Technical Product Information

Sn-Pb-based Solder Paste SM-388

General Description

ELSOLD has introduced no clean solder paste SM-388 to meet the requirements of today's SMT application. This no-clean paste uses a highly heat stable synthetic resin as its base. With this resin, the residue left after reflow is much lighter in color as compared to those left by traditional RMA solder pastes. SM-388 meets IPC-SF-818 and Federal QQ-S-571E specifications. The no-clean paste flux used in this solder paste consists of additives such as high-boiling-point solvents, corrosion inhibitors, thixotropic agents and heat-stable synthetic resin. These additives provide the SM-388 paste with the desired rheology for SMT application.

The residues of SM-388 solder paste are chemically non-corrosive and electrically non-conductive. They are colourless and therefore can be widely accepted for no clean application. As SM-388 uses a highly heat stable resin, the residues are also more resistant to moisture and water. Therefore, the residues would not develop "white powdery residue" after post clean with water when the PCBs are wave-soldered with water soluble fluxes. SM-388 solder paste is conforming to IPC-SF-818 specification and is characterized under L3NC classification.

Application

SM-388 solder paste can be applied by dispensing, stencil or screen-printing. As a general guide, the following metal loading and viscosity ranges for each type of application method are available.

Paste Deposition Method	Solder Paste Flux Percent [wt%]	Viscosity Range [Pa·s]
Syringe Dispensing	12 – 14	300 – 500
Mesh Screen Printing	11 – 12	500 – 700
Metal Stencil Printing	9 – 11	600 – 800

Various pre-alloyed and mesh size solder particles can be selected for desired SMT application. The selection guide is as follow:

Pre-alloyed Composition	Melting Point [°C]	Finest SMDs Pitch [mils]	Mesh Size	Stencil Thickness [mils]
Sn63Pb37	183	25 – 50	-200 +325	9 – 10
Sn62Pb36Ag2	179	20 – 25	-230 +500	7 – 8
Anti-Tombstone Paste				
Sn63Pb37 + Sn62Pb36Ag2 mixed powder	179-183	25 – 50	-200 +325	9 – 10

Hüttenstraße 1 · D-38871 Ilsenburg
Phone +49 (0)39452 4879-11 · Fax: -66
info@tamura-elsold.de

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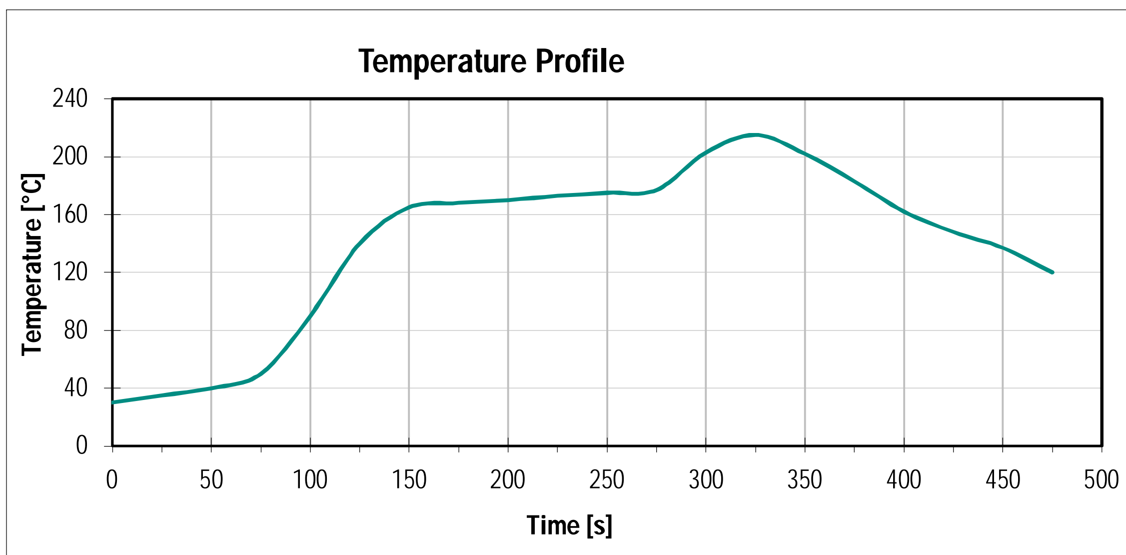
Recommended Reflow Profile

SM-388 solder paste can be reflowed in any type of reflow machines such as vapor phase, hot plate, I.R., convection, IR/convection ovens though the last three are preferred methods. A recommended IR/convection reflow profile for pre-alloyed Sn63/Pb37 or Sn62/Pb36/Ag2 solder paste is shown below:

Zone	Temp. Range [°C]	Ramp Rate [K/s]	Duration [s]
Preheating	RT – 160	0.9 – 1.8	80 – 100
Soaking	175 – 180	0.4 – 0.7	80 – 120
Reflow	210 – 235	0.75 – 1.2	40 – 75



Process Parameters

SM-388 solder paste is non-hygroscopic and therefore is less sensitive to humidity. It can be operated in relatively high humidity (up to 85 % R/H) environment. Following are some recommended process control parameters:

1.	Pre-Conditioning	Solder paste is normally stored in refrigeration. Pre-condition paste to room temp (25 °C) before use (usually takes about 3 - 6 hours).
2.	Printing Speed	15 to 50 mm/s depending on board size and pitch size
3.	Squeegee Hardness	>80 – 90 durometer
4.	Printing Mode	S.S. Stencil with on-contact print for small to medium-size boards S.S. Stencil with 0.5 – 1.2 mm snap-off distance print for boards with 250 X 300 mm W x L size (and/or above)
5.	Pick & Placement	Within 6 hours
6.	Working Environment	Ideally between 20 – 25 °C with humidity less than 75 % RH

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Cleaning

The residues of SM-388 solder paste are colourless, tack-free, non-conductive and non-corrosive. Its resin/solvent system enables it to flow away from soldered joint surface and therefore would not interfere with ICT test probe. If residue appearance and colour is not a primary concern, in fact, it can be left without cleaning. However, if cleaning is desired, it can be easily removed by HCFC and Terpene / Hydrocarbon solvents. Semi-aqueous or saponification techniques as well can be applied in effective cleaning.

Storage

SM-388 solder paste shall be stored in refrigeration condition to prolong its shelf life. Fresh (unused) solder paste under storage condition of 5 to 15 °C shall have minimum shelf life of 6 months (jars and cartridges).
If FIFO system is well implemented, SM-388 can also be kept in air-conditioned room of 20 – 25 °C, RH below 75 % for as long as 14 – 21 days.

Precaution

Solder paste contains Tin/Lead alloy powder that is bonded by resin paste flux. Hence, it is not easily air-borne and can be removed well by a solvent-soaked cloth. However, as a standard industrial practice, operators are urged to wear hand gloves and mask when working with solder paste. When contacted, wipe clean with cloth or paper wetted with alcohol or hydrocarbon solvents. This should be followed by water rinse with soap.

Also, during reflow, some amount of evaporated solvent will be released, localized ventilation is necessary to reduce accumulation of vapour in work areas.

The information contained herein is based on technical data that we believe to be reliable and is intended for use by persons having technical skill, at their own risk. Users of our products should make their own tests to determine the suitability of each product for their particular process. TAMURA ELSOLD will assume no liability for results obtained or damages incurred through the application of the data presented.

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