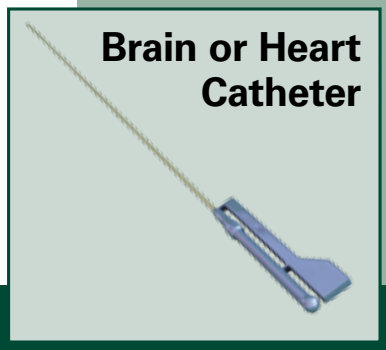
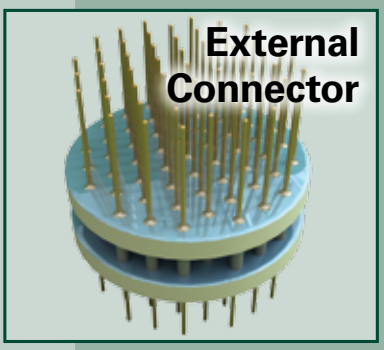
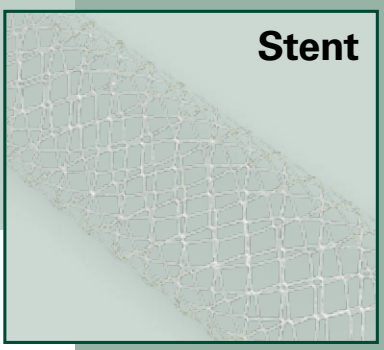
Soldering for Medical Devices and Electronics







New technologies and longer life spans are driving the medical device and medical electronic manufacturing markets around the world.

Supplier flexibility, design support and expertise, and prototype quantities are the keys to getting your designs off the drawing board and ready for production.

To ensure efficient time-to-market, Indium Corporation can provide you with product quality and reliability, production quantity flexibility, and on-time delivery.

INDIUM® CORPORATION®

From One Engineer To Another®

Soldering for Medical Devices and Electronics

Medical Device Assembly

The assembly of medical devices (such as catheters, guide wires, Nitinol stents, etc.) uses a wide variety of alternative soldering processes that require non-standard soldering products.

- **Catheter and feed-through assemblies**
  - The assembly of diagnostic and therapeutic catheters, micro-catheters, and feed-throughs requires precision solder products that are made to tight tolerances and high quality standards.
- **Optics**
  - Sealing optics into devices, such as endoscopes, requires the use of a fluxless process and materials.
- **Hermetic sealing**
  - A hermetic seal is often required to ensure that delicate components are not exposed to harsh environments.
  - Gold-tin, because of its reliability and resistance to metallic oxide formation, makes it ideal for a fluxless process.
  - Indium can be used for hermetic, vacuum, and cryogenic seals because it is malleable and ductile, even at extremely low temperatures.
- **Implantable devices including sensors**
  - Temperature-sensitive devices may need low-melting alloys to prevent thermal stress during assembly.
- **Soldering to medical alloys**
  - Soldering to some of the most widely used metals in the medical market, including Nitinol and stainless steel, can be challenging.
  - Removal of the tenacious surface metal oxides must be achieved before soldering can take place.
- **Connector manufacture**
  - Maximum signal integrity is required to allow for the optimum flow of data and images.

Electronics Assembly

From diagnostic and imaging equipment to hand-held monitoring devices, printed circuit boards are in almost all of the equipment used by doctors, hospitals, and clinics.

- Smaller components in smaller devices require solder materials that provide good electrical contacts with no bridging, excellent wetting and good throughput.
- In order to achieve maximum functionality in increasingly smaller spaces, the use of flexible circuit boards is increasing, providing new challenges for electronics assembly.
- Connectors need to be securely soldered to the circuit board to withstand constant use.

Product Characteristics

Solder Paste
- Spherical, low-oxide powder available in various mesh sizes
- Pb–free, Pb-containing, AuSn, and indium-containing alloys
- No-clean, water or solvent cleanable flux vehicles
- Flexible packaging and quantities to support manufacturing requirements

Solder Preforms
- A large die library of washers, squares, discs, frames, and special shapes
- InTEGRATED® Preforms used for fast placement of multiple washers at once
- Pb-free, Pb-containing, AuSn, and indium-containing alloys
- Flux coatings
- Small sizes, variable thicknesses to achieve optimum solder volume
- Flexible packaging and quantities to support manufacturing requirements

Solder Wire
- Diameters available in SnAg and AuSn down to 0.001”
- Pb-free, Pb-containing, AuSn, and indium-containing alloys
- Solid cored and flux cored

Solder Spheres
- Alloys: SAC and Pb-containing alloys as well as indium-containing
- Standard sizes are 300 to 1270 microns. Other sizes may be available on request
- Tolerances as tight as ±5 microns for uniform alignment

Fluxes
- Flux #2 and #3 for removing tenacious oxides from metals, such as Nitinol and stainless steel
- No-clean and water soluble TACFlux®

Soldering for Medical Devices and Electronics

Soldering Process	Description	Challenges	Our Recommended Products
Surface Mount Reflow	Standard process for PCB assembly	Flexible circuits and smaller boards and components require no bridging; provide excellent wetting	• Indium8.9HF Solder Paste for the higher reflow temperatures needed by SAC and SnPb • NC-SMQ92J Solder Paste for Sn63 and Sn62 • Solder Fortification™ Preforms
Laser Soldering	Non-contact; highly controlled heating	Identifying the proper power and timing to reduce voiding and flux spatter, and optimize wetting	• Indium509L and Indium510L • Solder Preforms, especially washers for pin soldering • Solder Spheres
IR Soldering	Can be used for smaller packages such as chip resistors, capacitors, and SOICs, and high temperature soldering	Larger components may impede heating of smaller components due to shadowing effect	• Solder Preforms • Solder Spheres • Indium8.9HF Solder Paste for SAC and SnPb Indium8.9HF
Induction Soldering	Localized, uniform heating	Requires proper set up and design with a repeatable process to introduce the parts being soldered	• Solder Preforms • Solder Spheres • Solder Wire • Solder Ribbon
Vacuum Soldering	Reduction in pressure allows voids in solder to escape prior to reflow, creating much lower voiding in finished solder joint	Batch process may be too slow for high volume manufacturing Requires proper set up, design, and material selection	• Solder Preforms (especially AuSn) • Solder Spheres • Indium8.9HF Solder Paste for SAC and SnPb
Vapor Phase Soldering	Vapor chamber allows for uniform heating across the entire assembly	Fast wetting forces may cause tombstoning with common chip and resistors, which can be minimized with preheat	• InTEGRATED® Preforms • Standard Solder Preforms • NC-SMQ®230 Solder Paste • Indium8.9HF Solder Paste for SAC and SnPb
Manual Soldering	Heat gun, soldering iron, or other hand-held heat source reflows the solder	Operator-to-operator solder volume variance	• Flux-Cored Wire • Solid Cored Wire • Solder Preforms

Additional Information

To discuss your specific application, contact us at medical@indium.com
For more information, the following Product Data Sheets and Application Notes are available at www.indium.com

Product Data Sheets:

Eutectic AuSn Solder
Flux-Coated Preforms
Indalloy® Flux #2
Indalloy® Flux #3
Indium509L Solder Paste
Indium510L Solder Paste
Indium8.9HF No-Clean Solder Paste
InTEGRATED® Preforms
NC-SMQ®230 Solder Paste
Precision Spheres
Solder Preforms
Solder Wire

Application Notes:

Flux and Solder Compatibility
Indium for Sealing
Pb-Free Solder Preforms
Solder Pastes Used in Vapor-Phase Soldering
Soldering to Nitinol
Using Flux-Coated Preforms in Soldering

Locations Worldwide

- Electronics Assembly Materials
- Engineered Solders & Alloys
- Metals & Compounds
- Metal Thermal Interface Materials
- Nanotechnology
- Semiconductor Assembly Materials
- Solar Energy Materials

Our Goal

Increase our customers' productivity and profitability through premium design, application, and service using advanced materials.

Our basis for success:

- *Excellent product quality and performance*
- *Technical and customer service*
- *Cutting-edge material research and development*
- *Extensive product range*
- *Lowest cost of ownership*

ISO 9001 REGISTERED

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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

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