

# The Adherent<sup>®</sup>

Technology Insights from Adhesives Research



Taking your products further.™

## Electrically Conductive Adhesives Enable High-Functioning, Compact Product Designs

As electronic devices become increasingly smaller, thinner and more complex, reducing the size of component real estate is becoming more important. Electrically conductive pressure-sensitive adhesive (PSAs) enable smaller electronic designs through thin, effective bonds because they not only bond components together, but also provide the added functionality of providing pathways for electrical current. By eliminating the need for other conductive elements, electrically conductive PSAs present options for simplifying device design and manufacturing. The design benefits of electrically conductive PSAs are being realized in a wide range of applications, some of which include hand-held mobile devices, photovoltaic modules, medical electrochemical sensors and transdermal drug delivery.

### Creating Conductivity

Adhesives Research (AR) has been designing, developing, and manufacturing leading-edge, electrically conductive adhesive products for more than 20 years. Our electrically conductive PSAs are based on a homogeneous carbon-based adhesive technology that delivers exceptionally stable bonds to electrical contact points, even under extreme stress. The bonds are particularly reliable because the conductive particles within the adhesive form strong carbon chains for good point-to-point conductivity. The chains are flexible to provide movement

with the adhesive as it expands or contracts against bonded substrates during temperature changes. This flexibility results in uninterrupted electrical contact for reliable electrical interconnections. The conductive fillers may be comprised of a number of materials, such as: nickel, silver and carbon, or a combination of these. The



adhesive matrix may be formulated from silicone, acrylic or rubber polymers to ensure the maximum flexibility and compatibility with metal, film and low surface-energy substrates.

### Performance is Key

We tailor an adhesive's physical properties for resistivity, conductivity and a number of environmental stresses, including shock and moisture resistance. For example, our

conductive technology can achieve Z-axis resistances from a few milli-ohms to a few ohms reliably, and product thicknesses range from 25 to 100 microns. This technology is also proven for use in fine pitch connections where X-Y isolation is critical, and provides reliable connections down to 300 x 300 microns.

Some applications, such as those for the solar industry, require electrically conductive PSAs to withstand a wider range of harsh environmental conditions, including significant humidity and temperature fluctuations. Our technology demonstrates stable bonding performance through temperature cycling (-20° C to 85° C) and humidity up to 95% Relative Humidity. We can also tailor adhesives to provide a degree of removability which is important for parts requiring re-work during the manufacturing process.

Design engineers should consider the process and handling benefits of PSAs when selecting an adhesive for their product designs. Electrically conductive PSAs form instant bonds, and provide reliable electrical contact without mechanical pressure or cure times. Because these adhesive systems are manufactured in a continuous web format, rolls can be manufactured into wide roll formats, or slit to specified widths, lengths or sheets, and further converted into die-cut components. The manufactured PSA rolls are easy to handle and process, with no clean-up.



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For more information about our company and products, please visit our website at [www.adhesivesresearch.com](http://www.adhesivesresearch.com).

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