

ALPHA[®] WB-400

Low-VOC, No-Clean Wave Soldering Flux (Type 2.1.3 according to DIN EN 29 454)

DESCRIPTION

ALPHA WB-400 is a further development of the water-based VOC-free fluxing agent series NR-300. In contrast to water-based fluxing agents, the solution content of **ALPHA WB-400** has been partially replaced with alcohol.

Compared with the VOC-free fluxing agents, this has the following advantages:

- Less heating-up expenditure for pre-drying
- Lower surface tension during wetting
- Less fluxing agent splashes and solder beads
- No corrosion from water residues

The advantages of the water-based fluxing agents regarding safety, transportation, storage, etc., at an ignition point of 23 °C are largely retained.

ALPHA WB-400 has been formulated with a proprietary mixture of organic activators, guaranteeing excellent wetting and good penetrating also in case of passivated copper surfaces after repeated thermal load cycles. Several proprietary additives reduce the surface tension of solder stopping lacquer and solder and guarantee, due to this, a drastic reduction of the solder bead forming tendency. The composition of **ALPHA WB-400** provides a high heat resistance, which clearly reduces the tendency of bridge forming and closures.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- Excellent wetting; good penetration performance, also in case of passivated copper after re-flow processes.
- Significant reduction of bridges and closures due to thermally stable activators.
- Drastic reduction of solder beads due to effective reduction of surface tension of solder stop lacquer and solder.
- Extremely little, not sticky, fluxing agent residues, provide adaptability in the contact test and visually clean circuit boards.
- Well suitable for lead-containing, as well as, lead-free soft solders like 99SnCu, 96.5Sn3.5Ag, 95.5Sn4Ag0.5Cu and others.

APPLICATION GUIDELINES

Preparation: The use of circuit boards and component parts, meeting the specified requirements for soldering and cleanness, are unavoidable for lasting, stable processes and electrical reliability. Preferably, the assemblers should agree specifications about this with their suppliers and verify this by a certificate and/or acceptance test. Furthermore, a widely spread requirement for cleanness of the circuit boards and components is the maximum limit of 5 $\mu\text{gNaCl}/\text{in}^2$; measured with an ionic contamination tester.

The circuit boards should be handled carefully during the process. Circuit boards must always only be touched at the edges. The used of clean, lint-free gloves is recommended. Conveyor belts, fingers, and magazines should be cleaned. For this purpose, ALPHA SM-110 is extremely useful.

Flux Application: ALPHA WB-400 is suitable for spraying applications. The consistency of the fluxing agent application can visually be checked. For this, a circuit board or glass plate (heat-resistant) is transported over the spray fluxing device and the pre-drying and then assessed.

Operating Parameter	Recommendation
Flux application	Spray
Amount of Flux Applied	100 to 130 $\mu\text{g}/\text{cm}^2$
Top-Side Preheat Temperature	90 to 110 ° C
Bottom side Preheat Temperature	Approximately 30 ° C higher than top side
Recommended profile	Linear increase to intended LP-top side temperature
Maximum Ramp Rate of Topside Temperature (to avoid component damage)	2 ° C/s maximum
Conveyor Speed	1 to 1.8 m/min
Contact Angle	5 to 8° (6° usually)
Contact Time	2 to 4sec (usually 2.5 to 3sec)
Solder bath temperature	235 to 260 ° C
Lead-free alloys	260 to 290 ° C
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).	

Control: When using fluxing drums, the ALPHA WB-400 must be checked. Losses must be made up with distilled water. As with all low-solids fluxing agents, a density check is not an effective method to check the solids content. The acid number should be kept in the range of 22.8 to 25.8. Checking is best carried out by titration. The acid number should be checked every 8 hours in case of continuous operation. Dirt and impurities will deposit in the fluxing agent container with increasing operation duration. In order to guarantee unchanged good soldering results, it is recommended to replace the fluxing agent after 40 hours of operation with fresh fluxing agent. The fluxing agent tank should be flushed with distilled water after draining the tank.

Residue Removal: ALPHA WB-400 is a no-clean flux and the residues are designed to be left on the board. If desired, flux residues can be removed with hot water.

TECHNICAL DATA

Item	Typical Values	Item	Typical Values
Appearance	Clear, colorless solution	Flash Point (T.C.C.)	23 ° C
Solids Content, %wt/wt	2.5%	Shelf Life (from Date of Mfg.)	540 days
Specific Gravity @ 20° C	0.939 ± 0.003 g/cm ³	IPC J-STD-004 Designation	ORL0
Acid Number (mg KOH/g)	24.3 ± 1.5		

CORROSION & ELECTRICAL TESTING

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	PASS

IPC J-STD-004A Surface Insulation Resistance

Test	Conditions	Requirements	Results
"Comb-Down" Un-cleaned	85 °C/85% RH, 7 days	$> 1.0 \times 10^8 \Omega$	$4.3 \times 10^9 \Omega$
Control Boards	85 °C/85% RH, 7 days	$> 1.0 \times 10^9 \Omega$	$3.2 \times 10^9 \Omega$
IPC Test Condition (per J-STD-004A): -50V, measurement @ 100V/IPC B-24 board (0.4 mm lines, 0.5 mm spacing).			

Bellcore Electromigration

Test	SIR (Initial)	SIR (Final)	Requirements	Results	Visual Results
"Comb-Down" Un-cleaned	$6.6 \times 10^9 \Omega$	$5.9 \times 10^9 \Omega$	$SIR (Initial)/SIR (Final) < 10$	Pass	Pass
Control	$3.2 \times 10^{11} \Omega$	$4.3 \times 10^{11} \Omega$	Not applicable	N/A	N/A
Bellcore Test Condition (per GR 78-CORE, Issue 1): 65 °C/85% RH/500 Hours/10V, measurement @ 100V/IPC B-25B Pattern (12.5 mil lines, 12.5 mil spacing).					

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.**

STORAGE

ALPHA WB-400 should be stored in original containers and properly sealed. Material should be stored at 50 to 110 °F (10 to 43 °C).

CONTACT INFORMATION

To confirm this document is the most recent version, please contact Assembly@MacDermidAlpha.com

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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