ECOREL™ FREE 305-6 / 405-6

Lead Free no-clean solder paste

FEATURES

SAC (SnAgCu) alloys are currently the industry choice because they have excellent soldering and mechanical properties. Of these alloys, the SAC 305 (SnAg3.0Cu0.5) is preferred because several evaluations (such as IPC SPVC reliability study) have demonstrated no significant statistical differences between SAC alloys with 3 to 4 % silver content and 0.5 to 0.7 % copper content. Patents, cost and soldering standardization considerations make the SAC 305 (SnAg3.Cu0.5) preferable for the majority of the industry.

In spite of the higher melting temperatures and the longer reflow profiles needed by SAC solders, the range of ECOREL™ FREE solder pastes offers process capabilities equivalent to the best no-clean SnPb solder pastes

The radar chart below shows the excellent printing capabilities of **ECOREL™ FREE 305-6** : High speed printing – excellent abandon time – long, steady tackiness. In addition **ECOREL™ FREE 305-6** exhibits good wetting properties and excellent ability to avoid solder beading.

SPECIFICATIONS

Alloy (available with others Ag content)	SnAg3Cu0.5	SnAg4Cu0.5
Powder size distribution (microns)	25 - 45	25 – 45
Melting point (°C)	217	217
Metal content (%)	88 ±- 0,5	88 ± 0.5
Halogen content	No halogen	No halogen
Viscosity* (Pa.s 20°C) **Brookfield RVT - TF at 5 rpm*	700 - 900	700-900
Post reflow residues	approximately 5% by w/w	

CHARACTERISTICS

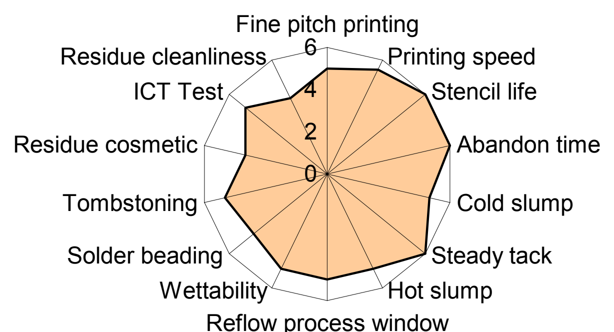
Stencil life — over 12 hours
(Paste life time in a continuous printing process)

Abandon time — over 4 hours
(for 0.4 mm pitch, 120 microns stencil)
(Maximum time between two prints with good print restart)

Steady tackiness — more than 16 hours

High speed printing — up to 150mm/sec

High first pass yield at ICT



FUNCTIONAL TESTS	RESULTS	PROCEDURES
Flux Classification	REL0	ANSI/J-STD-004
	F-SW 33	DIN 8511
	123	ISO 9454
Solder balling test	pass	ANSI/J-STD-005
Copper mirror	pass	ANSI/J-STD-004
Chromate paper	pass	ANSI/J-STD-004
Copper corrosion	pass	ANSI/J-STD-004
Surface Insulation Resistance Ohms	pass	ANSI/J-STD-004
After 7 days		
85°C - 85 % RH - 50 Volts	$> 10^{10}$	
25°C - 65 % RH	$> 10^{12}$	

PACKAGING

Jars	250 g or 500 g
Cartridges	600 g or 1200 g
Proflow	700 g

STORAGE & SHELF LIFE

To ensure the best product performance, the recommended storage temperature range is from 5°C to 10°C. A shelf life of 9 months is achieved under these conditions. For cartridges, shelf life is 6 months.

For an optimal preservation, store cartridges and syringes in vertical position, tip downwards.

PROCESS PARAMETERS

Solder paste preparation

Before printing, it's essential to properly mix the solder paste, either manually with a spatula, or by doing several preliminary prints on the stencil.

Printing guidelines

WITH SQUEEGEES

Apply on the stencil solder paste to form a roll of 1 to 2 cm of diameter all along the squeegee. This way, the solder paste will roll easily under the squeegees to offer excellent printing quality.

Printing speed : 50 to 150 mm/sec.
Minimum pitch : 0.3 mm
Pressure depends on printing speed

Squeegee width	Speed	Pressure
250 mm	50 mm/sec	3 Kg
250 mm	100 mm/sec	5 Kg
250 mm	150 mm/sec	7 Kg
400 mm	50 mm/sec	5 Kg
400mm	100 mm/sec	7 Kg
400 mm	150 mm/sec	9 Kg

WITH PROFLOW

Typical parameters only given as an example :

Head size	300 mm
Printing speed	50 mm/sec
Head pressure (or system pressure)	1.6 kg
Paste pressure	2 bar

WITH SPEEDLINE RHEOPUMP

Typical parameters only given as an example :

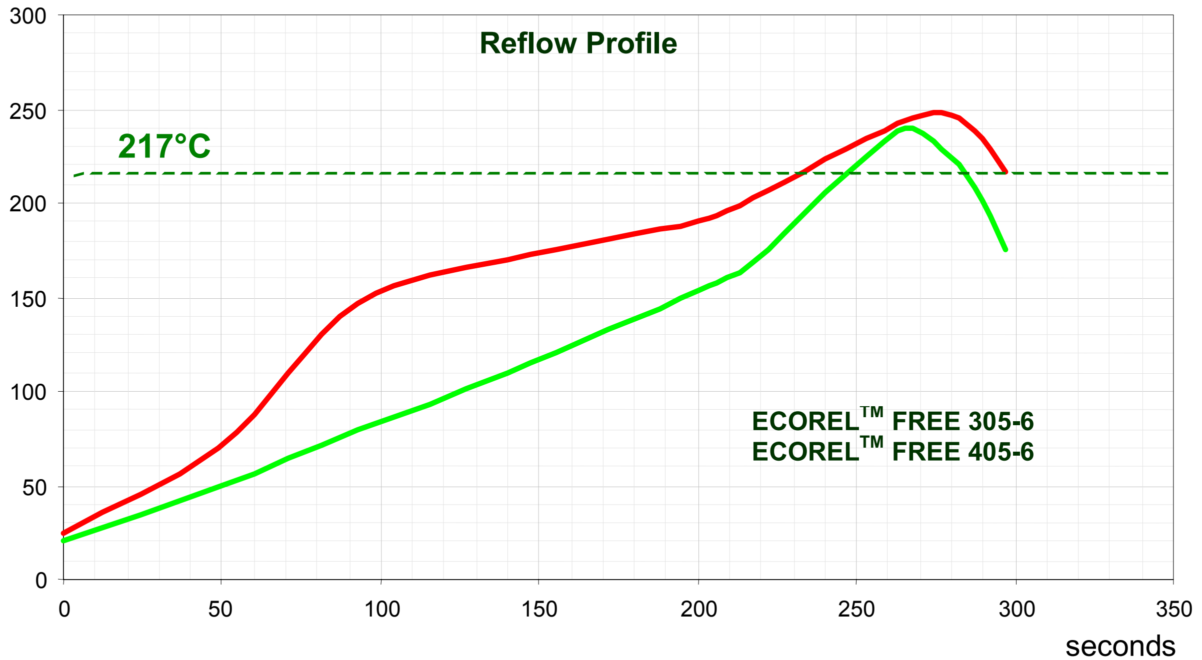
Pump size	12 inch
Down force	1.5 lbs/inch
Print speed	2 inch/sec.
PID settings	3
Pump pressure	1.4 psi

Reflow guideline

Linear preheating ramp rate is recommended. But high density board may require soak zone during preheating to homogenize temperature over the circuit board before reflow peak.

Preheating ramp rate with linear preheating	0.7-1.2°C/s according the circuit board size and density
Preheating steps in case of preheating soak zone	- From 20 to 150°C: ramp rate 1-2°C/s - soak zone between 150-180°C for 60 to 140s - from 170 to liquidus 1.0-2.0°C/s
Peak ramp rate	1.0-2.0 °C/s
Peak temperature	235-250°C (240-245°C real optimum) Paste can stand higher temperature than 250°C, but it is not recommended to preserve component integrity
Time above liquidus	45-90s (55-70s typical)
Cooling ramp rate	1.8-7°C/s (studies have demonstrated 1.8-2.2°C/s allows homogeneous joint structure and reduce surface cracks formation)

Typical reflow profile



Cleaning

These no-clean solder pastes **ECOREL™ FREE 305-6 & ECOREL™ FREE 405-6** can be cleaned with recommended INVENTEC cleaning solution.

PROCESS	Immersion or spray system (water based solution)	Immersion system (solvent based solution)	Manual use (Solvent based solution)
INVENTEC SOLUTION	PROMOCLEAN™ DISPER 605 (as packaged, pH=11.9)	HFE + co-solvents : TOPKLEAN™ EL-20A TOPKLEAN™ EL-20R Under vacuum system : TOPKLEAN™ EL-20D Fast evaporation azeotropic solvent : PROMOSOLV™ 70ES	TOPKLEAN™ EL-10F QUICKSOLV™ DEF 90 TOPKLEAN™ EL-60

HSE

No issues when used as recommended.

Although the conformity to ROHS 2002/95CE applies to EQUIPMENT put on the market and not to a component in particular, we warranty that this product contains less than 0.1% of mercury, lead, chromium VI, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) and less than 0.01% for the cadmium, in accordance with the decision of The European Commission dated 18/08/2005, fixing the maximal concentration values.

This data is based on information that the manufacturer believe to be reliable and offered in good faith. In no event will INVENTEC be responsible for special, incidental and consequential damages. The user is responsible to the Administrative Authorities (regulations for the protection of the Environment) for the conformity of his installation.

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