

ALPHA[®] CVP-390 INNOLOT

High Reliability & High Operating Temperature Lead-Free Alloy Solder Paste

DESCRIPTION

Innolot is a SAC based alloy designed for use in demanding environments (high temperature and vibration) that are beyond the reliability performance capabilities of standard SAC alloys. **ALPHA CVP-390 Innolot** deploys the InnoLot alloy in a zero-halogen, no-clean solder paste flux system, which provides excellent pin testing properties and ability to pass the most demanding electro-chemical reliability standards.

This product is also designed to enable consistent fine pitch printing capability, down to 180 μ m circle printed with 100 μ m thickness stencil. Its excellent print volume deposit repeatability also provides value by reducing defects associated with print process variability.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- Increased Temperature Performance: Higher reliability solder joints than SAC alloys at 125 °C. Can be used in applications up to 150 °C operating temperature.
- 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 μ m 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.
- Reflow Atmosphere: Compatible with both Nitrogen and Air atmospheres in reflow.
- 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

<u>Alloy:</u>	Innolot
<u>Powder Size:</u>	Type 4 (20 to 38µm per IPC J-STD-005)
<u>Packaging Sizes:</u>	500-gram jars, 6" & 12" cartridges, DEK (ProFlow®) Cassette
<u>Flux Gel:</u>	Flux gel is available in 10 and 30 cc syringes for rework applications
<u>Lead Free:</u>	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 25mm/sec (1"/sec) and 150mm/sec (6"/sec), with stencil thickness of 0.100mm (0.004") to 0.150mm (0.006"), particularly when used in conjunction with ALPHA Stencils. Blade pressures should be 0.21-0.36 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 Innolot is a Zero Halogen product and passes the standards listed in the table below:

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		
Activity Level	ROL0	IPC J-STD-004B
Halide Content	Halide free (IC).	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
Water Extract Resistivity	13,400 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)
Electromigration (Bellcore 500 hours @ 65 °C/85%RH 10V)	Pass	Bellcore GR78-CORE (Pass=final > initial/10)
JIS Electromigration (1000 hours @ 85 °C/85%RH 48V)	Pass	JIS-Z-3197-1999 8.5.4
Physical Properties		
Color	Clear, Colorless Flux Residue	
Tack Force vs. Humidity	Pass , > 100gf over 24 hrs at 25%, 50% and 75 % Relative Humidity	JIS Z-3284-1994, Annex 9

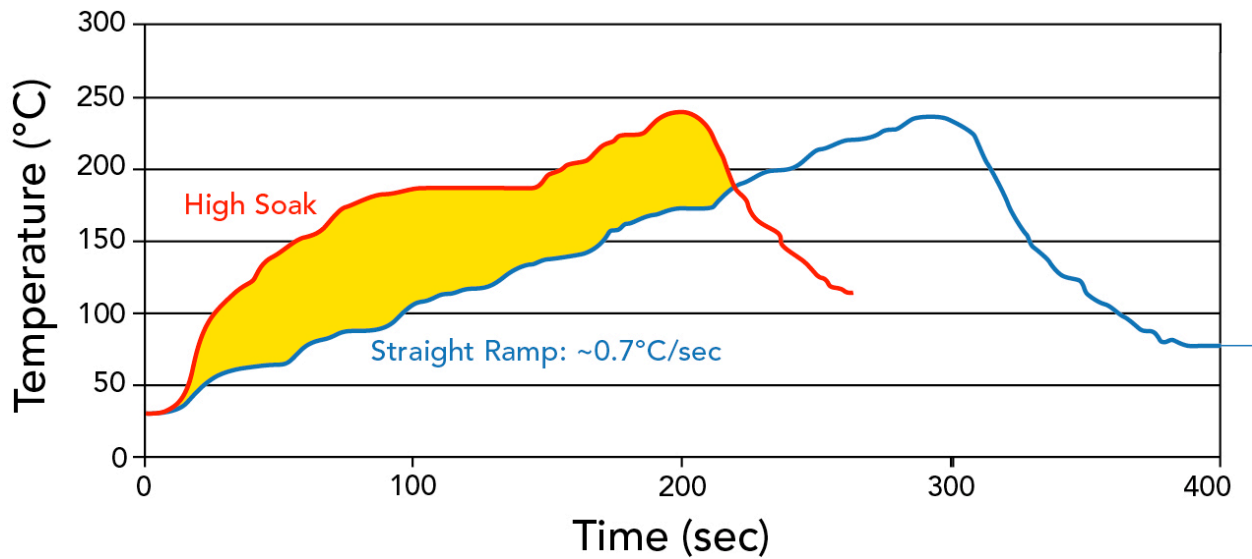
Category	Results	Procedures/Remarks
	Pass , Change of <1g/mm ² over 24 hrs at 25% and 75 % Relative Humidity	IPC J-STD-005 TM-650 2.4.44
Tack Force at 32 °C/35%RH, measured after 0, 1, 2, 3 & 4 hrs print duration	> 100gf	JIS Z-3284-1994, Annex 9
Viscosity	88.8% metal load, Type 4 designated M17 for printing Viscosity (Typical) 1700 poise at 10 RPM Malcom	Malcom Spiral Viscometer. J-STD-005
	89% metal load, Type 4 designated M20 for printing; Viscosity (Typical) 2000 poise at 10 RPM Malcom	
Viscosity Stability at 25 °C for 20 days	Pass	Malcom Spiral Viscometer
Continuous Viscosity Measurement at 25 °C for 24 hours	Pass	Malcom Spiral Viscometer
Coalescence Test	Able to reflow at < 180 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	No bridge for 0.2 mm space	JIS-Z-3284-1994 Annex 7
	Not tested	IPC J-STD-005; TM-650 2.4.35
Hot Slump	No bridge for 0.4 mm space	JIS-Z-3284-1994 Annex 8
	Pass	IPC J-STD-005; TM-650 2.4.35
Dryness Test (Talc)	Pass	JIS-Z-3197-1999 8.5.1

PROCESSING GUIDELINES

Storage & Handling	Printing	Reflow	Cleaning
<ol style="list-style-type: none"> 1. Refrigerate to guarantee stability @ 0 to 10 °C (32 to 50 °F). When stored under these conditions, the shelf life of CVP-390 is 6 months. 2. Paste can be stored for 2 weeks at room temperature up to 25 °C (77 °F) prior to use 3. When refrigerated, warm up paste container to room temperature for up to 4 hrs. 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 setup of printer. 4. 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. 5. Do not remove worked paste from stencil and mix with unused paste in jar. This will alter the rheology of unused paste. 6. These are starting recommendations and all process settings should be reviewed independently. 	<p>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") pitch. Stencil design is subject to many process variables. Contact your local Alpha representative for advice.</p> <p>Squeegee: Metal (recommended)</p> <p>Pressure: 0.21 to 0.36 kg/cm of blade (1.25 to 2.0 lbs/inch)</p> <p>Speed: 25 to 150 mm per second (1 to 6 inches per second).</p> <p>Paste Roll: 1.5 to 2.0 cm diameter and make additions when roll reaches 1-cm (0.4") diameter (min). Max roll size will depend upon blade.</p> <p>Stencil Release Speed: 1 to 5 mm/sec.</p> <p>Lift Height: 8 to 14mm (0.31 to 0.55")</p>	<p>Atmosphere: Clean-dry air or nitrogen atmosphere.</p> <p>Profile (Innolot Alloy): Can use straight ramp profile or soak profile depending upon assembly requirements:</p> <p>See Figure 1 and General Reflow Guidelines</p> <p>Note 1: Keeping the peak temperature below 241°C may reduce the number and size of BGA and QFN voids.</p> <p>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.</p>	<p>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</p> <p>Misprints and stencil cleaning may be done with IPA, ALPHA SM-110E, ALPHA SM-440, and Bioact™ SC-10E cleaners. Bioact is a registered trademark of Petroferm.</p>

REFLOW PROFILES

Fig 1: ALPHA® CVP-390 InnoLot Typical Reflow Profile



General Reflow Profile Guidelines		
Parameter	Guideline	Additional Information
Atmosphere	Air or N2	
InnoLot Alloy	206 to 218 °C Melting Range	InnoLot can be reflowed as per standard SAC alloys however the minimum reflow temperature can be reduced from 235 to 230 °C
Setting Zone*	Optimal	Extended window
40 to 218 °C	2:30 to 4:15 min.	< 5:00 min.
170 to 218 °C	0:45 to 2:15 min.	< 2:30 min.
130 to 218 °C	1:30 to 3:15 min.	< 3:30 min.
TAL (218 °C)	45 to 90 sec.	30 to 90 sec.
Peak temperature	230 to 245 °C	230 to 250 °C
Joint cool down rate	1 to 6 °C/second	Recommended to prevent surface cracking issues.

Compatible with most common surface finishes. (ENTEK HT, ENTEK OM, Alpha Star, ENIG, SACX HASL)

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 CVP-390 Innolot should be stored in a refrigerator upon receipt at 0 to 10 °C (32 to 50 °F). ALPHA CVP-390 Innolot should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures page 5). This will prevent moisture condensation build up in the solder paste.

CONTACT INFORMATION

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

www.macdermidalpha.com

<p>North America 109 Corporate Blvd. South Plainfield, NJ 07080, USA 1.800.367.5460</p>	<p>Europe Unit 2, Genesis Business Park Albert Drive Woking, Surrey, GU21 5RW, UK 44.01483.758400</p>	<p>Asia 8/F., Paul Y. Centre 51 Hung To Road Kwun Tong, Kowloon, Hong Kong 852.3190.3100</p>
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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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