



# 979

## VOC-Free No-Clean Liquid Flux

For Lead-bearing and Lead-free alloys  
US Patent 5,281,281 and 5,334,260

### Product Description

Kester 979 is a VOC-free, no-clean flux formulation for high quality, low-defect soldering of electronic circuit board assemblies. This flux's finely tuned activation system offers the best wetting available in VOC-Free liquid flux technology and the shiniest solder joints. Kester 979 also reduces microsolderballing on glossy laminates and between connector pins. Kester 979 will not attack properly cured solder masks or FR-4 Epoxy-Glass laminate. Kester 979 leaves no haze or visible residue behind, including the white powdery residue associated with use of earlier no-clean formulas. The miniscule amount of non-visible residue that remains after soldering is non-conductive, non-corrosive and does not have to be removed.

### Performance Characteristics:

- Biodegradable at pH of 2.0 or greater
- Chemically compatible with most solder masks and board laminates
- Does not degrade Surface Insulation Resistance
- No offensive odors
- Bright, shiny solder connections
- Classified as ORL0 per J-STD-004
- Compliant to Bellcore GR-78

### Physical Properties

**Specific Gravity:** 1.020 ± 0.010

Antoine Paar DMA 35 @ 25°C

**Percent Solids (typical):** 4.5

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

**Acid Number:** 40.0 ± 3.0 mg KOH/g of flux

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

**pH (10% solution):** 2.8

Hanna Instruments 8314 @ 25°C

**Thinner:** DI Water

### Reliability Properties

**Copper Mirror Corrosion:** Low

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

**Corrosion Test:** Low

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:** None Detected

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>979 PD</b>	<b>979 PU</b>
Day 1	$2.8 \times 10^{10} \Omega$	$1.9 \times 10^{10} \Omega$	$2.3 \times 10^{10} \Omega$
Day 4	$1.5 \times 10^{10} \Omega$	$1.1 \times 10^{10} \Omega$	$1.2 \times 10^{10} \Omega$
Day 7	$1.2 \times 10^{10} \Omega$	$9.1 \times 10^9 \Omega$	$9.6 \times 10^9 \Omega$

## Application Notes

### Flux Application:

Kester 979 can be applied to circuit boards by a spray or dip process. Flux deposition should be 120-240  $\mu\text{g}$  of solids/cm<sup>2</sup> (750-1500  $\mu\text{g}$  of solids/in<sup>2</sup>). 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 95-115°C (203-239°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:

Acid number is normally the most reliable method to control the flux concentration of low solids, no clean fluxes. Evaporative loss is minimal because this flux is water-based. To check concentration, a simple acid-base titration should be used. PS-20 Test Kit and procedure are available from Kester.

### Cleaning:

Kester 979 flux residues are non-conductive, non-corrosive and do not require removal in most applications. If residue removal is required, plain DI water at 43-54°C (110-130°F) may be used.

### 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 979 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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