

# 979T

## VOC-Free No-Clean Low Solids Liquid Flux

### For Telecommunication Application

#### Product Description

Kester 979T is a 100% VOC-free, no-clean flux formulation for high quality, low-defect soldering of electronic circuit board assemblies. 979T is specially formulated with a unique proprietary blend of organic activator system which offers the best wetting and topside hole fill and shiniest solder joints, even with OSP coated copper boards which have undergone at least two thermal excursions. Kester 979T flux also reduces micro-solderballing on glossy and matt laminates and between connector pins.

Kester 979T leaves a minimal amount of residue after soldering. These residues are non-conductive, non-corrosive and do not need to be removed.

#### Performance Characteristics:

- VOC-free to comply with air quality regulations
- Excellent wetting for topside hole fill and shiniest solder joints, even with OSP copper boards which have undergone at least two thermal excursions.
- Reduces micro-solderballing on glossy and matt laminates and between connector pins.
- Chemically compatible with most solder masks and board laminates
- No surface insulation degradation
- Bright, shiny solder connections
- Classified as ORL0 per J-STD-004

#### RoHS Compliance

This product meets the requirements of the RoHS (Restriction of Hazardous Substances) Directive, 2002/95/EC Article 4 for the stated banned substances.

#### Physical Properties

**Specific Gravity:** 1.015 ± 0.005

Anton Paar DMA 35 @ 25°C

**Acid Number (typical):** 27.0 ± 3.5 mg KOH/g flux

Tested by potentiometric titration, water

**Percent Solids (typical) :** 4.2

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

**pH (5% solution, typical):** 3.0

Mettler-Toledo MA235 pH/Ions Analyzer@ 25°C

#### 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 Bromide:** Non-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

**S.I.R., IPC (typical):** Pass

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

	Blank	979T PU	979T PD
Day 1(24h)	$7.2 \times 10^{10} \Omega$	$2.2 \times 10^{10} \Omega$	$6.6 \times 10^9 \Omega$
Day 4(96h)	$1.2 \times 10^{11} \Omega$	$2.1 \times 10^{10} \Omega$	$7.4 \times 10^9 \Omega$
Day 7(168h)	$9.4 \times 10^{10} \Omega$	$1.0 \times 10^{10} \Omega$	$8.8 \times 10^9 \Omega$

**S.I.R., Bellcore (typical):** Pass

Tested to Bellcore GR-78-CORE

	Blank	979T PU	979T PD
Day 1(24h)	$5.8 \times 10^{13} \Omega$	$2.5 \times 10^{10} \Omega$	$1.8 \times 10^{11} \Omega$
Day 4(96h)	$4.3 \times 10^{13} \Omega$	$3.8 \times 10^{11} \Omega$	$1.8 \times 10^{12} \Omega$

## Application Notes

### Flux Application:

Kester 979T can be applied to circuit boards by a spray process. Flux deposition should be 120-240  $\mu\text{g}$  of solids/ $\text{cm}^2$  (750-1500  $\mu\text{g}$  of solids/ $\text{in}^2$ ). An air knife after the flux tank is recommended to remove excess flux from the circuit board and prevent dipping on the preheater surface.

### Process Considerations:

The optimum preheat temperature for most circuit assemblies is 90-100°C (194-212°F), as measured on the top or component side of the assembly. The optimum preheat temperature for most circuit assemblies is 110-150°C (230-302°F), as measured at the bottom or component side of the assembly. It is still important to note that the optimum preheat temperature for a given assembly will depend on the circuit board design, board thickness, length of contact time with molten solder, solder wave shape, speed of solder flow and preheating time.

Dwell time in the wave is typically 3-5 seconds. The wave soldering speed should be adjusted to accomplish proper preheating and evaporate excess solvent, which could cause splattering. For best results, speeds of 0.90-1.2 m/min (2.95 – 3.93 ft/min) are used. The surface tension has been adjusted to help the flux form a thin film on the board surface allowing rapid solvent evaporation. The solderpot temperature is recommended to be 245-260°C (473-500°F) for Sn63Pb37 alloy and about 260-270°C (500 – 518°F), for SnCu or SnAgCu alloy. Above information is a guideline and it is advisable to note that the optimum settings for a given assembly may vary and this is dependent on the circuit board design, board thickness, components used and equipment used. A design of experiment is recommended to be done to optimize the soldering process.

### Elimination of Splattering:

Since VOC-free fluxes are water-based, splattering can be a problem. Splattering occurs when water comes into 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  $\text{m}^3/\text{hr}$  (10-30  $\text{ft}^3/\text{hr}$ ) 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 since this flux is water-based. To check concentration, a simple acid-base titration should be used. Kester PS-20 test kit and procedure are available from Kester. When excessive debris from circuit boards, such as board fibers and from the air line build up in the flux tank, these particulates will re-deposit on the circuit boards which may create a build up of residues on probe test pins. It is, therefore, necessary to clean the tank and then replenish it with fresh flux when excessive debris accumulates in the flux tank.

### Cleaning:

Kester 979T 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 979T 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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