ALPHA® VACULOY® SAC0307, 0300

Lead-Free Wave Solder Alloy

DESCRIPTION

ALPHA Vaculoy SAC0307 is a lead-free Tin / Silver / Copper based alloy suitable for use as a replacement for ALPHA SAC305 and SnPb alloy for many applications in the wave solder process. This alloy has 0.3% silver vs ALPHA SAC305 at 3.0% silver which makes the **ALPHA Vaculoy SAC0307** less subject to price fluctuation based on the cost of silver. The **ALPHA Vaculoy SAC0300** variant is used to help stabilize / reduce the level of copper content in the wave solder bath when required. This requirement will depend on process conditions and can be determined by doing a proper solder bath analysis. As with all Alpha bar solder, Alpha's proprietary Vaculoy alloying process is used to remove certain impurities, particularly oxides.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

APPLICATION GUIDELINES

ALPHA Vaculoy SAC0307 is suitable for wave soldering and surface mount applications for electronic assemblers interested in implementing a lead-free process. It is suited to single side and mixed technology boards. A solder pot temperature of 255 to 265 °C (491 to 509 °F) is recommended with a contact time 2.3 to 3.5 seconds. For suitable wave solder fluxes, contact your local sales representative. Lead-free reclaim services including dedicated lead-free containers are also available, please consult your local sales office.

TECHNICAL DATA

Complies with all requirements of RoHS Directive (Article 4.1 of the European Directive EU/2015/863). Alloy specification for Maximum Lead (Pb) Content = 0.1%

Material Property	Units	Vaculoy SAC0307
Solidus	Celsius	217
Liquidus	Celsius	228
Silver Content	%	0.3 +0.15+/-0.05
Copper Content	%	0.70 +/-0.1
Lead Content	%	Max 0.1%

RECOMMENDED SOLDER PROCESS SETTINGS

Wave Configuration	Process Parameter	Suggested Process Settings
Single Wave	Pot temperature	255 to 265 °C (491 to 509 °F)
	Conveyor speed	1.0 to 1.5 m/min (3.3 to 5 ft/min)
	Contact time	2.3 to 2.8 seconds
	Wave Height	1/2 to 2/3 of board thickness
	Dross removal	Once per 8 hour run time
	Copper Check	Every 8,000 boards until 40,000
Dual Wave	Pot temperature	255 to 265 °C (491 to 509 °F)
	Conveyor speed	1.0 to 1.5 m/min (3.3 to 5 ft/min)
	Contact time	3.0 to 3.5 seconds
	Wave Height	1/2 to 2/3 of board thickness
	Dross removal	Once per 8 hour run time
	Copper Check	Every 8,000 boards until 40,000

MANAGEMENT OF COPPER LEVELS IN SOLDER BATH

Management of the copper level in the wave solder bath is critical to ensure low defects in the soldering process. There is a tendency for the copper levels of the ALPHA SAC0307 materials to increase due to the leaching effect of the solder wave on the board and components. This effect is at its most severe when using an OSP Copper finish on the PCB.

Studies have shown a typical leaching rate of **0.01% Cu per 1000 boards**. Each process is unique this is an indication only of the leaching rate (based on actual data). It is recommended that the copper is controlled at between 0.7% and max 1.0% for ALPHA SAC0307 alloy. If the copper levels are higher than 1.0% then this will increase the liquidous temperature which in turn may mean that the solder bath temperature must be increased to maintain the process yields.

The copper levels in the bath can be controlled by means of adding **ALPHA SAC0300** to the wave solder pot. It may be the case that equilibrium can be attained by continuing with ALPHA

SAC0300 additions as the only means of solder top up, however each process is unique, and we would recommend regular analysis of the solder bath so that good control of copper can be maintained.

This analysis service is available, contact your local office for details.

RECOMMENDED ACTION LEVELS FOR WAVE SOLDER IMPURITIES

Please find below a list of recommended action levels for wave solder bath impurities. For information of specific action plans to bring your solder bath back to an acceptable condition please contact your local sales office.

Aluminum*: As little as 0.0005% may increase dross rate without affecting joint formation.

Arsenic: Above 0.03% can cause de-wetting.

Bismuth: Levels of 1.0% are added to some wave-solder alloys to improve wetting joint cosmetics and thermal fatigue resistance. At this level care should be taken over lead contamination as there is some evidence that this may increase the chances of fillet lifting. Lead at<0.1% RoHS) should not cause any problems.

Cadmium*: At levels of 0.002% joint formation will be noticeably affected. At 0.005% there will be a high incidence of bridging and icicling, together with a diminution in joint strength.

Copper: Copper levels will increase in many cases due to pick up from board surfaces. This causes the liquidous of the bath material to increase slightly. Generally, systems are tolerant to levels up to 1.0% Cu, but in some cases, it may be necessary to increase bath temperatures by a few degrees, or to correct the bath composition at an earlier stage.

Gold: At levels of 0.1% and quite often less, the solder becomes sluggish and dull joints are formed.

Iron: 0.02% of iron can make joint formation gritty.

Lead: The current ROHS directive (restriction of certain hazardous substances) states a maximum of 0.1% Pb in the solder joints.

The lead contamination level should be kept below this level to comply with legislation. If this level is exceeded, please consult with your local MacDermid Alpha Electronics Solutions contacts for advice on how to rectify this problem.

Silver: Silver is used as an alloying element in lead-free solders. That enhances wetting speed and thermal fatigue resistance.

Zinc*: The presence of zinc can cause dulling and create bridging and icicling. 0.005% can also cause lack of adhesion and grittiness.

Note: *The effects of Al, Cd and Zn are cumulative. If more than one element is present the following lower maxima are suggested: 0.0005%, 0.002% and 0.001%

AVAILABILITY

ALPHA Vaculoy SAC0307/0300 is available in 1kg (2.2lb) Bar, Feeder Ingots, and Auto-feed Solid Wire

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.**

CONTACT INFORMATION

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

www.macdermidalpha.com

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