

Summary: SS5001 silicone dispersion applied with a thin paintbrush

Electrode Interface Fixture - Insulation Methods

The EIF-8 consists of five helical leads soldered to a connector, their joints encapsulated in epoxy. The red and pink leads have X-Electrodes soldered to their other ends. This electrode/helical wire joint must also be insulated to protect it from damage. We performed a study to determine the best insulator, and the best method of application.

Below is a list of the different insulators we used:

1. Silicone - 5001
2. Silicone - Med 6607
3. Acrylic Conformal Coating (MG Chemicals)
4. Silicone Conformal Coating (MG Chemicals)
5. Scotch Weld (3M)
6. Silicone Glue (Bazic)
7. Superglue

The joint needs to be thinly coated, but fully covering the joint. The insulation must be applied evenly. To achieve this we tried two application methods: by syringe with a dispensing needle, and by paintbrush.

We quickly ruled out three options (5, 6, 7) due to low viscosity; the material was too runny and would drip down the lead during curing, they would not adhere to the electrode wire and lead insulation. Superglue was too rigid after curing and messy to work with. Acrylic and silicone conformal coatings did not drip as much so were not ruled out at this stage, though we ultimately found that 5001 silicone (highlighted green) was the best insulator. It did not drip down the lead while curing and sufficiently evenly coated the joint. Med 6607 was slightly more runny. By using 5001 silicone, we ensure complete coverage while avoiding drips and inconsistencies. The silicone cures firm but remains flexible enough to provide a small degree of strain relief for the joint.

Here are images of six electrodes all coated in 5001 silicone. A brush was used to apply the silicone on the top row and a syringe was used on the bottom row. The two electrodes highlighted in green pass our quality control; the coating is consistent and substantial without globbing up as seen in the four electrodes highlighted in red, which failed quality control.

Applying 5001 silicone with a paintbrush yielded the best result, highlighted green on the top left of the diagram. The silicone can be applied via brush with 2-3 coats, or 1-2 coats via syringe with a high gauge needle.

