

# 2166-BN

## VOC-Free Organic Water-Soluble Liquid Flux

### Halide Free

#### Product Description

Kester 2166-BN is a halide-free, organic flux designed for automated soldering of circuit board assemblies. This flux provides good activity on both bare copper and solder coated boards. The absence of chlorides, bromides, phosphates and highly corrosive materials facilitates removal after soldering. Kester 2166-BN provides better surface insulation resistance than typical water-soluble fluxes, making it particularly suitable for surface mount assemblies. Kester 2166-BN provides better chemical compatibility with solder resists than other water-soluble fluxes. It is free of volatile organic compounds. This eliminates the use of ozone depleting chemicals and volatile organic compounds contained in the flux removal solvents. Kester 2166-BN flux produces bright, shiny solder joints and the residue after soldering is effectively removed in standard water cleaning systems.

#### Performance Characteristics:

- Halide free
- 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

#### 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

**SIR, IPC (typical):** Pass

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

	<b>Blank</b>	<b>2166-BN</b>
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

## Application Notes

### Flux Application:

Kester 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 from the circuit board and prevent dripping on the preheater surface.

### Process Considerations:

The optimum preheat temperature for most circuit assemblies is 104-116°C (220-240°F) as measured on the top or component side of the printed circuit board. Dwell time in the wave is typically 2-4 seconds. The wave soldering speed should be adjusted to accomplish proper preheating and evaporate excess water, which could cause splattering. For best results, speeds of 1.1-1.8 m/min (3½-6 ft/min) are used. The surface tension has been adjusted to help the flux form a thin film on the board surface allowing rapid water evaporation.

### 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 0.28-0.85 m<sup>3</sup>/hr (10-30 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 49-60°C (120-140°F), although lower temperatures may be sufficient.

### Storage 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 Kester 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 4-25°C (40-77°F).

### Health & Safety:

This product, during handling or use, may be hazardous to health or the environment. Read the Material Safety Data Sheet and warning label before using this product.

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