

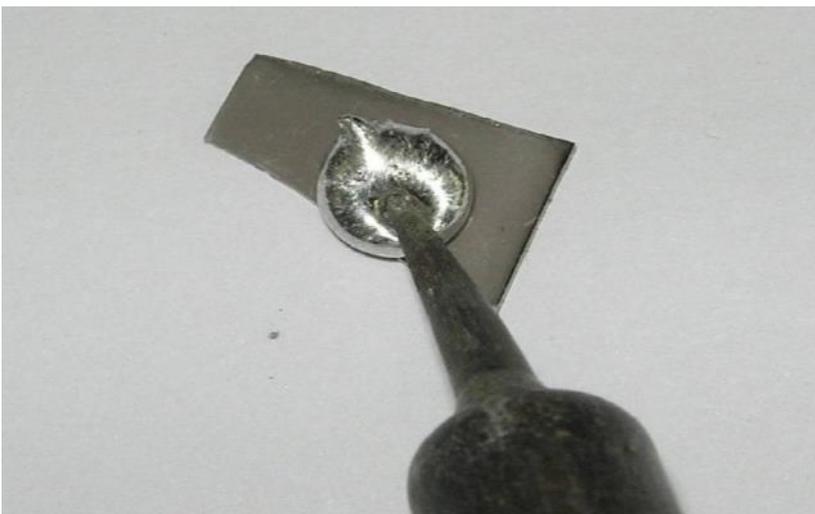
Applying 95/5% Indium/Tin to Sample Corners in Preparation for Mounting onto Sample Board

Most materials measured with a Hall effect measurement system require that contacts be made on the corners of the sample to improve electrical conductivity. This applies to samples measured using the spring clip board as well as samples which are tested using the wire bonding technique.

The most often used material for making contacts is indium/tin, i.e., InSn compound which is 95% indium and 5% tin. Occasionally, the use of gold paste is necessary. Ecopia includes a small amount of InSn with each Hall measurement system. In cases where something other than InSn is required to make sufficient ohmic contact, if the customer has sent samples for testing, Ecopia will include a notation regarding the use of gold paste if it was found to be necessary.

Ecopia has found that in some cases it is necessary to use gold paste make sufficient ohmic contact to difficult materials. Gold paste is similar in consistency to toothpaste, but somewhat softer. InSn is a solid metallic material similar to common solder. InSn needs to be heated either with a soldering iron or by using an oven or hot plate to melt it into the corners of the sample. When applied by soldering iron, usually it is recommended that the soldering iron be kept in contact with the sample for about 60 seconds to insure that the InSn melts completely and makes good ohmic contact to the sample material.

No heating is required for gold paste material. Care must be taken when using gold pastes since it involves flammable materials. The "extender" supplied with the gold paste looks like water, but we believe that it consists of alcohol. It functions as a diluting agent for the gold paste since it becomes dry and solid in time and must be remixed using the extender solution to regain the consistency for applying as a contact material.

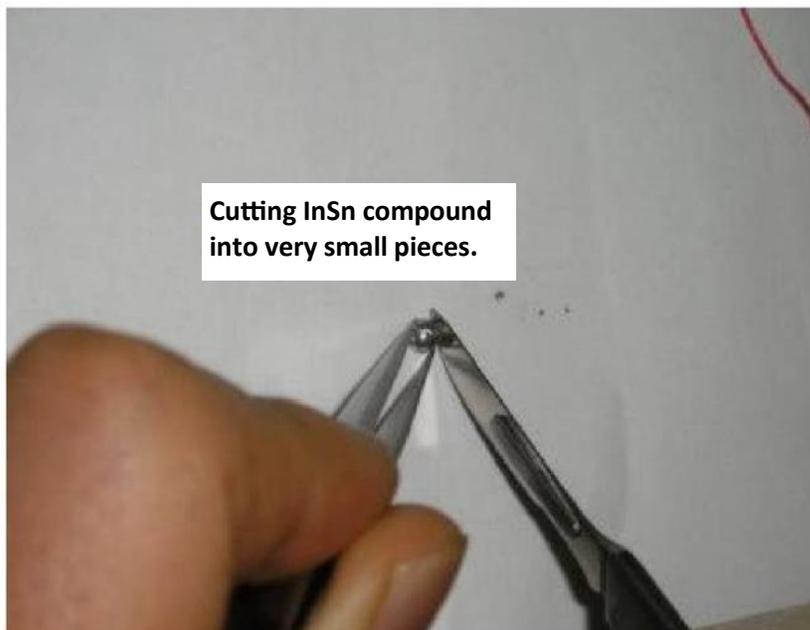


If you have a larger piece of InSn, place a small amount on an insulating material (here, a spare piece of a silicon substrate is used) and melt it using a soldering iron.



Temp controlling soldering iron

Set the soldering iron to 350°C to 400°C for best results.



Cutting InSn compound into very small pieces.

Using a razor blade knife, cut tiny fragments of the cooled InSn so that it can be applied to the corners of the sample.

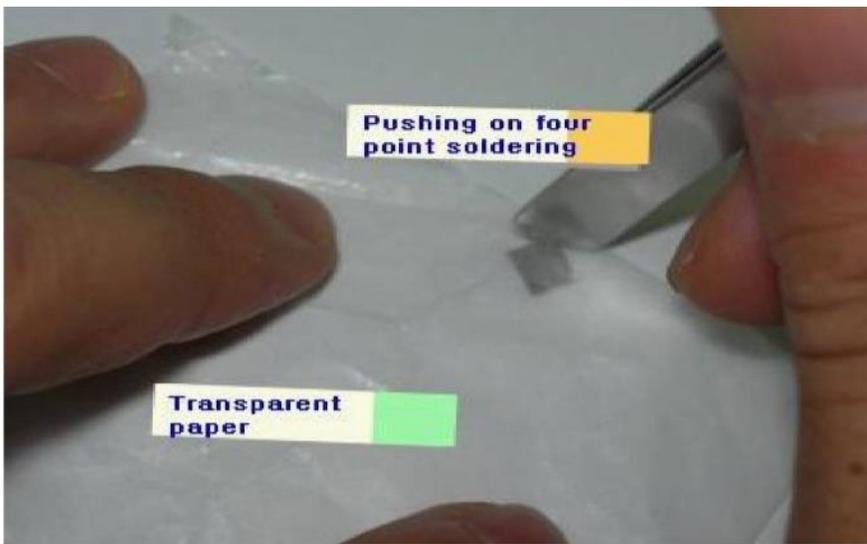
As opposed to standard solder, InSn maintains good ohmic contact even when submerged in LN₂, and it does not contain solder resin which might inhibit ohmic contact.

InSn can usually be used as the electrical conductivity material for corner contacts. However, for some samples, other contact materials are required such as gold paste.



Soldering in four points, using iron.

Use the soldering iron to melt the InSn into the four corners of the material. It should be done as close to the corner as possible. If the sample has not been annealed, it might be helpful to keep the soldering iron in contact for about one minute to improve ohmic contact.



If to be used with the spring clip board, after soldering on the contacts, it is helpful to allow the contact to cool, and then using a plastic bag placed over the sample, use the flat edge of the razor blade knife to slightly mash down the contact so that it is flat on top. This will help the spring clip board pin make better contact.



Sample, ready to be mounted onto the spring clip mounting system, or to be wired using the sample board for wire bonding samples.

Conductive Gold Paste

- Resistant to oxidation and retains measurement integrity over time
- Gold paste is fast drying and useful for analytical analysis over time where a high signal is desired.
- The gold is in microfine form and contains organic binders and a solvent.
- Dries at room temperature.
- Not intended for permanent use, but for testing and temporary work.
- Resistance is about 30-40 ohms.
- Contacts hold down to very low temperatures ($<-200^{\circ}\text{C}$), but are not permanent since this type of product has low mechanical strength. 75% gold content; sphere size $<2\mu\text{m}$, flake size $<10\mu\text{m}$.
- Maximum service temperature is 65°C .
- Refrigerate for best life. Bring to room temperature gradually.
- Approximate calculated specific gravity 3.18gm/cc.