

Electrical Contacts for Resistivity Measurements (Silver Epoxy)

Applying electrical contacts to a sample can be a very frustrating process. Here are some tips that may help for working with silver epoxy, so that you won't be suffering from contacts that fall off at the slightest touch, noisy data, and ruined samples. If you have any tips for working with indium or other common contact materials, please send them to the **Materials Advancement Portal** administrators via the contact form on the website.

1. When using silver epoxy that comes in two components, always mix the two components very thoroughly. While it may seem sufficiently mixed after a couple of minutes, a few more minutes of mixing might make all the difference between epoxy that cures properly and goop, or a well-paved silver highway for electrons and a bunch of poorly-spaced silver stepping stones.
2. Make sure that your samples are clean so that the epoxy will have a nice surface to sit on and won't have other junk in it. Also make sure that the mixing tools that you use are clean and smooth (i.e. don't use wood or dirty tools) so as to not contaminate the mixture.
3. Always use a sharp tool to apply contacts, and try to use the point of the tool to create an even sharper point so as to be able to form tiny beads of silver epoxy on small samples. It is often easier to form all beads first before placing wire directly into each bead. Be sure the end of the wire is inside the bead and not sticking out the other end or simply lying on top.
4. Better safe than sorry – cure for five to ten minutes longer than the epoxy spec sheet says is necessary.
5. Check the contacts with a microscope and multimeter prior to inserting the sample into the measurement unit. Silver epoxy can be carefully scraped away if necessary, so checking means that you can prevent shorts, which you can find using the multimeter.
6. If the data appear noisy or the resistivity too high, try attaching wires to a 9V battery and putting the wires on either side of each epoxy bubble. This allows you to “punch through” the silver epoxy a bit. If this doesn't work, best scrape off the contacts and start back at step one!

For brand-specific epoxy tips, please consult any reference/spec sheets that might be available online from the epoxy company.