alpha ASSEMBLY SOLUTIONS™

ALPHA® Vapor Phase Solutions

Solder Pastes formulated for use in Vapor Phase Reflow Processes

DESCRIPTION

ALPHA Vapor Phase Solutions solder pastes are capable of high reflow performance in vapor phase ovens. The paste chemistries were developed to blend with Type 4 &Type 5 powder making these pastes suitable for fine feature printing applications. These pastes have been tested and proven to perform extremely well in print, reflow, and reliability attributes. When used in a Vapor Phase oven, these pastes will enable customers to maximize the benefits of their vapor phase reflow oven while reaping the benefits of Alpha engineered pastes.

FEATURES & BENEFITS

- **Reflowing**: Suitable for Vapor Phase and Convection reflowing
- **Long Stencil Life:** Engineered for consistent performance in warm/humid production environments, reducing variations in print performance and paste dry-out
- **High Tack Force Life:** Ensures high pick-and-place yields, good self-alignment
- **Wide Reflow Profile Window:** Enables quality soldering of complex, high density PWB assemblies in an N2
- environment, using high ramp rates and soak profiles as high as 170°C to 180°C
- **Reduced Mid Chip Solder Balling, Head-in-Pillow:** Minimizes rework and increases first time yield
- **Excellent Coalescence and Wetting Performance:** Coalesces well for 170µm small circle deposit at low
- soak air environment
- **Excellent Solder Joint and Flux Residue Cosmetics:** Residue does not char or burn after reflow soldering, even when using long/high thermal soaking
- **Excellent Voiding Performance:** Pass IPC7095 Class III requirement for BGA
- **Halogen Content:** Zero Halogen, no halogen intentionally added
- **Reliability:** Pass JIS Copper Corrosion Test and all standard SIR Tests
- **Safe and Environmentally Friendly:** Materials comply with ROHS, TSCA, EINECS and Halogen-free requirements (Zero Halogen, see table below)

PRODUCT INFORMATION

Fluxes:	OM-353
Alloys:	SAC305, SAC105, ALPHA SACX Plus™0307 ALPHA Maxrel™ (Innolot), ALPHA Maxrel Plus™
Powder Size:	Type 4 & Type 5
Packaging Sizes:	500 gram jars, 6” & 12” cartridges
Flux Gel:	Flux gel is available in 10 and 30 cc syringes for rework applications
Lead Free:	Complies with RoHS Directive 2011/65/EU

NOTE 1: For other alloys, powder size and packaging sizes, contact your local Alpha Sales Office.

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HALOGEN STATUS

Halogen Standards			
Standard	**Requirement**	**Test Method**	**Status**
JEITA ET-7304A *Definition of Halogen Free Soldering Materials*	Cl, I, F in solder material solids	**TM EN 14582**	Pass
IEC 612249-2-21	Post Soldering Residues contain < 900 ppm each or total of < 1500 ppm Br or Cl from flame retardant source		Pass
JEDEC *A Guideline for Defining "Low Halogen" Electronics*	Post soldering residues contain < 1000 ppm Br or Cl from flame retardant source		Pass
Zero Halogen: *No halogenated compounds have been intentionally added to this product*			

TECHNICAL DATA

CATEGORY	RESULTS	PROCEDURES/REMARKS
CHEMICAL PROPERTIES		
Activity Level	ROL0	IPC J-STD-004B
Halide Content	Halide free (by titration), < 0.05%	IPC J-STD-004B
Fluoride Spot Test	Pass	JIS-Z-3197-1999 8.1.4.2.4
Halogen Test	Pass, Zero Halogen - No halogen intentionally added	EN14582, by oxygen bomb combustion, Non-detectable (ND) at < 50 ppm
Ag Chromate Test	Pass	IPC J-STD-004B
	Pass	JIS-Z-3197-1999 8.1.4.2.3
Copper Mirror Test	Pass	IPC J-STD-004B
	Pass	JIS-Z-3197-1999 8.4.2
Copper Corrosion Test	Pass (No evidence of Corrosion)	IPC J-STD-004B
	Pass (No evidence of Corrosion)	JIS-Z-3197-1999 8.4.1
ELECTRICAL PROPERTIES		
Water Extract Resistivity	11,500 ohm-cm	JIS-Z-3197-1999 8.1.1
SIR (7 days, 40°C/90%RH, 12 V bias)	Pass	IPC J-STD-004B TM-650 2.6.3.7 (Pass ≥ 1 x 10^8 ohm)
JIS Electromigration (1000 hrs @ 85°C/85%RH48V)	Pass	JIS-Z-3197-1999 8.5.4 (Pass ≥ 1 x 10^9 ohm)
Bono Test 85°C 85% RH and 50 V bias	Pass	Bono Test

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CATEGORY	RESULTS	PROCEDURES/REMARKS
PHYSICAL PROPERTIES		
Color	Clear, Colorless Flux Residue	
Tack Force vs. Humidity	**Pass,** > 100gf over 24 hours at 25%, 50% and 75% Relative Humidity	JIS Z-3284-1994, Annex 9
	Pass, Change of <1g/mm2 over 24 hours at 25% and 75% Relative Humidity	IPC J-STD-005 TM-650 2.4.44
Viscosity Stability at 25ºC for 14 days	Pass	Malcom Spiral Viscometer
Solder Ball	Preferred	IPC J-STD-005, TM-650 2.4.43
Spread	>80%	JIS-Z-3198-3
Wetting Time	Pass, 1.6 second	Rhesca Test, zero cross time T0
Stencil Life	>8 hours	@ 50% RH 23°C (74°C)
Cold/Printing Slump	No bridge for 0.3 mm space	JIS-Z-3284-1994 Annex 7
	No bridge for 0.3 mm space	IPC J-STD-005, TM-650 2.4.35
Hot Slump	No bridge for 0.3 mm space	JIS-Z-3284-1994 Annex 8
	No bridge for 0.3 mm space	IPC J-STD-005, TM-650 2.4.35
Dryness Test (Talc)	Pass	JIS-Z-3197-1999 8.5.1

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PROCESSING GUIDELINES

Storage & Handling

Refrigerate to guarantee stability @ 0-10°C (32-50°F). When stored under these conditions, the shelf life of OM-353 is 6 months.

Paste can be stored for 2 weeks at room temperature up to 25°C(77°F) prior to use.

When refrigerated, warm up paste container to room temperature for up to 4 hours. Paste must be 19°C (66°F) before processing. Verify paste temperature with a thermometer to ensure paste is at 19°C (66°F) or greater before set up of printer.

Paste can be manually stirred before use. A rotating/Centrifugal force mixing operation is not required. If a rotating/centrifugal force mixing is used, 30 - 60 seconds at 300 RPM is adequate.

Do not remove worked paste from stencil and mix with unused paste in jar. This will alter the rheology of unused paste.

These are starting recommendations and all process settings should be reviewed independently.

Printing

STENCIL: Recommend **ALPHA CUT, ALPHA NICKEL-CUT, ALPHA TETRABOND®**, or **ALPHA FORM** stencils @ 0.100mm - 0.150 mm (4-6 mil) thick for 0.4 - 0.5 mm (0.016" or 0.020") pitch. Stencil design is subject to many process variables. Contact your local Alpha stencil site for advice.

SQUEEGEE: Metal (recommended)

PRESSURE: 0.21 - 0.36 kg/cm of blade (1.25 -2.0 lbs/inch)

SPEED: 25 – 150 mm per second (1 – 6 inches per second).

PASTE ROLL: 1.5-2.0 cm diameter and make additions when roll reaches 1-cm (0.4") diameter (min). Max roll size will depend upon blade.

STENCIL RELEASE SPEED 1 – 5 mm/sec.

LIFT HEIGHT: 8 – 14mm (0.31 - 0.55")

Reflow

ATMOSPHERE: Clean-dry air or nitrogen atmosphere.

PROFILE: Soak: 155 – 175 °C, 60 to 100 sec soak profiles have been determined to give optimal results, please see profile chart, **ALPHA OM-353 SAC305/SACXPlus™0307** Typical Reflow Profile. If required, good results are also achievable with high soak temperature profiles of 170 – 180°C for 60 -120s, especially in Vapor Phase and N_2. Typical peak temperature of Vapor Phase is 235°C.

NOTE 2: Keeping the peak temperature below 235ºC may reduce the number and size of BGA and QFN voids.

NOTE 3: Refer to component and board supplier data for thermal properties at elevated temperatures. Lower peak temperatures require longer TAL for improved joint cosmetics.

Cleaning

ALPHA OM-353 residue is designed to remain on the board after reflow. If reflowed residue cleaning is required, Vigon A201 (in line cleaning), Vigon A 250 (Batch Cleaning) or Vigon US (Ultrasonic Cleaning) are recommended. Vigon is a registered trademark of Zestron.

Misprints and stencil cleaning may be done with IPA, **ALPHA SM-110E** and **ALPHA SM-440.**

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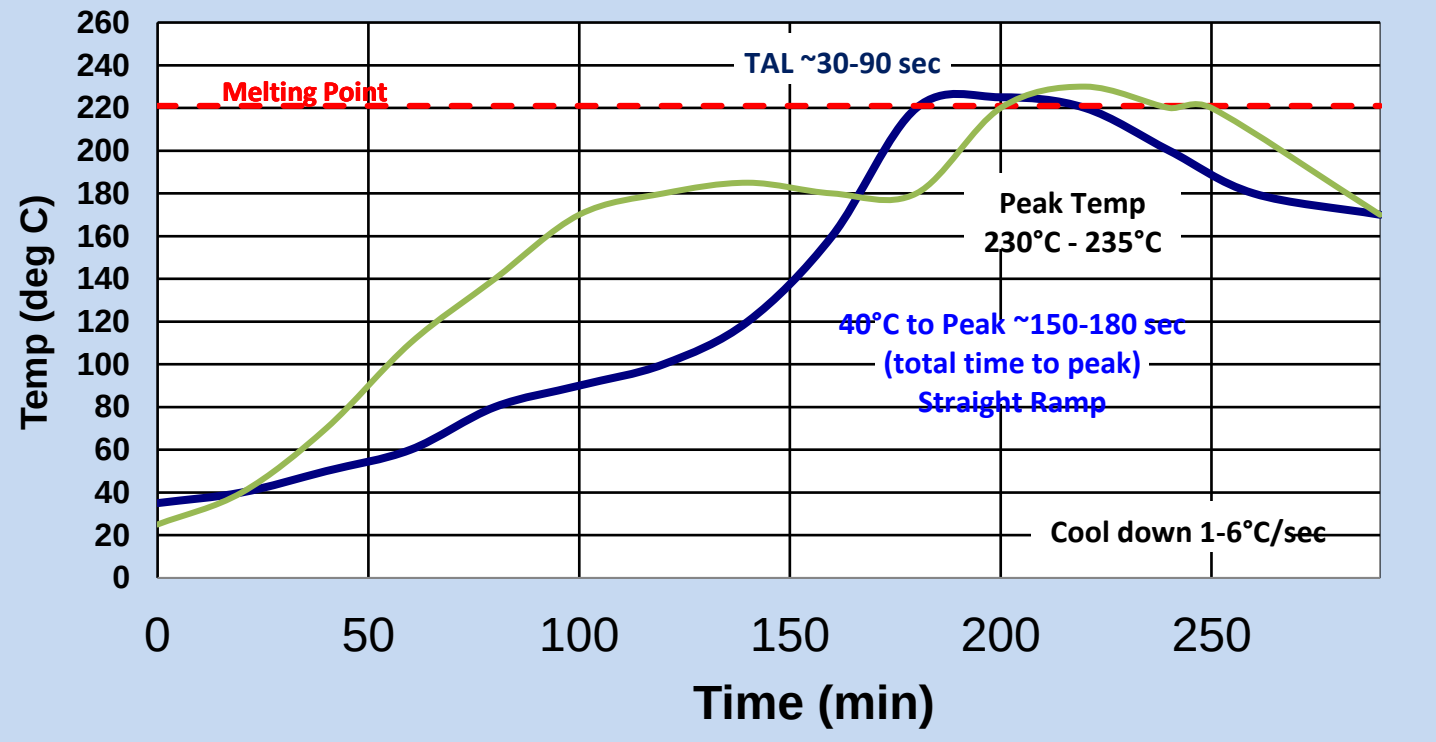
REFLOW GUIDELINES

The vapor phase reflow profiles show below are based on work done by Alpha on R&D Vaportech Machines. Please take note that this is only a recommendation. While it is beneficial to start off with these parameters, equipment and assembly (PCB and parts) may require adjustments be made to the profile to meet other criteria. In normal soldering operations the accepted TAL is in the range 30-90 'however vapour phase soldering may allow shorter TAL's to be achieved. Alpha advises customers when reducing the TAL to verify it is suitable for their assembly process taking into consideration equipment, reflow medium boiling point and the assembly mass'.

Straight Ramp & High Soak Vapor Phase Reflow:



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CONTACT INFORMATION

To confirm this is the most recent issue, please contact Alpha Assembly Solutions

AlphaAssembly.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 directory assistance Chemtrec 1 - 800 - 424 - 9300.