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TECHNICAL BULLETIN

ALPHA® PF-2

Low solids, Halide Free, Rosin/Resin Free, No-Clean Flux

DESCRIPTION

ALPHA PF-2 Flux is a low solid, halide free, rosin/resin free, no-clean, low residue flux, designed for use in nitrogen inerted wave soldering machines. ALPHA PF Series Fluxes have been formulated for spray applications only. They are compatible with all currently available spray fluxers from leading manufacturers.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

APPLICATION GUIDELINES

Preparation – In order to maintain consistent soldering performance and electrical reliability, it is important to begin the process with circuit boards and components that meet established requirements for solderability and ionic cleanliness. It is suggested that assemblers establish specifications on these items with their suppliers and that suppliers provide Certificates of Analysis with shipments and/or assemblers perform incoming inspection. A common specification for the ionic cleanliness of incoming boards and components is 5µg/in^2 maximum, as measured by an Omegameter with heated solution.

Care should be taken in handling the circuit boards throughout the process. Boards should always be held at the edges. The use of clean, lint-free gloves is also recommended. When switching from one flux to another, the use of a new foam stone is recommended (for foam fluxing).

Conveyors, fingers and pallets should be cleaned. ALPHA SM-110 Solvent Cleaner has been found to be very useful for these cleaning applications. When foam fluxing, do not use hot fixtures or pallets. Hot fixtures/pallets will deteriorate the foam head.

Flux Application – ALPHA PF-2 is formulated to be applied by spray methods. When spray fluxing, the uniformity of the coating can be visually checked by running a piece of cardboard over the spray fluxer or by processing a board-sized piece of tempered glass through the spray and then through the preheat section.

Operating Parameter	Typical Level
Spray	80 to 400 µg/cm^2 of solids
Topside Preheat Temperature	(140 to 248) °F (60 to 120) °C

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Operating Parameter	Typical Level
Bottom-side Preheat Temperature	About 65 °F (35 °C) higher than topside
Maximum Ramp Rate of Topside Temperature (to avoid component damage)	3.5 °F/second (2 °C/second) maximum
Conveyor Angle	5 to 8° (6° most common)
Conveyor Speed	4 to 6 feet/minute (1.2 to 1.8 meters/minute)
Contact Time in the Solder (includes Chip Wave and Primary Wave)	1 to 5 seconds, (2 to 2½ seconds most common)
Solder Pot Temperature	455 to 554 °F (235 to 290) °C
These are general guidelines which have proven to yield excellent results; however, depending upon your equipment, components, and circuit boards, your optimal settings may be different. In order to optimize your process, it is recommended to perform a design experiment, optimizing the most important variables (amount of flux applied, topside preheat temperature, soldering temperature and board orientation).	

Touch-Up/Rework – Use of the Cleanline Write Flux Applicator with ALPHA NR-205 flux and Telecore Series cored solder is recommended for hand soldering applications.

For applications which require cleaning, a saponifier such as ALPHA 2110 can be used.

TECHNICAL DATA

Properties	Typical Values	Properties	Typical Values
Appearance	Clear, water-white solution	Acid Number	15.5
Solids content wt,wt	1.9%	IPC J-STD-04 Designation	ORL0
Specific Gravity @ 25 °C (77 °F)	0.785 to 0.791	Shelf Life	360 days
Flash Point	53 °F/12 °C	Container Size Availability	1, 5 , 55 gallons

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CORROSION & ELECTRICAL TESTING

Corrosion Testing

Test		Requirement for ORL0	Results
IPC	Silver Chromate Paper	No detection of halide	PASS
	IPC-TM 650 Test Method 2.3.33		
	Copper Mirror Test	No complete removal of copper	PASS
	IPC-TM 650 Test Method 2.3.32		
	Copper Corrosion Test	No evidence of corrosion	PASS
	IPC-TM650 Test Method 2.6.15		
NOTE: Copper Mirror and Silver Chromate Paper tests were performed using flux sample prepared by reconstituting with isoprophyl alcohol after evaporation of its water vehicle at 80 °C for one hour as per footnote 1 of table 5, page 8 of J-STD-004.			

J-STD-004A Surface Insulation Resistance

Test	Conditions	Requirements	Results
"Comb-Down" Uncleaned	85 °C/85% RH, 7 days	> 1.0 x 10^8 Ω	3.8 x 10^9 Ω
"Comb-Up" Uncleaned	85 °C/85% RH, 7 days	> 1.0 x 10^8 Ω	4.2 x 10^9 Ω
Control Boards	85 °C/85% RH, 7 days	> 1.0 x 10^9 Ω	3.6 x 10^{10} Ω
IPC Test Condition (per J-STD-004): -50V, measurement @ 100V/IPC B-24 board (0.4mm lines, 0.5mm spacing).			

Bellcore Surface Insulation Resistance

Test	Conditions	Requirements	Results
"Comb-Down" Uncleaned	35 °C/85% RH, 5 days	1.0 x 10^{11} minimum	7.3 x 10^{11}
"Comb-Up" Uncleaned	35 °C/85% RH, 5 days	1.0 x 10^{11} minimum	1.5 x 10^{12}
Control Boards	35 °C/85% RH, 5 days	2.0 x 10^{11} minimum	1.3 x 10^{13}
Bellcore Test Condition (per GR 78-CORE, Issue 1): 48 Volts, measurement @ 100V/25 mil lines/50 mil spacing.			

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Bellcore Electromigration

Test	SIR (Intial)	SIR (Final)	Requirement	Result	Visual Result
"Comb-Up" Uncleaned	2.6 x 10^{10} Ω	8.1 x 10^{10} Ω	SIR(Intial) / SIR(Final) <10	Pass	Pass
"Comb-Down" Uncleaned	1.6 x 10^{9} Ω	3.5 x 10^{10} Ω	SIR(Intial) / SIR(Final) <10	Pass	Pass
Bellcore Test Condition (per GR 78-CORE, Issue1): 65 °C/85% RH/500 Hours/10V, measurement @ 100V/IPC B-25B Pattern (12.5 mil lines, 12.5 mil spacing).					

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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 or link here.



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 at MacdermidAlpha.com/assembly-solutions/knowledge-base.**

CONTACT INFORMATION

To confirm this document is the most recent version, please contact Assembly@MacDermidAlpha.com

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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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