SOLDER PASTE SP15 63S4

WITH ANTI-TOMBSTONING OPTION FOR PRINTING AND DISPENSING

GENERAL DESCRIPTION

STANNOL SP15 medium has been formulated as a No Clean product for printing and reflow in air, where process yield is critical. **SP15** solder pastes offer excellent open time, greatly extended abandon times and good soldering activity, especially on OSP copper. It is available in different types for stencil printing and dispensing..

SP15 solder pastes may be supplied with powder made from 63S4 or Sn62Pb36Ag2 alloys. These alloys are conforming to the purity requirements of J-STD-006 and EN29453. The unique 63S4 alloy may be specified to eliminate „tombstone" defects which can occur when reflowing boards populated with very small chip components.

SP15 medium contains a high activity yet No Clean type of flux and will be suitable for most assembly processes. Although specifically formulated to give excellent wetting on OSP copper, it is especially suited to meet the demands of high volume production processes using components and boards which have less than the desirable level of solderability. The activity level of **SP15** medium produces greater tolerance to process variations and a lower tendency to poor component wetting.

PRODUCT FEATURES

This product offers the following technical features:

- **Suitable for fine pitch, high speed stencil printing up to at least 150mm s-1**
- **Excellent printer open time and tack life**
- **Extended between print abandon time**
- **High activity to deal with poor component solderability**
- **Formulated to give excellent wetting on OSP copper**
- **Produces safe residues - eliminates the need for cleaning**
- **Excellent slump resistance**
- **Dispensing grade available for high dispensing speed**
- **Suitable for dispensing down to 0,5mm fine pitch**

APPLICATION

SP15 63S4 solder pastes are available for stencil printing down to 16mil (0.4mm) pitch devices with the AGS (Type 3) and ACS powder sizes. Printing up to 150mm sec-1 can be reliably achieved in production using electroformed or laser cut stencils with a metal blade squeegee (60°C). This is due to a unique rheology which ensures that the high shear rate viscosity is relatively low while the thixotropic index is high enough to ensure excellent definition and slump resistance while maintaining good roll and drop off behaviour. It can be used in volume production down to speeds of 25mm sec-1. Unlike some pastes, high squeegee pressures are not required, making **SP15 63S4** particularly useful for second side printing processes. The excellent resistance to drying and consequent avoidance of blocking stencil apertures means that SP15 63S4 yields good quality prints immediately after printer downtimes of greater than 3 hours (in laboratory tests) with no need for conditioning prints. **SP15 63S4** solder pastes do not require the addition of thinners either before or during use. It is recommended that products shipped in jars should be gently stirred for 15 seconds before use as some slight flux separation may be seen.

The dispensing grade of **SP15 63S4** is suitable for use with 0,4mm needles or larger. It is essential that the dispensing mechanism and needles are clean and in good condition. It is recommended, to clean your dispensing equipment immediately after use to prevent contamination with dry solder cream.

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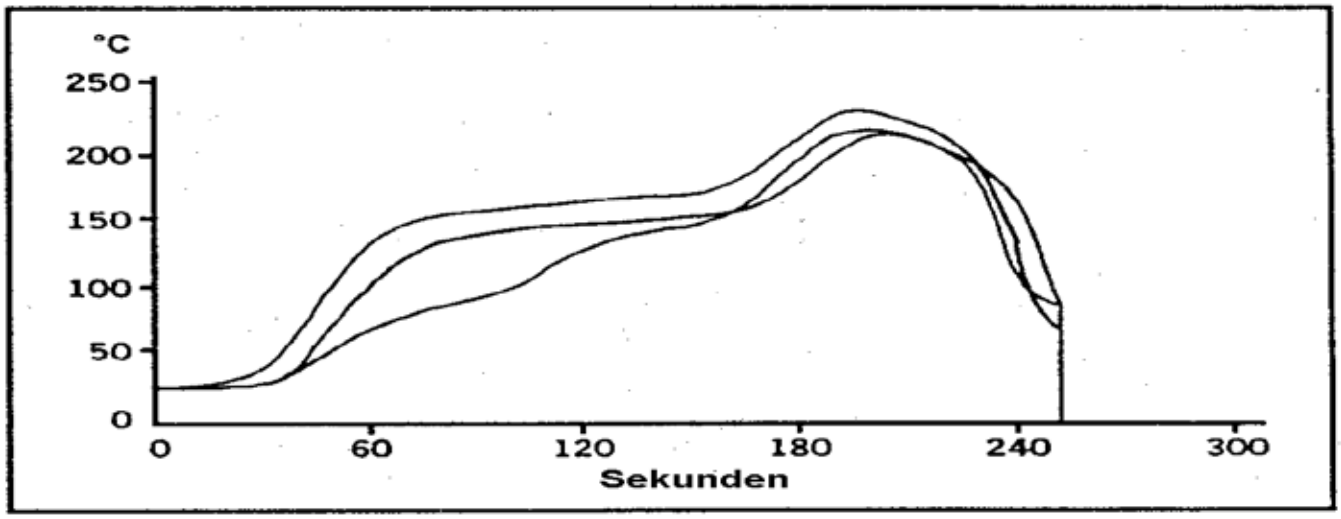
REFLOW: Any of the available methods of heating to cause reflow may be used including IR, convection, hot belt, vapour phase and laser soldering. It is not practicable to recommend an ideal reflow temperature profile for all situations. However, the following shows example profiles that have given good results in practice.

Recommendations for generating an appropriate reflow profile for use with the Sn62Pb36Ag2 alloy:



RECOMMENDED AVERAGE	UPPER LIMIT
Heat up with 1-2K sec^{-1} up to 110-150°C	Heat up with not more than 3-4K sec^{-1}
Keep temperature stable at 120-160°C for 60-90sec (if necessary)	No ramp at temperatures above >160-170°C
Heat up with 1-2K sec^{-1} up to 205-220°C	Heat up with not more than 2K sec^{-1}
Keep temperature at 205-220°C for app. 30-60sec	Keep temperature not longer than 90sec above liquidus

CLEANING: The residues from **SP15** solder pastes may be left on the PCB in many applications since they do not pose a hazard to long term reliability. However, should there be a specific requirement for residue removal, this may be achieved using conventional cleaning processes based on solvents such as **Flux Ex 500**, or water containing suitable saponifying agents like the **Flux-Ex 200/B**.

TECHNICAL SPECIFICATIONS

SOLDER POWDER: The solder powder for **SP15 63S4** solder pastes is produced by atomising alloys conforming to the purity requirements of J-STD-006, EN 39453 or other national and international standards where relevant.
Careful control of production processes ensures that the solder powder is at least 97% spherical (aspect ratio <1.5) and contains less than the minimum level of contaminants that would adversely affect solder paste performance. A typical maximum oxide contamination level of 80 ppm (expressed as oxygen in the solder) is regularly achieved or bettered.

SOLDER PASTE: The properties of a solder paste depend in part on the metal content, the solder alloy and the solder powder particle size range. In general terms, increasing metal content reduces the tendency to slump and reduces the tack life of the solder paste while the solder balling performance improves. Typical properties of selected **SP15** solder pastes are as follows:

Solder paste	SP15 63S4-89,5-3/5-660	SP15 62-85-3-400
Alloy	63S4	Sn62Pb36Ag2
Metal content, %	89,5	85
Solder powder, µm	45-10	45-25
Viscosity measured at 25°C Brookfield, cP [1] Malcolm , p [2] Thixotropic Index, TI [3]	 660.000 1400 0,70	 400.000 560 0,6
Slump, [4] IIW Method, mm 1 hr, room temp. 0.7mm pads 1.5mm pads	 0,2 0,2	 0,2 0,2
80°C, 20 mins 0.7mm pads 1.5mm pads	 0,2 0,2	 0,5 0,5
Tack [5] Initial tack force, gmm^{-2} Useful open time, h	 1,46 >48	 1,36 >48

Solder paste	SP15 63S4-89,5-3/5-660	SP15 62-85-3-400
Copper Plate Corrosion	DTD 599A IPC-SF-818 BS 5625	Pass Pass Pass
Copper Mirror Corrosion	IPC-SF-818	Pass
Surface Insulation Resistance [without cleaning]	IPC-SP-819 J-STD-004 Bellcore TR-NWT-000078	Pass Pass Pass
Electromigration [without cleaning]	Bellcore TR-NWT-000078	 Pass
Flux Activity Classification [without cleaning]	IPC-SF-818 J-STD-004 EN 29454	LR3CN R0 L1 1.1.2.

[1] Measured at 25 C, TF spindle at 5rpm after 2 minutes
[2] Measured at 25 C, and a shear rate of 6s-1
[3] TI = log [viscosity at 1.8s-1/Viscosity at18s-1]
[4] The slump data is expressed as the min spacing between pads of the size shown that does not allow bridging
[5] Tack data is derived from comparative laboratory tests and do not necessarily relate directly to a particular user's conditions

CUSTOMARY PACKING

STANNOL® SP15 solder pastes are supplied in:

- 500g plastic jars with an insert to seal off the surface of the paste
- 650/1200g vacuum filled Semco cartridges for direct application
- 25/75g Semco cartridges with Luerlock for automatic or manual dispensing applications

Other forms of packaging may be available on request.

STORAGE AND EXPIRATION

Provided **SP15** solder pastes are stored at 5-10°C tightly sealed in the original container, a minimum shelf life (from date of production) of 6 months can be expected for the printing types. Air shipment is recommended to minimise the time that containers are exposed to higher temperatures. **SP15** solder pastes have been formulated to reduce separation on storage to a minimum but should it occur, gentle stirring for 15 seconds will return the products to their correct rheological performance.

HEALTH AND SAFETY

Carefully read the material related safety datasheet (MSDS) before using this product for the first time and apply the safety measures accordingly.

LEGAL NOTE

The above mentioned data are typical and common values only and do not represent any specifications. This datasheet is only for the purpose of your information. Our applicational guidance in written is noncommittal unconcerned if advised by first or third party also in connection to third party property rights and does not exempt our customers to individually evaluate our products for the intended applications and purposes. Should any liabilities occure to us, we award compensation only to the same extent as with quality failures.

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