

# ECOREL™ FREE 305-21 / 305-21 T4



**Lead free no-clean solder paste**  
**Halogen-Free – Excellent Solderability**  
**High reliability residue**

## FEATURES

**ECOREL™ FREE 305-21** solder paste is developed to offer very good wettability on different lead-free finishes, including OSP. Its large process window allows for good soldering of medium and large boards with a wide range of component sizes. Due to its outstanding organic properties, **ECOREL™ FREE 305-21** can withstand multiple reflow cycles and offers low voiding. The solder joint is very shiny without graping even on very small deposits.

**ECOREL™ FREE 305-21** is available with standard particle size and with type 4.

The radar chart below shows the excellent printing capabilities of **ECOREL™ FREE 305-21** which allow for high speed printing, excellent abandon time, and long, steady tackiness.

The fine particle size distribution of its type 4 powder enhances the printing quality for small apertures.

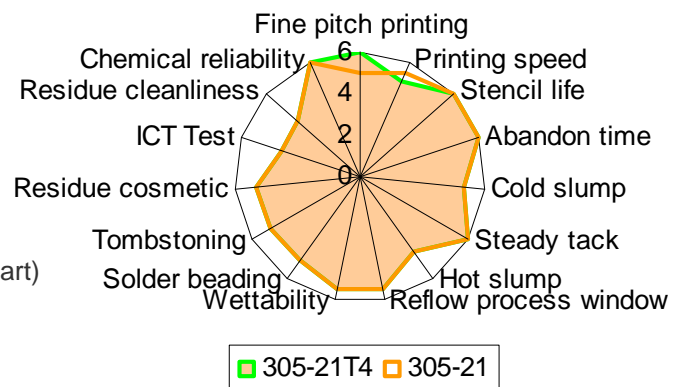
After soldering, the flux residue remaining on the PCB presents no corrosion risk and does not have to be removed by a cleaning operation. However, if cleaning is required, the residue can be cleaned with a wide range of cleaners as detergents and solvents.

## SPECIFICATIONS

Alloy (available with others Ag content)	SnAg3Cu0.5	
Powder size distribution (microns)	25 - 45	20 – 38 µm
Melting point (°C)	217	
Metal content (%)	88 ± 0,5	
Halogen content	No Halogen	
Viscosity* (Pa.s 20°C) *Brookfield RVT - TF at 5 rpm	700 - 900	750 – 950
Post reflow residues	approximately 5% by w/w	

## CHARACTERISTICS

Stencil life (Paste life time in a continuous printing process)	>12 hours
Abandon time (for 0.4 mm pitch, 120 microns stencil) (Maximum time between two prints with good print restart)	>4 hours
Steady tackiness	>16 hours



FUNCTIONAL TESTS	Results	Procedures
Flux Classification	RELO	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 TYPE

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

## 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 syringes, the shelf life is 6 months. For an optimal preservation, store cartridges in vertical position, tip downwards.

## PROCESS PARAMETERS

### Solder paste preparation

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

### Printing guideline

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

Squeegee length	Printing Speed	Pressure
250	50 mm/sec	5 Kg
250	100 mm/sec	7 Kg
250	150 mm/sec	9 Kg

For **ECOREL™ FREE 305-21 T4**, the printing pressure is slightly higher (around 0.5 to 1 kg according to the speed).

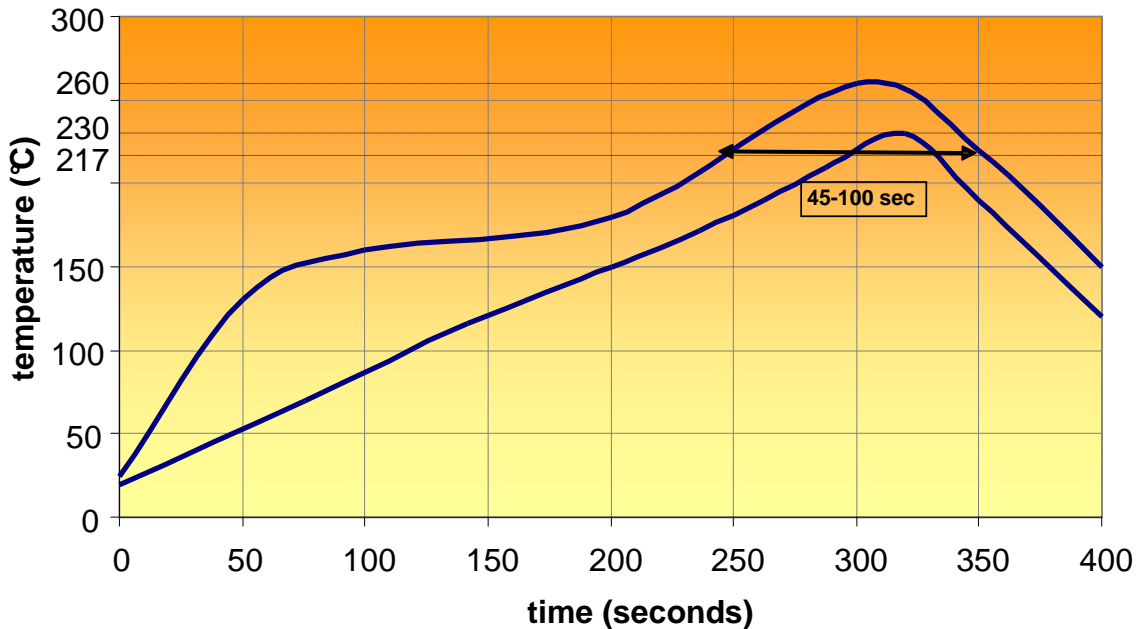
### Reflow guideline

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

<b>Preheating ramp rate with linear preheating</b>	0.7-1.2°C/s according the circuit board size and density
<b>Preheating steps in case of preheating soak zone</b>	- 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
<b>Peak ramp rate</b>	1.0-2.0 °C/s
<b>Peak temperature</b>	235-250°C (240-245°C is optimum) The paste can stand a temperature higher than 250°C , but it is not recommended in order to preserve component integrity.
<b>Time above liquidus</b>	45-100s (55-70s typical)
<b>Cooling ramp rate</b>	1.8-7°C/s (studies have demonstrated 1.8-2.2°C/s at lows homogeneous joint structure and reduce surface cracks formation)

### Examples of reflow profiles Ecorel™ FREE 305-21 / 305-21 T4

- With linear preheat
- With soak zone



## Cleaning

ECOREL™ FREE 305-21 residue after reflow can be easily removed with a wide range of cleaning solutions, such as detergents, hydrocarbonated solvents or fluorinated solvents, including the INVENTEC cleaning solutions.

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.  
Please refer to Material Safety Data Sheet before use.

**Although the conformity to ROHS 2002/95CE applies EQUIPMENT put on the market and not 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.*

FPW.SB 10210 001 – 2011/12/12