

## PRODUCT DATA SHEET

# Durafuse<sup>®</sup> LT with SiPaste<sup>®</sup> C201HF

## Low-Temperature Drop Shock Solution

### Introduction

**Durafuse<sup>®</sup> LT** is a patented novel solder paste mixed-alloy system for low-temperature reflow processes which require high drop shock reliability. **Durafuse<sup>®</sup> LT** is made up of a low-melting In-containing alloy and higher-melting SAC alloy. The SnInAg alloy initiates joint fusion while the SAC alloy provides enhanced strength and durability. **Durafuse<sup>®</sup> LT** is ideal for high-reliability applications, which utilize thermally sensitive components.

### Features

- Excellent drop shock reliability—comparable to SAC
- Reflow below 210°C
- Melting temperature above 180°C
- Good mechanical shear strength up to 150–165°C
- Good thermal and electrical conductivity

### Flux Vehicle

Indium Corporation's SiPaste<sup>®</sup> C201HF is a halogen-free solder paste specifically formulated to accommodate fine feature printing, as seen with 01005 and 008004 components. This material features excellent transfer efficiency on fine feature apertures, with consistent process yields below 80µm. This material also leaves behind a cleanable residue, able to be removed with commercially available semi-aqueous cleaning solutions, with any residue remaining being benign. SiPaste<sup>®</sup> C201HF is not designed for standard low-temperature reflow profiles, but may be used for select processes with **Durafuse<sup>®</sup> LT**. Please contact Technical Support for assistance.

### Storage and Handling Procedures

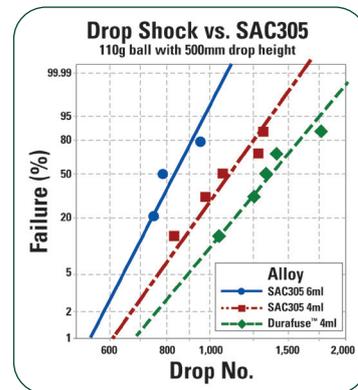
Refrigerated storage will prolong the shelf life of solder paste. Solder paste packaged in syringes and cartridges should be stored tip down.

Packaging	Storage Conditions (unopened containers)	Shelf Life
Syringe	-20°C–0°C	6 months
Jar/Cartridge		

Solder paste should be allowed to reach ambient working temperature 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 container size. Paste temperature should be verified before use. Jars and cartridges should be labeled with date and time of opening.

### Key Applications

Low-temperature solders reduce warpage of thermally sensitive components by reducing peak reflow temperature; however, standard Bi-based low-temperature alloys are unable to withstand even moderate drop shock. **Durafuse<sup>®</sup> LT** is a low-temperature Pb-free solder capable of reducing peak reflow temperature by 40°C relative to SAC305, with drop shock reliability two orders of magnitude greater than standard low-temperature alloys.



**Durafuse<sup>®</sup> LT** samples in the chart (left) experienced a peak reflow temperature of 210°C and demonstrated drop shock resilience similar to that of SAC305.

### Standard Product Specifications

Flux	Mesh Size	Printing Metal Load
SiPaste <sup>®</sup> C201HF	Type 4	88–90%
	Type 5-MC	88–89%
	Type 6-MC	87.5–89.0%

Indium Corporation manufactures mixed low-oxide spherical powders in the industry standard Type 4 and Type 5-MC mesh sizes. Other non-standard mesh sizes are available upon request. The weight ratio of the flux/vehicle to the solder powder is referred to as the metal load and is typically in the range of 83–92% for standard compositions.

#### SiPaste<sup>®</sup> C201HF Industry Standard Test Results and Classification

Based on the testing required by IPC J-STD-004B (IPC-TM-650)	Typical Solder Paste Viscosity for Type 4/4.5 Solder	1,400kcps
Halogen-free per IEC 61249-2-21, Test Method EN14582	<900ppm Cl <900ppm Br <1,500ppm Total	Conforms with all requirements from J-STD-005 (IPC-TM-650)

From One Engineer To Another<sup>®</sup>



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### Printing

#### Stencil Design:

Electroformed and laser cut/electropolished stencils produce the best printing characteristics among stencil types. Stencil aperture design is a crucial step in optimizing the print process. The following are a few general recommendations:

- Discrete components—A 10–20% reduction of stencil aperture has significantly reduced or eliminated the occurrence of mid-chip solder beads. The “home plate” design is a common method for achieving this reduction.
- Fine-pitch components—A surface area reduction is recommended for apertures of 20mil pitch and finer. This reduction will help minimize solder balling and bridging that can lead to electrical shorts. The amount of reduction necessary is process-dependent (5–15% is common).
- A minimum aspect ratio of 1:5 is suggested for adequate release of solder paste from stencil apertures. The aspect ratio is defined as the width of the aperture divided by the thickness of the stencil.

#### Printer Operation:

The following are general recommendations for stencil printer optimization. Adjustments may be necessary based on specific process requirements:

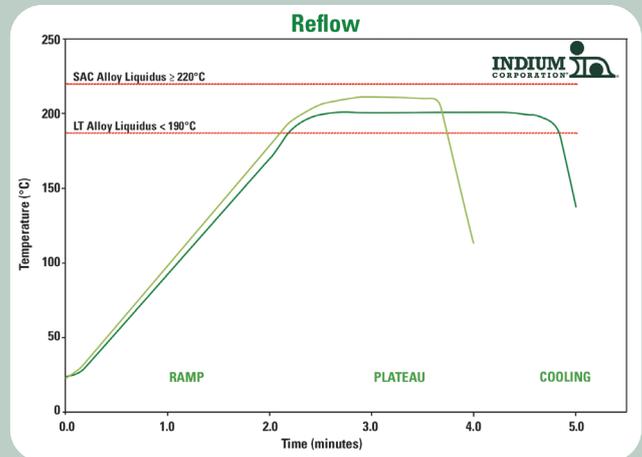
Solder Paste Bead Size	20–25mm in diameter
Print Speed	25–150mm/second
Squeegee Pressure	0.018–0.027kg/mm of blade length
Underside Stencil Wipe	Start at once per every 5 prints and decrease frequency until optimum value is reached
Solder Paste Stencil Life	Up to 12 hours at 30–60% RH and 22–28°C

### Cleaning

SiPaste<sup>®</sup> C201HF flux residue can be easily removed by using water with mixture of saponifier or semi-aqueous cleaners, and most commercially available flux residue removers. This material is formulated to leave an easily cleanable, benign residue after reflow. 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. We recommend cleaning the flux residue 12 hours (or sooner) after reflow for optimal test performance. Electrical testing should be completed after the flux residue is removed. For a recommendation of appropriate cleaning solutions, please contact one of Indium Corporation’s Technical Support Engineers.

### Reflow

#### Recommended Profile:



This profile is designed for use with **Durafuse<sup>®</sup> LT with SiPaste<sup>®</sup> C201HF**. This can be used as a general guideline in establishing a reflow profile for **Durafuse<sup>®</sup> LT Solder Paste**. Deviations from these recommendations are acceptable, and may be necessary, based on specific process requirements.

### Packaging

Standard packaging for **Durafuse<sup>®</sup> LT** is 500g jars and 600g cartridges. Other packaging options may be available upon request.

### Complementary Products

- **Rework Flux:** TACFlux<sup>®</sup> 020B, TACFlux<sup>®</sup> 089HF
- **Cored Wire:** CW-807
- **Wave Flux:** WF-9945, WF-9958

*Note: Other products may be applicable.*

*Please consult one of Indium Corporation’s Technical Support Engineers.*

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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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