

ECOREL™ FREE 300-31A

INVENTEC
PERFORMANCE CHEMICALS



FOR SOLDERING ON DBC

用于DBC焊接

HALOGEN FREE SOLDER PASTE

无卤锡膏

BENEFITS 产品特点

ECOREL™ FREE 300-31A are no clean halogen-free lead-free solder paste developed with the reliable chemistry of the ECOREL™ range.

ECOREL™ FREE 300-31A是一款使用ECOREL™系列可靠化学成分开发的无需清洗的无卤无铅焊膏。

- Applicable for vacuum soldering in conduction or vapour phase oven
适用于传导或气相炉中的真空焊接
- Designed to minimize copper oxidation
专为解决铜氧化而设计
- Good wettability on Cu with low void level
针对铜焊接具有良好的润湿性，低空洞率

SPECIFICATIONS 技术说明

| Name 名称 | ECOREL™ FREE 300-31A |
|---|------------------------------------|
| Alloy 合金 | Sn96.5Ag3.5 |
| Particle size (microns) / Type 粒径分布 (微米) / 型号 | 25-45 / Type 3 |
| Melting point (°C) 熔点 | 221 |
| Metal content (%) 金属含量 | 89 +/- 0.5 |
| Halogen content 卤素含量 | No halogen 无卤 |
| Viscosity* (Pa.s 20°C) 粘度 *Brookfield RVT – TF at 5 rpm 转子, 转速 5 rpm | 800 – 1000 |
| Post reflow residues 回流后的残留物 | Approximately 5% by w/w 大约5% (重量比) |

* Viscosity range may be subjected to slight adjustments 粘度范围可稍作调整

CHARACTERISTICS 特性

- Capable of medium to high speed printing, excellent abandon time, long, steady tackiness
适合中至高速印刷，停滞时间长，粘性稳定
- Low voiding level when applying vacuum 空洞率低
- If cleaning is required, residue easily removed with a large range of cleaning solutions
易清洗，残留物适用于多种清洗剂轻松清除

| Standards tests 功能测试 | Results 结果 | Procedures 测试方法 |
|---------------------------------------|------------|---------------------------------|
| Flux Classification 助焊剂级别 | ROLO | ANSI/J-STD-004 |
| | 113 | ISO 9454 |
| Solder balling test 锡球测试 | Pass 通过 | ANSI/J-STD-005 |
| Chromate paper 络酸盐试纸 | Pass 通过 | ANSI/J-STD-004 |
| Copper corrosion 铜腐蚀 | Pass 通过 | ANSI/J-STD-004 |
| SIR (IPC) 表面绝缘抗阻 | Pass 通过 | ANSI/J-STD-004 |
| SIR (Bellcore) 表面绝缘抗阻 | Pass 通过 | Bellcore |
| Electromigration (IPC / Bellcore) 电迁移 | Pass 通过 | ANSI/J-STD-004 /Bellcore |

PROCESS PARAMETERS 流程工艺

Store at room temperature for at least four hours prior to use. 使用前至少需要室温储存4小时。

Solder paste preparation 锡膏准备

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.

印刷之前，建议用刮刀手动搅拌或在钢网上印刷几次，以充分混合锡膏。

Printing guideline 印刷指南

Apply the solder paste to the stencil to form a roll of 1 to 2cm in diameter all along the squeegee or around 100g per 10cm of squeegee length. This way, the solder paste will roll easily under the squeegees to offer excellent printing quality

沿刮刀长度方向加一条长锡膏，直径控制在1-2cm，或每10cm刮板长度约100g。这样有利于锡膏在钢网上滚动，确保印刷质量。

Printing speed印刷速度: 20 to 150 mm/s (1 to 6 in/s) 20-150 mm/s (1-6 in/s)

Minimum pitch最小间距: 0.3 mm

Pressure刮刀压力: depends on printing speed and printing equipment 根据印刷速度和设备而定

| Squeegee length 刮刀长度 (mm) | Printing Speed 印刷速度 (mm/s) | Pressure 刮刀压力 (kg) |
|---------------------------|----------------------------|--------------------|
| 250 | 50 mm/s | 2.5 kg |
| | 100 mm/s | 5 kg |
| | 150 mm/s | 6 kg |

Typical speed / pressure set up 速度/压力设定:

- Stencil life in continuous printing process连续印刷工序后丝网寿命: > 12 hrs
- Abandon time between prints 印刷中的停滞时间 > 4 hrs
- Steady tackiness 黏度 > 16 hrs

Reflow guideline 回流指南

In case of convection, nitrogen is recommended to allow good wettability.

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

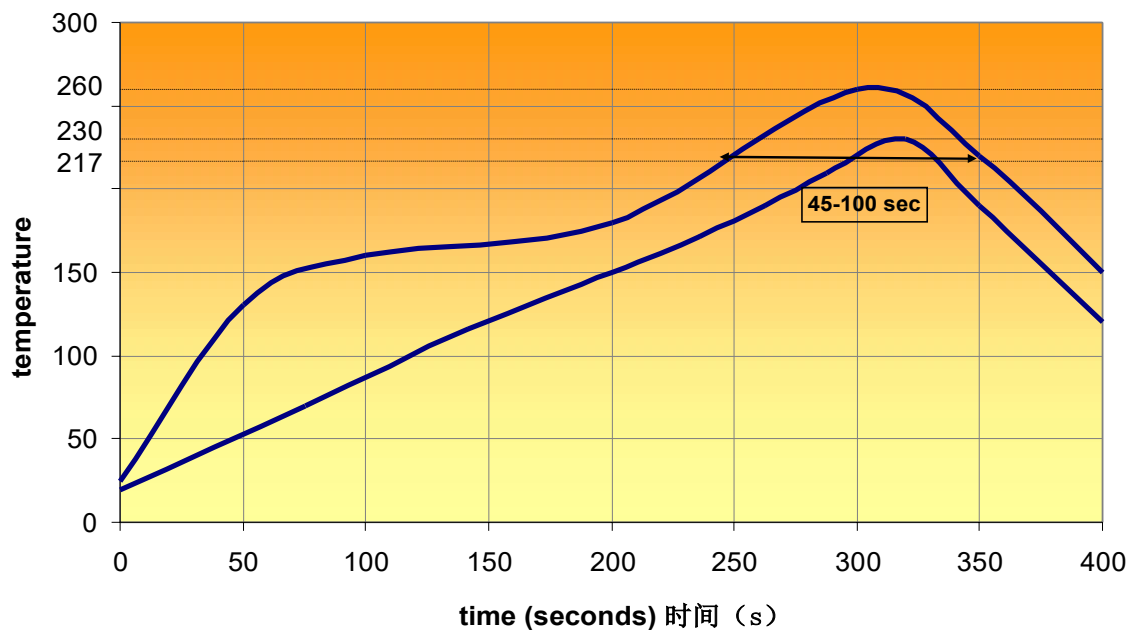
在对流情况下，建议使用氮气以保持良好的润湿性。

推荐使用线性升温曲线，对于高密度板可以使用浸润型曲线以确保在到达回流峰值温度前每一部分的温度达到均一。

| | |
|---|--|
| Preheating ramp rate with linear preheating 预热升温速率（线性升温曲线） | 0.7 to 1.2°C/s according to the circuit board size and density 0.7-1.2°C/s, 根据实际板子大小和密度而定 |
| Preheating steps in case of preheating soak zone 预热升温步骤（浸润型曲线） | - From 20 to 150°C: ramp rate 1 to 2°C/s 20-150°C: 升温速率1-2°C/s - soak zone between 150 to 180°C for 140s maximum (typically 45-90s) 浸润温区 150-180°C, 140s最大值（通常45-90s） - from 170°C to liquidus 1 to 2°C/s 170°C液相线温度: 1-2°C/s |
| Peak ramp rate 峰值升温速率 | 1 to 2°C/s 1-2°C/s |
| Peak temperature 峰值温度 | 235 to 250°C (240 to 245°C is optimum) 235-250°C (240-245°C最佳) The paste can stand a temperature higher than 250°C, but it is not recommended in order to preserve component integrity 锡膏本身可以承受超过250°C的峰值温度, 但是有可能对元器件有损伤 |
| Time above liquidus 超过液相线温度时间 | 45 to 100s (55 to 70s typical) 45-100s (通常55-70s) |
| Cooling ramp rate 冷却速率 | 1.8 to 7°C/s (studies have demonstrated 1.8 to 2.2°C/s allows homogeneous joint structure and reduces surface crack formations) (研究证明1.8-2.2°C的降温速率可形成均一的焊点结构并减少焊点表面裂纹的产生) |

Example of reflow profiles for Ecorel™ FREE 300-31A (convection)
ECOREL™ FREE 300-31A回流曲线（对流）

- With linear preheating 预热曲线
- With soak zone 浸润曲线



Soldering may be achieved using shorter profiles with lower peak temperature and shorter time above liquidus in vapor phase ovens.

在气相炉中，使用较短的型材，较低的峰值温度和较短的液相线以上时间可以实现焊接。

In case of vacuum soldering, thermal profiles have to be adjusted in accordance with the process and the desired voiding level.

在真空焊接的情况下，必须根据工艺和所需的空洞水平来调整热曲线。

Cleaning 清洗

After soldering, the remaining flux residue does not have to be removed by a cleaning operation as it is chemically inert.

焊接后，残留的助焊剂残留物无需清洗，因为它是化学惰性的。

When cleaning is required (e.g. high reliability assembly, improved conformal coating adhesion), the residue left after reflow can be easily removed with a large range of cleaning solutions, such as detergents, hydro-carbonated solvents or halogenated solvents, including the INVENTEC cleaning range solutions.

当需要清洗时（例如，高可靠性的装配，改良的三防漆粘附），可以使用各种清洗方案轻松地去除回流后的残留物，例如清洗剂，碳酸氢盐溶剂或卤化溶剂，包括INVENTEC清洗解决方案。

In the table below is a quick reference for INVENTEC PCBA defluxing solutions.

下表是INVENTEC PCBA除助焊剂解决方案的快速参考。

| PROCESS Type 工艺类型 | INVENTEC PCBA Defluxing solutions INVENTEC PCBA 除助焊剂方案 |
|---|--|
| Manual 手洗 | Topklean™ EL10F/ Topklean™ EL60/ Quicksolv™ DEF90 EL |
| Aqueous system (Immersion or spray) 水洗流程（浸泡或喷淋） | Promoclean™ DISPER 605 and DISPER 607 Promoclean™ DISPER 605 和 DISPER 607 |
| Co-solvent system 双溶剂 | Topklean™ EL 20 series 系列 |
| Under vacuum system 真空清洗 | Topklean™ EL 20D |
| Mono-solvent (Azeotropic) 共沸清洗 | Promosolv™ 70ES |

PACKAGING, STORAGE & SHELF LIFE 包装和保存期限

To ensure the best product performance, the recommended storage temperature range is from 0°C to 10°C. For an optimal preservation, store cartridges and syringes in a vertical position, tip downwards.

为了确保最佳的产品性能，建议的存储温度范围是0° C至10° C。为了获得最佳的保存效果，请将罐装和针筒装垂直存放，并朝下倾斜。

| | | |
|------------------|---------------|-----------|
| Jars 罐装 | 250g or 500g | 12 months |
| Cartridge 针筒装 | 600g or 1200g | 9 months |

HSE

No issues when used as recommended. 根据说明规范使用，则不会出现其他问题。

Please refer to the Material Safety Data Sheet prior to use. 使用前，请先参阅本产品的化学品安全技术说明书
INVENTEC Material Safety Data Sheets can be found at www.quickfds.com

可通过www.quickfds.com查找INVENTEC MSDS

Although the conformity to ROHS 2015/863/UE applies to EQUIPMENT put on the market and not a component in particular, we warranty that this product does not contains in quantities exceeding less than 0.1% of Hg, Pb, Cr VI, PBB, PBDE, DEHP, BBP, DBP, DIBP and less than 0.01% of Cd, in accordance with the decision of The European Commission, fixing the maximal concentration values. 虽然 ROHS 2002/95CE 指令仅针对电器和设备，而非单个部件，但我们承诺该产品符合欧盟于2005年8月18日决定的最高允许值，即该产品的汞，铅，六价铬，多溴联苯和多溴联苯醚的含量低于0.1%，镉的含量低于0.01%。

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