PRODUCT DATA SHEET

Durafuse® HR with Indium8.9HFRV

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 -40/150°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

Durafuse® HR is compatible with Indium8.9HFRV, designed specifically for high-reliability alloys. Indium8.9HFRV is a halogen-free, no-clean solder paste. This paste has excellent stencil print transfer efficiency and response-to-pause performance. Indium8.9HFRV provides reduced voiding for high-reliability alloys and retains the enhanced SIR performance necessary for high-reliability applications. This paste is compatible with both air and nitrogen atmospheres and features clear flux residue and excellent wetting.

Standard Product Specifications

Alloy	Composition	Powder Type	Metal Load
Durafuse® HR	Patent Pending	Type 4	88–90%
		Type 5-MC	87–89%

Industry Standard Test Results and Classification

Industry Standard Test Results and Classification			
Flux Classification	ROL0	Typical Solder Paste Viscosity for Indium8.9HFRV T4 (Poise)	1,340
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® 089HFRV, TACFlux® 020B-RC

Note: Other products may be applicable. Please consult one of Indium Corporation's Technical Support Engineers.

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®

INDIUM® CORPORATION®

PRODUCT DATA SHEET

Durafuse® HR with Indium8.9HFRV

High-Reliability Alloy Technology

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	~20–25mm 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
Squeegee Type/Angle	Metal with appropriate length; 45 or 60° squeegees are typically used
Separation Speed	5–20mm/second or per equipment manufacturer's specifications
Solder Paste Stencil Life	>12 hours (at 30–60% RH and 22–28°C)

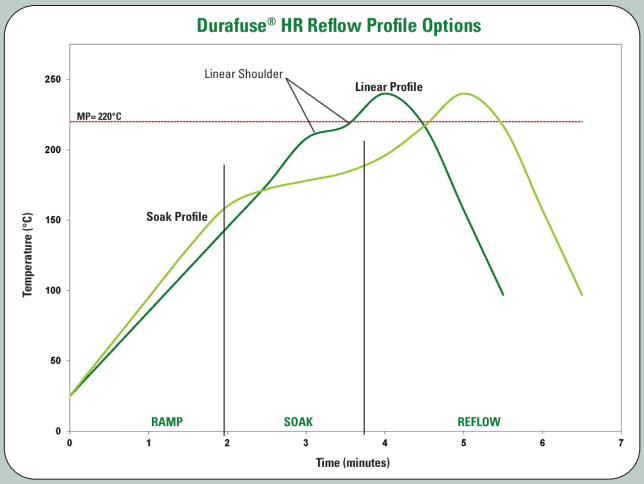
Cleaning

Durafuse® HR is designed for no-clean applications; however, the flux can be removed, if necessary, by using a commercially available flux residue remover.

Stencil cleaning is best performed using isopropyl alcohol (IPA) as a solvent. Most commercially available non-water-based stencil cleaners work well.

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 As measured with thermocouple
Peak Temperature	230–260°C	230–262°C	
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.

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.

Contact our engineers: askus@indium.com
Learn more: www.indium.com
ASIA +65 6268 8678 • CHINA +86 (0) 512 628 34900 • EUROPE +44 (0) 1908 580400 • USA +1 315 853 4900