

SHENZHEN FITECH CO., LTD.

Technical Data Sheet

Solder paste Sn89.5Sb10Ni0.5 series

FTP -905 系列 — FTP-9054、FTP-9055、 FTP-9056

技术部

Technical Department

Technical Data Sheet

锡膏 (Solder Paste) FTP -905 系

一、简介 Introduction

FTP -905 系列锡膏采用球形度好，粒度均匀，氧含量低的高温 SnSb10Ni0.5 焊粉及优良无卤助焊剂配制的优质锡膏，焊接固化过程中很少溶剂挥发，无飞溅，焊接后无锡珠产生，焊接性能好，残留物少，免清洗，为优良的高温焊接材料。

FTP-905 series solder paste is a high-quality printing solder paste prepared by SnSb10Ni0.5 high temperature solder powder with good sphericity, uniform particle size, low oxygen content and excellent halogen-free flux. It has good adhesion before soldering, less solvent evaporation during soldering, after soldering. No solder ball, has good wetting effect, less residue, low void. It is an ideal soldering material for high temperature packaging.

二、产品特性及优势: Features and Advantages

1. 实现冶金连接，导热、导电性能强于导电银浆。

Thermal and electrical conductivity is better than silver paste.

2. 化学活性好，焊接性能好，无锡珠，空洞率低。

Good chemical activity, no solder ball, good wetting, low void.

3. 操作简单，可选择回焊炉、电热板、烘箱等。

Simple operation, able to choose from reflow oven, heating plate, oven.

4. 触变性好，粘度合适，稳定性好，不分层，工作寿命长。

Good thixotropy, suitable viscosity, good stability, no delamination, long working life.

5. 熔点 248-265℃，满足二次回流封装要求（二次回流峰值温度低于 245℃）。

Melting point 248-265℃, meet the requirements of secondary reflow packaging (secondary reflow peak temperature is lower than 245℃)

三、技术特性: Technical feature

1. 未固化时特性: Before reflow

产品性能 Feature	指标 Result	备注 Note
外观 Appearance	浅灰色 Light gray	膏状 Paste
金属填料类型 Alloy	Sn89.5Sb10Ni0.5	
金属填料粒径 Powder size	FTP-9054 T4 20-38μm FTP-9055 T5 15-25μm	类型 Description

	FTP-9056 T6 5-15μm	
金属填料熔点 Alloy melting point	248~265℃	DSC
金属填料比例 Powder content	87±2%	可进行调整 Adjustable
比重 Solder density	3.8 ~ 4.2	
粘度 Viscosity	150±30Pa.s	可按客户要求进行调整 Malcolm (10rpm)
触变指数 Ti	0.6±0.2	Lg(3rpm/30rpm)
卤素含量 Halogen Cl+Br	< 1000ppm	
保质期 Shelf life	6 month@ 0-10℃	Sealed storage

2. 固化后特性: After curing

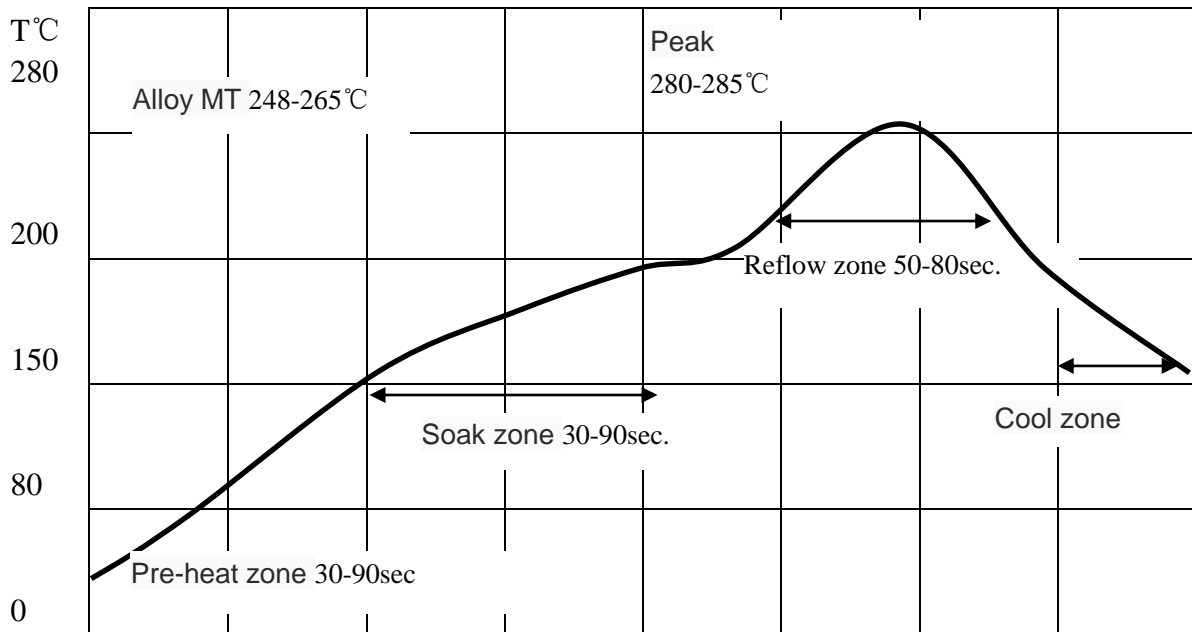
性能 Feature	指标 Result	备注 Note
导热系数 Thermal conductivity	42J/M.S.K	参考值
导电率 Electrical conductivity	12% of IACS	参考值
抗拉强度 Tensile strength	44Mpa	参考值
铜板腐蚀性 Copper corrosion test	合格 Pass	
残留物干燥度 Dryness test	合格 Pass	
锡球测试 Solder ball test	合格 Pass	
润湿测试 Wetting test	合格 Pass	

四、焊接工艺: Soldering & curing process

热风回流焊工艺 Reflow oven : Heat cure according to the reflow curve as shown below.

以下是我们建议的氮气保护的热风回流焊工艺采用的温度曲线，可以用作回流焊炉温度设定之参考。该温度曲线可有效减少锡膏的垂流性以及锡球的发生，对绝大多数的产品和工艺条件均适用。不同炉型、不同元器件对炉温将会有所改变。

The below graph shows our recommended hot nitrogen reflow soldering process temperature curve. It can be used as a reflow furnace temperature setting. The temperature curve can effectively reduce the vertical flow of the solder paste and the forming of solder balls. For the vast majority of products and process conditions this is suitable. Furnace temperature would vary for different type and different components.



1. 预热区（加热通道的 25~33%）：在预热区，焊膏内的部分挥发性溶剂被蒸发，并降低对芯片之热冲击：要求：升温速率为 1.0~3.0°C/秒；若升温速度太快，则可能会引起锡膏的流移性及成份恶化，造成锡球及桥连等现象，同时会使芯片承受过大的热应力而受损。

Pre-heat zone (25% to 33% of the heat channel) : In the pre-heat zone part of the volatile solvent in the solder paste evaporates, reducing the thermal shock to the chip: Requirements: heating rate is 1.0 ~ 3.0 °C / s. If temperature goes up too fast, it may cause the flow moves and composition of the solder paste deterioration. Solder ball and bridging would occur. At the same time chips would receive damage under excessive thermal stress.

2. 浸濡区（加热通道的 33~50%）：在该区助焊剂开始活跃，化学清洗行动开始，并使支架在到达回焊区前各部温度均匀。要求：温度：150~200°C 时间：30~90 秒 升温速度：< 2°C/秒。

Soak zone (33% to 50% of the heating channel) : Flux became active in this region. Chemical cleaning action begins and make every bracket having uniform temperature before arriving back to reflow zone. Requirements: temperature: 150 ~200 °C time: 30 ~90seconds heat rising rate: < 2 °C / s.

3. 回焊区：锡膏中的金属颗粒熔化，在液态表面张力作用下形成焊点表面。要求：最高温度：280~285°C 时间：260°C以上 20~50 秒(Important)，高于 275°C 时间为 10-30 秒。若峰值温度过高或回焊时间过长，可能会导致焊点变暗、助焊剂残留物碳化变色、支架及芯片受损等。若温度太低或回焊时间太短，则可能会使焊料的润湿性变差而不能形成高品质的焊点，具有较大的热容量的芯片的焊点甚至会形成虚焊。

Reflow zone: metal particles in the solder paste melts. Solder joint surface is formed under liquid surface

tension: Requirement: The peak temperature: 280 ~ 285 °C, above 260 °C for 20 ~ 50 seconds (Important), higher than 275 °C for 10 to 30 seconds. If the peak temperature too high or reflow time is too long, can lead to solder dimming, flux residues carbonization and discoloration or bracket and chip damage. If temperature is too low or reflow time is too short, you might lower the wettability of solder and cannot form a high quality of solder joint. Chips with solder joints having large heat capacity can even results for pseudo soldering.

4. 冷却区：离开回焊区后，基板进入冷却区，控制焊点的冷却速度也十分重要，焊点强度会随冷却速率增加而增加。要求：降温速率 $<4^{\circ}\text{C}$ ，冷却终止温度最好不高于 75°C ；若冷却速率太快，则可能会因承受过大的热应力而造成芯片受损，焊点有裂纹等不良现象。若冷却速率太慢，由可能会形成较大的晶粒结构，使焊点强度变差或芯片移位。

Requirements: cooling rate $< 4^{\circ}\text{C}$, the end temperature for cooling should be higher than 75°C ; If the cooling rate is too fast, chips may be damaged by excessive thermal stress. Other bad phenomenons such as solder joint crack would also occur. If the cooling rate is too slow, large grain structure may form. This would worsen the strength of solder joint or leading to chip displacement.

5. 备注 Note :

- ★ 上述温度曲线是指焊点处的实际温度，而非回焊炉的设定加热温度（不同）

The above temperature curve refers to the actual temperature of the solder joint position rather than the welding furnace heating temperature during setting (different).

- ★ 上述回焊温度曲线仅供参考，可作为使用者寻找在不同制程应用之最佳曲线的基础。实际温度设定需结合产品性质、支架大小、芯片分布状况及特点、设备工艺条件等因素综合考虑，事前不妨多做试验，以确保曲线的最佳化。

The temperature curve are for reference only. It can be used as the user to find the basis of the optimal curve of different process application. Actual temperature setting should be combined with the product properties, stent size, chip distribution, characteristics, equipment and process condition factors. Sample tests should be done in advance to ensure the curve is optimized.

- ★ 本型号系列锡膏除可采用上述“升温-保温”型加热方式外，也可采用“逐步升温”型加热方式。

This series of solder paste can be used in addition to the above "heat - insulation" type heating mode. It can also be used in "warmed" type heating mode.

要求: Requirements:

- 焊峰值温度为高于熔点 $30\sim 50^{\circ}\text{C}$ ； The peak welding temperature is $30\sim 50^{\circ}\text{C}$ higher than the melting point;
- 升温速率 $<3^{\circ}\text{C}/\text{秒}$,各部受热均匀。 heating rate $<3^{\circ}\text{C}/\text{s}$, all parts are heated evenly.

五、包装储存 Package and storage

1. 包装 Package□

- 印刷型：500g/罐，宽口型塑胶（PE）瓶包装，并盖上内盖密封封装，送货时可用泡沫箱盛装。可按客户要求要求进行包装。

Printing: 500g/bottle, wide-mouth plastic (PE) bottle, sealed with inner lid and packaged in foam box.

2. 运输储存 Transport storage

- 运输条件：冰袋冷藏运输 Transport: Ice pack refrigerated transportation.
- 储存条件：收到后应尽快将其放进冰箱储存，建议储存温度为0~10℃。温度过高会相应缩短其使用寿命，影响其特性。

Storage: It should be stored in the refrigerator as soon as possible after receipt. The recommended storage temperature is 0~10 °C. If the temperature is too high, it will shorten its service life and affect its characteristics.

- 有效期限：在0~10℃正常密封储存条件下，有效期为6个月。

Shelf life: 6 months under normal sealed storage conditions of 0~10 °C.

- 工作时间：建议回温后24小时内使用完毕。

Work time: Used within 24 hours after returning to temperature.

- 印刷至回流时间：印刷锡膏2小时内完成过回焊炉。

Time from printing to reflow: the PCB shall be reflowed within 2hrs. after printing.

六、使用方法：Instructions

- 回温方式：不开盖的前提下，于室温中自然回温；回温次数不超过两次；
Recovery method: don't open the bottle cap until the solder is close to room temperature, No more than two times of temperature return;
- 回温时间：室温下回温2~4小时。达到热均衡所需要的实际时间因容器大小而异。
Recovery time : Generally, paste should be removed from refrigeration 2~4 hours before use. Actual time to reach thermal equilibrium will vary with container size.
- 注 意：未经充足“回温”，不要打开瓶盖，不可用加热的方式缩短“回温”时间；
Note: without enough "recovery", DO NOT open the bottle caps. DO NOT try to heat the paste to lower recovery time.
- 使用环境：锡膏最佳使用环境温度20~25℃，相对湿度40~60%RH。建议在氮气保护环境下进行回流焊。
Using environment: The best temperature for using the solder paste is 20 to 25 °C, relative humidity 40-60% RH. Suggestions reflow soldering under nitrogen protection.

七、健康与安全方面应注意事项 Health and safety considerations

注意！Note!

以下资料仅提供给使用者作参考，用户在使用前应了解清楚。详细内容请查阅本品物料安全数据表(MSDS)。

The following information is provided for users' reference only. Users should know clearly before using it. For details, please refer to the material safety data sheet (MSDS) of this product.

本制品不含受管制的特定化学物质，也不含有机溶剂中毒预防规则中所规制的有机溶剂，但仍需作必要的防范措施，以确保人体健康及安全。

This product does not contain specific chemical substances that are regulated, nor does it contain organic solvents that are regulated in the Organic Solvent Toxicity Prevention Regulations. However, necessary precautions must be taken to ensure human health and safety. For products containing lead, the operation should be carried out in accordance with the Labor Safety and Health Act and lead poisoning prevention rules.

1. 锡膏是一种化学产品，混合了多种化学成份，应切记避免近距离嗅闻其气味，更不可食用。

Solder paste is a chemical product that is mixed with a variety of chemical ingredients. should remember to avoid close smell of its smell, not to be edible.

2. 在焊接固化过程中，锡膏中的焊剂产生的部分烟雾会对人体的呼吸系统产生刺激，长时间或一再暴露在其废气中可能会产生不适，因此应确保作业现场通风良好，焊接设备必须安装充足的排气装置，将废气排走。

In the welding process, part of the smoke generated by the flux in the solder paste will stimulate the respiratory system of the human body, which may cause discomfort if exposed to the exhaust gas for a long time or repeatedly. Therefore, it is necessary to ensure good ventilation in the operation site.

3. 应有必要的防范措施避免锡膏接触皮肤和眼睛。若不慎接触到皮肤，则应立即用肥皂和清水彻底清洗干净。若不慎让锡胶接触眼睛，则需立即用清水冲洗 10 分钟以上，并尽快送医院医治。

Necessary precautions should be taken to prevent the paste from touching the skin and eyes. In case of contact with the skin inadvertently, the place should be immediately cleaned with soap and water. If the tin paste contact the eyes carelessly, it shall be immediately washed with water for more than 10 minutes and sent to the hospital as soon as possible.

4. 作业过程中不允许饮食、抽烟，作业后须先用肥皂或温水洗手后才能进食。

No eating or smoking is allowed in the course of homework. After homework, you must wash your hands with soap or warm water before eating.

5. 虽然本品之溶剂系统闪点较高，但仍然易燃，应避免接近火源。若不慎着火，可用二氧化碳或化学干粉、泡沫灭火器进行灭火，不可用水灭火。

Although the solvent system of this product has a very high flash point, it is still flammable and should be avoided. If you accidentally catch fire, use carbon dioxide or chemical dry powder fire extinguisher to extinguish the fire. Do not use water to extinguish the fire.

6. 废弃的锡膏和清理后沾有锡胶污渍的清洁布不能随意掉弃，应将其装入封密容器中，并按国家和地方的相关法规处置。

The waste solder paste and the cleaning cloth with solder adhesive stains after cleaning shall not be discarded at will. It shall be put into a sealed container and disposed of in accordance with relevant national and local regulations.