

## PRODUCT DATA SHEET

# WS-446-NRD

## Ball-Attach Flux

### Introduction

**Ball-Attach Flux WS-446-NRD** is a water-soluble ball-attach 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-NRD** has an activator system powerful enough to promote wetting on the most demanding substrate metallizations. It contains no dye, so it does not stain surfaces.

### Features

- Designed for ball-attach pin-transfer applications
- Flux rheology applicable for all sphere sizes
- Excellent solderability on a wide range of surfaces
- Water-soluble
- Does not stain substrates or wash equipment

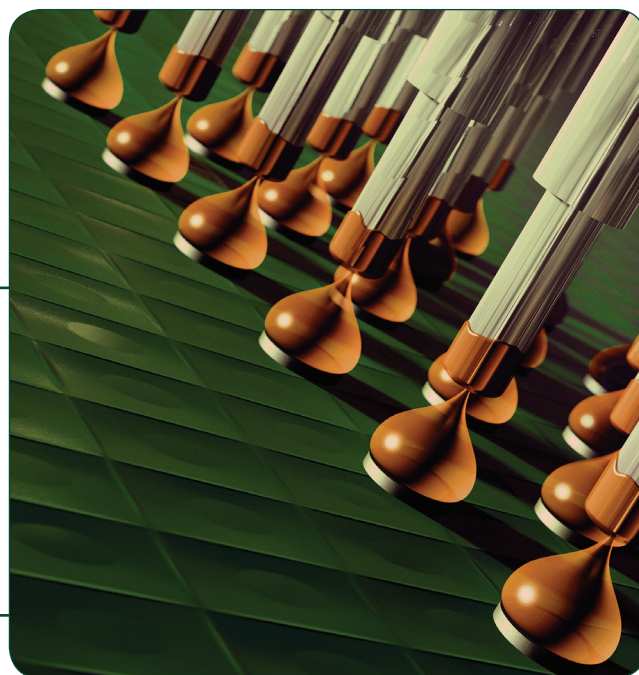
### Properties

	Value	
Flux Type Classification	M1	J-STD-004 (IPC-TM-650: 2.3.32 and 2.3.33)
Typical Viscosity	14.5kcps (5min)	Brookfield Spindle TB (20rpm)
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	72mg KOH/g	Titration
Typical Tack Strength	180g	J-STD-005 (IPC-TM-650: 2.4.44)
Shelf Life	6 months (-20 to +10°C)	Viscosity change/ microscope examination

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

### Application

The amount of **WS-446-NRD** 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 desired application by shearing to achieve the desired viscosity.



### Cleaning

**WS-446-NRD** 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

**Ball-Attach Flux WS-446-NRD** is available in 150g (6 fl. oz.) and 300g (12 fl. oz.) cartridges. Other packaging can be provided to meet the customer's specific requirements.

### Storage

For maximum shelf life, **WS-446-NRD** syringes and cartridges should be stored tip down at -20 to +10°C for maximum shelf life. Storage temperatures should not exceed 25°C for more than 4 days, and should never exceed 30°C. After removing from cold storage, **WS-446-NRD** should be allowed to stand for at least 4 hours at room temperature before using.

### 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 can be found online at <http://www.indium.com/sds>

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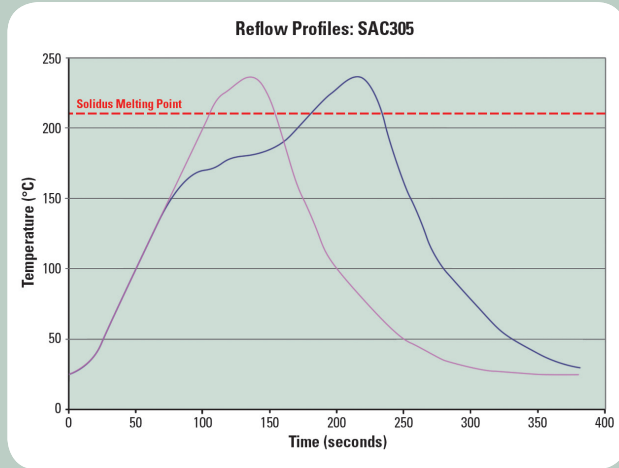


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### Reflow

#### Recommended Profile:



A short preheat (150–160°C) for less than 45 seconds may be used to reduce voiding. The profile should ideally be a linear ramp at 1–2°C/second up to 20–30°C above solidus temperature, with a rapid cool down afterwards, and a minimum time above liquidus of 20 seconds.

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