ALPHA® CVP-390 SOLDER PASTE

No-Clean, Lead-Free Solder Paste featuring Zero-Halogen, Low Voids, Fine-Feature, Excellent Pin Test Performance, SAC305, SAC405, & Low Ag Capable

DESCRIPTION

ALPHA CVP-390 is a lead-free, zero-halogen no-clean solder paste designed for applications where residue with excellent pin testing property and ability to pass JIS Copper Corrosion test are required.

This product is also designed to enable consistent fine pitch printing capability, down to 180 µm circle printed with 100 µm thickness stencil. Its excellent print volume deposit repeatability also provides value by reducing defects associated with print process variability. Additionally, **ALPHA CVP-390** achieves IPC-7095 Class 3 voiding performance.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- **Long Stencil Life:** consistent performance for at least 8 hours of continuous printing without addition of new paste
- **Long, High Tack Force Life:** Ensures high pick-and-place yields, good self-alignment
- **Wide Reflow Profile Window:** Allows best quality solderability of complicated, high density PWB assemblies in both air and nitrogen reflow, using ramp and soak profiles, as high as 175 to 185 °C
- **Reduced Random Solder Ball Levels:** Minimizes rework and increases first time yield
- **Excellent Coalescence and Wetting Performance:** Coalesced 180 µm circle deposit, even at high soak profile environment
- **Excellent Solder Joint and Flux Residue Cosmetics:** After reflow soldering, even using long/high thermal soaking, without charring or burning
- **Excellent Voiding Performance:** Meets IPC-7095 Class 3 Classification
- **Halogen Content:** Zero-halogen, no halogen intentionally added
- **Residue:** Excellent Pin Testing property and Pass JIS Copper Corrosion Test
- **Safe and Environmentally Friendly:** Materials comply with RoHS and Halogen-free requirements (see table below), as well as TOSCA & EINECS

PRODUCT INFORMATION

Alloys:	SAC105, SAC305, SAC405, SACX Plus 0307 SMT, SACX Plus 0807 SMT, Innolot. For other alloys, contact your local Alpha Sales Office.
Powder Size:	Type 3, Type 4, Type 4.5, Type 5, Type 6, & Type 7
Packaging Sizes:	500 gram jars, 10 cc & 30 cc syringe, 6 in & 12 in cartridges
Flux Gel:	Flux gel is available in 10 and 30 cc syringes for rework applications
Lead Free:	Complies with RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU

APPLICATION GUIDELINES

Formulated for both standard and fine pitch stencil printing, at print speeds of between 25 mm/sec (1 in/s) and 150 mm/sec (6 in/s), with stencil thickness of 0.100 mm (0.004 in) to 0.150 mm (0.006 in), particularly when used in conjunction with ALPHA Stencils. Blade pressures should be 0.21 to 0.36 kg/cm of blade (1.25 to 1.5 lbs/inch), depending upon the print speed. The higher the print speed employed, the higher the blade pressure that is required. The reflow process window will give high soldering yield with good cosmetics and minimized rework.

HALOGEN STATUS

ALPHA CVP-390 is a zero-halogen product and passes the standards listed in the table below:

Halogen Standards			
Standard	**Requirement**	**Test Method**	**Status**
JEITA ET-7304 Definition of Halogen-Free Soldering Materials	< 1000 ppm Br, Cl, 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		
Flux Classification	ROL0	IPC J-STD-004B
Halide Content	Halide-free (by IC)	IPC J-STD-004B
Fluoride Spot Test	Pass, No Fluoride present	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, No Halides present	IPC J-STD-004B
		JIS Z 3197:1999 8.1.4.2.3
Copper Mirror Test	Pass, Low activity, no breakthrough	IPC J-STD-004B
		JIS Z 3197:1999 8.4.2
Copper Corrosion Test	Pass, Low activity, no corrosion	IPC J-STD-004B
		JIS Z 3197:1999 8.4.1
Electrical Properties		
Water Extract Resistivity	13,400 ohm-cm	JIS Z 3197:1999 8.1.1
SIR (7days, 85 °C/85% RH 12V)	Pass, $\geq 10^8$ ohms for 7 days	IPC J-STD-004C TM-650 2.6.3.7
SIR (7 days, 40 °C/90% RH 12V)	Pass, $\geq 10^8$ ohms for 7 days down to 100 µm spacing	IPC J-STD-004B TM-650 2.6.3.7
SIR (7days, 85 °C/85% RH)	Pass, $\geq 10^8$ ohms for 7 days down to 100 µm spacing	IPC J-STD-004A TM-650 2.6.3.3
Electromigration (Bellcore 500 hrs @ 65 °C/85% RH 10V)	Pass, final > initial/10	Bellcore GR-78-CORE
JIS Electromigration (1000 hours @ 85 °C/85% RH 48V)	Pass	JIS Z 3197:1999 8.5.4
Physical Properties		
Color	Clear, Colorless Flux Residue	

Category	Results	Procedures/Remarks
Tack Life	Pass, > 100 gf over 24 hours at 25 °C and 50% Relative Humidity	JIS Z 3284:1994, Annex 9
	Pass, Change of <1 g/mm2 over 24 hours at 25 °C and 50 % Relative Humidity	IPC J-STD-005 TM-650 2.4.44
Tack Force at 32 °C/35% RH, measured after 0, 1, 2, 3 & 4 hours print duration	> 100 gf	JIS Z 3284:1994, Annex 9
Coalescence Test	Able to reflow at < 200 µm Cu pad circle size	Internal
Solder Ball	Preferred	IPC J-STD-005 TM-650 2.4.43
Wetting Time	Pass 0.34 second	Rhesca Test, Test Time T2, 3 seconds
Spread	~80%	JIS Z 3197:1999 8.3.1.1
Stencil Life	>8 hours	@ 50% RH 23°C (74 °C)
Cold Slump (25 °C /50% RH)	Pass, no bridging at 0.10 mm gap & above	IPC J-STD-005A
	Pass, no bridging at 0.20 mm gap & above	JIS Z 3284:1994 Annex 7
Hot Slump (150 °C/10 min)	Pass, no bridging at 0.25 mm gap & above	IPC J-STD-005A
	Pass, no bridging at 0.30 mm gap & above	JIS Z 3284:1994 Annex 8
Dryness Test (Talc)	Pass	JIS Z 3197:1999 8.5.1

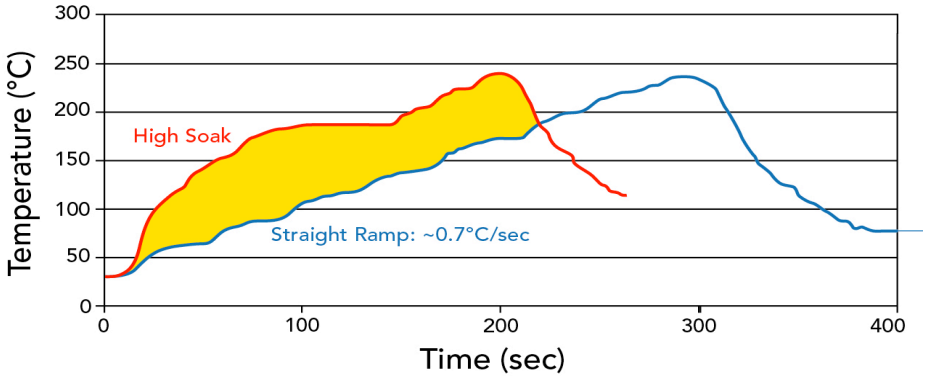
PROCESSING GUIDELINES*[1]

Storage & Handling	Printing	Reflow (See Fig. 1)	Cleaning
1. Refrigerate to guarantee stability @ 0 to 10 °C (32 to 50 °F). When stored under these conditions, the shelf life of ALPHA CVP-390 is 6 months. Refrigeration is recommended for optimal performance. 2. Paste can be stored for maximum 2 weeks at room temperature up to 25 °C (77 °F) prior to use. 3. Product supplied in cartridge format can be stored vertically (tip down) or horizontally. Rotation of cartridge 180° weekly is recommended for horizontal storage conditions. 4. 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. 5. 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 to 60 seconds at 300 RPM is adequate. 6. Do not remove worked paste from stencil and mix with unused paste in jar. This will alter the rheology of unused paste.	**Stencil**: Recommend ALPHA CUT, ALPHA NICKEL-CUT, ALPHA TETRABOND, or ALPHA FORM stencils @ 0.100 to 0.150 mm (4 to 6 mil) thick for 0.4 to 0.5 mm (0.016 or 0.020 in) pitch. Stencil design is subject to many process variables. Contact your local Alpha stencil site for advice. **Squeegee:** Metal (recommended) **Pressure:** 0.21 to 0.36 kg/cm of blade (1.25 to 2.0 lbs/inch) **Speed:** 25 to 150 mm per second (1 to 6 inches per second). **Paste Roll:** 1.5 to 2.0 cm diameter and make additions when roll reaches 1 cm (0.4 in) diameter (minimum). Max roll size will depend upon blade. **Stencil Release Speed**: 1 to 5 mm/sec. **Lift Height:** 8 to 14 mm (0.31 to 0.55 in)	**Atmosphere**: Clean-dry air or nitrogen atmosphere. **Profile (SAC Alloys):** Straight Ramp: 0.7 °C/sec & 1.3 °C/sec ramp profiles, 45 to 90 TAL. **Soak**: 155 to 175 °C, 60 to 100 sec soak profiles have been determined to give optimal results. If required, good results are also achievable with high soak temperature profiles of 170 to 185 °C for 60 sec. Typical peak temperature is 235 to 245 °C. Note 1: Keeping the peak temperature below 241 °C may reduce the number and size of BGA and QFN voids. Note 2: Refer to component and board supplier data for thermal properties at elevated temperatures. Lower peak temperatures require longer TAL for improved joint cosmetics. Note 3: During reflow profile setup, ensure that thermal profile measurements are taken across an entire assembly, particularly at component locations of heavy thermal mass, solder joints in the shadow of component bodies, large components & Bottom Terminated Components.	ALPHA CVP-390 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 cleaners.

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

REFLOW PROFILES

Fig 1: ALPHA CVP-390 SAC305 Typical Reflow Profile



Parameter	Guideline	Additional Information
Atmosphere	Air or N2	
SAC305	217 to 221 °C Melting Range	
SACX Plus 0807 SMT	217 to 225 °C Melting Range	
SACX Plus 0307 SMT	217 to 227 °C Melting Range	
Innolot Alloy	212.5 to 222.5 °C Melting Range	
90Sn10Sb	Solidus: 239 °C Liquidus: 262 °C	
Setting Zone*	**Optimal Dwell Period**	**Extended window**
40 to 221 °C	2:30 to 4:30 min	< 5:00 min
170 to 221 °C	0:30 to 2:00 min	< 2:30 min
120 to 221 °C	1:25 to 3:00 min	< 3:30 min
TAL (>221 °C)	45 to 90 sec	Not Recommended
Peak Temperature	235 to 245 °C	Compatible with most common surface finishes. (ENTEK HT, ENTEK OM, Alpha Star, ENIG, SACX HASL). Coldest point on the PCB can be as low as 230 °C. Paste can withstand 250 °C during reflow.
Joint Cool Down Rate	1 to 6 °C/sec	Recommended to prevent surface cracking issues.

Above recommendations are for SAC305.
For alternative alloys, please follow the liquidus temperature of the respective alloy

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.

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.**

CONTACT INFORMATION

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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