

无铅低温焊锡膏

Lead-free Low melting point solder paste

EcoLM-C15

技术资料 Technical Data Sheet

1. 简介 Description

- EcoLM-C15 是一种无铅低温锡膏，使用公司的新型低温合金 LM2，针对高温敏感的元素、基材和芯片的热变形问题，如电脑主板、通讯设备主板的焊接。

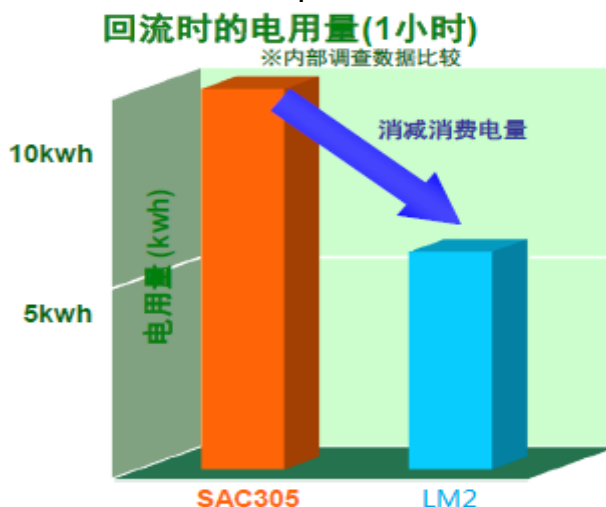
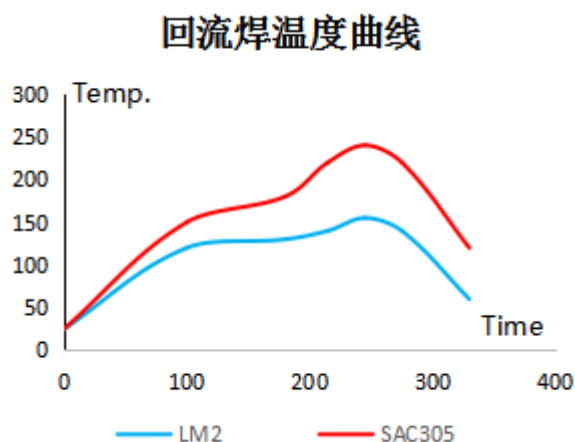
EcoLM-C15 is a Lead-free Low melting point solder paste, use the Low melting point alloy LM2. It is aimed at thermal deformation of high temperature sensitive components, substrates and chips, such as the welding of computer board and communication equipment board.

- 与常用 SAC305 合金成份的焊点相比，焊点力学性能及电性能相当，但是熔点低约 80℃。Compared with the SAC305 solder paste, it is closed to the mechanical and electrical properties of the solder joints of SAC305, but the melting point is Lower than about 80℃.
- 与常规的 Sn-Bi 低温合金相比，焊点可靠性大大提升。Compared with the Sn-Bi solder paste, the reliability of solder joint is greatly improved.

2. 产品特性 Product Features

A) LM2 合金锡膏与 SAC305 锡膏以及常规的 Sn-Bi 低温锡膏对比：

- 1) 与 SAC305 合金焊料相比，熔点低约 80℃，可实现回流曲线的低温化，大幅度降低用电量，有效降低生产组装的成本。同时在环保面对改善温室效应也有一定的效果。Compared with SAC305 alloy, the melting point is lower than about 80℃, which can reduce the temperature of reflux soldering curve, greatly reduce the power consumption and the cost. At the same time, it has certain effect on improving greenhouse effect in the environmental protection.

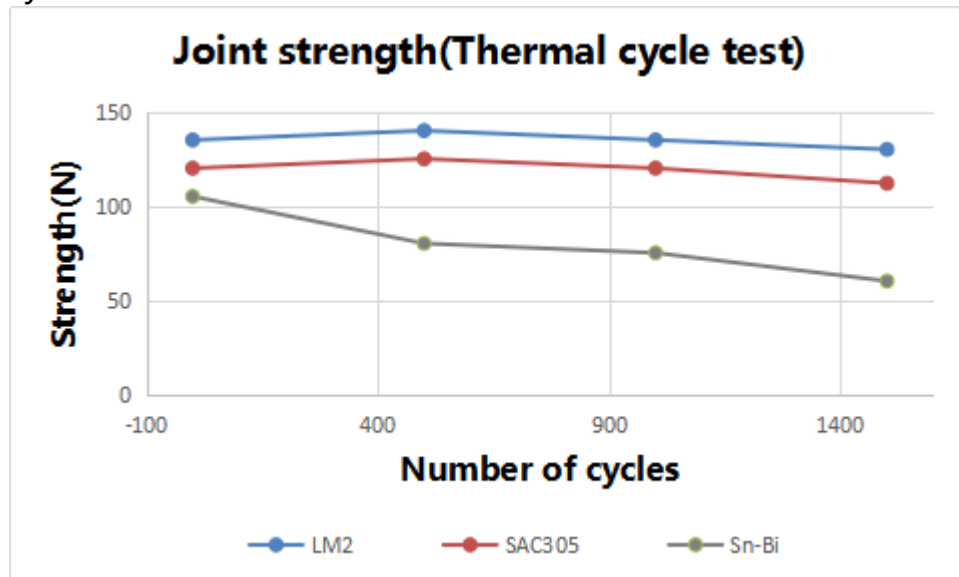


- 2) 熔融时，表面张力比 SAC305 合金低，有良好的润湿扩展性，可以减少露铜等不良。When melting, the surface tension of LM2 is lower than that of SAC305,

which has great wettability and expansibility and can reduce the copper exposure.

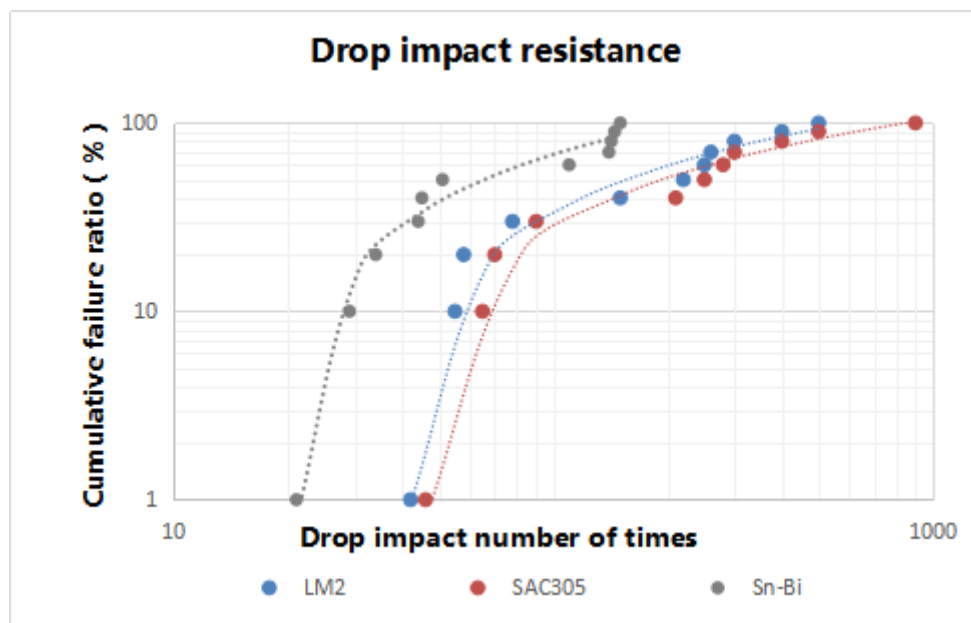
- 3) LM2 合金锡膏焊点热循环强度强于 SAC305 合金锡膏和 Sn-Bi 合金锡膏。

The thermal cycling joint strength of LM2 is stronger than SAC305 and Sn-Bi alloy.

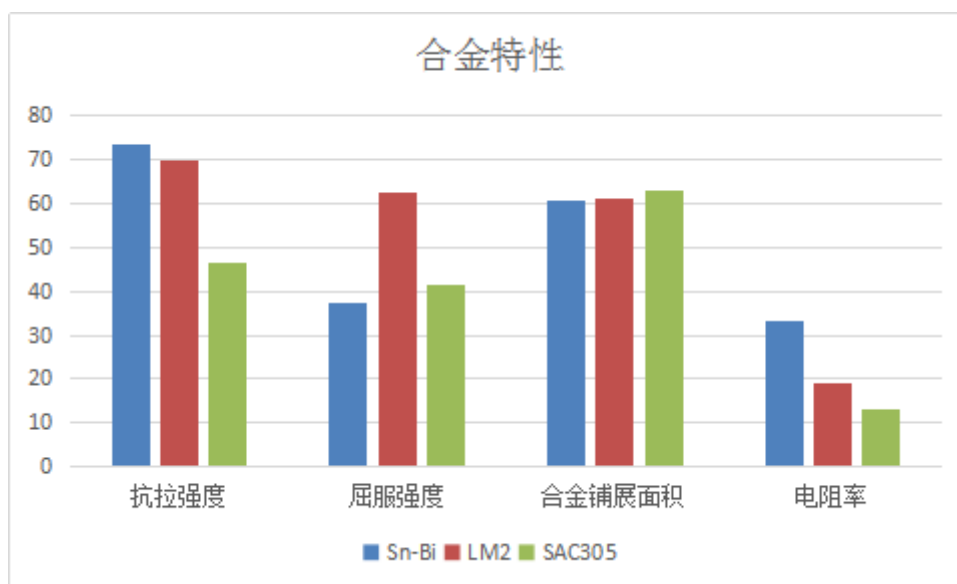


- 4) LM2 合金锡膏焊点抗跌落冲击性能接近与 SAC305 合金锡膏 ,强于 Sn-Bi 合金锡膏。

The drop impact resistance of LM2 alloy is close to SAC305 alloy, But stronger than Sn-Bi alloy.



- 5) 合金特性 Alloy properties



- LM2 合金的锡膏焊点抗拉强度大于 SAC305 合金锡膏。
The tensile strength of solder joints of LM2 is stronger than SAC305 alloy.
- LM2 合金的锡膏焊点屈服强度大于 SAC305 合金锡膏。
The Yield strength of solder joints of LM2 is stronger than SAC305 alloy.
- LM2 合金的锡膏润湿铺展面积与 SAC305 合金锡膏相当。
The wetted spread area of LM2 is close to SAC305 alloy.
- LM2 合金的锡膏焊点导电性能接近与 SAC305 合金锡膏，远大于 Sn-Bi 合金锡膏。
The electric conductivity of LM2 is close to SAC305but greater than Sn-Bi.

B) 满足环保相关法规要求 Meet the requirements of environmental protection related laws and regulations :

标准/法规 Standard or statute	要求 Requirement	测试方法 Test method	状态 State
JEITA ET-7304 无卤素焊接材料的定义 Definition of Halogen-free Welding Materials	焊接材料 (固态) 中氯、溴、氟含量低于1000ppm The content of Chlorine, Bromine and Fluorine in welding material (solid) is less than 1000 ppm	EN 14582	PASS
RoHS Directive 2011/65/EU	符合RoHS测试结果要求 The test results meet the RoHS directive requirement	IEC 62321	PASS

欧 盟 第 1907/2006 号 REACH法规 Regulation (EC) No 1907/2006 concerning the reach	SVHC清单物质测试结果不超过 限值 The test results of SVHC list material are not exceed the limit	IEC-OES、 UV-VIS、 GC-MS、 HPLC-DAD/MS	PASS
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3. 应用 Application

钢网模板设计 Stencil Design:

- 电铸和激光切割、电解抛光试样钢网具有最佳的印刷特性。丝印钢网的开口设计是优化印刷工艺的关键，我们一般建议进行如下的设计：

Electroformed and laser cut electropolished stencils produce the best printing characteristics among stencil types. Stencil aperture design is a crucial step in optimizing the print process. The following are a few general recommendations :

- 分立元件：钢网开口面积减少10%到20%，这样可以很大程度上降低或消除元件间锡珠的出现，可采用常见的“屋顶形状”的开口设计来达到减少落锡面积。

Discrete components: A 10-20% reduction in stencil aperture area may significantly reduce or eliminate the occurrence of mid-chip solder beads. The “home plate” design is a common method for achieving this reduction.

- 密脚距元件：对于20mil (0.5mm) 或更密的脚距元件，建议减少开口面积，这样有助于减少导致短路的锡珠和桥接现象。开口面积的减少量由具体的制程工艺来确定（一般为5%到15%）。

Fine pitch components: A surface area reduction is recommended for apertures of 20 mil pitch and finer. This reduction will help minimize solder balling and bridging that can lead to electrical shorts. The amount of reduction necessary is process dependent (5-15% is common).

- 建议采用最低1.5的宽深比，以便有足够的锡膏量从钢网的开口中释放出来。宽深比是指钢网开口的宽度与钢网厚度之比。

A minimum aspect ratio of 1.5 is suggested for adequate release of solder paste from stencil apertures. The aspect ratio is defined as the width of the aperture divided by the thickness of the stencil.

印刷参数设置 Printer Operation

- 滚动直径 Solder Paste Bead Size : 20~25mm
- 印刷速度 Print Speed : 25~100mm/sec
- 刮刀压力 Squeegee Pressure : 0.020~0.027kg/mm 刃长

- 擦纸频率：可达每印10~25片擦拭一次
Underside Stencil Wipe : It can be wiped every 10-25 prints
- 模版寿命：大于8小时在30~60%RH和22~28°C条件下
Solder Paste Stencil Life:>8 hrs. @ 30-60% R.H. &22-28°C

4. 安全和清洗 Safety and Cleaning

- EcoLM-C15无毒性，但在回流焊过程中会产生一些反应性或化合物分解导致的气体。因此建议工作区域内应有良好的通风条件。
EcoLM-C15 has no toxicity, however, some reactivity or gases resulting from decomposition of compounds are produced during reflow welding. Therefore, It' s suggested that there are good atmospheric conditions in the work area.
- EcoLM-C15专为免洗应用设计。如果需要清洗，一般的清洗剂就可以完全清除助焊剂残留。
EcoLM-C15 is designed for no-clean applications, however the flux can be removed if necessary by using a commercially available flux residue remover.
- 丝印模板清洗：推荐使用自动化模板清洗系统，用于模板和印刷失败清洗，以防出现锡珠。大多数模板清洗剂都很有效，例如异丙醇（IPA）。
Stencil Cleaning: This is best performed using isopropyl alcohol (IPA) as a solvent. Most commercially available stencil cleaners work well.

5. 贮存 Storage

- EcoLM-C15在0~10°C条件下可保存6个月。注意不要对锡膏进行冷冻处理。
EcoLM-C15 has a refrigerated shelf life of 6 months at 0 to 10°C. Do not freeze this product.
- 锡膏打开包装使用前需进行充分回温到室温（推荐4个小时）。
Allow the solder paste to warm completely and naturally to ambient temperature (4 hours is recommended) prior to breaking the seal for use.
- 长时间冷藏储存后可能会引起锡膏内组分的分离，使用前应对锡膏进行充分搅拌，手工搅拌2~4分钟，机器搅拌1~2分钟。
Refrigeration may result in the separated materials of solder paste. Thoroughly mix the product for 2 to 4 minutes for manual mixing and 1 to 2 minutes for machine mixing before application.
- 不要将用剩的锡膏与新的锡膏混合在同一包装瓶内。锡膏不需使用时应重新进行密封，当瓶盖不能很好地进行密封保存时请更换瓶盖内衬以保证尽可能的密封。

Do not mix new and used paste in the same container. Re-seal any opened containers while not in use. As the cap of the 500 gram jars is not a seal, replace the internal plug in conjunction with the cap to ensure the best possible seal.

6. 性能规格 Performance and Standard

6.1 化学特性 Chemical Characteristic

测试项目 Test item	结果 Result	参照标准/备注 Standard reference/Notes
助焊膏类型/活性 Flux type/Activity	ROLO	IPC J-STD-004B
铜镜试验 Bronze mirror test	L0	IPC J-STD-004B
铜板腐蚀试验 Bronze board erode test	L0	IPC J-STD-004B

6.2 电性能 Electrical capability

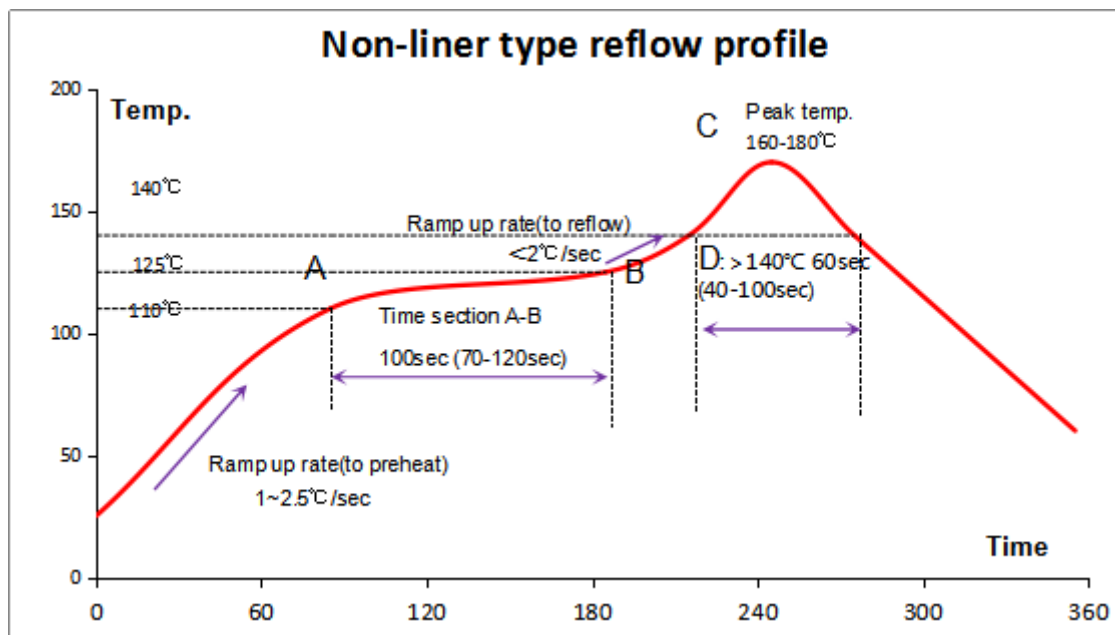
测试项目 Test item	结果 Result	参照标准/备注 Standard reference/Notes
表面绝缘电阻 SIR (IPC, 7days @85°C/85%RH)	$> 1.0 \times 10^8 \Omega$	IPC J-STD-004B
表面绝缘电阻SIR+ 盖玻片 (IPC, 7days @40°C /90%RH)	$> 1.0 \times 10^8 \Omega$	IPC J-STD-004B
电迁移Electromigration (Bellcore, @65°C /85%RH 10v 500hours)	$IR_{final} > IR_{initial} / 10$	IPC J-STD-004B

6.3 物理性能 Physics capability

测试项目 Test item	结果 Result	参照标准/备注 Standard reference/Notes
颜色 colour	清澈助焊剂残余 Limpidity flux residue	-

粘着力 @湿度 Adhesive force@Humidity (time = 8 hours)	PASS, @25°C/75%RH, 变化 <1g/mm ² change<1g/mm ²	IPC J-STD-005A
	PASS, @25°C/50%RH, 变化<10% Variation<10%	JIS Z 3284
锡珠 Solder ball	Acceptable	IPC J-STD-005A
印刷时粘度保持时间 Holding time of viscosity	> 12 hours	@ 50%RH, 22°C
铺展率 Coverage	> 80%	JIS Z 3197
坍塌 Slump	PASS	IPC J-STD-005A

7. 推荐的回流曲线 Recommendation Reflow Profile



Point		Standard	Upper	Lower
A	Pre-heat start point	110°C	120°C	100°C
B	Pre-heat end point	125°C	130°C	120°C
A-B	Pre-heat time	100s	120s	70s
C	Peak temp.	170°C	180°C	160°C
D	Time above 180°C	60s	100s	40s

注：以上温度曲线为推荐工艺曲线，仅供参考，客户可根据本身的回流炉使用情况以及实际工艺需求做适当调整。

NOTE: The above temperature curve is considered to be a recommended technology one for reference. It can be adjusted due to actual technology demand.

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