

## PRODUCT DATA SHEET

# Indium3.2HFA

## Pb-Free Water-Soluble Solder Paste

### Introduction

**Indium3.2HFA** is a nitrogen reflow (<100ppm O<sub>2</sub>), water-soluble solder paste specifically formulated for use with lead(Pb)-free alloys such as SnAgCu, SnAg, SnSb, and other similar solder types. This solder paste meets customer needs for compliance with the definition of a halogen-free material, as defined in IEC 61249-2-21.

The flux formulation offers consistent, repeatable printing performance at fine pitches down to the 100-micron level, combined with a long stencil life and good tack values, and is able to retain CSP and passives in place during SiP assembly and reflow. In addition to consistent printing and reflow requirements, this solder paste offers superb wetting to standard termination and substrate metallizations. The use of low oxide solder powder means that the paste has exceptionally low-voiding performance on a variety of SiP components, such as miniature passive devices (0201 and 01005).

Tombstoning is also a problem for ultra-small devices. The controlled wetting and consistent deposit size decrease the risk of tombstoning.

### Features

- Exceptional fine-pitch printing
- Long stencil life
- Outstanding slump resistance
- Excellent wetting capability
- Superior fine-pitch soldering ability
- Low-voiding
- Halogen-free (halogen compliant)

### Indium3.2HFA Test Data Summary

Test	Result	Test	Result
<b>J-STD-004 (IPC-TM-650)</b>		<b>J-STD-005 (IPC-TM-650)</b>	
Flux Type	ORH1	Typical Solder Paste Viscosity (SnAgCu, 89.25%, Type 6-SG) Malcom (10rpm)	2,700 poise
SIR	Pass		
Wetting Test	Pass	Slump Test	Pass
<i>All information is for reference only. Not to be used as incoming product specifications.</i>		Solder Ball Test	Pass

### Alloys

Indium Corporation manufactures low-oxide spherical powder in a variety of alloys that covers a broad range of melting temperatures. Type 6-SG powder is the standard offering. The metal percent is the weight percent of the solder powder in the solder paste and is dependent upon the powder type and application.

### Standard Product Specifications

Alloy	Metal Load (Type 6-SG)
	Printing
96.5Sn/3.0Ag/0.5Cu (SAC305)	89.25%

### Packaging

**Indium3.2HFA** is currently available in 500g jars or 600g cartridges. Packaging for enclosed print head systems is also readily available. Alternate packaging options may be available upon request.

### Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **Indium3.2HFA** is no less than 3 months when stored at <10°C. Solder paste packaged in cartridges and syringes should be stored tip down.

When refrigerated, solder paste should be allowed to reach ambient working temperatures prior to use. Generally, paste should be removed from refrigeration at least 2 hours before use. Actual time to reach thermal equilibrium will vary with the container size, and the solder paste temperature should be verified before use. Jars and cartridges should be labeled with the date and time of opening. It is not recommended to remove paste from the stencil and mix it with the unused paste in the jar, because this may alter the rheology of the unused paste.

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### Printing

#### Stencil Design:

Electroformed and laser cut/electropolished stencils produce the best printing characteristics. Stencil aperture design is a crucial step in optimizing the print process.

### Wetting

**Indium3.2HFA** exhibits excellent wetting under both air and nitrogen reflow atmosphere. The solder joints are shiny and smooth, including those for ultrafine-pitch components. **Indium3.2HFA** has low-voiding performance, including those for BGAs and CSPs.

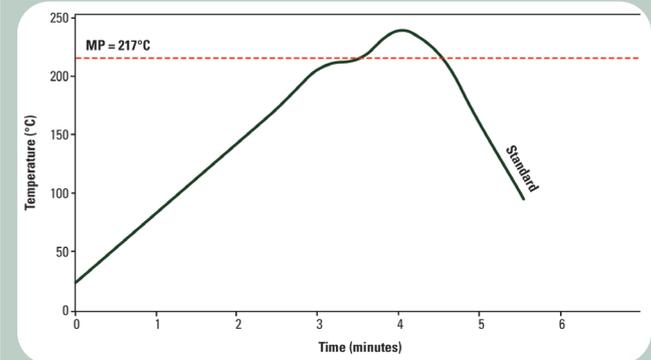
### Cleaning

**Residue Removal:** **Indium3.2HFA** flux residues are water-soluble and best removed by an inline or batch type cleaning process using spray pressure and heated DI water. A spray pressure of 60psi and a DI water temperature of 55°C can be used as a starting point. The optimal spray pressure and temperature are a function of board size, complexity, and the efficiency of the cleaning equipment and should be optimized accordingly.

**Stencil Cleaning:** This is best performed using an automated stencil cleaning system for both stencil and misprint cleaning to remove extraneous solder particles. Most commercially available stencil cleaners and isopropyl alcohol are acceptable.

### Reflow

#### Recommended Profile:



**Indium3.2HFA** should be reflowed using a linear profile in an air or nitrogen atmosphere. The stated profile recommendations can be used as a general guideline in establishing a reflow profile for **Indium3.2HFA** with SnAgCu alloy systems.

#### Heating Stage:

A linear ramp rate of 0.5–2.0°C/second allows gradual evaporation of volatile flux constituents and helps minimize defects such as solder balling and/or beading and bridging resulting from hot slump. It also prevents unnecessary depletion of fluxing capacity when a high peak temperature and extended time above liquidus is used.

#### Liquidus Stage:

**Indium3.2HFA** can accommodate a peak temperature range of 235–260°C. The actual peak temperature is determined by the board size, complexity, and component limitations. The time above liquidus (TAL) should be 30–90 seconds. A peak temperature and TAL above these recommendations can result in excessive intermetallic formation that can decrease solder joint reliability.

#### Cooling Stage:

A rapid cool down is desired to form a fine-grain structure. Slow cooling will form a large-grain structure, which typically exhibits poor fatigue resistance. The acceptable cooling range is 0.5–6.0°C/second (2–6°C/second is ideal).

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All of Indium Corporation's solder paste and preform manufacturing facilities are IATF 16949:2016 certified. Indium Corporation is an ISO 9001:2015 registered company.

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