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MacDermid Alpha ELECTRONICS SOLUTIONS

TECHNICAL DATA SHEET

KESTER® 977 SOLDERING FLUX

VOC-free, No-Clean, Liquid Flux for Leaded and Lead-free Alloys

DESCRIPTION

Kester 977 Soldering Flux is an organic, water-based, no-clean chemistry for high quality soldering of electronic circuit board assemblies. Designed for wave soldering applications, 977 provides good wetting on most surface finishes. The flux was specifically designed to reduce bridging, which is commonly associated with VOC-free no-clean fluxes. 977 has excellent soldering properties for improved productivity without sacrificing reliability of the assembly. The flux leaves bright shiny solder joints and will not attack properly cured solder masks or FR-4 Epoxy-Glass laminate. The minimal amount of residue remaining after soldering is non-conductive, non-corrosive and need not be removed. The residues left after soldering will not interfere with in-circuit testing. 977 is not detrimental to the Surface Insulation Resistance (SIR) of the soldered assembly.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- 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

ROHS COMPLIANCE

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

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TECHNICAL DATA

Category	Results	Procedure/Remarks
Physical Properties		
Specific Gravity	1.012 ± 0.010	Anton Paar DMA 35 @ 25 °C
Percent Solids (typical)	3.25%	Tested to J-STD-004, IPC-TM-650, Method 2.3.34
Acid Number (typical)	27.0 ± 1.0 mg KOH/g of flux	Tested to J-STD-004, IPC-TM-650, Method 2.3.13
pH (10% solution)	3.0	Hanna Instruments 8314 @ 25 °C
Flash Point	>100 °C (212 °F)	
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
Surface Insulation Resistivity (SIR)	Pass	Tested to J-STD-004, IPC-TM-650, Method 2.6.3.3

	Blank	977 PD	977 PU
Day 1	$4.1*10^9$ Ω	$7.1*10^8$ Ω	$8.4*10^8$ Ω
Day 4	$7.0*10^9$ Ω	$1.3*10^9$ Ω	$2.8*10^9$ Ω
Day 7	$8.0*10^9$ Ω	$1.7*10^9$ Ω	$3.5*10^9$ Ω

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FLUX APPLICATION

977 can be applied to circuit boards by a spray or dip process. Flux deposition should be 120 to 240 µg of solids/cm^2 (750 to 1500 µg of solids/in^2). An air knife after the flux tank is recommended in the dip solder application to remove excess flux from the circuit board and prevent dripping on the preheater surface.

NOTE: 977 is not designed to be foamed applied. It is not a good candidate for any soldering process that does not have a preheat step in the process.

PROCESSING GUIDELINES

The optimum preheat temperature for most circuit assemblies is typically 90 to 115 °C (194 to 239 °F) as measured on the top or component side of the printed circuit board. Dwell time in the wave is for a SnPb process is typically 2 to 4 seconds, and dwell time in the wave for a lead-free alloy's is typically 4 to 8 seconds. The wave soldering conveyor speed should be adjusted to accomplish proper contact time, then the preheating settings should be adjusted to meet the top board temperature requirement. Ensure all water has been evaporated. After the preheater the board should be dull without and water spots on it.

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^3/hr (10 to 30 ft^3/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-22 Test Kit and procedure are available from MacDermid Alpha. The thinner for this flux is DI water.

Cleaning

977 flux residues are non-conductive, non-corrosive that does not require removal in most applications. If residue removal is required, plain DI water at 43 to 54 °C (110 to 130 °F) with a Saponifier is required.

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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, 977 is easily reconstituted by stirring at room temperature. Shelf life is 3 years from the date of manufacture when handled properly and held at 4 to 25 °C (40 to 77 °F).

RECYCLING SERVICES

We provide safe and efficient recycling services to help companies meet their environmental and legislative requirements and at the same time, maximize the value of their waste streams.

Our service collects solder dross, solder scrap, and various forms of solder paste waste. Please contact your local sales representative for recycling capabilities in your area.



SAFETY & WARNING

It is recommended that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use. **Safety Data Sheets are available.**

CONTACT INFORMATION

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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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