SHENZHEN FITECH CO., LTD.

# 低温锡膏系列—规格书

## Low temperature solder paste series

FTP/FTD-574 系列 — FTP-574A、FTP-574B、FTP-574C
FTD-574A、FTD-574B、FTD-574C、FTD-574D

技术部

**Technical Department**

# Technical Data Sheet

# 锡膏（Solder Paste）FTP/FTD-574 系

## 一、 简介 Introduction

FTP-574 系列低温锡膏采用球形度好，粒度均匀，氧含量低的福英达 SnBiAg 合金超微焊粉及优良无卤助焊剂配制的优质锡膏，焊接过程中很少溶剂挥发，焊接后无锡珠产生残留少，为低温焊接的理想材料，非常适用于低温度元器件的贴片，其润湿性好，焊点光亮饱满。

FTP-574 series low-temperature solder paste is a high-quality solder paste prepared by Fitech SnBiAg alloy ultrafine solder powder with good sphericity, uniform particle size, low oxygen content and excellent halogen free flux. After soldering, no solder ball, less residual residue,it is an ideal materials forlow-temperature soldering. They are very suitable for low-temperature components package, and have good solder ability and bright solder joints.

## 二、 产品特性及优势：Features and Advantages

1. 焊点润湿性好，无锡珠，爬锡性能好。
   Good solderability , No solder ball.

2. 触变性好，粘度合适，调配不同的粘度可采用印刷、喷印、针转移、点胶等方式。
   Good thixotropy, Appropriate viscosity, can be used to spray print, transfer, point glue needle, printing, etc.

3. 采用低温超微焊粉，适合窄间距、微凸点的封装。
   Adopt low temperature ultrafine solder powder, suitable for the package of narrow pitch and micro bumps.

4. 具有极佳的焊接性能，可在不同部位表现出适当的润湿性。
   It has excellent welding performance and can exhibit proper wettability in different parts.

5. 无卤素，环境友好。
   Halogen free, environmentally friendly.

## 三、 技术特性：Technical feature

1. 未固化时特性：Before curing

| 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 | Sn42Bi57.6Ag0.4 | |
| 金属填料粒径 Powder size | FTP/FTD-574A T6/ 5-15μm<br>FTP/FTD-574B T7/ 2-11μm<br>FTP/FTD-574C T8/ 2-8μm<br>FTD-574D T9/ 1-5μm | 类型<br>Description |
| 金属填料熔点 Alloy melting point | 139℃ | |
| 金属填料比例 Powder content | 印刷型 Printing 87±1%<br>点胶型 Dispensing 83±2% | 可进行调整<br>Adjustable |
| 比重 Solder density | 4.5~5.0 | 比重瓶 |
| 粘度 Viscosity | 印刷型 Printing 140±20 Pa.s<br>点胶型 Dispensing 40±10 Pa.s | 可按客户要求进行调整<br>Malcolm (10rpm) |
| 触变指数 Ti | 0.6±0.1 | Lg(3rpm/30rpm) |
| 卤素含量 Halogen Cl+Br | 无卤< 1500ppm | Halogen free |
| 钢网印刷持续寿命<br>Stencil printing continuous life | ＞8H | In house |
| 保质期 Shelf life | T6~T8:4 month@ 0-10℃<br>T9: 3month@ 0-10℃ | 密封 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 | 19 J/M.S.K | |
| 导电率 Electrical conductivity | 4.5% of IACS | |
| 抗拉强度 Tensile strength | 55.17Mpa | |
| 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 | J-STD-005 |
| 坍塌试验 Slump test | 合格 Pass | J-STD-005 |
| 润湿测试 Wetting test | 合格 Pass | J-STD-005 |

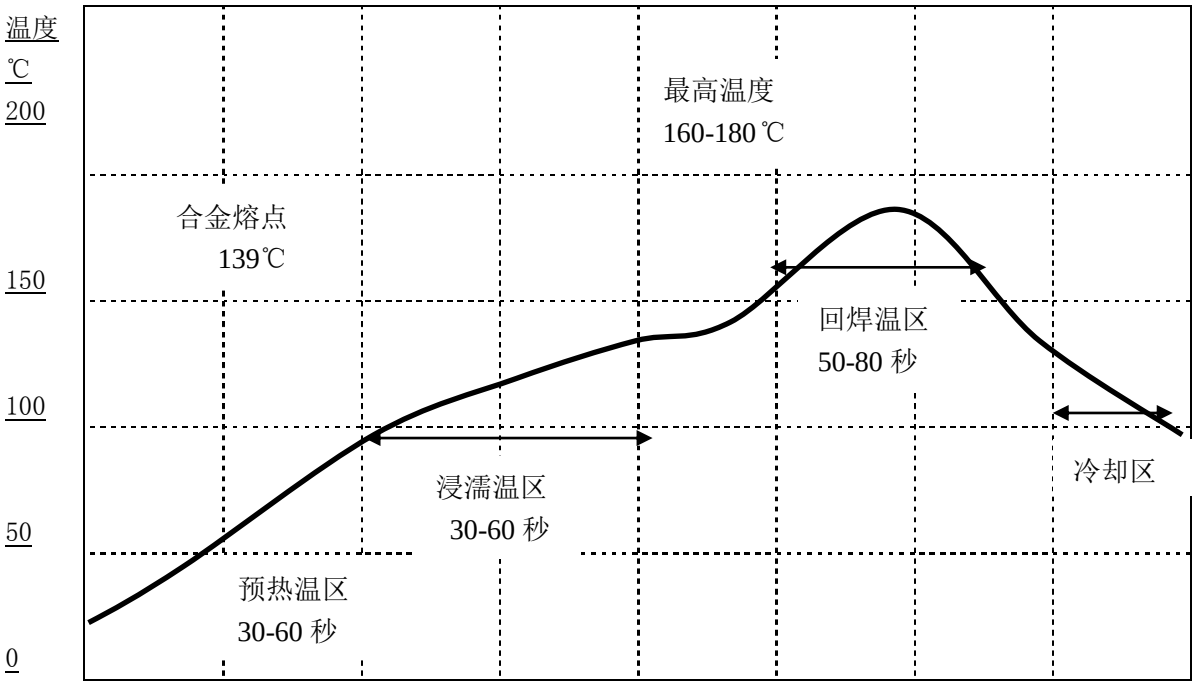
## 四、 焊接固化工艺：Soldering & curing process

回流焊接固化：按下图回流曲线加热固化。

Reflow oven ： Heat cure according to the reflow curve as shown below.

以下是我们建议的回流焊工艺所采用的温度曲线，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。我们建议在氮气保护氛围内进行回流焊接，**氧含量不超过 300ppm**。

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. We recommend reflow soldering in a nitrogen atmosphere, and the oxygen content should not exceed 300ppm.




① 预热区（加热通道的 25～33%）：在预热区，焊膏内的部分挥发性熔剂被蒸发，并降低对芯片之热冲击。要求：升温速率为 1.5～3.0℃/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 1.5~ 3.0 ℃ / 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 25～33%）：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：80～120℃　　时间：30～60 秒　　升温速度：<2℃/秒。

Soak zone (25% to 33% 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: 80 ~ 120 ℃ time: 30~60 seconds heat rising rate: < 2 ℃ / s.

③ 你回焊区：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:160-180℃时间:140℃以上 20～50 秒(Important），高于 150℃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: 160 ~ 180 ℃, above 140 ℃ for 20 ~ 50 seconds (Important), higher than 150 ℃ 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℃，冷却终止温度最好不高于 75℃；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 ℃, the end temperature for cooling should be higher than 75 ℃; 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:**

- 升温速率<3℃/秒, 各部受热均匀;
  The heating rate is smaller than 3 ℃ / sec. And it is evenly heated.

- 回焊峰值温度为高于熔点 30～50℃。
  The peak reflow temperature is 30 ~ 50℃ higher than the melting point.

## 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，送货时使用泡沫箱盛装。
  Printing :500g/bottle, wide-mouth plastic (PE) bottle, sealed with inner lid and packaged in foam box.

- 点胶型：EFD 针筒 10g/5cc、 10g/10cc、 20g/10cc 包装，可按客户要求进行包装，运输时采用冰袋、泡沫箱+纸箱包装。
  Dispensing: The dispensing syringes are packed in 10g/5cc, 10g/10cc, 20g/10cc according to customer's requirements. They are packed in ice bags, foam boxes and cartons during transportation.

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 ℃. 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3~4 个月。
  Selflife:3~4 months under normal sealed storage conditions of 0~1 0℃.

- 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.

## 六、 使用方法：Instructions

1. 回温说明：锡膏通常需冰箱冷藏，温度为0-10℃为佳。故从冷箱中取出锡膏时，其温度较室温低很多，若未经“回温”而开启瓶盖，则容易将空气中的水汽凝结，并沾附于锡膏上，在焊接时（温度超过150℃），水份因受强热而迅速汽化，易造成“爆锡”现象产生锡珠，甚至损坏元器件。
   Recovery description: Solder paste is normally stored in a refrigerator with 0 ~ 10℃. When solder paste is

taken out of the cold box, its temperature is much lower than room temperature. If use without the recovery process varies damage may be caused to the paste. Opening the cap of sealing may cause water vapor in the air to condense on the paste. If this occurs, later in the reflow furnace (temperature over 150℃), water would vaporize due to strong heat. This may lead to solder explosion and damage the chip.

2. 回温方式：不开启盖子的前提下，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;

3. 回温时间：室温下回温2~3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 2~3 hours before use. Actual time to reach thermal equilibrium will vary with container size.

4. **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.

5. 使用环境：锡膏最佳使用环境温度为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 ℃, relative humidity 40-60% RH. Suggestions reflow soldering under nitrogen protection.

6. 使用时间 Work time
   ① 连续印刷时间Continuous printing time
   - 连续添加锡膏的场合：8小时。When adding solder paste continuously: 8 hours.
   - 不连续添加锡膏的场合：4小时。When the solder paste is not continuously added: 4 hours.

   ② 版上的锡膏快到1/3（滚动径：10㎜以下）之前，请添加锡膏。
   Add solder paste when it is about 1/3 on the plate (rolling diameter: 10mm or less).

   ③ 锡膏被放置在版上的停留时间请在3小时内。
   Solder paste should be placed on stencil within 3 hours.

   ④ 印刷中断30分钟以上，请清洗模板。
   Please clean the stencil if printing is interrupted for more than 30 minutes.

   ⑤ 印刷后的停留时间Residence time after printing
   锡膏印刷后，应尽快完成元器件的贴装并过炉完成焊接，免因搁置太久而导致锡膏表面变干，影响元件贴装及焊接效果，一般锡膏建议停留时间不超过4小时，低温含铋锡膏不超过2小时。若印刷中途休息30分钟以上或一时中断的场合，印刷模板需要清洗并在试印1-2块后进行生产。≦0.4mm间隙开口部狭小地方、模板开口部旁边附有的焊膏会逐渐变干、印刷模板的脱落性也可能会随之变差。
   After printing the solder paste, the components should be attached and welded as soon as possible, so as to avoid drying the surface of the solder paste and affecting the assembly and welding effect. Generally, it is recommended that the residence time of the solder paste shall not exceed 4 hours, and the low-temperature bismuth-containing solder paste shall not exceed 2 hours.If the printing break is more than 30 minutes or temporary interruption, the stensil needs to be cleaned .No more than 0.4mm pitch, the solder paste

attached to the opening of the template will gradually dry out, and the shedding of the printing template may also become worse.

## 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.

i. 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.

ii. 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.

iii. 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，则应立即用沾有酒精的布将该处擦干净，再用肥皂和清水彻底清洗干净。若不慎让锡膏接触眼睛，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 an alcoholic cloth, and then thoroughly 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.

iv. 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.

v. 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.

vi. 废弃的锡膏和清理后沾有锡膏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 paste 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.