Lead-free solder paste Delphine **5503**

Lead-free, no-clean and halide free solder paste

Description:

Interflux® Delphine 5503 is a No-clean and lead-free solder paste that shows excellent results in **vapour phase soldering**.

The paste has a great print definition with good cold and hot slump properties.

Delphine 5503 can be reflowed with commonly used lead-free solder profiles in vaphour phase but also in both air and nitrogen soldering systems. The solder paste has good wetting ability on lead-free surface finishes.

Because this solder paste is absolutely halogen free, it eliminates the risk of formation of dangerous metal salts which is typical for solder chemistry using halides.

The post reflow residue of **Delphine 5503** is very safe. It doesn't need to be cleaned but it is possible if desired.

The solder paste is classified as **RE L0** according IPC and EN–standards.

Products pictured may differ from the product delivered

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Key advantages:

- Very suitable for vapour phase soldering
- Absolutely halide free
- Increased cold and hot slump resistance

Availability

alloy	metal content	powder size	packaging
Sn96,5Ag3Cu0,5 Sn95,5Ag3,8Cu0,7 Sn95,5Ag4Cu0,5 Sn99Ag0,3Cu0,7 Sn98,5Ag0,8Cu0,7 Sn95,8Ag4,2 Sn99,3Cu0,7 Other alloys upon request	printing: 88% dispensing: 84-85%	Standard type 3 (25— 45µ) Type 4 and type 5 available for certain alloys	jars :250g/500g cartridges: 6Oz: 500g/600g/700g 12Oz: 1kg/1,2kg/1,3kg/1,5kg syringes : 5CC/10CC/ 30CC other packaging upon request

Reflow profile

General description

In vapour phase, the means of constituting a profile are often limited. The vapour temperature is constant but the immersion in the vapour can often be controlled. There is no risk of overheating in vapour phase.

In general a soak profile is advised and may be used when temperature differences across a board, due to a high mix of components or large board sizes, need to be levelled out. Or when the number of voids, if present because of material combination, need to be decreased.

When soldering in air the profile's peak temperature should occur within a frame time of maximum 300sec from the profile's starting point.

The correct conveyor speed (m/min) can be calculated by dividing the total chamber length (m) of the heating zones by the desired process time (min). Soldering under nitrogen has fewer limitations.

When soldering an assembly in a lead-free solder process, care must be taken not to overheat components especially when using air convection or IR ovens. It is very important to know the temperature limitations of the components used on the board. To get a good thermal mapping of the board it is advised to use thermocouples and a thermal measuring tool. Measure on small outline, big outline and temperature sensitive components. Measure on the board side near the conveyor chain, in the middle of the board and close to, or on heat sinks.

Profile recommendations

Preheat

From room temperature until about 200°C at a rate of 1-3°C/ seconds.
Higher heating rates could result in component cracking due to absorbed moisture.

Soak

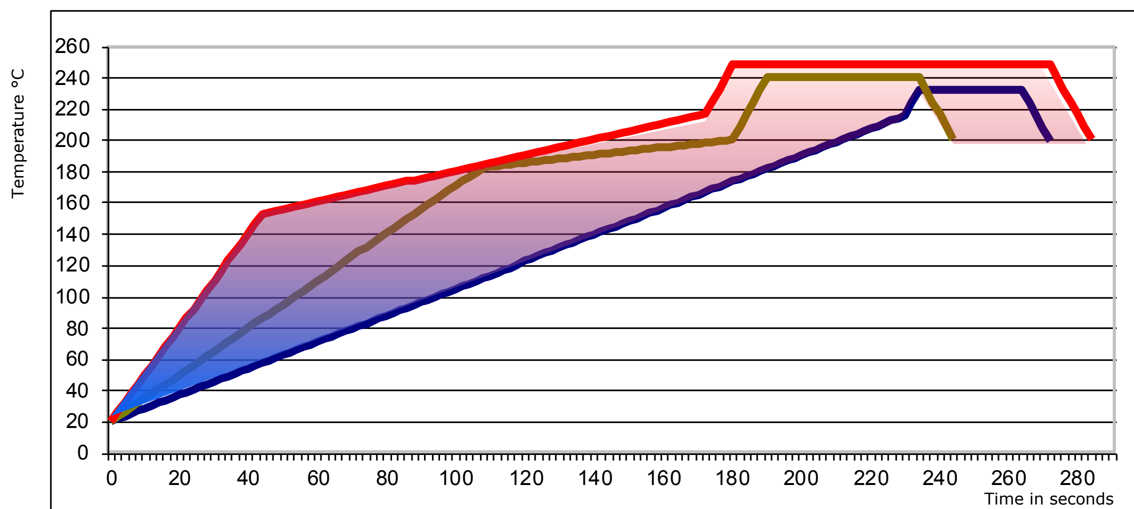
From 180°C to about 215°C at a rate of 0-1°C/seconds.
In some cases a temperature holding soak zone is used to level out differences on a board. It is often used on high mix boards or to reduce voids in certain lead-free processes. A 20-90 sec soak between 200°C and 215°C is often used for this purpose.

Reflow

Peak temperature used is related to component specifications. In general between 235°C and 250°C. The time in liquidus (over melting point of the alloy used) could be between 45 seconds and 90 seconds.

Cooling

Cooling rate around -4°C/ second because of differences in thermal expansion of different materials



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Handling

Storage
Store the solder paste in the original packaging, tightly sealed at a preferred temperature of 3° to 7°C

Handling
Let the solder paste reach room temperature prior to opening the packaging. Stir well before use.

Printing
Assure good sealing between PCB and stencil. Apply no more than enough squeegee pressure to get a clean stencil. Apply enough solder paste to the stencil to allow smooth rolling during printing. Regular replenish fresh solder paste.

Maintenance
Set an under stencil clean interval which provides continuous printing quality. **IS-C8020** is recommended as cleaning agent in pre saturated wipes and USC liquid.

Reuse
Avoid mixing used and fresh paste. Do not put packages back into refrigeration when already opened. Store used paste in a closed separate jar at room temperature. A test board before re-using in production is advisable

Safety
Please always consult the safety datasheet of the product.

Test results

conform EN 61190-1-2(2002) and IPC J-STD-004A/J-STD-005

Property	Result	Method
Chemical		
flux designator	**RE / L0**	J-STD-004A
qualitative copper mirror	**pass**	J-STD-004A IPC-TM-650 2.3.32
qualitative halide		
silver chromate (Cl, Br)	**pass**	J-STD-004A IPC-TM-650 2.3.33
spot test (F)	**pass**	J-STD-004A IPC-TM-650 2.3.35.1
quantitative halide	**0,00%**	J-STD-004A IPC-TM-650 2.3.35
Environmental		
SIR test	**pass**	J-STD-004A IPC-TM-650 2.6.3.3
SIR test	**pass**	GR-78-CORE, Rev. 9/97
qualitative corrosion, flux	**pass**	J-STD-004A IPC-TM-650 2.6.15
electro chemical migration	**pass**	GR-78-CORE, Rev. 9/97
ECM	**pass**	Siemens Prüfprotokoll (2006)

Property		Result	Method
Mechanical			
solder ball test	after 15min	**preferred**	J-STD-005 IPC-TM-650 2.4.43
	after 4h	**acceptable**	J-STD-005 IPC-TM-650 2.4.43
wetting test		**pass**	J-STD-005 IPC-TM-650 2.4.45
slump test	after 10min @ 25°C	**pass**	J-STD-005 IPC-TM-650 2.4.35
	after 15min @ 150°C	**pass**	J-STD-005 IPC-TM-650 2.4.35

Operating parameter recommendations

Printing

speed:	20—100mm/sec
squeegee pressure:	±250g / cm length
U.S.C.* interval:	every 10 boards
abandon time:	1 hour
temperature range:	15°C to 25°C

Mounting

tack time:	> 4 hours

Reflow

reflow profile:	linear and soak
heating type:	vapour phase, convection, ...

I.C.T	flying probe testable pin-bed testable

*U.S.C : under stencil cleaning

Cleaning

Cleaning of the paste from stencils and tools is recommended with Interflux® **ISC 8020.**

The residues after refllow of Delphine 5503 are very reliable and don't need to be cleaned, however they can be cleaned if desired.

A compatibility list between Interflux® products and Zestron® cleaning products is available at Interflux

Trade name : Delphine 5503 No-Clean, Halide Free, Lead Free Solder Paste

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