ALPHA® EF-6803 HF

Low-Solids, Halogen-Free, Lead-Free Wave Flux

DESCRIPTION

ALPHA EF-6803HF is an alcohol based flux designed to optimize solderability and reliability. It is formulated for both standard and thicker, high-density PCBs in Lead-free processes. It is designed to have low bridging on bottom side QFPs, as well as provide superior performance in hole-fill and solderballing. Additionally, it provides good Lead-free solder joint cosmetics with an evenly spread, tack free residue.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

Features for Lead-free:

- Halogen-free per IEC 61249-2-21
- Excellent post-soldering cosmetics on PCB
- Good hole fill in both dual and single wave soldering
- Low bridging performance on connectors, 0.65 mm and 0.80 mm QFPs.

Benefits:

- Excellent Lead-free soldering performance on various board finishes.
- Halide free

APPLICATION GUIDELINES

Preparation: 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.

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 brand AutoClean 40 cleaner is recommended for this process.

Flux Application: ALPHA EF-6803HF can be applied with a spray fluxer. 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	SAC305 or Low Ag SAC Alloys
Amount of Flux Applied	Spray: 1000 to 1500µg/in^2 of solids//in^2 for dual wave and 900 to 1200 µg/in^2 of solids/in^2 for single wave soldering
Top-Side Preheat Temperature	95 to 125 °C
Bottom side 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 recommended by equipment manufacturers)
Conveyor Speed	1.0 to 2.0 meters/minute (3.3 to 6.6 ft/min) ALPHA EF-6803HF can run at a slower conveyor speed for certain types of Lead-free wave soldering process
Contact Time in the Solder (includes Chip Wave and Primary Wave)	2 to 7 seconds (3 to 5 seconds most common)
Solder Pot Temperature:	255 to 265 °C
These are general guidelines which have proven to yield excellent results. However, depending on your equipment, components, and circuit boards, your optimal settings may be different. To optimize your process, it is recommended to perform a designed experiment optimizing the most important variables (the 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. For measuring the solids content, 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 IPA.

Residue Removal: ALPHA EF-6803HF is a no-clean flux and the residues are designed to be left on the board. If desired, flux residues can be removed with ALPHA 2110 saponifier cleaner and with other commercially available solvent cleaners and saponifier cleaners.

HALOGEN STATUS

Standard	Requirement	Test Method	Status
IEC 61249-2-21	Post soldering residues contain <900ppm each or total of <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

TECHNICAL DATA

Physical Properties	Specifiction	Parameters/Test Method	Specification
Appearance	Clear, Pale Yellow Liquid	pH, 5% v/v aqueous solution	3.4
Solids Content, wt/wt	3.9	Recommended Thinner	ALPHA 425
Specific Gravity @ 25 °C (77 °C)	0.793 +/- 0.003	Shelf Life	12 months
Acid Number (mg KOH/g)	20.8 +/-1.3	IPC J-STD-004A Designation	ROL0
Flash Point (T.C.C.)	17 °C		

CORROSION & ELECTRICAL TESTING – SAC305 ALLOY

Corrosion Testing

Test		Requirement for ROL0	Results
IPC	Silver Chromate Paper IPC-TM 650 Test Method 2.3.33	No detection of halide	PASS
	Copper Mirror Test IPC-TM 650 Test Method 2.3.32	No complete removal of copper	PASS
	Copper Corrosion Test IPC-TM650 Test Method 2.6.15	No evidence of corrosion	PASS
JIS	Copper Corrosion Test JIS Z 3197:1999 Test Method 8.4.1	No evidence of corrosion	PASS

IPC J-STD-004B Surface Insulation Resistance

Test	Conditions	Requirements	Results
"Comb-Down" Un-cleaned	40 °C/93% RH, 7 days	1.0×10^8 Ω minimum	$>1.0 \times 10^{10}$ Ω
"Comb-Up" Un-cleaned	40 °C/93% RH, 7 days	1.0×10^8 Ω minimum	$>1.0 \times 10^{10}$ Ω
Control Boards	40 °C/93% RH, 7 days	1.0×10^9 Ω minimum	$>1.0 \times 10^{11}$ Ω
IPC Test Condition (per J-STD-004B): Bias: +12.5V, measurement @ 12.5V/IPC B-24 board (0.4 mm lines, 0.5 mm spacing).			

JIS STANDARD Surface Insulation Resistance

Test	Conditions	Requirements	Controls	Results
Initial	Ambient	1.0×10^{11} Ω minimum	2.4×10^{13} Ω	7.9×10^{12} Ω
After 7 days	40 °C / 90% RH	1.0×10^{10} Ω minimum	4.1×10^{12} Ω	8.0×10^{11} Ω
Recovered	25 °C/75% RH, 7 days	1.0×10^{11} Ω minimum	$9. \times 10^{12}$ Ω	3.9×10^{12} Ω
All Measurements @ 100V, JIS Boards (0.32mm lines, 0.32 mm spacing, same as IPC B25 Boards).				

Bellcore Surface Insulation Resistance

Test	Conditions	Requirements	Results
"Comb-Down" Un-cleaned	35 °C/85% RH, 4 days	1.0 x 10^{11} Ω minimum	9.9 x 10^{11} Ω
"Comb-Up" Un-cleaned	35 °C/85% RH, 4 days	1.0 x 10^{11} Ω minimum	7.8 x 10^{11} Ω
Control Boards	35 °C/85% RH, 4 days	2.0 x 10^{11} Ω minimum	9.0 x 10^{11} 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)	SIR (Final)	Requirement	Result	Visual Result
"Comb-Up" Un-cleaned	5.9 x 10^{11} Ω	3.1 x 10^{11} Ω	SIR (Initial)/SIR (Final) <10	Pass	Pass
"Comb-Down" Uncleaned	3.5 x 10^{10} Ω	8.4 x 10^{10} Ω	SIR (Initial)/SIR (Final) <10	Pass	Pass
Control	1.0 x 10^{11} Ω	5.9 x 10^{11} Ω	Not applicable	N/A	N/A
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 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