ALPHA® CVP-370-BN

No-Clean, Lead-Free Solder Paste; Zero-Halogen, Low Voids, Fine Feature, Low Tack Residue

DESCRIPTION

ALPHA CVP-370-BN 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 180μm circle printed with 100μm thickness stencil. Its excellent print volume deposit repeatability also provides value by reducing defects associated with print process variability. Additionally, **ALPHA CVP-370-BN** achieves IPC7095 Class III 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 air & nitrogen reflow, using ramp & soak profiles, as high as 175-185°C
- **Reduced Random Solder Ball Levels:** minimizes rework and increases first time yield
- **Excellent Coalescence and Wetting Performance:** coalesced 180μm 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 IPC7095 Class III Requirement
- **Halogen Content:** Zero Halogen, no halogen intentionally added
- **Residue:** Low Tack Residue post reflow
- **Safe and Environmentally Friendly:** Materials comply with RoHS and Halogen-free requirements (see table below), as well as TOSCA & EINECS

PRODUCT INFORMATION

Alloys:	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu). For other alloys, contact your local Alpha Sales Office
Powder Size:	Type 4.5 (Proprietary powder size distribution)
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:	RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU

APPLICATION GUIDELINES

Content 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 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-370-BN is a Zero Halogen product & 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 (by titration).	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	13,800 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 2.6.3.7 (Pass ≥ 1 x 10^8ohm)
Electromigration (Bellcore 500 hrs @ 65 °C/85%RH 10V)	Not tested	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 hours at 25%, 50% and 75 % Relative Humidity	JIS Z-3284-1994, Annex 9
	Not Tested	IPC J-STD-005 TM-650 2.4.44

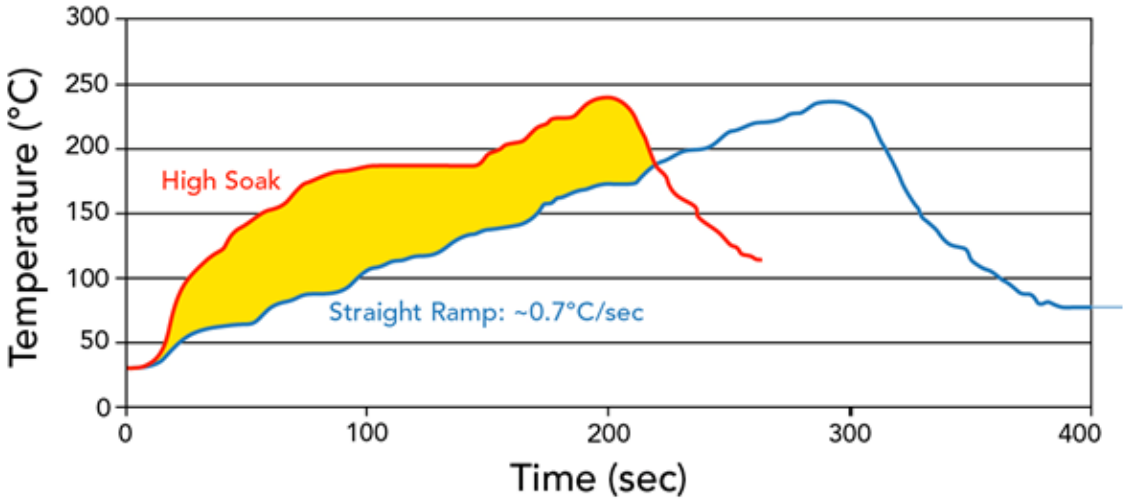
Category	Results	Procedures/Remarks
Tack Force at 32 °C/35%RH, measured after 0, 1, 2, 3 & 4 hrs print duration	> 100gf	JIS Z-3284-1994, Annex 9
Viscosity	89% metal load, Type 4.5 designated M18 for printing Viscosity (Typical) 1800 poise at 10 RPM Malcom	Malcom Spiral Viscometer; J-STD-005
Viscosity Stability at 25 ºC for 20 days	Pass	Malcom Spiral Viscometer
Continuous Viscosity Measurement at 25 ºC for 24 hrs	Pass	Malcom Spiral Viscometer
Coalescence Test	Able to reflow at < 180 µm circle size Cu pad	Internal
Solder Ball	Preferred	IPC J-STD-005 TM-650 2.4.43
Wetting Time	Not Tested	Rhesca Test, Test Time T2, 3 seconds
Spread	80%	JIS-Z-3197-1999 8.3.1.1
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
	Not Tested	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 (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 CVP-370-BN 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.	**Stencil**: Recommend Cookson Electronics 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 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") diameter (min). Max roll size will depend upon blade. **Stencil Release Speed:** 1 to 5 mm/sec. **Lift Height:** 8 to 14mm (0.31 to 0.55 inches)	**ATMOSPHERE**: Clean-dry air or nitrogen atmosphere. **PROFILE (SAC Alloys):** Straight Ramp: 0.7°C/sec & 1.3°C/sec ramp profiles, 45 - 60 TAL, Peak Temperature 235 - 245°C. Soak: 155 – 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 175 – 185°C for 60s. Typical peak temperature is 235 to 245°C. Note 1: Keeping the peak temperature below 241ºC 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.	ALPHA CVP-370-BN 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, ALPHA SM-440, and Bioact SC-10E cleaners. Bioact is a registered trademark of Petroferm.

REFLOW PROFILES

Fig 1:
ALPHA CVP-370-BN SAC305--Typical Reflow Profile



General Reflow Profile Guidelines		
Parameter	**Guideline**	**Additional Information**
Atmosphere	Air or N2	
SAC305	217 -225°C Melting Range	
Setting Zone*	**Optimal Dwell Period**	**Extended window**
40 to 225 °C	2:30 to 4:30 min.	< 5:00 min.
170 to 225 °C	0:30 to 2:00 min	< 2:30 min.
120 to 225 °C	1:25 to 3:00 min.	< 3:30 min.
TAL (217 to 225 °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)
Joint cool down rate from 170 °C	1 to 6 °C/second	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 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-370-BN should be stored in a refrigerator upon receipt at 0 to 10 °C (32-50 °F). ALPHA CVP-370-BN should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures on 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

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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