

ALPHA[®] SM-402

Low Solids, Active Fluxing, No-Clean Liquid Soldering Flux

DESCRIPTION

ALPHA SM-402 is a non-corrosive resin formulation that pass both the Copper Mirror and Silver Chromate Paper Tests yet are highly effective fluxes. ALPHA SM-402 is especially designed for foam fluxing but can also be applied from a wave.

With a solids content of 4.3%, **ALPHA SM-402** will provide good wicking on either multi-layered boards or boards with a lot of heat sinking.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES AND BENEFITS

- ALPHA SM-402 has Very Low Solid Content so no cleaning is necessary. Soldered assemblies, fixtures and solder machines will be virtually residue-free, eliminating the need for assembly de-fluxing, and reducing equipment maintenance and cleaning.
- ALPHA SM-402 leaves uniform, Tack-Free Residues and pin-testable residues.
- ALPHA SM-402 with low-halide, Non-Corrosive Residues produces highly reliable assemblies meeting tough SIR requirements.
- ALPHA SM-402 exhibits Excellent Soldering in both single and dual wave processes, plated-thru hole, as well as (bottom side) surface mount assemblies.

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.

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. Boiling ALPHA 565 solvent or a 5% solution of ALPHA 2110 Saponifier solution heated to 166 to 171 °C (150 to 160 °F) is recommended for this process. Rinse with water and air dry.

Flux Solids Control: Due to the very low solids content of this flux, the usual Specific Gravity monitoring technique is not recommended.

ALPHA Flux Solids Control Kit (F.S. C. K.) #2 is available for periodic testing of 4 to 5% solids ALPHA fluxes. ALPHA F.S.C.K. #2 has Control Solution #32. Each kit can be used for 100 tests.

Procedure:

1. Fill a graduated tube to the 5ml mark with the proper Control Solution.
2. Add 11 drops of ALPHA SM-402 from the flux sump to the graduated tube and shake for 5 seconds with cap on.
3. If the solution turns colorless, the flux solids content is above the control limit (+0.5% above nominal). ALPHA 450F Thinner should be added to the flux sump. Repeat steps 1-3.
4. If the solution remains pink, add 3 more drops of ALPHA SM-402 and shake for 5 seconds with cap on.
5. If the solution now turns colorless, the flux solids content is within acceptable limits (-0.2% / +0.5%).
6. If the solution remains pink, the flux solids are below the control limit. Drain about ¼ of the flux sump contents and replace with fresh flux. Repeat steps 1-4.

Flux Application: ALPHA SM-402 is suggested to be applied by spray application. A proper preheat setting will help to achieve a goal of best soldering performance. Please refer below recommend preheat setting:

Operating Parameters	Recommendation
Flux application	Foam, Wave
Top-Side Preheat Temperature	105 to 120 °C
Maximum Ramp Rate of Topside Temperature (to avoid component damage)	2 °C/second (35 °F/second) maximum
Conveyor Speed	1.0 to 1.5 m/min.
Contact Angle	4 to 6°
Contact Time	2 to 5 sec
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 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, Pale Yellow	Flash Point (T.C.C.)	16 °C (60 °F)
Solids Content, wt/wt	4.3%	Recommended Thinner	ALPHA 450F
Specific Gravity @ 25 °C (77°F)	0.8335 +/- 0.005	IPC J-STD-004 Designation	ROL1
Shelf Life	18 months	Packaging Size	1, 5 and 55 gallon

CORROSION & ELECTRICAL TESTING
Bellcore

Test	Requirements for ROL1	Results
Copper Mirror Test and Ag Chromate Test TR-NWT-0078 13.1.1	No complete removal of copper	PASS
Surface Insulation Resistance Test TR-NWT-0078 13.1.4	>10 ¹¹ ohm	PASS
FR-4 comb pattern test boards (0.025" lines, 0.050" spacing), after 28 days at 35 °C, 90% R.H>, with 50 VDC bias, 100 VDC test		

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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