

# ALPHA<sup>®</sup> NC-200

## No-Clean Flux

### DESCRIPTION

**ALPHA NC-200** is a very active, low solids, no-clean flux. It is formulated with a proprietary activator system. A small percentage of rosin is added for enhanced thermal stability. The activators are designed to provide the broadest operating window for a low solids, no-clean flux, while maintaining a high level of long-term electrical reliability. After wave soldering, **ALPHA NC-200** leaves a low level of non-tacky residue, which is easily penetrable in pin testing.

**ALPHA NC-200** provides the broadest process window for a no-clean flux with less than 5% solids content. **ALPHA NC-200** is designed to provide excellent soldering results (low defects rates), even when the surfaces to be soldered (component leads and pads) are not highly solderable. **ALPHA NC-200** works particularly well with bare copper boards protected with organic or rosin/resin coatings and with tin-lead coated PCBs.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

### FEATURES & BENEFITS

- Highly active for excellent soldering and low defect rates.
- Low level of non-tacky residue to reduce interference with pin testing.
- Cleaning is not required which reduces operating costs.
- Reduces the surface tension between solder mask and solder to significantly reduce solder ball frequency.
- Meets Bellcore requirements for long-term electrical reliability.

### 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<sup>2</sup> 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 have 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 NC-200 is formulated to be applied by foam, wave or spray methods. When foam fluxing, the foam fluxer should be supplied with compressed air which is free of oil and water. Always keep the flux tank full. The flux level should be maintained 1 inch to 1-1/2 inches above the top of the stone. Adjust the air pressure to produce the optimum foam height with a fine, uniform foam head.

A uniform coating of flux is essential to successful soldering. When using the foam or wave method of application, an air knife is recommended after the fluxing operation. An air knife will help ensure that the flux is uniformly distributed across the board and will remove the excess flux. 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	Recommendation
Flux application	Foam, Wave, Spray
Amount of Flux Applied	Foam, Wave: 1,000 to 2,000 µg/in <sup>2</sup> of solids Spray: 750 to 1,500 µg/in <sup>2</sup> of solids
<b>Foam Fluxing</b>	
Foam Stone Pore Size	20 to 50 µm
Distance that Top of Stone is Submerged Below Flux	1 to 1 ½ inches (25 to 40 mm)
Foam Fluxer Chimney Opening	3/8 to ½ inch (10 to 13 mm)
<b>Foam Fluxing Using Air Knife</b>	
Air Knife Hole Diameter	1 to 1.5 mm
Distance Between Holes	4 to 5 mm
Distance from Fluxer to Air Knife	4 to 6 inches (10 to 15 cm)
Air Knife Angle Back toward Fluxed from perpendicular	3 to 5°

Operating Parameter	Recommendation
Top-Side Preheat Temperature	85 to 110 °C (190 to 230 °F)
Bottom side Preheat Temperature	About 35 °C (65 °F) higher than topside
Maximum Ramp Rate of Topside Temperature (to avoid component damage)	2 °C/second (3.5 °F/second) maximum
Conveyor Speed	4 to 6 feet/minute (1.2 to 1.8 meters/minute)
Contact Angle	5 to 8° (6° most common)
Contact Time	1.5 to 3.5 seconds (2 to 2½ seconds most common)
Solder Pot Temperature	235 to 260 °C (460 to 500 °F)
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. To optimize your process, it is recommended to perform a design experiment, optimizing the most important variables (amount of flux applied, conveyor speed, topside preheat temperature, solder pot temperature and board orientation).	

**Flux Solids Control** – If foam, wave, or rotary drum spray fluxing, the flux solids will need to be controlled via thinner addition to replace evaporative losses of the flux solvent. As with any flux with less than 5% solids content, specific gravity is not an effective measurement for assessing and controlling the solids content. Monitoring and controlling the acid number is recommended for maintaining the solids content. The acid number should be controlled to between 14.5 and 16.5. Alpha’s Flux Solids Control Kit #3, a digital titrator, is suggested. Request Alpha’s Technical Bulletin SM-458 for details on the kit and titration procedure.

When operating the foam fluxer continuously, the acid number should be checked every two to four hours. Over time, debris and contaminants will accumulate in recirculating type flux applicators. For consistent soldering performance, dispose of spent flux every 40 hours of operation. After emptying the flux, the reservoir and foam stone should be thoroughly cleaned with flux thinner.

**Residue Removal** – ALPHA NC-200 is a no-clean flux, and the residues are designed to be left on the board. However, if desired, ALPHA NC-200 residues can be removed with ALPHA 2110 Saponifier.

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

**TECHNICAL DATA**

Physical Properties	Typical Values	Parameters/Test Method	Typical Values
Appearance	Pale Yellow Liquid	pH (5% aqueous solution)	3.4
Solids Content, wt/wt	4.1	Recommended Thinner	ALPHA 425
Specific Gravity @ 25 °C (77 °C)	0.792 ± 0.003	Shelf Life (from Date of Mfg.)	360 days
Acid Number (mg KOH/g)	15.5	IPC J-STD-004 Designation	ROL0
Flash Point (T.C.C.)	56 °F (13 °C)	Bellcore GR78-CORE, Issue 1	Yes
Pounds Per Gallon	6.6	Container Size Availability	1, 5 and 55 Gal.

**CORROSION & ELECTRICAL TESTING**
**Corrosion Testing**

Test	Requirement for ROL0	Results
Silver Chromate Paper <sup>1</sup> IPC-TM 650 Test Method 2.3.33	No detection of halide	Pass
Copper Mirror Tests <sup>1</sup> (Modified IPC/Bellcore Method)	No complete removal of copper	Pass
Copper Corrosion Test IPC-TM 650 Test Method 2.6.15	No evidence of corrosion	Pass

**J-STD-004 Surface Insulation Resistance**

Test	Conditions	Requirements <sup>2</sup>	Results <sup>2</sup>
"Comb-Down" Uncleaned	85 °C/85% RH, 7 days	1.0 x 10 <sup>8</sup> minimum	1.6 x 10 <sup>9</sup>
"Comb-Up" Uncleaned	85 °C/85% RH, 7 days	1.0 x 10 <sup>8</sup> minimum	2.9 x 10 <sup>9</sup>
Control Boards	85 °C/85% RH, 7 days	2.0 x 10 <sup>8</sup> minimum	7.2 x 10 <sup>9</sup>
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 <sup>2</sup>	Results <sup>2</sup>
"Comb-Down" Uncleaned	35 °C/85% RH, 5 days	1.0 x 10 <sup>11</sup> minimum	3.8 x 10 <sup>11</sup>
"Comb-Up" Uncleaned	35 °C/85% RH, 5 days	1.0 x 10 <sup>11</sup> minimum	7.3 x 10 <sup>11</sup>
Control Boards	35 °C/85% RH, 5 days	2.0 x 10 <sup>11</sup> minimum	2.1 x 10 <sup>11</sup>
Bellcore Test Condition (per GR 78-CORE, Issue 1): 48 Volts, measurement @ 100V/25 mil lines/50 mil spacing.			

**Bellcore Electromigration**

Test	SIR (Initial) <sup>2</sup>	SIR (Final) <sup>2</sup>	Requirement	Result	Visual Result
"Comb-Up" Uncleaned	1.8 x 10 <sup>9</sup>	8.5 x 10 <sup>9</sup>	SIR (Initial)/SIR (Final) <10	Pass	Pass
"Comb-Down" Uncleaned	1.4 x 10 <sup>9</sup>	2.5 x 10 <sup>9</sup>	SIR (Initial)/SIR (Final) <10	Pass	Pass
Bellcore Test Condition (per GR 78-CORE, Issue 1): 65°C/85% RH/500 Hours/10V, measurement @ 100V/IPC B-25B Pattern (12.5 mil lines, 12.5 mil spacing).					

<sup>1</sup> **Copper Mirror and Silver Chromate Paper** tests were performed using flux sample prepared by reconstituting with isopropyl 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.

<sup>2</sup>All values shown are in ohms.

**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](https://MacDermidAlpha.com/assembly-solutions/knowledge-base).**

**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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