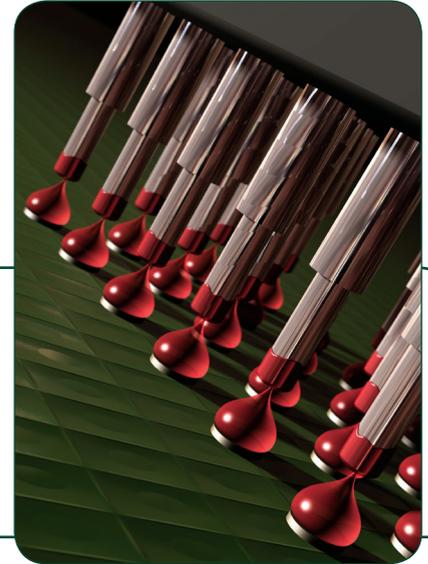


# PRODUCT DATA SHEET

# WS-446-AL

## Ball-Attach Flux



### Introduction

**WS-446-AL Ball-Attach Flux** is a thixotropic flux designed for use in pin transfer applications for ball-attachment to substrates (BGA manufacturing). Its rheology is specifically designed for use with even the smallest gravity-fed spheres. **WS-446-AL** has an activator system powerful enough to promote wetting on the most demanding substrate metallizations. The flux is a distinctive red color, which aids automated level-sensing equipment and also enhances visual inspection.

### Features

- Flux rheology applicable for all sphere sizes
- Suitable for Pb-free or Sn/Pb applications
- Uniform pin transfer over extended periods
- Red color for ease of detection
- Proven high yields in ball-attach process
- Excellent solderability on a wide range of surfaces

### Cleaning

**WS-446-AL** residue can be cleaned with DI water, or water with an added cleaner. Ideal conditions for spray-cleaning: 25°C (room temperature) or higher for >1 minute at >60psi.

### Packaging

**WS-446-AL** is available in (10) 150g syringes and in 100g jars or cartridges. Other packaging can be provided to meet the customer's specific requirements.

### Properties

	Value	Test Method
Flux Type Classification	H1	J-STD-004 (IPC-TM-650: 2.3.32 and 2.3.33)
Typical Viscosity	16kcps	Brookfield HB DVII+-CP (5rpm)
SIR (Ohms, after cleaning)	Pass (>10 <sup>8</sup> after 7 days @ 85°C and 85% RH)	J-STD-004 (IPC-TM-650: 2.6.3.3 IPC-B-24)
Typical Acid Value	78mg KOH/g	Titration
Typical Tack Strength	180g	J-STD-005 (IPC-TM.650: 2.4.44)
Shelf Life	6 months (-20–5°C)	Viscosity change/ microscope examination

*All information is for reference only.  
Not to be used as incoming product specifications.*

### Application

The amount of flux deposited on the substrate can be optimized by changing equipment parameters. Key variables include pin shape, pin diameter, shear speed, dwell, and depth of immersion. The flux rheology can be optimized for the desired application by shearing to achieve the desired viscosity.



### Storage

For maximum shelf life **WS-446-AL** syringes and cartridges should be stored tip down. Storage temperatures should not exceed 30°C. After removing from cold storage, **WS-446-AL** should be allowed to stand for at least 4 hours at room temperature before using.

**From One Engineer To Another®**



## PRODUCT DATA SHEET

# WS-446-AL Ball-Attach Flux

### Technical Support

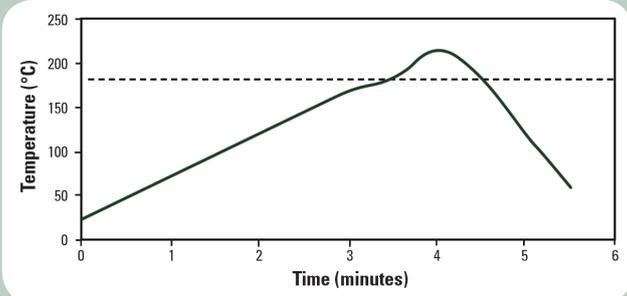
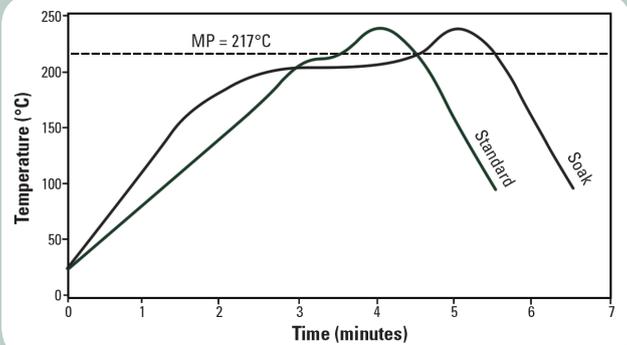
Indium Corporation sets the industry standard in providing rapid response, onsite technical support for our customers worldwide. Indium Corporation's team of Technical Support Engineers can provide expertise in all aspects of Materials Science and Semiconductor Packaging process applications.

### Safety Data Sheets

The SDS for this product is available by contacting [askus@indium.com](mailto:askus@indium.com)

### Reflow

#### Recommended Profile:



Peak reflow temperature should be <math><350^{\circ}\text{C}</math> in an air or nitrogen atmosphere (<math><500\text{ppm O}\_2</math>), with a linear ramp up to <math>30^{\circ}\text{C}</math> above liquidus temperature. These profiles are recommended to the user as starting points, and should be optimized by the user to meet their individual process needs.

This product data sheet is provided for general information only. It is not intended, and shall not be construed, to warrant or guarantee the performance of the products described which are sold subject exclusively to written warranties and limitations thereon included in product packaging and invoices. All Indium Corporation's products and solutions are designed to be commercially available unless specifically stated otherwise.

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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