

PRODUCT DATA SHEET

Durafuse[®] HR with Indium3.2HF

High-Reliability Alloy Technology

Introduction

Durafuse[®] HR uses Indium Corporation's novel solder paste mixed-alloy system to enable low-voiding in alloys designed for high-reliability thermal cycling performance. The low-voiding alloy initiates wetting while the high-reliability elements enhance strength and durability of the solder joint. **Durafuse[®] HR** is ideal for applications requiring extended thermal cycling reliability beyond that available with traditional Pb-free alloys (-40°C/125°C and -40°C/150°C).

Features

- High-temperature thermal cycling reliability
- Excellent voiding performance
- Good shear strength
- Compatible with most SAC305 reflow profiles
- Compatible with standard PCB surface finishes, including ImSn, OSP, and ENIG

Flux Vehicle

Indium3.2HF is a halogen-free, water-soluble solder paste. This product formulation offers consistent, repeatable printing performance combined with a long stencil life and sufficient tack strength to handle the challenges of today's high-speed as well as high-mix surface mount lines. In addition, this solder paste offers superb wetting to various Pb-free metallizations and has exceptional low-voiding performance on fine-pitch components, including BGAs and CSPs. Please contact Technical Support for assistance.

Standard Product Specifications

Alloy		Metal Load
Name	Composition	Type 4
Durafuse [®] HR	Patent Pending	88–90%

Industry Standard Test Results and Classification

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Flux Classification	ORH0	Typical Solder Paste Viscosity for T4 Paste (Poise)	TBD
Based on the testing required by IPC J-STD-004B.		Conforms with all requirements from IPC J-STD-005A.	
Halogen-free per IEC 61249-2-21, Test Method EN14582	<900ppm Cl <900ppm Br <1,500ppm Total		

All information is for reference only.

Not to be used as incoming product specifications.

Storage and Handling Procedures

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

Storage Conditions (unopened containers)	Shelf Life
<10°C	6 months

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.

Complementary Products

- **Rework Flux:** TACFlux[®] 032HF
- **Flux Pen:** FP-300
- **Cored Wire:** CW-301
- **Wave Flux:** 1095-NF

Packaging

Durafuse[®] HR 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.

Technical Support

Indium Corporation's internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Materials Science as it applies to the electronics and semiconductor sectors, Technical Support Engineers provide expert advice in solder preforms, wire, ribbon, and paste. Indium Corporation's Technical Support Engineers provide rapid response to all technical inquiries.

Safety Data Sheets

Please refer to the SDS document within the product shipment, or contact our local team to receive a copy.

From One Engineer To Another[®]



Form No. 100310 R0

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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).
- For optimum transfer efficiency and release of the solder paste from the stencil apertures, industry standard aperture and aspect ratios should be adhered to.

Recommended Printer Operation

Solder Paste Bead Size	20–40mm in diameter
Print Speed	12–150mm/second
Squeegee Pressure	0.018–0.027kg/mm of blade length
Underside Stencil Wipe	Start at once per every 5 prints, then decrease frequency until an optimum value is reached
Solder Paste Stencil Life	>8 hours (at 60% RH and 22–28°C)

Cleaning

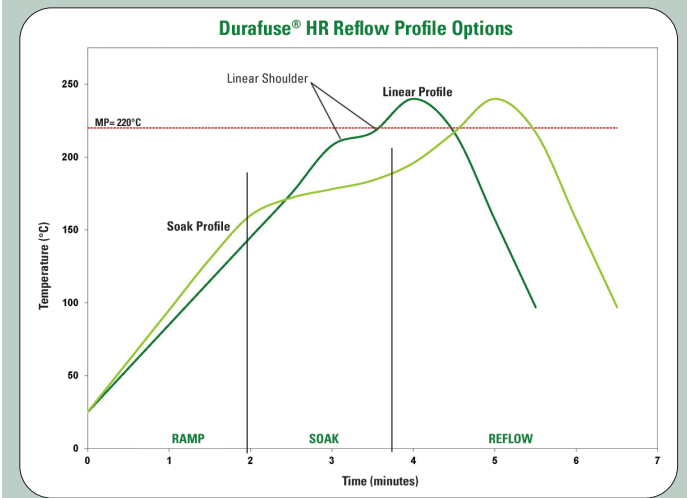
Residue Removal: Indium3.2HF flux residues are water-soluble and best removed by an inline or batch type cleaning process using spray pressure and heated DI water. A spray pressure of 60psi and a DI water temperature of 55°C can be used as a starting point. The

optimal spray pressure and temperature are a function of board size, complexity, and the efficiency of the cleaning equipment and should be optimized accordingly. We recommend cleaning the flux residue 12 hours (or sooner) after reflow for optimal test performance.

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:



This can be used as a general guideline in establishing a reflow profile when using **Durafuse® HR Solder Paste**. Deviations from these recommendations are acceptable, and may be necessary. When selecting between the recommended linear and soak profiles, please take board size, thickness, and density into consideration. The flat soak portion of the linear profile (linear shoulder) may be eliminated.

Reflow Profile Details	Durafuse® HR Parameters		Comments
	Recommended	Acceptable	
Ramp Profile (Average Ambient to Peak)—Not the Same as Maximum Rising Slope	1.0–1.5°C/second	0.5–2.5°C/second	To minimize solder balling, beading, hot slump
Soak Zone Profile (Optional)	20–60 seconds	30–120 seconds	A soak profile may be used to diminish delta T between components.
	140–160°C	140–170°C	
Time Above Liquidus (TAL, over 220°C)	45–60 seconds	30–100 seconds	Needed for good wetting/reliable solder joint
Peak Temperature	230–260°C	230–262°C	As measured with thermocouple
Cooling Ramp Rate	2–6°C/second	0.5–6.0°C/second	Rapid cooling promotes fine-grain structure
Reflow Atmosphere	Air or N ₂		N ₂ preferred for small components

Note: All parameters are for reference only.

Modifications may be required to fit process and design.

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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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