

Indium Cold Welding

Indium has the unique ability to cold weld to itself. If the surfaces have been coated with indium (minimum 0.002" - 0.003"), they can be joined by following this procedure:

1. Degrease the indium with an organic solvent, such as acetone, to remove any organic contaminants that may be on the surface.
2. Mildly etch the indium surface in a solution of 5-10% hydrochloric acid (by volume) at room temperature for 1 to 5 minutes, depending on oxide thickness, until the surface appears bright. This will remove the 80-100 angstroms of oxide that form on the surface. (Indium is self-passivating and will form an oxide layer that is only 80-100 angstroms thick. The oxide, once removed, will reform to the 30-40 angstroms level immediately and to the 80-100 angstroms level in about 3 days. This oxide layer reduces indium's ability to cold weld.)
3. Thoroughly rinse twice in DI water.
4. Rinse off the water with acetone (preferred) or isopropyl alcohol.
5. Blow-dry with dry nitrogen.
6. A mild pressure is all that is usually required to join the indium surfaces together.
7. Use caution to properly align the indium surfaces before joining, as they will not easily separate without damaging the joint. They will stick like contact cement.



Pure indium ribbon with normal oxide layer of 80-100 Å (formed at room temperature in ambient conditions).



Indium ribbon being etched in the hydrochloric acid solution for 1 minute to remove oxide layer.



Etched indium ribbon wound back on itself and cold-welded to form a loop.

APPLICATION NOTE

This application note is provided for general information only. It is not intended, and shall not be construed, to warrant or guarantee the performance of the products described which are sold subject exclusively to written warranties and limitations thereon included in product packaging and invoices. All Indium Corporation's products and solutions are designed to be commercially available unless specifically stated otherwise.

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