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MacDermid Alpha ELECTRONICS SOLUTIONS

TECHNICAL DATA SHEET

ALPHA® EF-12000

High Solids, No-Clean Rosin Flux for Lead-Free & Sn-Pb Wave Soldering

DESCRIPTION

ALPHA EF-12000 is a high-solid, rosin-bearing, no-clean, alcohol-based dulling flux. It possesses the unique attributes of superb electrical reliability and excellent solderability in both Lead-Free and Tin-Lead wave soldering processes. It complies with all major international requirements for Electromigration (EM) and Surface Insulation Resistance (SIR). In addition, **ALPHA EF-12000** is designed for best-in-class top-side hole-fill and superior resistance to micro-solder balling, connector bridging, and bridging of bottom-side SMT components including fine-pitch QFPs.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- Wide process window for superior performance in both lead-free and tin-lead alloys
- Excellent flux activity for defect-free soldering
- Best-in-class top-side, hole-fill attributes
- High level of bridging and icicle resistance
- Superior long-term electrical reliability
- Evenly spread, uniform, non-tacky, clear residue on solder mask
- Dulling flux for reduced glare on solder joints during visual inspection
- Can be applied via spraying or foaming

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 (0.77μg/cm2) maximum, as measured by an ionic contamination tester.

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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 flux reservoir, flux tank and lines of the spray fluxer assembly should be purged with ALPHA 425 Thinner. Conveyors, fingers and pallets should be cleaned periodically with DI Water, IPA or other commercial Solvent Cleaners to eliminate residues on the assembly edges.

Flux Application: ALPHA EF-12000 can be applied by spray, foam or wave application. A uniform coating of flux is essential to successful soldering. When spray fluxing, the uniformity of the coating can be visually checked by running a piece of pH sensitive paper matching the footprint of the assembly over the spray fluxer. Further process capability can be confirmed by placing pH paper above an unpopulated board to confirm that flux is reaching the top of the plated through-holes.

Operating Parameter	Guidelines
Amount of Flux	220 to 390 µg/cm^2 (1400 to 2500 µg/in^2) of solids
Topside Preheat Temperature	90 to 120 °C (212 to 248 °F)
Conveyor Angle	6 to 7°
Conveyor Speed	1.0 to 2.0 m/min. (3.3 to 6.5 ft/min.)
Contact Time in the Solder (includes Chip Wave and Primary Wave)	2 to 6 seconds
Solder Pot Temperature	250 to 265 °C (482 to 509°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. 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).	

Specific Gravity Control: If foam fluxing, the consistency of ALPHA EF-12000 should be maintained by the addition of thinner to compensate for evaporation loss. It is recommended that the specific gravity @ 77 °F be maintained between 0.815 and 0.825 by the addition of thinner. Only ALPHA 425 thinner should be used for this purpose to ensure consistency of flux foaming and soldering characteristics.

Residue Removal: ALPHA EF-12000 is a no-clean flux and the residues are designed to be left on the board. However, if desired, ALPHA EF-12000 residues can be cleaned with saponifier cleaner (for example ALPHA 2110) or commercial solvent cleaners.

Touch-Up/Rework: Use of ALPHA Flux and ALPHA Telecore Series cored solder wire is recommended for hand soldering applications.

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TECHNICAL SPECIFICATIONS

Parameters	Typical Values	Parameters	Typical Values
Appearance	Clear/colorless to light pinkish-amber liquid	Pounds per Gallon	6.83
Specific Gravity @ 25 °C (77 °F)	0.818 ± 0.005	Flash Point (T.C.C.)	52 °F (11 °C)
Acid Number (mg KOH/g)	29 ± 2.0	Recommended Thinner	ALPHA 425
Solids Content, %, wt/wt	14	Shelf Life (from Date of Mfg.)	360 days
pH (5% aqueous solution)	3.2, typical	Container Size Availability	1, 5, and 55 Gal.
Dryness Test (JIS Z 3197:1999)	Pass	IPC J-STD-004 Designation	ROL1

CORROSION & ELECTRICAL TESTING

Test Condition	Results	Test Method
IPC Copper Corrosion Test	PASS	JIS-Z-3197-1999
Water Extract Resistivity, Ω	403	JIS-Z-3197-1999
Solder spread Ratio (SAC 305)	85.1%	JIS-Z-3197-1999

JIS STANDARD SURFACE INSULATION RESISTANCE

Test	Conditions	Requirements	Results
JIS Z 3197:1999	40 °C / 90% RH / 96 hrs	> 1 X 10^{11} Ω	1.8 x 10^{11} Ω

JIS STANDARD ELECTROCHEMICAL MIGRATION:

Electrical and visual requirements of JIS standards: **Pass**

SIR value: > 1 x 10^{9} Ω (@85 °C/85%RH/48VDC/1000hrs)

Migration: No evidence of electrochemical migration

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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.**

STORAGE

The shelf life information is valid for Alpha products in factory-sealed containers kept at recommended storage temperatures of 10 to 43 °C. However, if the flux is stored at lower temperatures from (-15 to 5 °C), it should be allowed to reach a temperature of 25 to 30 °C for 24 hours prior to use.

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

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