

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.

WB400 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 WB 400 provides a high heat resistance, which clearly reduces the tendency of bridge forming and closures.

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

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 tests. Furthermore, a widely spread requirement for cleanness of the circuit boards and components is the maximum limit of 5 µgNaCl/in²; measured with Omegameter® in heated up process liquid.

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, Bioact SC-10 proved extremely useful.

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Flux agent application:

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.

SAFETY

The safety data sheet has to be used as primary source for safety and health information. Inhaling the solder smoke can lead to headache, dizziness, and nausea. A suitable exhaust unit to remove the vapors from the work area is state-of-the-art technology. When handling chemicals, the usual precautions have to be observed. Wear suitable protective clothing during handling.

MACHINE SETTINGS

Parameter	Typical Setting
Fluxing agent quantity	100 - 130 µg/cm ²
Pre-heating	90° C - 110° C
LP-top side	Approximately 30° C higher than top side
LP-bottom side	
Recommended profile	Linear increase to intended LP-top side temperature
Maximal heating rate (to avoid component damage)	2° C/s maximum
Positioning angle	5° - 8° (6° usually)
Transportation speed	1 - 1.8 m/min
Solder contact duration	2 - 4sec (usually 2.5 - 3sec)
Solder bath temperature	235° C - 260° C
Lead-free alloys	260° C - 290° C

These are general guidelines, leading to good results as a rule. Depending on the equipment, components and circuit boards, these settings may vary. It is recommended for process optimization to carry out a design experiment with the most important parameters (fluxing agent quantity, transportation speed, pre-heating temperature, solder bath temperature, and circuit board orientation).

CLEANING

WB 400 is a no-clean fluxing agent and the residues are planned to remain on the assembly. However, the residues can be removed with hot water, if necessary, possibly adding Hydrex SP50.

CHARACTERISTICS

Appearance	Clear, colorless solution
Solids Content	2.5 weight %
Specific Gravity (density) at 20° C	0939+/-0.003 g/cm ³
Acid Number	24.3+/-1.5mg KOH/g fluxing agent
Flash Point	23° C
Shelf life	18 months from date of manufacture
IPC J-STD-004 Designation	ORL0

STORAGE

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

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CORROSION & ELECTRICAL TESTING

BELLCORE ELCTROMIGRATION

Test	SIR (Intial)	SIR (Final)	Requirement	Result	Visual Result
"Comb-Up" Uncleaned	$8.9 \times 10^9 \Omega$	$3.7 \times 10^{11} \Omega$	SIR(Intial) / SIR(Final) <10	Pass	Pass
"Comb-Down" Uncleaned	$6.6 \times 10^9 \Omega$	$5.9 \times 10^9 \Omega$	SIR(Intial) / SIR(Final) <10	Pass	Pass

Bellcore Test Condition (per GR 78-CORE, Issue1): 65°C/85% RH/500 Hours/10V, measurement @ 100V/IPC B-25B Pattern (12.5 mil lines, 12.5 mil spacing).

FLUXING AGENT CHECK

When using fluxing drums, the fluxing agent 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 – 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.