

APPLICATION NOTE

Plating—An Alternative Method of Applying Indium

Why Indium?

Indium is a versatile metal with the following unique physical properties:

- Has a low melting point of 157°C and a high boiling point of 2,080°C
- Has a low vapor pressure, ideal for use in vacuum applications
- Is soft and malleable, even down to cryogenic temperatures approaching absolute zero
- Has relatively low toxicity
- Is a bright, shiny metal that forms a thin (80–100 angstroms) protective oxide layer
- Will create a hermetic gasket seal between two mating parts. Being soft, indium will deform and fill in the microstructure of two mating parts pressed together using moderate pressure. Unlike Viton A or other elastomers, indium will retain its plasticity at cryogenic temperatures.
- Will cold weld to itself using moderate pressure

Advantages of Using Electroplating

- An easy and simple way of coating a metallic part or substrate with indium for applications that utilize the unique physical properties of indium
- Indium sulfamate plating bath is one of the easiest plating baths to operate and maintain; only pH control is required
- Proven formulation—capable of large production
- Extremely stable operation and long life
- Constant plating rate
- Operates at room temperature (20–25°C)
- High constant cathode efficiency (CCE) of 90%
- Easy reclaim of indium from rinse waters
- No additional agents or additives required after makeup for the life of the bath
- Bath is ready to use as supplied by Indium Corporation
- Indium metal is replenished in the bath from the indium anodes

Process for Using the Indium Sulfamate Plating Bath

The following steps are used to electroplate indium:

1. Clean oils, grease, and other contamination using an organic solvent or hot aqueous alkaline cleaner
2. Hot water immersion rinse
3. Remove oxides from the metallic substrate by dipping in a 5–10 volume percent mineral acid, such as sulfuric or hydrochloric acid
4. Spray rinse using cold DI water
5. Dip in 5% sulfamic acid to prevent contamination of the plating bath
6. Electroplate the indium at room temperature in the indium sulfamate plating bath at a current density of 10–100 amperes/ft; the deposition rate is approximately 1.5 mils/hour at a current density of 20 amperes/ft
7. Cold water rinse
8. Dry

Detailed information about indium electroplating can be found in *A Guide to Indium Plating*, available from Indium Corporation. A plating kit is also available for experimental evaluations and the plating of small parts.

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