Product Data Sheet

CR32

August 2007

TYPE L NO CLEAN SOLDER PASTES

Multicore CR32 has been formulated as a modest residue level product for printing and reflow in air. CR32 solder pastes offer excellent open time and soldering activity with pale post-soldering residues.

- Non-corrosive residues – eliminates the need for cleaning
- Enhanced activity to deal with poor component solderability
- Excellent resistance to solder balling
- Wide reflow process window for tin/lead and lead-free soldering processes
- Suitable for fine pitch, stencil printing applications
- Excellent slump resistance
- Good tack performance and open time
- Probe testable residues with reduced false failures
- ROL0 to ANSI/J-STD-004

PRODUCT RANGE

Multicore CR32 solder pastes may be supplied with powder made from most soldering alloys in the Multicore product range. The most common alloy types are Sn62, Sn63 and lead free alloys 96SC, 97SC and 96S conforming to the purity requirements of J-STD-006 and EN 29453. Minimum order requirements may apply to certain alloy and powder particle size combinations.

Multicore CR32 flux is a no-clean type L flux and will be suitable for most assembly processes. It is especially suited to meet the demands of high volume production processes using components and boards that have less than the desirable level of solderability. The activity level of CR32 produces greater tolerance to process variations and lower tendency to solder balling.

REFLOW GUIDELINES

Any of the available methods of heating to cause reflow may be used including IR, convection, hot belt, vapour phase and laser soldering. In most cases the reflow profile is determined by the requirements of the board & components and the capability of the oven rather than the solder paste.

However some general guidelines on the reflow conditions can be given.

Depending on the thermal demand of the assembly and the efficiency of the oven used a reflow "soak" profile or a linear ramp type profile can be used. Usually the process determines the type of profile required (or achievable). CR32 solder pastes can be used with either kind of profile. Excessive preheat time or temperature and/or time above liquidus will lead to non-coalescence of the solder. The residues are resistant to charring but may show some cosmetic deterioration with particularly long and/or hot profiles.

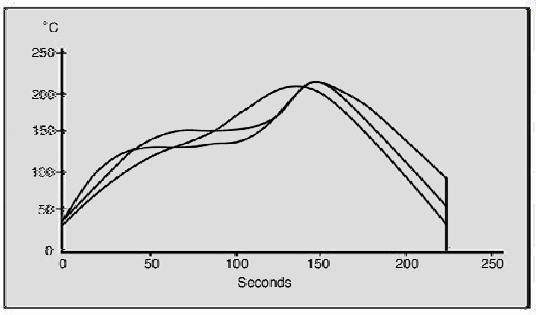
Generally the reflow profile should allow for a time above the liquidus temperature of the alloy used of 20-60s above reflow, however times above liquidus temperature outside of this range may be necessary for some processes and in most cases acceptable reflow will be possible in the range 60-90s above reflow.

Recommended preheat soak zone temperature is 120-160°C, the length of the preheat step will be determined by the assembly being soldered; one to four minutes is typical. For linear ramp profiles the ramp to peak reflow temperature will typically be between 2.0°C/s to 0.7°C/s

Reflow conditions for lead-free pastes

The reflow conditions are broadly similar to those for tin/lead pastes. A time above the liquidus temperature (217°C for 96SC) of 20-60s is typical. Preheat recommendations are similar to those for tin/lead pastes. The peak reflow temperature will typically be in the range 235-260°C.

The chart below shows some example profiles for tin-lead alloy solder pastes which have given good results in practice using typical process equipment.



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STENCIL PRINTING

CR32 solder pastes are designed to be used with semi-automatic or fully automatic stencil printing equipment but may also be used on manual printing equipment. With type three powder the paste is capable of giving reproducible prints with repeatable print height down to 16mil (thou) pitch, 50:50 pad gap, although finer pitch printing may be possible where the stencil thickness is optimised for the finest pitch areas on the board. For 16 mil pitch printing the use of a 5 mil thick stencil will improve general print-to-print height consistency and aperture release. Printing at up to 150mm s^{-1} can be reliably achieved in production. Typically most stencil printing processes use metal blades (squeegees) and these are recommended for fine pitch printing. The rheology of CR32 solder pastes ensure excellent definition and slump resistance while maintaining good roll and drop off behaviour. CR32 pastes do not require the addition of thinners either before or during use. It is recommended that product shipped in jars should be gently stirred for 15 seconds before use.

CLEANING

The residues from Multicore CR32 no-clean solder pastes are designed to be left on the PCB 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 Multicore MCF800.

TECHNICAL SPECIFICATION

Solder Powder: The solder powder for Multicore CR32 solder pastes is produced by atomising alloys conforming to the purity requirements of J-STD-006, EN 29453 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 80ppm (expressed as oxygen in the solder) is regularly achieved or bettered.

Solder Paste Medium: Multicore CR32 contains a stable resin system and solvents with high boiling ranges and low odour.

CR32 is classified as Type L flux under IPC-SF-818 specification and passes the surface insulation resistance requirements for Class 3 (high reliability) products. The flux testing is summarised in the table below, official test reports are available on request.

Test	Specification	Results
Copper Plate Corrosion	DTD599A	Pass
	JIS-Z-3197	
	IPC-SF-818	
	ANSI/J-STD-004	
	DIN32-513	
Surface Insulation Resistance	IPC-SF-818	Pass
	ANSI/J-STD-004	
	JIS-Z-3284	
	Bell Telephone TR-NWT-000078 Issue 3	
Copper Mirror Corrosion	ANSI/J-STD-004	Pass
Chlorides and Bromides	ANSI/J-STD-004	Pass
Spread Test	QQ-S-571E	Pass
Electromigration	JIS-Z-3284	Pass
	DIN32-513	
	Bell Telephone TR-NWT-000078 Issue 3	
Flux Activity Classification	IPC-SF-818	LR3CN
	ANSI/J-STD-004	ROL0

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 tackiness of the solder paste while the solder balling performance improves. The metal content (by weight) of lead free solder pastes are often somewhat lower than tin lead solder pastes for similar applications due to the lower density of lead free alloys.

It is common practice to characterise the rheology of solder pastes by making a viscosity measurement at a single specified shear condition. Increasing metal content increases the measured value and at higher metal contents, decreasing the mean solder powder particle size can have the same effect. A more informative indication of the rheological properties of solder pastes is provided by a plot of viscosity versus shear rate and these data are summarised as the "Thixotropic Index" of a paste.

Typical properties of selected Multicore CR32 solder pastes are as follows. Full details of test methods can be supplied on request.

Properties		CR32		
Alloys		Sn62 Sn63	96SC 96S 97SC	96SC 96S 97SC
Metal Content %		89.5%	88%	88.5%
Powder particle size	µm	45-20µm	45-20µm	45-20µm
	IPC	Type 3	Type 3	Type 3
	code	AGS	AGS	AGS
Viscosity, 25°C	Brookfield, cP (1) Malcom viscosity, P (2) Thixotropic index (3)	660,000 1380 0.72	660,000 1340 0.62	800,000 1660 0.65
Slump (4) IIW test method (mm)	1 hour @ room temp. 0.7mm pads 1.5mm pads 20 minutes @ 80°C 0.7mm pads 1.5mm pads	 0.2 0.2 0.2 0.2	 0.2 0.2 0.2 0.2	 0.2 0.2 0.2 0.2
Tack	Initial force, g mm^{-2} Peak force, g mm^{-2} Useful open time, h	1.2 1.4 >24	1.0 1.4 >24	1.0 1.4 >24

(1) Measured at 25°C, TF spindle at 5rpm after 2 minutes.
(2) Measured at 25°C and a shear rate of $6s^{-1}$ (typical values)
(3) The Thixotropic Index (TI) is defined as:
TI=log (viscosity at 1.8s-1/viscosity at $18s^{-1}$), typical values.
(4) The slump data are expressed as the minimum spacing between pads of the size shown that does not allow bridging
(5) Tack data are derived from comparative laboratory tests and do not necessarily relate directly to particular user conditions.

PACKAGING

Containers: Multicore CR32 solder pastes are supplied in:

- 500g or 250g plastic jars with an insert to seal ff the surface of the paste
- 1 kg standard, 1kg Pyles and 650g Semco vacuumfilled cartridges for direct application.

Other forms of packaging may be available on request.

Shelf Life: Provided Multicore CR32 solder pastes are stored at 5-10°C tightly sealed in the original container, a minimum shelf life of 6 months can be expected. Air shipment is recommended to minimise the time the containers are exposed to higher temperatures.

Multicore CR32 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.

GENERAL INFORMATION

For safe handling information on this product, consult the Material Safety Data Sheet, (MSDS).

Note

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

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