

ALPHA[®] EF-9816HF

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

DESCRIPTION

ALPHA EF-9816HF 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 AND BENEFITS

Features

- Halogen-free per IPC J-STD-709
- Excellent post-soldering cosmetics on PCB
- Good hole fills in both dual and single wave soldering
- Low bridging performance on connectors, 0.65mm and 0.80mm 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 5 $\mu\text{g}/\text{in}^2$ 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 regularly to reduce the build-up of flux residues. ALPHA AutoClean 40 cleaner is recommended for this process.

Flux Application: ALPHA EF-9816HF 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 pre-heat section.

A proper preheat setting will help to achieve a goal of best soldering performance. Please refer below recommend preheat setting:

Operating Parameter	Recommendation
Flux application	Spray
Amount of Flux Applied	Single : 1000 to 1,200 µg/in ² solids Dual : 1,200 to 1,600 µg/in ² solids
Top-Side Preheat Temperature	80 to 125 °C
Bottom side Preheat Temperature	95 to 125 °C Pre-heat Time: 60 to 120
Recommended Pre-heat Temperature	Straight ramp to desired top-side temperature
Maximum Ramp Rate of Topside Temperature (to avoid component damage)	2 °C/second (35 °F/second) maximum
Conveyor Speed	1.0 to 2.0 m/min ALPHA EF-9816HF can run at a slower conveyor speed for certain types of Lead-Free wave soldering process.
Contact Angle	3.5 to 4.5° (6° most common recommended by equipment manufacturers)
Contact Time	2 to 7 sec (3 to 5 seconds most common)
Solder Pot Temperature	255 to 265 °C
<p>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).</p>	

Control: If using 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-9816HF 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

Halogen Standards			
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

Item	Typical Values	Item	Typical Values
Appearance	Clear, Pale Yellow	Flash Point (T.C.C.)	18 °C
Solids Content, wt/wt	13.0%	Recommended Thinner	ALPHA 425
Specific Gravity @ 25 °C (77 °F)	0.810 +/- 0.005	Shelf Life (from date of mfg.)	12 months
Acid Number (mg KOH/g)	36.6 +/- 5	IPC J-STD-004(B) Designation	ROLO

CORROSION & ELECTRICAL TESTING
Corrosion Test

Test		Requirements	Results
JIS	Copper Corrosion Test JIS Z 3197:1999 Test Method 8.4.1	No evidence of corrosion	Pass

JIS Standard Surface Insulation Resistance

Test	Conditions	Requirements	Result
Initial	Ambient	$1.0 \times 10^{11} \Omega$ minimum	$3.0 \times 10^{13} \Omega$
After 7 days	40 °C / 90% RH	$1.0 \times 10^{10} \Omega$ minimum	$1.0 \times 10^{12} \Omega$

All measurements @ 100V, JIS Boards (0.32mm lines, 0.32mm spacing, same as IPC B25 Boards).

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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