# ALPHA® CVP-390V(R9) SAC305 Solder Paste

## A CircularSolder Offering with Guaranteed >90% Recycled Tin in Alpha's High Reliability, Fine Feature Capable, Zero-Halogen, No-Clean Paste

## DESCRIPTION

**ALPHA CVP-390V(R9) SAC305** features minimum 90% recycled tin content in the same no-clean solder paste designed to maximize electrochemical reliability and processing flexibility.

**ALPHA CVP-390V(R9) SAC305** delivers consistent print and reflow performance across a wide range of component types. **ALPHA CVP-390V(R9) SAC305** exhibits >2.00CpK for transfer efficiencies between 60 to 120% at area ratios above 0.60 against variable print process conditions for the ultimate flexibility in manufacturing. ALPHA CVP-390V(R9) SAC305 maintains repeatable transfer efficiency on fine feature 01005 components and excellent coalescence down to 170µm circle and square apertures.

**ALPHA CVP-390V(R9) SAC305** exhibits best-in-class electrochemical reliability down to 0.100mm comb spacing against the most challenging SIR profiles. The ability to maintain high electrochemical performance in harsh operating conditions on dense assembly designs makes **ALPHA CVP-390V(R9) SAC305** ideal for high reliability applications.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

## FEATURES & BENEFITS

| Features | Benefits |
|---|---|
| Superior electrochemical reliability | ≥$10^8$ Ohms for 7 days on 100 µm spaced modified IPC-B-24 coupons against harsh environment SIR profiles to ensure reliability on complex assemblies |
| Wide process window | >2.0 Cpk transfer efficiency between 60 to 120% at area ratios above 0.60 for maximum process flexibility |
| Reliable post reflow flux residue | Excellent pin testability to ensure highest first pass yields |
| Excellent reflow and coalescence | Good solderability down to 170 µm apertures on high density assemblies using both ramp and soak profiles |
| Zero-halogen,<br>no halogens intentionally added | Ensures RoHS compliance for a safe and environmentally friendly assembly process |

## PRODUCT INFORMATION

| | |
|---|---|
| Alloy: | >90% Recycled tin SAC305 |
| Powder Size: | Type 4 |
| Packaging Size: | 500 gram jars, 6 & 12 inch cartridges |
| Lead-Free: | Complies with RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU |
| Halogen Content: | Zero-halogen |

## HALOGEN STATUS

| Halogen Standards | | | |
|---|---|---|---|
| **Standard** | **Requirement** | **Test Method** | **Status** |
| BS EN 14582:2016 | Zero-halogen (not intentionally added) | SGS Halogen Cl, Br - BS EN14582(2016)/ Combustion | Not Detected |
| RoHS | Directive EU/2015/863; amending Annex II of 2011/65/EU (Permissible Limit ≤1000mg/kg & ≤100mg/kg for cadmium and cadmium compounds) | IEC 62321:2013 & IEC 62321:2008 | Pass |
| REACH | Concentrations of tested SVHC are ≤ 0.1% (w/w) | SGS In-House Method | Pass |

## TECHNICAL DATA

| ALPHA CVP-390V(R9) SAC305 | | |
|---|---|---|
| **Category** | **Results** | **Procedures/Remarks** |
| **Chemical Properties** | | |
| Activity Level | ROL0 | IPC J-STD-004B |
| Fluoride Spot Test | No fluoride present | IPC J-STD-004B |
| Halogen Content Test | No Halogens detected | BS EN 14582 (2016) |
| Ag Chromate Test | No Halides present | JIS Z 3197 |
| Copper Mirror test | Low activity, no breakthrough | JIS Z 3197 & IPC J-STD-004B |

| ALPHA CVP-390V(R9) SAC305 | | |
|---|---|---|
| **Category** | **Results** | **Procedures/Remarks** |
| Copper Corrosion Test | Low activity, no corrosion | JIS Z 3197 & IPC J-STD-004B |
| **Electrical Properies** | | |
| Automotive Damp Heat (50V) | Pass, ≥$10^8$ Ohms for 6 days | IEC 6068-2-30 |
| SIR (7 days, 40 °C/90%RH) | Pass, ≥$10^8$ Ohms for 7 days down to 100 µm spacing | JIS Z 3197 & IPC J-STD-004B |
| SIR (7days, 85 °C/85%RH) | Pass, ≥$10^8$ Ohms for 7 days down to 100 µm spacing | JIS Z 3197 & IPC J-STD-004A |
| SIR (7days, 85 °C/85%RH) | Pass, ≥$10^8$ Ohms for 7 days on BGA and MLF packages | IPC J-STD-004A |
| Bono Corrosion (15 days, 85 °C/85%RH) | Pass, corrosion factor ($F_c$) <2% for 15 days | Per Bono criteria |
| Electrochemical Migration | Pass, No visual evidence of corrosion, discoloration or electromigration for 596 hrs | IPC J-STD-004B |
| **Physical Properties** | | |
| Residue Color | Clear & light amber flux residue | |
| Tack life | Pass, Tack force ≥100gf for minimum 24 hrs | JIS Z 3284:1994, Annex 9 |
| Tack Life | Pass, Tack life within 80% peak for minimum 24 hrs | IPC J-STD-004B |
| Spread Rate | Average spread between 88 to 90% | JIS Z 3197 |
| Stencil Life | > 8hrs consistent transfer efficiency | @25 °C/30%RH |
| Cold Slump (25 °C /50% RH) | Pass, no bridging above 0.20 mm | IPC J-STD-005A |
| Hot Slump (150 °C/10min) | Pass, no bridging above 0.25 mm | IPC J-STD-005A |
| Dryness Test (Talc) | Pass, non-sticky post reflow residue | JIS Z 3197 |

## PROCESSING GUIDELINES

The following process settings are offered as a process window guideline based on typical SMT assembly. Due to the variation in the industry, the optimum process setting will need to be developed for each process.

**Speed:** Formulated for stencil printing at speeds between 25 mm/s (1 in/s) and 150 mm/s (6 in/sec). Optimal performance achieved at 100 to 120 mm/s

**Pressure:** Typical blade pressures are between 0.21 Kg/cm (1.25 lbs/in) to 0.36 kg/cm (2.0 lbs/in) depending upon the print speed and quality of stencil /substrate gasket. Higher blade pressure is required to achieve a clean stencil surface for applications requiring higher print speed.

**Paste Roll:** Paste roll between 1.5 cm (0.60 in) to 2.0 cm (0.80 in) in diameter is recommended for optimum performance with paste additions made when roll reaches 1.0 cm (0.40 in) diameter (Min). Max roll size will depend upon blade.

**Squeegee:** Recommend Metal Squeegee angle 60°

**Stencil Release Speed:** >10 mm/s preferred.

For apertures with AR≥0.64 the print volumes are consistent and no prior kneading is required. For AR<0.64, paste would benefit from 1 to 2 knead strokes prior to printing.

ALPHA CVP-390V(R9) SAC305 residue is designed to remain on the board after reflow. Misprint or stencil cleaning may be done with IPA.

**Storage & Handling:**

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

Refrigerate to guarantee stability @ 0 to 10 °C (32 to 50 °F). When stored under these conditions, shelf life of ALPHA CVP-390V(R9) SAC305 is 6 months. 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 stored for maximum 2 weeks at room temperature up to 25 °C (77 °F) prior to use.

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.

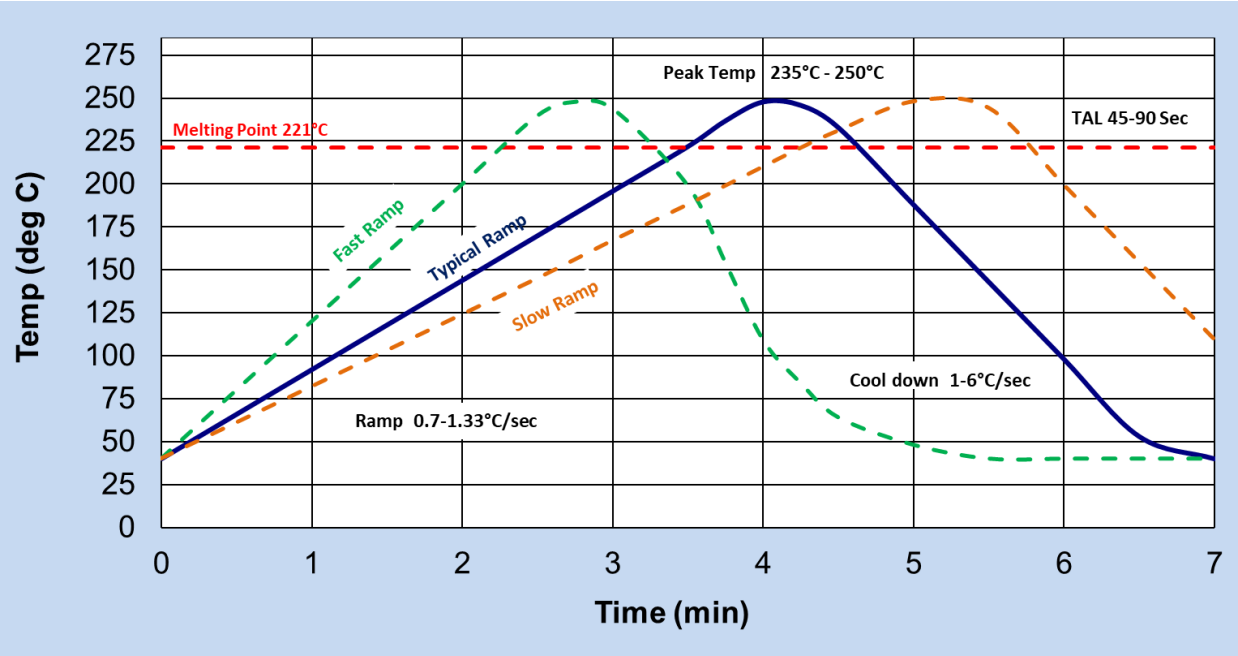
Do not remove worked paste from stencil and mix with unused paste in jar. This will alter the rheology of unused paste.

## REFLOW GUIDELINES

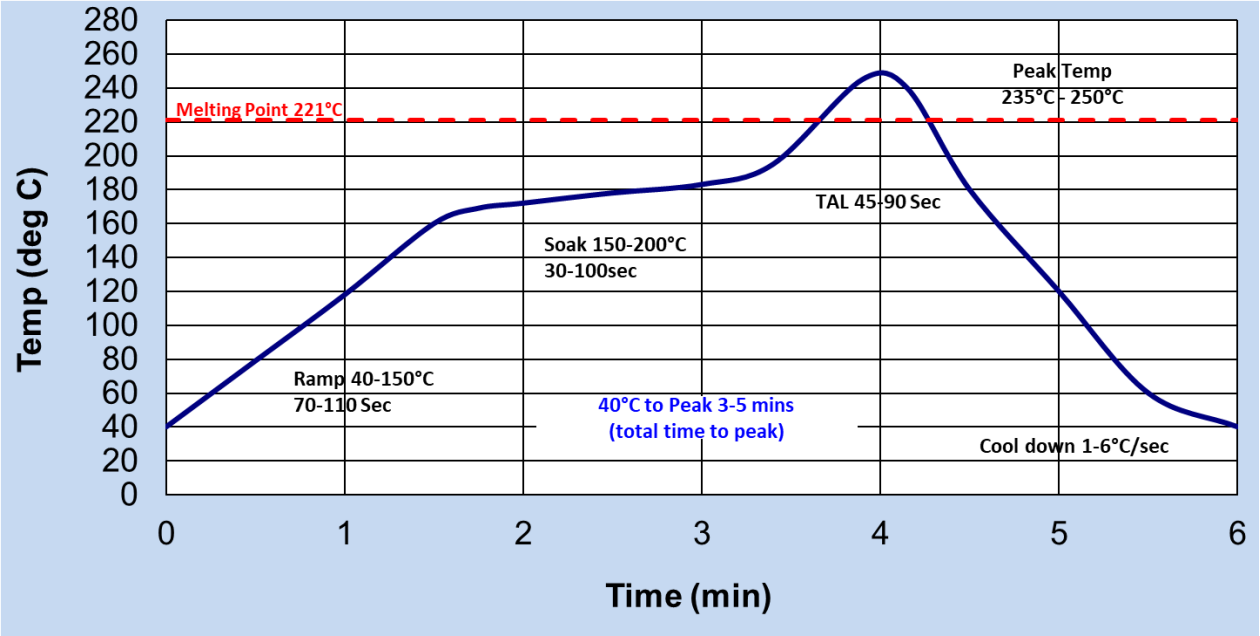
**Atmosphere:** Capable of reflow in Air and $N_2$ environments.

**ALPHA CVP-390V(R9) SAC305 Typical Reflow Profile Recommendation**

**Straight Ramp:** CVP-390V(R9) SAC305

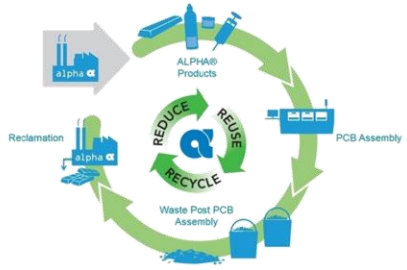


**High Soak:** CVP-390V(R9) SAC305




The processing guidelines recommended and typical reflow profiles presented were tested in the lab with acceptable performance. Optimization to each board application should still be carried out by users to ensure best results.

## MacDermid Alpha CircularSolder Program




**MacDermid Alpha CircularSolder** represents a closed-loop approach to solder sourcing and recycling. **MacDermid Alpha CircularSolder** participants actively reduce the environmental impact of electronic assemblies by minimizing reliance on resource-intensive tin mining and processing by substituting with recycled materials in our leading paste formulations.

Program participants play a pivotal role by contributing their solder waste in the form of solder dross, solder scrap, or various forms of solder paste waste which we then responsibly recover and reintroduce into the market.

By integrating our recycling services with our advanced solder paste production capabilities **MacDermid Alpha CircularSolder** harmonizes social and environmental initiatives with practical industry needs.

Embrace change with CircularSolder and join us in shaping the future of sustainable electronics.

## 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.**

## CONTACT INFORMATION

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

www.macdermidalpha.com

| | | |
|---|---|---|
| **North America**<br>300 Atrium Drive<br>Somerset, NJ 08873, USA<br>1.800.367.5460 | **Europe**<br>Unit 2, Genesis Business Park<br>Albert Drive<br>Woking, Surrey, GU21 5RW, UK<br>44.01483.758400 | **Asia**<br>8/F., Paul Y. Centre<br>51 Hung To Road<br>Kwun Tong, Kowloon, Hong Kong<br>852.3190.3100 |

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.

DISCLAIMER: All statements, technical information and recommendations contained herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. No statement or recommendation shall constitute a representation unless set forth in an agreement signed by officers of seller and manufacturer. NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY IS MADE. The following warranty is made in lieu of such warranties and all other warranties, express, implied, or statutory. Products are warranted to be free from defects in material and workmanship at the time sold. The sole obligation of seller and manufacturer under this warranty shall be to replace any noncompliant product at the time sold. Under no circumstances shall manufacturer or seller be liable for any loss, damage or expense, direct, indirect, incidental or consequential, arising out of the inability to use the product. Notwithstanding the foregoing, if products are supplied in response to a customer request that specifies operating parameters beyond those stated above, or if products are used under conditions exceeding said parameters, the customer by acceptance or use thereof assumes all risk of product failure and of all direct, indirect, incidental and consequential damages that may result from use of the products under such conditions, and agrees to exonerate, indemnify, defend and hold harmless MacDermid, Incorporated and its affiliates therefrom. No suggestion for product use nor anything contained herein shall be construed as a recommendation to use any product in a manner that infringes any patent or other intellectual property rights, and seller and manufacturer assume no responsibility or liability for any such infringement.

© 2019 MacDermid, Inc. and its group of companies. All rights reserved. "(R)" and "TM" are registered trademarks or trademarks of MacDermid, Inc. and its group of companies in the United States and/or other countries.

SCAN ME