

# ECOREL™ FREE LT 140-18



## LOW TEMPERATURE/ LOW VOIDING HALOGEN FREE SOLDER PASTE

### FEATURES

**ECOREL™ FREE LT 140-18** is a No Clean solder paste combining the metallurgical properties and benefits of a low melting point alloy with high performance chemistry of the ECOREL™ range assuring that the assembled electronics can reach their best reliability.

- Low reflow temperature is recommended for thermal sensitive components such as LEDs, MEMS, CMOS, plastics and flexible circuits
- Excellent solder joint strength
- Lower energy consumption during reflow contributes to reduce CO2 emissions

Compared to low melting point alloy solder pastes like SnBi, **ECOREL™ FREE LT 140-18** exhibits better wetting and solder joint strength due to the presence of silver.

### SPECIFICATIONS

Alloy	Sn42Bi57.6Ag0.4
Melting point (°C)	139-140
Powder size distribution (microns)	25 - 45
Metal content (%)	89.5 – 90.5
Post reflow residues	approximately 7% by w/w
Halogen content	no halogen
Viscosity* (Pa.s 20°C) <small>* Brookfield RVT, TF at 5RPM</small>	600 - 750

### CHARACTERISTICS

Thanks to its outstanding organic properties, **ECOREL™ FREE LT 140-18** offers optimized printing quality from medium to high printing speed, excellent abandon time, and long steady tackiness.

- Excellent solder joint quality and interconnect reliability
- Superior Wettability - Reduced solderballing
- Low solder voids

Traction Resistance Alloy Comparison (MPa) – pull & shear test

Alloy	SnPb36Ag2	SAC305	SnBi	SnBiAg
Average	76	52	57	93

FUNCTIONAL TESTS	Results	Procedures
Flux Classification	ROLO 113	ANSI/J-STD-004 ISO 9454
Copper mirror	pass	ANSI/J-STD-004
Copper corrosion	pass	ANSI/J-STD-004
Surface Insulation Resistance Ohms	pass	ANSI/J-STD-004
After 21 days 85°C - 85 % HR - 50 Volts	> 10 <sup>8</sup>	

## PACKAGING TYPE

Jars 250g or 500g  
 Syringes 100g  
 Other packaging is available upon request.

## STORAGE & SHELF LIFE

To ensure the best product performance, the recommended storage temperature range is 5°C to 10°C. A shelf life of 9 months for jars and 6 months for syringes is achieved under these conditions. Before use, allow the paste to stabilize for 4 hours minimum at room temperature before opening.

## 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: 0.4 mm  
 Pressure depends on printing speed

Squeegee length	Printing Speed	Pressure
250	50	5
250	100	7
250	150	9

## Reflow guideline

Short to medium thermal reflow profiles (3 to 5 minutes) can be used according to the size of the board and density with excellent wetting performances.

Linear preheating ramp rate is recommended. Use of nitrogen enlarges the reflow process window and improves solderballing and wetting properties.

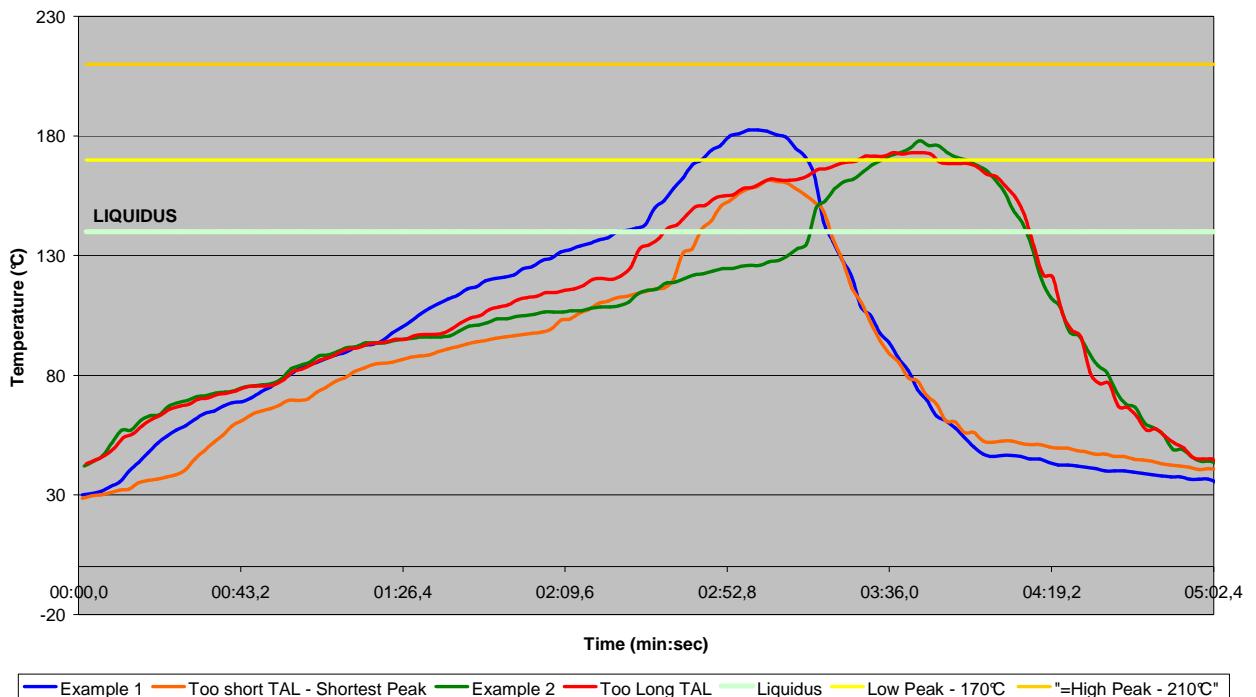
<b>Preheating ramp rate with linear preheating</b>	0.5 to 1°C/s according the circuit board size and density Around 120s (2min) to 240s (4 min) from the start to the liquidus
<b>Peak ramp rate</b>	0.5 to 2.0 °C/s
<b>Peak temperature</b>	170 to 210°C
<b>Time above liquidus</b>	35 to 90s
<b>Cooling ramp rate</b>	2 to 5°C/s

Some profile examples are given below.

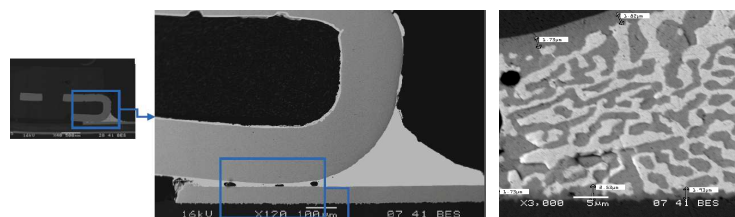
We recommend staying within the specification above mentioned:

- the red curve illustrate a too long TAL
- the orange curve illustrate the lowest limit in terms of TAL and a too low peak temperature
- the blue and the green curves (example 1 and example 2) are within the specification

Examples of Thermal Profiles



## Examples of solder joints with Ecorel™ FREE LT 140-18 on LED



Low solder voids. SEM analysis.  
Uniform and constant IMC to both surfaces (PCB pad and LED)

## CLEANING

After soldering, the flux residue remaining of **ECOREL™ FREE LT 140-18** does not have to be removed by a cleaning operation. However, if cleaning is required, the residue left after reflow can be easily removed if needed with a large range of cleaning solutions, such as detergents, hydro-carbonated solvents or halogenated solvents, all included in the INVENTEC cleaning range. This is also a best practice for a robust adhesion if conformal coating is to be applied on the board. In the table below is a quick reference about INVENTEC PCBA defluxing solutions.

PROCESS Type	INVENTEC PCBA Defluxing solutions
Manual	Topklean™ EL10F/ Topklean™ EL60/ Quicksolv™ DEF90 EL
Aqueous System (Immersion or spray)	Promoclean™ DISPER 605 and DISPER 607
Novec™ HFE + Co-solvent	Topklean™ EL 20A and EL 20R
Under Vacuum System	Topklean™ EL 20D
Azeotropic Solvent	Promosolv™ 70ES

## HSE

No issues when used as recommended.  
INVENTEC Material Safety Data sheets can be found at [www.quickfds.com](http://www.quickfds.com)

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.*

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