

ALPHA[®] SLS 65H

No Clean Flux

DESCRIPTION

ALPHA SLS 65H is an active, low solids, no-clean flux. It was specifically developed to eliminate the tendency for solder balling and solder bridging-two defects which are normally associated with the use of the chip wave. Of all low solids (< 4% solids), no-clean fluxes, **ALPHA SLS 65H** exhibits the lowest tendency for solder ball generation over a wide variety of solder masks. **ALPHA SLS 65H** should be considered for use by any assembler who has board designs which are sensitive to solder bridging, performs pin testing, and whose specification requires an extremely low frequency of solder balls.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- Thermally stable activators provide the lowest solder bridging in a low solids, no-clean flux.
- Reduces the surface tension between solder mask and solder to provide the lowest solder ball frequency of any low solids, no-clean flux.
- Very low level of non-tacky residue to reduce interference with pin testing and exhibit no visible residue.
- Cleaning is not required which reduces operating costs.
- Bellcore Compliant 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/in² maximum, as measured by an ionic contamination tester.

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 SLS 65H 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. Keep the flux tank full at all times. The flux level should be maintained 1 inch to 1-½ 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.

GENERAL GUIDELINES FOR MACHINE SETTINGS

Operating Parameter	Typical Level
Amount of Flux Applied	Foam, Wave: 1,000 to 1,500 µg/in ² of solids Spray: 450 to 800 µg/in ² of solids
When foam fluxing--Foam Stone Pore Size	20 to 50 µm
Distance that top of stone is submerged below flux	1 to 1½ inches (25 to 40 mm)
Foam Fluxer Chimney Opening	3/8 to 1/2 inch (10 to 13 mm)
When foam fluxing, use an Air Knife: 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 Fluxer from Perpendicular	3 to 5°
Topside Preheat Temperature	100 to 120 °C (210 to 250 °F)
Bottomside Preheat Temperature	about 65 °F (35 °C) higher than topside
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)

Operating Parameter	Typical Level
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 3.5 seconds (2½ to 3 seconds most common)
Solder Pot Temperature	460 to 500 °F (235 to 260 °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 designed 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 22 and 24. 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 SLS 65H is a no-clean flux and the residues are designed to be left on the board. However, if desired, ALPHA SLS 65H 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

Item	Typical Values	Item	Typical Values
Appearance	Clear, colorless liquid	pH (5% aqueous solution)	3.2
Solids Content, wt/wt	2.8	Recommended Thinner	ALPHA 425
Acid Number (mg KOH/g)	21.5 to 23.0	Shelf Life (from Date of Mfg.)	360 days
Specific Gravity@ 25 °C / 77 °F	0.802 ± 0.003	Container Size Availability	1, 5, and 55 Gal.
Pounds Per Gallon	6.68	Bellcore GR 78-CORE Issue 1 Compliant	Yes
Flash Point (T.C.C.)	53 °F (12 °C)	IPC J-STD-004 Designation	ORL0

CORROSION & ELECTRICAL TESTING
Corrosion Testing:

Test	Requirement For OrL0	Results
Silver Chromate Paper Test	No Detection of Halide	Pass
Copper Mirror Test	No Complete Removal of Copper	Pass
IPC Copper Corrosion Test	No evidence of corrosion	Pass

IPC J-STD-004 Surface Insulation Resistance: (All values in ohms.)

Test	Conditions	Requirements	Results
"Comb-Down" Uncleaned	85 °C/85% RH, 7 days	$> 1.0 \times 10^8 \Omega$	$1.4 \times 10^9 \Omega$
"Comb-Up" Uncleaned	85 °C/85% RH, 7 days	$> 1.0 \times 10^8 \Omega$	$2.4 \times 10^9 \Omega$
Control Boards	85 °C/85% RH, 7 days	$> 1.0 \times 10^9 \Omega$	$1.4 \times 10^{10} \Omega$
IPC Test Condition (per J-STD-004): -50V, measurement @ 100V/IPC B-24 board (0.4mm lines, 0.5mm spacing).			

Bellcore Surface Insulation Resistance: (All values in ohms.)

Test	Conditions	Requirements	Results
"Comb-Down" Uncleaned	35 °C/85% RH, 5 days	$> 1.0 \times 10^{11} \Omega$	$8.2 \times 10^{12} \Omega$
"Comb-Up" Uncleaned	35 °C/85% RH, 5 days	$> 1.0 \times 10^{11} \Omega$	$1.7 \times 10^{12} \Omega$
Control Boards	35 °C/85% RH, 5 days	$> 2.0 \times 10^{11} \Omega$	$6.7 \times 10^{12} \Omega$
Bellcore Test Condition (per GR 78-CORE, Issue 1): 48 Volts, measurement @ 100V/25 mil lines/50 mil spacing.			

Bellcore Electromigration: (All values in ohms.)

Test	Sir (Initial)	Sir (Final)	Requirement	Result	Visual Result
"Comb-Up" Uncleaned	$1.5 \times 10^9 \Omega$	$1.8 \times 10^{10} \Omega$	SIR (Initial)/SIR (Final) <10	Pass	$1.9 \times 10^{11} \Omega$
"Comb-Down" Uncleaned	$1.1 \times 10^9 \Omega$	$4.5 \times 10^9 \Omega$	SIR (Initial)/SIR (Final) <10	Pass	$1.2 \times 10^{11} \Omega$
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).					

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
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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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