# CR36

March 2007

## TYPE L NO CLEAN, CLEAR RESIDUE SOLDER PASTES

**Multicore CR36 solder pastes are formulated as modest residue level products for printing and reflow in air. These pastes offer good open time, extended abandon time and good soldering activity with clear post soldering residues.**

- **Clear residues for easy visual inspection**
- **Residues non-corrosive – eliminates the need for cleaning**
- **Enhanced activity to deal with poor component solderability**
- **Good activity on copper OSP board**
- **Suitable for fine pitch, high speed stencil printing up to at least 200 mm/sec**
- **Excellent slump resistance**
- **Excellent tack performance and printer open time**
- **Extended "between-print" abandon time**
- **Long component tack time**
- **Effective over a wide range of reflow profiles in air or nitrogen**
- **Suitable for a range of alloys, including lead-free and high temperature materials**
- **RO L0 TO ANSI/J-STD-004**

## PRODUCT RANGE

Multicore CR36 solder pastes may be supplied with powder made from a range of alloys in the Multicore Product Range. The most common alloys used are Sn62 and Sn63 conforming to the purity requirements of J-STD-006 and EN 29453. Minimum order requirements may apply to certain alloys and powder particle sizes.

Multicore CR36 contains a high activity yet No Clean type of 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 which have less than the desirable level of solderability. The activity level of CR36 produces greater tolerance to process variations and lower tendency to solder balling.

| Recommended Metal Content, % in Multicore CR36 Solder Pastes for Stencil Printing | | | | |
|---|---|---|---|---|
| Application | Solder Powder Particle Size | | | |
| | Code | J-STD-005 | Type 3 | |
| | | Multicore | AGS | |
| | Alloy | | Sn62/63 | |
| Stencil Printing | Metal Content (%) | | 90.0 | 89.5 |
| | Viscosity | | 735,000 | 680,000 |

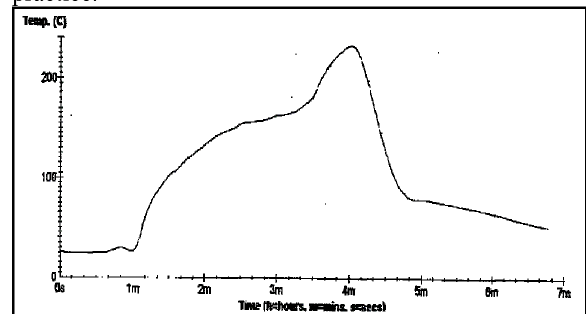
## RECOMMENDED OPERATING CONDITIONS

**Application:** Grades of CR36 solder paste are currently available for stencil printing down to 16 mil (0.4 mm) pitch devices with AGS (Type 3) powder size.

Printing at up to 200 mm.sec$^{-1}$ can be reliably achieved in production using electroformed or laser-cut stencils with a metal blade squeegee (60°). This is due to a unique rheology which ensures that the higher shear rate viscosity is relatively low and 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 25 mm.sec$^{-1}$, but even better print results are obtained if the speed is increased. Unlike some pastes, high squeegee pressures are not required, making CR36 particularly useful for second side printing processes.

CR36 solder 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.

**Reflow:** Any of the available methods of heating to cause reflow may be used including IR, convection, hot belt, vapour phase and laser soldering. CR36 is not particularly sensitive to reflow profile type. It is not practicable to recommend an ideal reflow temperature profile for all situations; however, the following shows an example profile which has given good results in practice.




**Cleaning:** The residues from Multicore CR36 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 Multicore MCF800.

**Solder powder:** The solder powder for Multicore CR36 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.

NOT FOR PRODUCT SPECIFICATIONS
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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 solder) is regularly achieved or bettered.

**Solder paste medium:** Multicore CR36 contains a stable resin system and solvents with high boiling ranges and low odour. CR36 is classified as Type LR3CN under IPC-SF-818 specification and Type RO L0 to ANSI/J-STD-004 standard.

| Test | Specification | Results |
|---|---|---|
| Copper Plate Corrosion | DTD599A<br>JIS-Z-3197<br>ANSI/J-STD-004<br>IPC-SF-818 | Pass<br>Pass<br>Pass<br>Pass |
| Copper Mirror Corrosion | ANSI/J-STD-004 | Pass |
| Chlorides & Bromides | ANSI/J-STD-004 | Pass |
| Surface Insulation Resistance (without cleaning) | ANSI / J-STD-004<br>IPC-SF-818<br>Bell Telephone TR-NWT-000078 Issue 3 | Pass<br>Pass<br>Pass |
| Electromigration (without cleaning) | Bell Telephone TR-NWT-000078 Issue 3 | Pass |
| Flux Activity Classification (without cleaning) | IPC-SF-818<br>ANSI/J-STD-004 | LR3CN<br>RO L0 |

**Solder paste:** The properties of solder paste depend in part on the metal content, the solder alloy and the solder 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.

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.

| Properties | CR36 | |
|---|---|---|
| Alloy | Sn62, Sn63 | |
| Powder Particle Size, µm | 45-20 | |
| Multicore Code | AGS | |
| Metal Content, % | 89.5 | 90 |
| Viscosity measured at 25°C | | |
| Brookfield, cP [1] | 680,000 | 735,000 |
| Malcolm , p [2] | 1510 | 1740 |
| Thixotropic Index, TI [3] | 0.61 | 0.62 |
| Slump, [4] IIW Method, mm | | |
| 1 hr, room temp. | | |
| 0.7mm pads | 0.2 | 0.2 |
| 1.5mm pads | 0.2 | 0.2 |
| 80°C, 20 mins | | |
| 0.7mm pads | 0.2 | 0.2 |
| 1.5mm pads | 0.2 | 0.2 |
| Tack [5] | | |
| Initial tack force, $gmm^{-2}$ | 0.9 | 1.0 |
| Peak tack force, $gmm^{-2}$ | 1.1 | 1.0 |
| Useful open time, h | 16 | 16 |

(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 at$18s^{-1}$)
(4) 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 a particular user's conditions

## PACKAGING

CR36 solder pastes are supplied in:

- 1kg, 500g or 250g plastic jars with an insert to seal off the surface of the paste
- 1kg standard, 1kg Pyles or 500g vacuum filled cartridges for direct application
- 750g Proflow cassettes

Other forms of packaging may be available on request.

**Shelf Life:** Provided Multicore CR36 solder pastes are stored tightly sealed in the original container at 5-10°C, a minimum shelf life of 6 months can be expected. Air shipment is recommended to minimise the time that containers are exposed to higher temperatures.

Multicore CR36 solder pastes have been formulated to reduce separation on storage to a minimum but should this occur, gentle stirring for 15 seconds will return the product to its 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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