ALPHA® WS-609 SOLDER CREAM
ORH0 per IPC-J-STD-0054

GENERAL DESCRIPTION

ALPHA WS-609 is a halide free neutral pH water soluble solder cream specifically designed for surface mount processes and other demanding electronics assembly applications where post-reflow water cleaning is used. **ALPHA WS-609's** unique activator systems and water soluble resin carrier are suitable to replace RMA solder creams.

APPLICATIONS

ALPHA WS-609 is designed for stencil printing. Stencil life is four hours while tack life exceeds six hours at 70-80°F and 30%-60% RH. Based on experience, the maximal RH for this paste is 50%. Higher humidity can cause lower viscosity-which may negatively impact print performance. This extended tack feature enables placement of parts long after what is possible with previous formulations. Using the number three particle size configuration, **ALPHA WS-609** is suitable for printing through stencil apertures as small as 9 mils in the smallest dimension.

ALPHA WS609's activator system allows the flux to penetrate tarnished surfaces among the following metals:

Silver	Copper
Solder (Creams)	Gold
Solder (Hot Dip)	Tin (Hot Dip)
Cadmium (Plate)	Tin (Plate)
Beryllium Copper	Nickel (Plate)
Lead	Bronze
Brass	Terne (Plate)

TECHNICAL SPECIFICATIONS

Physical Properties	Typical Values
Water Extract Resistivity	>100,000 ohm-cm; High RMA, Low RA Class
Halide Content	Halide-Free
pH, Flux Residues	= 6.8 Typical
SIR (ohms) 7 days	10^9, cleaned, 85°C/85% RH
Wetting Balance	Faster than traditional RMA's
Carrier Resin	Completely Water Soluble

VISCOMETRY

ALPHA WS-609 was developed exclusively through the use of Spiral Viscometry. Nominal readings of 3,000 poise or 300 Pascal-Seconds characterize its rheology at 5 RPM. Absolute magnitude of the slope ranges from .4 to .58.

While Brookfield viscometry has never been used on this product, empirical correlation factors approximate its T-Bar 5 RPM equivalent readings at 1100K centipoise. Initial tack force and penetration for this rheology are:

Tack Force: > 2 g/mm^2
Penetration: > 5 mils on 10 mil print

07-13-09

PRINTING/PLACEMENT

Nominal Squeegee speeds from 20 - 25mm/second are suitable to begin printing. Roll diameter cross-section should be 1.25 - 1.50 CM. Stencil aspect ratio (width of smallest aperture divided by stencil thickness, W_a/T_s)can be 1.5. Placement of parts can follow as long after printing as four hours.

REFLOW

ALPHA WS-609 can be successfully reflowed in IR, convection, hot stage, hot bar, hot belt or vapor phase systems.

A straight ramp up profile is preferred for reflowing low to medium thermal mass assemblies.

- Ramp up from ambient temperature to peak temperature of 210°-225°C at 1°C/second. Adjust ramp up rate to minimize the differential of temperature (ΔT) and thermal shock to components
- Time above liquidus: 45 - 75 seconds
- Cool down at 1° - 3° C/second

Pre-heat time may be required for reflowing high thermal mass assemblies to minimize the T.

- Ramp up from ambient temperature to 120°C at 1° - 2°C/second
- Soak at 120° - 160°C for 1 - 2 minutes
- Ramp up at 1 to 2 °C/second from 140°C to peak temperature of 210° - 225°C
- Time above liquidus: 45 to 75 seconds
- Cool down at 1° - 3° C/second

Total heating dwell time may be 2-4.5 minutes depending on thermal inertia and component sensitivity. Examples of straight ramp up and soak reflow profiles using 63/37 alloy are shown at Figure 1 for reference.

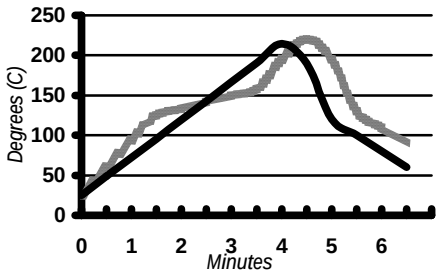

Figure 1

RESIDUE REMOVAL

ALPHA WS-609 is a halide free flux system designed for complete water cleanability of flux residues after reflow. Water at 140°F without saponifier is suitable to achieve excellent cleaning results. Spray pressure of 35-65 psi are sufficient to remove all residues.

Cleaning results using **ALPHA WS-609** may exceed those achievable using traditional RMA materials. Ionic contamination readings as low as 2.0 µg/in are possible with this very cleanable flux.

AVAILABILITY

ALPHA WS-609 is available in 63/37 and 62/36/2 alloys; in particle size number three (3); and in a variety of sealed jars and cartridges.

07-13-09

SHIPPING, STORAGE AND USE

High ambient temperature should be avoided in the handling of **ALPHA WS-609**. It is shipped in a thermally controlled carton and should be stored refrigerated upon receipt. Storage temperatures of 0°C - 10°C (32°F - 50°F) are sufficient to maintain its nominal shelf-life of three months from the date of manufacture. **ALPHA WS-609** should be allowed to achieve room temperature before unsealing its package.

The production environment should be 70 - 80°F maximum and 30% to 60% RH. Clean up of **ALPHA WS-609** in the work area is best achieved with hot water or with isopropyl alcohol. Local environmental and disposal regulations should be observed.

SAFETY

While **ALPHA WS-609** is not considered toxic, its use in typical reflow processes will generate a small amount of decomposition and reaction vapors. These vapors should be adequately exhausted during the reflow process consistent with the profile used. Consult MSDS for additional safety information and for toxicity data on alloys containing lead and silver.