



ALPHA Vaculoy SACX[®]0807/ SACX[®]0800

LEAD FREE WAVE SOLDER ALLOY

DESCRIPTION

ALPHA Vaculoy SACX[®]0807 is a low silver lead-free alloy specially designed with proprietary additives to deliver soldering and reliability performance similar to higher silver SAC alloys (ie. SAC305, 405, etc...). The SACX[®]0800 variant is used to stabilize / reduce the copper content in the wave solder bath; this requirement will depend on process conditions. As with all Alpha Metals wave solder alloys, Alpha's proprietary Vaculoy[™] process is used to remove certain impurities, particularly oxides. SACX[®]0807 can be used for the widest range of assemblies and under the widest range of operating conditions of any low silver or silver free alloy available today. SACX[®]0807 is available in a variety of forms including solid wire for replenishment and rework requirements.

FEATURES & BENEFITS

Feature	Benefit
Low Silver Content	Lower material costs vs SAC305
Low Operating Temperature Requirement	Wide processing window and energy cost savings. Drop in to most current lead free wave soldering machine temperature profiles
Low Dross Rate	Less dross means higher alloy utilization and less time spent on pot "maintenance"
Low Copper Erosion Rate	Less risk during high temperature, high exposure time processes (i.e. rework, selective soldering, etc...)
Low Surface Tension Alloy	Fast wetting with high wetting force delivering excellent hole fill and low SMD related defects
Strong, Ductile Joints	Lower warranty claims related to mechanical joint failures

The proprietary Vaculoy process is a highly effective method for removing included oxides from solder. This is extremely important because included oxides generate excessive drossing and increase the viscosity of the solder. Solder with higher viscosity can result in increased soldering defects (i.e. solder bridging).

APPLICATION

ALPHA VACULOY SACX[®] 0807 is suitable for wave soldering and selective soldering for electronic assemblers interested in implementing a lead-free process. It is suitable for nearly all types of boards (single & double-sided) and works particularly well on assemblies with OSP pad finishes that have been exposed to prior reflow excursions and where lower silver or silver free alloys have not worked. For suitable wave solder fluxes, please visit www.alphametals.com and navigate to the Wave Solder Flux Selector tool on the Wave Solder flux main page. Lead free Reclaim services including dedicated lead free containers are also available; please consult your local sales office.

AVAILABILITY

ALPHA VACULOY SACX[®] 0807 is available in a variety of sizes including 1kg bar, chunks, Feeder Ingots and Autofeed solid wire.

- Patent Pending PCT/GB2005/004609





HEALTH & SAFETY

Please refer to MSDS for advice on proper handling and safety instructions.

TECHNICAL SPECIFICATION

Complies with all requirements of RoHS Directive (Article 4.1 of the European Directive 2002/95/EC). Alloy specification for Maximum Lead (Pb) Content = 0.1%

Material Property	SACX®0807	Test Method
Solidus	216°C	Differential Scanning Colorimeter (DSC)
Liquidus (peak)	225°C	Cooling Curve
Density	7.4 g / cm ³	Calculated
Resistivity	0.1399 μΩm	Measured resistance of solid wire at 22°C
Coefficient of Thermal Expansion	19.5 x 10 ⁻⁶ / C	30 - 100°C at 1°C / minute
	20.2 x 10 ⁻⁶ / C	100 - 180°C at 1°C / minute
Spread Factor	> 75%	JIS Z 3197
Specific Heat	0.23 J/g/°C	At 100°C, Differential Scanning Colorimeter (DSC)
Hardness	16.4 HV	Vickers Hardness (as cast)
Tensile Strength	30.7 MPa	Strain rate 10 ⁻³ per second
Elongation	21.0 %	Strain rate 10 ⁻³ per second
Creep Strength	> 1000 Hours	400 g/mm ² load @ 100°C

RECOMMENDED PROCESS SETTINGS

Wave Configuration	Process Parameter	Suggested Process Settings
Single Wave	Pot temperature	255 - 265 Celsius (491 - 509 F)
	Conveyor speed	0.8 - 1.5 m/min (2.6 – 5.3 ft/min)
	Contact time	2.3 - 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 - 265 Celsius (491 - 509 F)
	Conveyor speed	0.8 - 1.5 m/min (2.6 – 5.3 ft/min)
	Contact time	3.0 – 4 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

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MANAGEMENT OF COPPER LEVELS IN THE SOLDER BATH

Copper should be controlled in the solder bath between 0.7% and 1.0%

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 within a high tin bearing alloy wave solder bath to increase due to copper dissolution from the PCB. This effect increases based on the level of exposed copper on the assembly, as in the case of boards using OSP pad finishes.

Studies have shown a typical leaching rate of 0.01% Cu per 1000 boards. As each process is unique, this rate should be viewed as a guideline only.

It is recommended that the copper is controlled at between 0.7% and max 1.0% for SACX® 0807 alloy. If the copper levels are higher than 1.0% then this will increase the liquidus temperature which in turn may mean that the solder bath temperature has to be increased to maintain the process yields.

The copper levels in the bath can be controlled by means of adding SACX® 0800 to the wave solder pot. It may be the case that equilibrium can be attained by continuing with SACX® 0800 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 from Cookson, contact your local sales 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.

Table with 3 columns: Element, ACTION Levels, Notes. Rows include Sn, Pb, As, Cu, Bi, Zn, Fe, Ag, Sb, Ni, Cd, Al, Au with their respective action levels and notes.

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