Product Data Sheet
RP15
December 2001

LOCTITE Multicore

fastprint 100™

HIGH SPEED PRINTING AND DISPENSING, NO CLEAN SOLDER PASTES WITH 'ANTI-TOMBSTONING' OPTION

Multicore RP15 medium has been formulated as a No Clean product for dispensing or printing and reflow in air, where process yield is critical. RP15 solder pastes offer excellent open time, greatly extended abandon times and good soldering activity, especially on OSP copper.

- **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**

PRODUCT RANGE

Multicore RP15 solder pastes may be supplied with powder made from most solder alloys in the Multicore product range. The most common alloys used are Sn60, Sn62 and Sn63 conforming to the purity requirements of J-STD-006 and EN29453. Multicore's unique 63S4 alloy powder blend may be specified to eliminate "tombstone" defects which can occur when reflowing boards populated with very small chip components. Minimum order requirements may apply to certain alloys and powder particle sizes.

Products For Stencil Printing					
Solder Powder Particle Size		45-20µm			45-10µm
Code	Multicore	AGS			ACS
	J-STD-005	Type 3			-
Metal Content (%)		89	89.5	90	89.5
Viscosity (cP) ±10%		620,000	670,000	740,000	660,000
Product For Dispensing					
Solder Powder Particle Size		45-20µm			
Code	Multicore	AGS			
	J-STD-005	Type 3			
Metal Content (%)		85			
Viscosity (cP) ±10%		400,000			

Multicore RP15 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 Multicore RP15 medium produces greater tolerance to process variations and a lower tendency to poor component wetting.

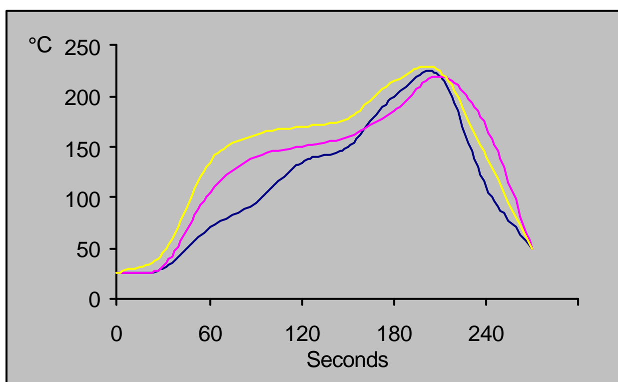
RECOMMENDED OPERATING CONDITIONS

Application by Printing: Multicore RP15 solder pastes are available for stencil printing down to 16mil (0.4mm) pitch devices with the AGS (Type 3) and ACS powder sizes. Printing at up to 150mm 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 that ensures the high shear rate viscosity is relatively low but 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 Multicore RP15 particularly useful for second side printing processes. The excellent resistance to drying and consequent avoidance of blocking stencil apertures means that Multicore RP15 yields good quality prints immediately after printer downtimes of greater than 3 hours (in laboratory tests) with no need for conditioning prints. Multicore RP15 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.

Application by Dispensing: The dispensing grade of RP15 is suitable for use with 22 gauge needles or larger. It is essential that the dispensing mechanism and needles are clean and in good condition. Regular cleaning of the dispensing equipment is recommended before and immediately after use to prevent contamination with dry solder paste. Even relatively small amounts of contamination in the dispensing equipment and needles will cause inconsistent deposit volumes and even complete system blockage.

A Henkel Company

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.



Cleaning: The residues from Multicore RP15 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 Prozone Plus, or water containing suitable saponifying agents.

MATERIAL PROPERTIES

Solder Powder: The solder powder for Multicore RP15 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 80 ppm (expressed as oxygen in the solder) is regularly achieved or bettered.

Solder Paste Medium: Multicore RP15 contains a stable resin system and solvents with high boiling ranges and low odour. The flux has been formulated to meet the requirements of IPC type LR3CN and the Bellcore specification.

Test	Specification	Results
Corrosion	DTD 599A IPC-SF-818 BS5625	Pass
Copper Mirror Corrosion	IPC-SF-818	Pass
Surface Insulation Resistance (without cleaning)	IPC-SF-819 J-STD-004 Bellcore TR-NWT-000078	Pass
Electromigration (without cleaning)	Bellcore TR-NWT-000078	Pass
Flux Activity Classification	IPC-SF-818 J-STD-004 EN 29454	LR3CN ROL1 1.1.2

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.

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 can be summarised as the "Thixotropic Index" of a paste.

Typical properties of selected Multicore RP15 solder pastes are as follows. Full details of test methods with be supplied on request.

Alloy		Sn60, Sn62, Sn63			63S4
Metal Content %		85	89.5	90	89.5
Powder Particle size	µm	45-20			45-10
	code	AGS			ACS
Viscosity, 25°C					
Brookfield, KcP(1)		400	670	740	6600
Malcom, P(2)		560	1,500	1,750	1,400
Thixotropic index (3)		0.6	0.68	0.65	0.70
Slump, (4) IIW test method, mm					
1 hour, room temp.					
0.7mm pads		0.2	0.2	0.2	0.2
1.5mm pads		0.2	0.2	0.2	0.2
80°C, 20 minutes					
0.7mm pads		0.5	0.2	0.2	0.2
1.5mm pads		0.5	0.3	0.2	0.2
Tack (5)					
Initial tack force, g mm^{-2}		1.36	-	1.62	1.46
Useful open time, h		>48		>48	>48

(1) Measured at 25°C, TF spindle at 5 rpm after 2 minutes
(2) Measured at 25°C and a shear rate of $6s^{-1}$
(3) The Thixotropic Index (TI) is defined as: TI =log (viscosity at $1.8s^{-1}$/viscosity at $18s^{-1}$)
(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 RP15 solder pastes are supplied in:

- 1 kg, 500g or 250g plastic jars with an insert to seal off the surface of the paste
- 1 kg or 500g vacuum filled cartridges for direct application to stencils
- Multicore RP15 solder pastes are supplied in a wide range of syringe and cartridge types to suit most dispensing equipment

Other forms of packaging may be available on request.

Shelf Life: Provided Multicore RP15 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 RP15 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

WARNING: The following information is for guidance only and users must refer to the Material Safety Data Sheet relevant to specific Multicore RP15 solder paste products before use.

Fumes, Vapours and Precautions: The flux fumes given off at soldering temperatures are irritating to the nose, throat and respiratory organs. Prolonged or repeated exposure to the fumes may cause sensitisation.

These materials should always be used in a well-ventilated area and suitable fume extraction should be used to extract flux fumes away from the operators.

Protection and Hygiene: Suitable protective clothing should be worn to prevent materials from coming into contact with the skin and eyes. If the materials come into contact with the skin, the affected area should be cleaned with a proprietary hand cleanser followed by washing with soap and water. If the materials come into contact with the eyes, they should be irrigated thoroughly with running water for a least 10 minutes and medical attention sought.

Eating, drinking or smoking should not be permitted in the working area and hands should be washed thoroughly with soap and warm water before eating.

Fire Hazards and Precautions: The flashpoint of the solvent used in these materials is high (118°C) but it is combustible. Carbon dioxide, foam or dry powder extinguishers are suitable. High temperatures may produce heavy metal dust, fumes and/or vapours. Do not use water where molten metal is present.

Spillage and Waste Disposal: Spills of the materials should be scraped up and the contaminated area washed with water.

Waste materials should be stored in closed containers and disposed of in accordance with the relevant local and national regulations.

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, **Loctite Corporation specifically disclaims all warranties exressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Loctite Corporation's products. Loctite 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 Loctite 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.

Loctite is a Trademark of Loctite Corporation U.S.A.