



ALPHA[®] EF-8800HF

Halogen-Free, High Reliability, Alcohol Based No-Clean Wave Soldering Flux for Thick Board Applications

DESCRIPTION

ALPHA EF-8800HF is an alcohol based flux designed for both standard and thicker, high-density PCBs in Lead-free process. This flux shows stable performance even under long exposure to higher preheat and higher solder pot temperature. **ALPHA EF-8800HF** is formulated to have low bridging on bottom side QFPs, as well as provide superior performance in pin testing, hole-fill and solderballing. Additionally, it provides good Lead-free solder joint cosmetics with an evenly spread, tack free residue.

FEATURES & BENEFITS

Features for Lead-free :

- Robust soldering performance even under high top-side preheat >125°C, Pb-free pot temperatures exceeding 270°C, contact times > 7 seconds
- Excellent hole fill demonstrated by >92% yield on 15 mil holes
- Low bridging performance on connectors, 0.65 mm and 0.80 mm QFPs
- Pin testable

Benefits:

- Evenly spread, tack free residue.
- Excellent Lead-free soldering performance on various board finishes.
- Can be used in Lead-free process
- Halide free
- Compliant to all current halogen-free industry standards

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.

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-8800HF** can be applied by spraying. 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.

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APPLICATION GUIDELINES

OPERATING PARAMETER	
Amount of Flux	350 to 700 $\mu\text{g}/\text{cm}^2$ of solids
Topside Preheat Temperature	90°C – 135°C (194°F – 275°F)
Bottom side Preheat Temperature	0 to +32°C (0 to +89.6°F) vs. Top-Side
Conveyor Angle	5°- 8°
Conveyor Speed	0.3 – 1.5 m/min (0.98 – 4.92 ft/min.)
Contact Time in the Solder (includes Chip Wave and Primary Wave)	3 – 10 seconds
Solder Pot Temperature	250°C – 270°C (482°F – 518°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. 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).	

CONTROL:

ALPHA EF-8800HF flux should be applied by spray fluxing application. A uniform coating of flux is essential to successful soldering. When applying flux, it is important to run a series of tests to ensure that the flux is being applied uniformly, that it is penetrating from top to bottom of the board on all holes to be soldered and to make sure that excessive amounts of flux are not being applied. There are various methods for conducting these tests. Consult with your local *Alpha Customer Technical Service Representative* for more information.

RESIDUE REMOVAL: **ALPHA EF-8800HF** 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 SM110E solvent cleaner or Alpha 2110 saponifier cleaner and with other commercially available solvent cleaners and saponifier cleaners.

SAFETY

Please refer to the Material Safety Data Sheet as the primary source of health and safety information. Inhalation of the volatilized flux activator fumes, which are generated at soldering temperatures, may cause headaches, dizziness and nausea.

Suitable fume extraction equipment should be used to remove the flux from the work area. An exhaust at the exit end of the wave solder machine may also be needed to completely capture the fumes. Observe precautions during handling and use. Suitable protective clothing should be worn to prevent the material from coming in contact with skin and eyes.

TECHNICAL SPECIFICATIONS

Item	Specification	Item	Specification
Appearance	Clear, Pale Yellow Liquid	pH, 5% v/v aqueous solution	3.1
Solids Content, wt/wt	6.0%	Recommended Thinner	ALPHA 425
Specific Gravity @ 25°C (77°C)	0.799 ± 0.003	Shelf Life	12 months
Acid Number (mg KOH/g)	34.0 ± 5.0	IPC J-STD-004B Designation	ORL0
Flash Point (T.C.C.)	17°C		

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HALOGEN CLASS

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

CORROSION & ELECTRICAL TESTING - SAC305 Alloy

CORROSION TESTING

Test	Requirement for ORL0	Results
Copper Mirror Tests IPC-TM 650 Test Method 2.6.32	No complete removal of copper	PASS
Copper Corrosion Test IPC-TM 650 Test Method 2..3.15 JIS 3197 Test Method 8.4.1	No evidence of corrosion	No Evidence of Corrosion

IPC J-STD-004A SURFACE INSULATION RESISTANCE

Test	Conditions	Requirements	Results
"Comb-Down" Un-cleaned	85°C/85% RH, 7 days	> 1.0 x 10 ⁸ Ω	7.0 x 10 ⁸ Ω
"Comb-Up" Un-cleaned	85°C/85% RH, 7 days	> 1.0 x 10 ⁸ Ω	2.2 x 10 ¹⁰ Ω
Control Boards	85°C/85% RH, 7 days	> 1.0 x 10 ⁹ Ω	5.0 x 10 ¹⁰ Ω

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

IPC J-STD-004B SURFACE INSULATION RESISTANCE

Test	Requirements (<1.0 x 10 ⁸ allowed during initial 24 hrs.)	Results (min. of all measurements recorded)		
		< 24 Hrs	24 – 168 Hrs	Visual
"Comb-Down" Un-cleaned	1.0 x 10 ⁸ Ω minimum	3.9 x 10 ⁹ Ω	1.1 x 10 ¹⁰ Ω	PASS
"Comb-Up" Un-cleaned	1.0 x 10 ⁸ Ω minimum	8.4 x 10 ⁹ Ω	4.5 x 10 ¹⁰ Ω	PASS
Control Boards	1.0 x 10 ⁹ Ω minimum	2.1 x 10 ¹⁰ Ω	1.2 x 10 ¹¹ Ω	NA

IPC Test Condition (per J-STD-004B TM2.6.3.7): IPC B-24 coupons, 12V, 40°C, 90% RH, measurements recorded @ 20min intervals

BELLCORE ELECTROCHEMICAL MIGRATION RESISTANCE

Test	SIR (Initial)	SIR (Final)	Requirement	Result	Visual Result
"Comb-Up" Un-cleaned	1.9 x 10 ¹¹ Ω	1.3 x 10 ¹¹ Ω	SIR (Initial)/SIR (Final) < 10	PASS	PASS
"Comb-Down" Un-cleaned	6.0 x 10 ¹⁰ Ω	3.9 x 10 ¹¹ Ω	SIR (Initial)/SIR (Final) < 10	PASS	PASS
Control	2.6 x 10 ¹¹ Ω	5.0 x 10 ¹¹ Ω	Not applicable	Not applicable	Not applicable

Bellcore Test Condition (per TR-NWT-000078, Issue 3): 85°C/85%RH/500 Hours/10V, measurement @ 100V/IPC B-25 B Pattern (12.5 mil lines, 12.5 mil spacing)