# 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 |

| 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 |

## 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. | | | |

**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). | | | | | |

## 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**

www.macdermidalpha.com

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|---|---|---|
| **North America**<br>109 Corporate Blvd.<br>South Plainfield, NJ 07080, USA<br>1.800.367.5460 | **Europe**<br>Unit 2, Genesis Business Park<br>Albert Drive<br>Woking, Surrey, GU21 5RW, UK<br>44.01483.758400 | **Asia**<br>8/F., Paul Y. Centre<br>51 Hung To Road<br>Kwun Tong, Kowloon, Hong Kong<br>852.3190.3100 |

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