can cause the adhesive to harden and not adhere properly.
- 3) Electrical and Physical Performance Properties will be a function of application technique. Whenever possible use laminator or press with significant pressure to adequately bond parts and ensure conductive particles in adhesive make contact with substrate of interest. Utilize a straight downward pressure, as opposed to back and forth rubbing, to help maintain the homogeneous distribution of conductive fillers in the adhesive and to provide best electrical performance. Consult your AR sales representative if you need additional information.

### WARRANTY AND DISCLAIMER

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