chanhvinh.com

MacDermid Alpha ELECTRONICS SOLUTIONS

TECHNICAL DATA SHEET

ALPHA® NR-330

VOC-Free, No-Clean Flux

DESCRIPTION

ALPHA NR-330 is a VOC-free halogen-free, rosin/resin-free, low solids no-clean flux which provides the highest activity of any VOC-free Bellcore compliant flux for defect-free soldering. It is formulated with a proprietary mixture of organic activators which deliver excellent wetting and top-side hole fill, even with OSP coated bare copper boards which have undergone prior thermal excursions. Several proprietary additives are also formulated into **ALPHA NR-330** which act to reduce the surface tension between the solder mask and the solder; thereby, dramatically reducing the tendency of solderball generation. The formulation of **ALPHA NR-330** is also designed to be more thermally stable; thereby, reducing the occurrence of solder bridging.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- Bellcore compliant for assemblies requiring this standard.
- VOC-free to help meet air quality regulations.
- Exceptional wetting for excellent hole-fill even with organically coated bare copper boards, with prior reflows.
- Thermally stable activators provide low solder bridging.
- Reduces the surface tension between solder mask and solder to provide low solderball frequency.
- Very low level of non-tacky residue to reduce interference with pin testing and good board cosmetics.
- Suitable for us with lead-free alloys such as 99.Sn/0.7Cu and 96.5Sn/3.5Ag.

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/in2 maximum, as measured by an Omegameter with heated solution.

chanhvinh.com

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.

Conveyors, fingers and pallets should be cleaned. ALPHA SM-110 Solvent Cleaner has been found to be very useful for these cleaning applications.

Flux Application: ALPHA NR-330 is formulated to be applied by spray method. 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
Amount of Flux Applied	Spray: 500 to 1000 µg/in^2 of solids
Top-Side Preheat Temperature	210 to 235 °F (99 to 113 °C)
Bottomside Preheat Temperature	0 to 40 °F (0 to 22 °C) vs. Top-Side
Recommended Preheat Profile	Straight ramp to desired top-side temperature
Maximum Ramp Rate of Topside Temperature (to avoid component damage)	2 °C/second (3.5 °F/second) maximum
Conveyor Angle	5 to 8° (6° most common)
Conveyor Speed	3.5 to 6.5 feet/minute (1.0 to 1.8 meters/minute)
Contact Time in the Solder (includes Chip Wave and Primary Wave)	1.5 to 4.0 seconds (2½ to 3 seconds most common)
Solder Pot Temperature:	
Sn63/Pb37 Alloy	460 to 500 °F (235 to 260 °C)
Lead-Free Alloys (99.3Sn/0.7Cu, 96.5/13.5Ag, Sn/4.0Ag/0.5Cu)	500 to 550 °F (260 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, conveyor speed, topside preheat temperature, solder pot temperature and board orientation).	

Flux Solids Control: If rotary drum spray fluxing, the flux solids will need to be controlled via thinner addition, in this case DI water, 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. The acid number should be controlled to between

chanhvinh.com

36.0 and 40.0. Alpha's Flux Solids Control Kit #3, a digital titrator, is suggested. Request Alpha's Reference Bulletin for details on the kit and titration procedure. When operating a rotary drum fluxer continuously, the acid number should be checked every eight 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 should be thoroughly cleaned with DI water.

Residue Removal: ALPHA NR-330 is a no-clean flux and the residues are designed to be left on the board. However, if desired, ALPHA NR-330 residues can be removed with hot water.

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.

HALOGEN STATUS

Halogen Standards			
Standard	**Requirement**	**Test Method**	**Status**
IEC 61249-2-21	Post soldering residues contain <990ppm each or total <1500ppm Br or Cl from flame retardant source	**TM EN 14582** Solids extraction per IPC TM 2.3.34	PASS
JEDEC A Guideline for Defining “Low Halogen” Electronic products	Post soldering residues contain <1000ppm Br or Cl from flame retardant source		PASS

chanhvinh.com

TECHNICAL DATA

Physical Properties	Typical Values	Parameters/Test Method	Typical Values
Appearance	Clear, Colorless Liquid	pH	2.35
Solids Content, wt/wt	4.0	Recommended Thinner	DI Water
Specific Gravity @ 25 °C(77 °F)	1.013 ± 0.003	Shelf Life (from Date of Mfg)	540 days
Acid Number (mg KOH/g)	38.0 ± 2.0	Container Size Availability	1, 5 and 55 Gal.
Flash Point (T.C.C.)	NONE	IPC J-STD-004 Designation	ORL0

CORROSION & ELECTRICAL TESTING

Corrosion Testing

Test	Requirement for ORL0	Results
Silver Chromate Paper[1] IPC-TM-650 Test Method 2.3.33	No detection of halide	Pass
Copper Mirror Tests[1] (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

[1] **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.

J-STD-004 Surface Insulation Resistance (All values shown are in ohms)

Test	Conditions	Requirements	Results
"Comb-Down" Uncleaned	85 °C/85% RH, 7 days	$> 1.0 \times 10^{8}$ Ω	6.8×10^{8} Ω
"Comb-Up" Uncleaned	85 °C/85% RH, 7 days	$> 1.0 \times 10^{8}$ Ω	2.4×10^{9} Ω
Control Boards	85 °C/85% RH, 7 days	$> 1.0 \times 10^{9}$ Ω	2.4×10^{10} Ω

chanhvinh.com

Test	Conditions	Requirements	Results
IPC Test Condition (per J-STD-004A): -50V, measurement @ 100V/IPC B-24 board (0.4mm lines, 0.5mm spacing).			

Bellcore Surface Insulation Resistance (All values shown are in ohms)

Test	Conditions	Requirements	Results
"Comb-Down" Uncleaned	35 °C/85% RH, 5 days	$> 1.0 \times 10^{11}$ Ω	2.3×10^{12} Ω
"Comb-Up" Uncleaned	35 °C/85% RH, 5 days	$> 1.0 \times 10^{11}$ Ω	1.9×10^{12} Ω
Control Boards	35 °C/85% RH, 5 days	$> 2.0 \times 10^{11}$ Ω	3.0×10^{12} Ω
Bellcore Test Condition (per GR 78-CORE, Issue 1): 48 Volts, measurement @ 100V/25 mil lines/50 mil spacing.			

Bellcore Electromigration

Test	SIR (Initial)[3]	SIR (Final)[3]	Requirement	Result	Visual Result
"Comb-Up" Uncleaned	4.3×10^{8} Ω	4.2×10^{10} Ω	SIR (Initial)/SIR (Final) <10	Pass	Pass
"Comb-Down" Uncleaned	1.4×10^{9} Ω	2.5×10^{10} Ω	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).					

chanhvinh.com

MacDermid Alpha ELECTRONICS SOLUTIONS

TECHNICAL DATA SHEET

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.**

STORAGE

Store ALPHA NR-330 flux in original containers at 10 to 30 °C to prevent phase separation. Because the formulation is water based it is subject to freezing below 4 °C. If frozen, NR-330 can be reconstituted easily by stirring it at room temperature.

CONTACT INFORMATION

www.macdermidalpha.com

North America 140 Centennial Avenue Piscataway, NJ 08854 1.800.367.5460	**Europe** Unit 2, Genesis Business Park Albert Drive Woking, Surrey, GU21 5RW, UK 44.01483.758400	**Asia** 8/F., Two Sky Parc 51 Hung To Road Kwun Tong, Kowloon, Hong Kong, SAR China 852.2500.5365

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

DISCLAIMER: All statements, technical information and recommendations contained herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. No statement or recommendation shall constitute a representation unless set forth in an agreement signed by officers of seller and manufacturer. NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY IS MADE. The following warranty is made in lieu of such warranties and all other warranties, express, implied, or statutory. Products are warranted to be free from defects in material and workmanship at the time sold. The sole obligation of seller and manufacturer under this warranty shall be to replace any noncompliant product at the time sold. Under no circumstances shall manufacturer or seller be liable for any loss, damage or expense, direct, indirect, incidental or consequential, arising out of the inability to use the product. Notwithstanding the foregoing, if products are supplied in response to a customer request that specifies operating parameters beyond those stated above, or if products are used under conditions exceeding said parameters, the customer by acceptance or use thereof assumes all risk of product failure and of all direct, indirect, incidental and consequential damages that may result from use of the products under such conditions, and agrees to exonerate, indemnify, defend and hold harmless MacDermid, Incorporated and its affiliates therefrom. No suggestion for product use nor anything contained herein shall be construed as a recommendation to use any product in a manner that infringes any patent or other intellectual property rights, and seller and manufacturer assume no responsibility or liability for any such infringement.

© 2019 MacDermid, Inc. and its group of companies. All rights reserved. "(R)" and "TM" are registered trademarks or trademarks of MacDermid, Inc. and its group of companies in the United States and/or other countries.