ALPHA® EF-6038HF

Ultra-Low Residue, Halogen-Free, No-Clean Liquid Flux for Standard to Moderate Thick Board Applications

DESCRIPTION

ALPHA EF-6038HF is an ultra-low residue, alcohol-based, high-reliability no-clean liquid flux formulated for standard to moderately complex PCB assemblies. The flux offers a broad operating process window, supporting a wide preheat temperatures range and extended dwell times, enabled by its enhanced thermal and oxidative stability.

Relative to other leading rosin-free formulations, **ALPHA EF-6038HF** delivers improved hole-fill capability in through-hole soldering applications. It's very low post-soldering residue levels typically eliminate cleaning requirements and exhibit excellent compatibility with in-circuit and pin testing.

ALPHA EF-6038HF is qualified to IPC J-STD-004 ORL0 and IPC J-STD-004B ORM0, confirming its halogen-free chemistry and high-reliability performance for demanding assembly environments.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- **Ultra-low, non-tacky residue** delivers excellent cosmetic appearance and minimal interference with pin testing
- **Wide process window** enables flexible application across a range of assembly conditions
- **Excellent hole fill** improves electrical reliability and mechanical strength
- **Thermally stable activators** reduce soldering defects and ensure consistent soldering results
- **High-reliability performance** ensures long-term reliability of final electrical assemblies
- **Halogen-free** formulation supports high-reliability assembly and environmentally responsible processing

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 10 µg/in^2 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.

Conveyors, fingers, and pallets should be regularly cleaned.

Residue Removal: ALPHA EF-6038HF is a no-clean flux, and the residues are designed to be left on the board.

General Guidelines for Machine Settings	
Operating Parameters	**Recommendation**
Flux Application	Spray
Amount of Flux Applied	Single: 800 to 1200 µg/in^2 of solids Dual: 1000 to 1600 µg/in^2 of solids
Top-side Preheat Temperature	105 to 130 °C (221 to 266 °F)
Bottom-side Preheat Temperature	0 to 25 °C (0 to 45 °F) greater than 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	0.9 to 1.5 meter/minute
Contact Time in the Solder (includes Chip Wave & Primary Wave)	2 to 7.5 seconds (3 to 5 seconds most common)
Solder Pot Temperature	260 to 280 °C (500 to 536 °F)

General Guidelines for Machine Settings	
Operating Parameters	**Recommendation**
Solder Alloy	Lead-Free Alloys (99.3Sn/0.7Cu, 96.5Sn/3.5Ag, SAC305, SAC405, ALPHA SnCX® Plus & ALPHA SACX® Plus)
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).	

TECHNICAL DATA

Item	Typical Values	Item	Typical Values
Appearance	Clear, Colorless to Pale Yellow Liquid	pH (%5 aqueous solution)	3
Solids Content, wt/wt	3.4%	Recommended Thinner	ALPHA 425
Specific Gravity @ 25°C (77 °F)	0.815 to 0.855	Shelf Life (from Date of Mfg.)	360 Days
Acid Number (mg KOH/g)	29	IPC Flux Designation	ORL0 per J-STD 004 ORM0 per J-STD 004B

HALOGEN STATUS

Halogen Standards			
Standard	**Requirement**	**Test Method**	**Status**
IEC 61249-2-21	Flux contains <900 ppm each or total of <1500 ppm 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	Flux contains <1000 ppm Br or Cl from flame-retardant source		Pass

CORROSION & ELECTRICAL TESTING

Corrosion Testing

Test	Assessment	Results
Copper Mirror Tests IPC-TM-650 Test Method 2.3.32	No breakthrough	Classified as “L”
Copper Corrosion Test IPC-TM-650 Test Method 2.6.15	Minor corrosion without pitting	Classified as “L” per IPC J-STD-004 or “M” per IPC J-STD-004B

IPC J-STD-004A Surface Insulation Resistance

Test	Requirements	Results	
		SIR value	Visual
"Comb-Down" Uncleaned	> 1.0 x 10^8 Ω	Pass	Pass
"Comb-Up" Uncleaned	> 1.0 x 10^8 Ω	Pass	Pass
Control Boards	> 1.0 x 10^9 Ω	Pass	NA
IPC Test Condition (per J-STD-004A TM 2.6.3.3): IPC B-24, 85°C, 85% RH, Bias 50V, measurement @100V, recorded @ 24hrs, 96hrs and 168hrs.			

IPC J-STD-004B Surface Insulation Resistance

Test	Requirements	Results	
		SIR value	Visual
"Comb-Down" Uncleaned	> 1.0 x 10^8 Ω	Pass	Pass
"Comb-Up" Uncleaned	> 1.0 x 10^8 Ω	Pass	Pass
Control Boards	> 1.0 x 10^9 Ω	Pass	NA
IPC Test Condition (per J-STD-004B TM 2.6.3.7): IPC B-24, 40 °C, 90% RH, Bias 12.5V, measurements @ 12.5V, recorded @ 20 min intervals.			

IPC J-STD-004B ELECTROCHEMICAL MIGRATION RESISTANCE

Test	SIR (Initial)	SIR (Final)	Requirement	Result	Visual Result
IPC ECM (Comb-Up)	6.35 x 10^{9} Ω	7.88 x 10^{10} Ω	IR (Final) ≧IR (Initial)/10	Pass	Pass
IPC ECM (Comb-down)	9.26 x 10^{8} Ω	1.34 x 10^{9} Ω	IR (Final) ≧IR (Initial)/10	Pass	Pass
Control	3.30 x 10^{11} Ω	3.05 x 10^{11} Ω	Not Applicable	Pass	Pass
IPC Test Condition (per J-STD-004B TM 2.6.14.1): IPC B-25 coupons, 65 ºC, 88.5% RH, 500 hrs.					

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.**

CONTACT INFORMATION

www.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