

PRODUCT DATA SHEET

Durafuse[®] HR with Indium10.2HFA

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

Durafuse[®] HR is compatible with Indium10.2HFA. This flux vehicle is a halogen-free, no-clean solder paste designed to provide superior ICT and NWO capability. Indium10.2HFA has excellent stencil print transfer efficiency and response-to-pause performance. This paste provides the combination of high-reliability alloy thermal cycling performance alongside the benefits of Indium10.2HFA. This paste is compatible with both air and nitrogen atmosphere reflow and features clear flux residue and excellent wetting.

Standard Product Specifications

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

Industry Standard Test Results and Classification

| Industry Standard Test Results and Classification | | | |
|--|---|---|-------|
| Flux Classification | ROLO | Typical Solder Paste Viscosity for Indium10.2HFA T4 (Poise) | 1,500 |
| 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[®] 102HFA, 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[®]

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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 | ~20–25mm 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) |

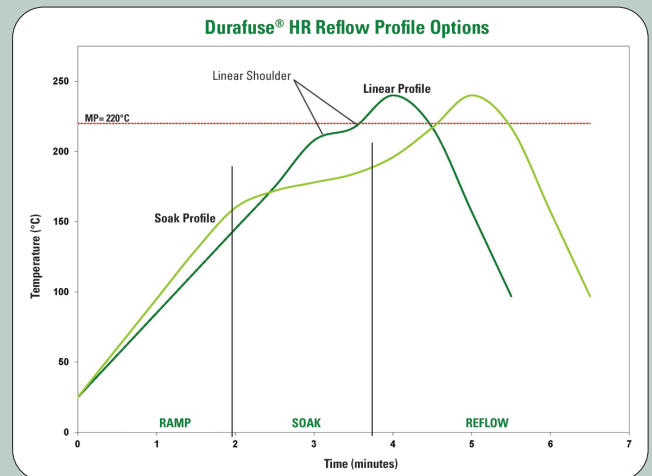
Cleaning

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 |
| 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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