

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 2080 °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.

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.

Form No. 97745 R2

www.indium.com

askus@indium.com

ASIA: Singapore, Cheongju, Malaysia: +65 6268 8678
 CHINA: Suzhou, Shenzhen: +86 (0)512 628 34900
 EUROPE: Milton Keynes, Torino: +44 (0) 1908 580400
 USA: Utica, Clinton, Chicago, Rome: +1 315 853 4900

