

Product Data Sheet

# Pb-Free Solder Fabrications

## Introduction

Indium Corporation can fabricate solders to meet any application. Materials in the table of Pb-Free alloys (see reverse side) can be manufactured into a wide range of products including **Solder Wire**, **Solder Ribbon**, **Solder Preforms**, and **Solder Spheres**.

## Solder Wire

Manufactured to demanding quality standards, diameter capabilities range from .001" (.025mm) to .250" (6.35mm). In addition, **solder wire** can be manufactured to fit all die bonding equipment. Sn/Ag/Cu (SAC) alloys offer the best balance of properties for the majority of Pb-Free applications. SAC alloys offer better wetting than the binary eutectic Sn/Cu and Sn/Ag. As wetting speed is a key performance requirement for hand soldering, SAC makes the most sense for solid or cored **solder wire**. For lower temperature rework with the option of controlling the amount of flux, the Bi/Sn/Ag alloy may be the best choice. Solid or non-cored wire along with a liquid flux is the answer when there is too much flux residue associated with rework.

## Solder Ribbon

Our capabilities allow us to manufacture high quality **solder ribbon** with a width range of .020" (.5mm) to 3.00" (76mm) and a thickness range of .001" (.025mm) up to as thick as your application requires. **Solder ribbon** is designed for high-power, high-reliability applications such as microwave devices. For die attach, **solder ribbon** can be manufactured to comply with all die bonding equipment. This would include Au/Sn and Au/Ge eutectic solders, as they offer a viable solution for high temp Pb-Free products.

## Solder Preforms

**Solder Preforms** can be manufactured in standard shapes such as squares, rectangles, washers, frames, and discs. Typical sizes range from .010" (.254mm) to 2.00" (50.8mm). Smaller and larger sizes, as well as custom shapes are available. A flux coating can also be applied to suite your metallizations. If you are looking to automate, we can put preforms in tape and reel packaging. In addition, **solder preforms** can be utilized with bulk feeding systems. **Solder preforms** are viable solution to solder fortification of through-hole components and can eliminate the need for step stencils in pin-in-paste applications. They are also a solution for consistent and precise solder volume in hand soldering.



## Solder Spheres

Indium Corporation's unique manufacturing process produces bright and shiny **solder spheres** supported by Statistical Quality Control systems. Capabilities range from .004" (.10mm) to .095" (2.41mm). All **solder spheres** can be manufactured utilizing SAC alloys and the higher temperature alloys such as the Au/Sn eutectic solder. **Solder spheres** can be manufactured for a wide variety of applications from ball-attach to re-balling of BGA's.

## Material Safety Data Sheet

The MSDS for this product can be found online at <http://www.indium.com/techlibrary/msds.php>

## Technical and Customer Support

Indium Corporation's internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Material Science as it applies to the electronics and semiconductor sectors, Technical Support Engineers provide expert advice in solder properties, alloy compatibility and selection of solder preforms, wire, ribbon and paste. Indium Corporation's Technical Support engineers provide Rapid Response to all technical inquiries, usually within 24 hours.

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# Pb-Free Solder Fabrications

## Pb-Free Alloy Table

Indalloy #	Composition	Liquidus °C	Solidus °C	Comments
1E	52In/48Sn	118	118	Lowest melting point solder that is feasible
281	58Bi/42Sn	138	138	Good thermal fatigue performance; established history
282	57Bi/42Sn/1Ag	140	139	The addition of Ag adds mechanical strength
227	77.2Sn/20In/2.8Ag	187	175	Not for use over 100°C due to In/Sn eutectic @ 118°C
254	86.9Sn/10In/3.1Ag	205	204	No In/Sn eutectic problem; potential use for flip-chip assembly
249	91.8Sn/3.4Ag/4.8Bi	213	211	Board and component metallizations must be Pb-free; Pb contamination will diminish joint strength
241	95.5Sn/3.8Ag/0.7Cu	220	217	Common Pb-free alloy
246	95.5Sn/4Ag/0.5Cu	220	217	Common Pb-free alloy
252	95.5Sn/3.9Ag/0.6Cu	220	217	NEMI-promoted alloy (average composition from Indalloy #241 and #246)
256	96.5Sn/3.0Ag/0.5Cu	220	217	Referred to as the SAC305 alloy
121	96.5Sn/3.5Ag	221	221	Binary Sn/Ag eutectic alloy with history of use, marginal wetting
244	99.3Sn/0.7Cu	227	227	Inexpensive, possible use in wave soldering
133	95Sn/5Sb	240	235	Used in food equipment and refrigeration tubing. Good wettability and creep resistance
209	65Sn/25Ag/10Sb	233	(Melt Point)	Die-attach solder, very brittle
182	80Au/20Sn	280	280	Excellent mechanical strength and thermal fatigue resistance solder, used for soldering to Au
183	88Au/12Ge	356	356	Close to brazing alloy family, typically used in a reducing atmosphere for step soldering



This product data sheet is provided for general information only. It is not intended, described which are sold subject exclusively to written warranties and limitations and shall not be construed, to warrant or guarantee the performance of the products thereon included in product packaging and invoices.

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