TAMURA
PRODUCT INFORMATION

Pb-FREE SOLDER PASTE TLF-SERIES

LFSOLDER TLF-204-SIS(20-38)

LFSOLDER TLF-204-SIS(20-38) is a Pb-free, no-clean solder paste using Pb-free, spherical solder powder and special flux. Since this solder paste contains no Pb, it reduces hazardous material usage and contributes to protecting the environment and a safer workplace. The flux residue contains no halides and can remain on the board without having to be removed.

1. Outstanding Features

1) Pb-free (Sn/Ag/Cu series) solder alloy is used.
2) Stable printability is obtained with little change in viscosity during continuous printing.
3) Chip-side ball seldom occur.
4) Excellent solderability at high temperature.
5) Superior reliability is provided by no washing.
6) The category of flux in J-STD-004A belongs to “L1”.

2. Characteristics

Characteristics of **LFSOLDER TLF-204-SIS(20-38)** is shown in Table 1 and Table 2.

Table 1 - Characteristics of **LFSOLDER TLF-204-SIS(20-38)**

Items	Characteristics	Test methods
Alloy composition	Sn 96.5 / Ag 3.0/ Cu 0.5	JIS Z 3282 (1999)
Melting point	216～220℃	According to DSC measurement
Particle size of solder powder	20～38um	According to laser diffraction method
Shape of solder powder	Spherical	Annex 1 to JIS Z 3284 (1994)
Flux content	12.0%	JIS Z 3284 (1994)
Chlorine content*	Less than 0.05%	JIS Z 3197 (1999)
Viscosity	210Pa.s	Annex 6 to JIS Z 3284 (1994) Viscometer, type PCU, manufactured by Malcom, at 25℃

* Result of examination in flux.

Table 2 - Characteristics of **LFSOLDER TLF-204-SIS(20-38)**

Items	Characteristics	Test methods
Water solution resistance test	More than 1×10^{4} Ω.cm	JIS Z 3197 (1999)
Insulation resistance test	More than 1×10^{9} Ω	Board type 2,Annex 3 to JIS Z 3284 (1994)
Slump test	Less than 0.15mm	Print the paste on ceramics board and heat for 60 seconds at 150℃. Measure slumping width from before and after heating. STD-092b※
Solder ball test	Solder balls seldom occur.	Print the paste on ceramics board. After melting and heating, observe with a microscope of 50 times. STD-009e ※
Solder spread test	More than 75%	JIS Z 3197 (1986) 6.10
Copper plate corrosion test	No corrosion	JIS Z 3197 (1986) 6.6.1
Tackiness test of residue	Pass	Annex 12 to JIS Z 3284 (1994)
Flux type	Category L1	J-STD-004A

※ Test method of our company (The written characteristics is not a guarantee value.)

3. Quality Guarantee Period

The quality guarantee period shall be 6 months after manufacture if the products are stored in sealed containers at temperature 0~30°C.

4. Product Packaging Units

Table 3 - Packaging units of products

Containers	Packaging units
Wide-mouthed polyethylene	500g

5. Cautions for Use

(1) Stirring of Solder Paste

(1.1) In the Case of Manual Stirring

Thoroughly stir solder paste stored in refrigerators with spatula or the like after returning to room temperature without fail (It takes about three to four hours if left standing at 25°C). If the seal is broken the paste will absorb moisture to cause solder balls.

(1.2) In the Case of Using Automatic Stirring Apparatus

An automatic stirring apparatus is utilized at times to use solder paste stored in refrigerators by returning it to room temperature in a short period of time. Even if such automatic stirring apparatus is used, no change will occur to the characteristics of the solder paste. With the lapse of stirring time, the temperature of solder paste will rise as shown in Fig.1: If the stirring time is lengthened, it will lead to the possibility of throwing solder paste with temperature higher than the working environment onto boards and thus causing bleeding during printing. So, be careful. Conduct adequate test beforehand since the stirring time will vary according to the specifications of apparatus, ambient temperature, and other conditions. (In case of using solder softener SS-1, appropriate stirring time will be about 20 minutes).

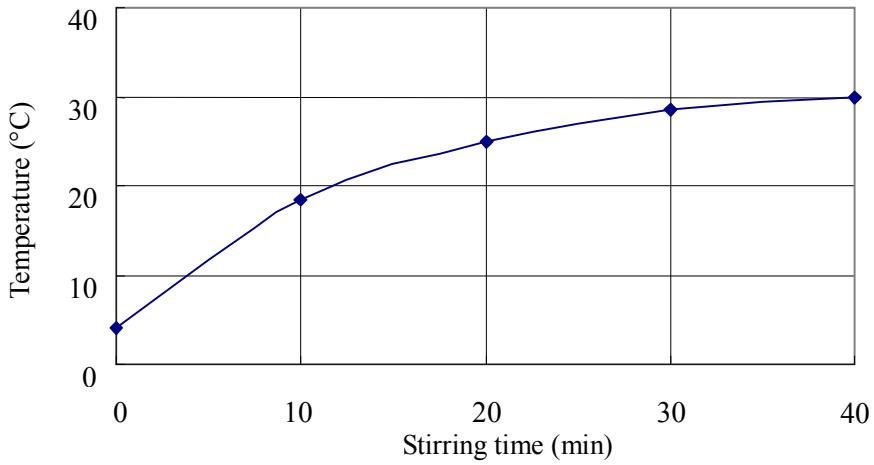

Fig.1 - Stirring time and temperature rise of solder paste when using automatic stirring apparatus

Apparatus: Solder softener SS-1 manufactured by Malcom

(2) Conditions for Printing

Printing conditions recommended for **LFSOLDER TLF-204-SIS(20-38)** is shown in Table 4:

Table 4 - Printing conditions recommended

Items	Setting range
Metal mask	Laser machined, manufactured by additive (or those having flat opening side)
Squeegee	Metal, Urethane (hardness 80 to 90 degrees)
Squeegee angle	50 to 70 degrees
Squeegee speed	20～60mm/s
Printing pressure	100～200kPa

(3) Parts Mounting Time

Mount the parts within 24 hours after printing the solder paste. If left standing for a long time after printing, the surface of solder paste will dry up to cause mount error of parts.

(4) Reflow Conditions

Recommended temperature profile of air reflow is shown in Fig.2.

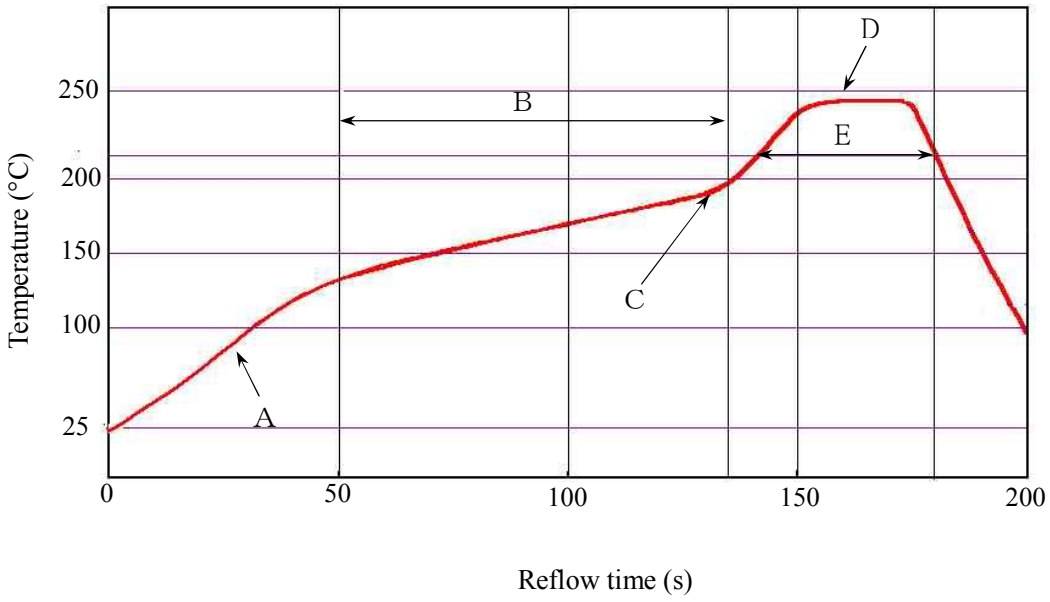

Fig.2 - Temperature profile of air reflow

[Precautions]

1) Preheat

- Set the temperature rising speed A at a rate of 1~3°C/s. Careful about rapid temperature rise in preheat zone as it may cause excessive slumping of the solder paste.

- Appropriate preheat time B will be from 60 to 100 seconds at about 150~180°C. If the preheat is insufficient, rather large solder balls tend to be generated. Conversely, if performed excessively, fine balls and large balls will generate in clusters at a time.

- Appropriate preheat ending temperature C will be from 180 to 200°C. If the temperature is too low, non-melting tends to be caused in the area with large heat capacity after reflow.

2) Heating

- Careful about sudden rise in temperature as it may worsen the slump of solder paste.

- Set the peak temperature D in the range from 230 to 250℃.

- Adjust the melting time that the time over 220℃,E, will be from 20 to 90 seconds.

3) Cooling

- Careful about slow cooling as it may cause the positional shift of parts and decline in joining strength at times.

※ **Perform adequate test in advance as the reflow temperature profile will vary according to the conditions of parts and boards, and the specifications of the reflow furnace.**

6. Cautions from Standpoints of Safety and Sanitation

1) Physiological interaction varies by individuals. As a prudent policy, therefore, care, should be exercised not to inhale gas of fume of solvent emitted during operations and not to have your skin exposed (especially mucous membrane and other parts vulnerable to stimuli) for a long time.

2) This paste is contains the organic solvent, but it is no flammable.

3) If the paste sticks to the skin, wipe it off with ethanol and the like, and wash thoroughly with soapy water.

*The flux ingredients in the paste contain nonionic halogen based activator.

*The physical chemistry-character among written contents etc. is not a guarantee value. The evaluation of danger and noxiousness is based and makes material, information, and the data, etc. which can be acquired now. However, it is not because all material was covered and note handling enough, please. As for notes, it is the one intended for usual handling. Special handling is not assumed. Please observe the restriction of related various regulations, and use after executing suitable safety measures for the usage.

Before start using out paste, please kindly conduct sufficient examination on manufacturing process and credibility. We will not guarantee your product in case a problem occurs to your product while using our product.

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