



# HIGH-SPEED PRINTING, NO-CLEAN SOLDER PASTE

## PRODUCT DESCRIPTION

LOCTITE® Product Multicore™ MP200 solder pastes have been formulated as no-clean solder paste for high speed printing and reflow in both air and nitrogen. The product was specifically formulated to have increased reflow process window.

- Suitable for fine pitch, high speed printing up to 200mms<sup>-1</sup>.
- Extended printer open time and tack-life.
- Prolonged between print abandon time.
- Essentially colorless residues
- Soft residues make pin testing easier eliminating any need for cleaning.
- Resistant to both hot and cold slump.
- RO L0 TO ANSI/J-STD-004

Multicore MP200 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.

## TYPICAL APPLICATIONS

Multicore MP200 is a high activity No-Clean type of flux that 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 enhanced activity level of MP200 produces greater tolerance to process variations and lower tendency to solder balling. The extended between print abandon time makes MP200 also suitable for high mix production.

## TYPICAL PROPERTIES

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 characterize the rheology of solder pastes by making a viscosity measurement at a single specified shear condition. Increasing metal content increases the measured value. Higher metal contents, and decreasing the mean solder powder particle size can have a similar effect. A more informative indication of the rheological properties of solder pastes is provided by a plot of viscosity versus shear rate. These data can be summarized as the "Thixotropic Index" of a paste.

Typical properties of a selected Multicore MP200 solder paste are as follows. Full details of test methods will be supplied on request.

Properties		MP200			
Alloy	Sn63 SN62				
Metal Content, %	90				
Powder Particle Size, μm	45-20				
Powder Particle Size, J-Std-005	Type 3				
Powder Particle Size, Multicore Code	AGS				
Viscosity measured at 25°C (Typical)	680,000				
Brookfield, cP <sup>(1)</sup>	1,350				
Malcolm, p <sup>(2)</sup>	0.61				
Thixotropic Index, TI <sup>(3)</sup>					
Slump, J-Std-005 <sup>(4)</sup>	Horizontal pads		Vertical Pads		
8 mils stencil.	80 x 25 mil	80 x 25 mil	80 x 13 mil	80 x 13 mil	
Room temp	13 mil	13 mil	3.2 mil	3.2 mil	
150°C	13 mil	13 mil	3.2 mil	3.2 mil	
4 mils stencil	80 x 13 mil	80 x 13 mil	80 x 8 mil	80 x 8 mil	
Room temp	3.2 mil	3.2 mil	3.0 mil	3.0 mil	
150°C	3.2 mil	3.2 mil	3.0 mil	3.0 mil	
Tack <sup>(5)</sup>	1.1				
Initial tack force, gmm <sup>-2</sup>					
Useful open time, hours	>24 hr				

<sup>(1)</sup> Measured at 25°C, TF spindle at 5rpm after 2 minutes

<sup>(2)</sup> Measured at 25°C, and a shear rate of 6s<sup>-1</sup>

<sup>(3)</sup> TI = log (viscosity at 1.8s<sup>-1</sup>/viscosity at 18s<sup>-1</sup>)

<sup>(4)</sup> Slump data are expressed as the minimum spacing between pads of the size shown that does not allow bridging

<sup>(5)</sup> Tack data are derived from comparative laboratory tests and do not necessarily relate directly to a particular user's conditions

**Solder powder:** Careful control of the atomization process for production of solder powders for MP200 solder pastes ensures that the solder powder is at least 97% spherical (aspect ratio <1.5) and contains the minimum level of contaminants that could adversely affect solder paste performance. A typical maximum oxide contamination level of 80 ppm (expressed as oxygen in solder) is regularly achieved or bettered.

## TYPICAL RELIABILITY PROPERTIES

Solder paste medium: Multicore MP200 medium contains, a stable resin system, and slow evaporating solvents with little or no odor. The final formulation meets the requirements of the BellcoreGR-78-Core and ANSI/J-Std-004 for a type RO L0 classification. The reliability data for MP200 is summarized in the following table.

Test	Specification	Results
Copper Plate Corrosion	ANSI/J-STD-004	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	Pass
Electromigration (without cleaning)	Bellcore GR-78-Core	Pass
Flux Activity Classification (without cleaning)	ANSI/J-STD-004	RO L0

## GENERAL INFORMATION

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

However it should be noted that these products contain both lead which a toxic metal that produces a range of diverse health effects, and also rosins which are potential sensitizers.

## DIRECTIONS FOR USE

**Application:** Currently Multicore MP200 solder paste is available for stencil printing down to 16mils (0.4mm) pitch devices, with the type 3 (AGP) powder. Printing at up to  $8''s^{-1}$  ( $200mms^{-1}$ ) and down to  $1.5''s^{-1}$  ( $30mms^{-1}$ ) can be achieved using laser cut electro-polished, or electroformed stencils and metal squeegees (preferably  $60^\circ$ ). 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 give good print definition and slump resistance while maintaining good roll and drop off behavior. Unlike some pastes, high squeegee pressures are not required (typically 0.5 to 1.0 lbs. per inch), making MP200 particularly useful for second side printing processes.

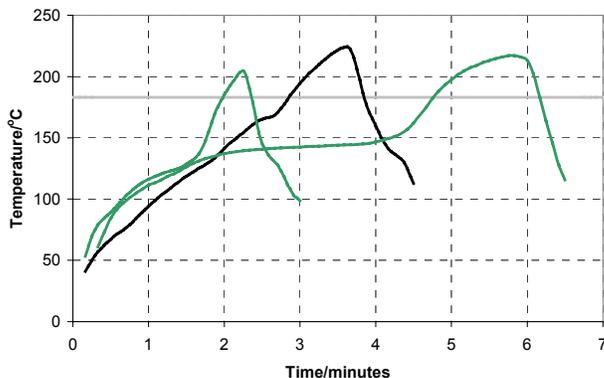
Acceptable first prints have been achieved at 16 mils (0.4mm) pitch after printer down times of greater than 90 minutes, without requiring a kneed cycle.

MP200 solder pastes do not require the addition of thinners. The only conditioning that may be done is to stir the paste in the jar for 15 seconds before introducing it to the stencil. Material in cartridges is conditioned by the shearing of the paste as it is expelled from the tip.

## Reflow:

Any of the available methods of heating to cause reflow may be used including IR, convection, hot belt, vapor phase and laser soldering. MP200 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 examples profiles that have given good results in practice.

### Example Profiles for SN63/62 MP200 Solder Paste



Note for soak profile

1. Ramp to 130 to 165°C at no more than  $2^\circ C s^{-1}$ .
2. Hold at 130 to 165°C for 60 –120 seconds.
3. Ramp to peak reflow temperature at no more than  $2^\circ C s^{-1}$ .
4. Recommended peak reflow temperature is 205°C to 225°C.
5. Dwell time above liquidus of 30-75 seconds.

## Cleaning:

The residues from Multicore MP200 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, or suitable saponifying agents.

For stencil cleaning and cleaning board misprints, Multicore SC-01 Solvent Cleaner is recommended.

## PACKAGING

MP200 solder pastes are supplied in:

- Various package sizes and types are available.
- Manual Repair Paste for SN62/63 in 30cc syringes for manual dispense only
- Tacky Flux in various package sizes

## Shelf Life:

Provided Multicore MP200 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 minimize the time that containers are exposed to higher temperatures.

## Storage

It is recommended to store MP200 at 5-10°C, (NB cartridges should be stored tip down to prevent the formation of air pockets). The paste should be removed from cold storage a minimum of 8 hours prior to use. Multicore MP200 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.

To prevent contamination of unused product, do not return any material to its original container. For further specific shelf life information, contact your local Technical Service Center.

## Data Ranges

The data contained herein may be reported as a typical value and/or range. Values are based on actual test data and are verified on a periodic basis.

**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 expressed 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.

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