

# 2166-BN Soldering Flux

Zero-Halogen, VOC-Free, Organic, Water Soluble, Liquid Flux

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## Product Description

Kester 2166-BN Soldering Flux is a zero-halogen, organic flux designed for automated soldering of circuit board assemblies. This flux provides good activity for all treated copper surfaces. The absence of chlorides, bromides, phosphates and highly corrosive materials facilitates removal after soldering. 2166-BN provides better surface insulation resistance than typical water soluble fluxes, making it particularly suitable for surface mount assemblies.

2166-BN is free of volatile organic compounds. This eliminates the use of ozone depleting chemicals and volatile organic compounds contained in the flux removal solvents. 2166-BN flux produces bright, shiny solder joints and the residue after soldering is effectively removed in standard water cleaning systems.

## Performance Characteristics:

- Zero-Halogen
- Chemically compatible with most solder masks and board laminates
- High ionic cleanliness and no surface insulation resistance degradation
- Classified as ORH0 per J-STD-004

## RoHS Compliance

This product meets the requirements of the Restriction of Hazardous Substances (RoHS) Directive, 2015/863 for the stated banned substances.

## Physical Properties

**Specific Gravity:** 1.144 ± 0.010

Antoine Paar DMA 35 @ 25 °C

**Percent Solids (typical):** 31

Tested to J-STD-004, IPC-TM-650, Method 2.3.34

**Acid Number:** 164 ± 15 mg KOH/g of flux

Tested to J-STD-004, IPC-TM-650, Method 2.3.13

**Flash Point:** >100 °C (212 °F)

## Reliability Properties

### Copper Mirror Corrosion: High

Tested to J-STD-004, IPC-TM-650, Method 2.3.32

### Corrosion Test: High

Tested to J-STD-004, IPC-TM-650, Method 2.6.15

### Silver Chromate: Pass

Tested to J-STD-004, IPC-TM-650, Method 2.3.33

### Chloride and Bromides: 20 ppm max

Tested to J-STD-004, IPC-TM-650, Method 2.3.35

### Fluorides by Spot Test: Pass

Tested to J-STD-004, IPC-TM-650, Method 2.3.35.1

### Surface Insulation Resistivity (SIR), IPC (typical): Pass

Tested to J-STD-004, IPC-TM-650, Method 2.6.3.3

|       | Blank                  | 2166-BN                |
|-------|------------------------|------------------------|
| Day 1 | 2.1*10 <sup>11</sup> Ω | 2.2*10 <sup>10</sup> Ω |
| Day 4 | 1.9*10 <sup>11</sup> Ω | 3.5*10 <sup>10</sup> Ω |
| Day 7 | 1.7*10 <sup>11</sup> Ω | 6.4*10 <sup>10</sup> Ω |

## Flux Application

2166-BN can be applied to circuit boards by a spray, dip, or wave process. An air knife after the flux tank is recommended to remove excess flux if used in a dip or wave application to remove any excess flux to prevent dripping on the preheater surface.

## Process Considerations

The optimum preheat temperature for most circuit assemblies is 104 to 116 °C (220 to 240 °F) as measured on the top or component side of the printed circuit board. Dwell time in the wave is typically 2 to 4 seconds for leaded alloys and 4 to 8 seconds for lead-free alloys. The conveyor speed should be adjusted to accomplish proper board contact time with the solder. Then the preheat temperatures are adjusted to achieve the required preheat top board temperatures. In the event you need further direction on the setup of your wave soldering system, please contact Kester Technical Support.

## Elimination of Splattering

Since VOC-free fluxes are water-based, splattering can be a problem. Splattering occurs when water comes in contact with molten solder, so it may be necessary to use forced air to drive off the water. Manufacturers have reported that blowing hot air at 0.28 to 0.85 m<sup>3</sup>/hr (10 to 30 ft<sup>3</sup>/hr) greatly assists in drying the water off the circuit boards.

## Flux Control

Specific gravity is normally the most reliable method to control the flux concentration. To check concentration, a hydrometer should be used. DI water can be used to replace evaporative losses.

## Cleaning

No neutralizer, saponifiers or detergents are necessary in the water wash system for complete removal of flux residues. It is not recommended to use high mineral content tap water. Otherwise, tap, deionized or softened water may be used for cleaning. The optimum water temperature is 49 to 60 °C (120 to 140 °F), although lower temperatures may be sufficient.

## Storage, Handling and Shelf Life

Because this formulation is water based, it is subject to freezing. A minimum storage temperature of 4 °C (40 °F) is recommended. If frozen, the 2166-BN is easily reconstituted by stirring at room temperature. Shelf life is 1 year from date of manufacture when handled properly and held at 4 to 25 °C (40 to 77 °F).

## Health and Safety

This product, during handling or use, may be hazardous to your health or the environment. Read the Safety Data Sheet and warning label before using this product. Safety Data Sheets are available at <https://www.kester.com/downloads/sds>.

## Contact Information

To confirm this document is the most recent version, please contact

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Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE. Emergency safety directory assistance: US 1 202 464 2554, Europe + 44 1235 239 670, Asia + 65 3158 1074, Brazil 0800 707 7022 and 0800 172 020, Mexico 01800 002 1400 and (55) 5559 1588

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