

## Dispensed Solder Paste Systems For Electronic-Circuit Assembly



### High Mix SMT

SolderPlus® is the solution for surface mount (SMT) solder assembly in applications where multiple PC board designs are assembled in low volume production runs.

- Eliminate manual soldering failures
- Reduce costly stencil printer changeovers
- Reduce stencil fabrication and maintenance costs

The SolderPlus dispensing system provides precise, high speed solder application, while reducing high mix, SMT solder assembly costs.



### Mixed Technology Circuit Assembly

Air- or valve-dispensed SolderPlus is the answer for fast, quality solder assembly of mixed surface mount and through-hole technology boards. Exceptional flux capillary action and precise solder paste placement insure quality through-hole joints and repeatable, controlled SMT assembly in one preprogrammed, automated dispensing process.



### Flexible Circuit Assembly

Automated dispensing of SolderPlus is a viable assembly alternative to stencil printing methods for solder assembly on flexible circuit substrates with irregular surfaces.

Valve-dispensed SolderPlus with height sensing compensates for substrate irregularities common

with flexible circuit technologies. The result is consistent, repeatable dispensing. EFD offers a range of lead-free and tin/lead solder paste alloys to meet the temperature requirements of flexible substrate materials.

### Features/Benefits

- SolderPlus solder paste is designed for precise, repeatable valve dispensing with no costly waste.
- SolderPlus superior capillary action – great for through-hole component assembly.
- SolderPlus dispensing systems – ideal for flexible circuits and odd board shapes
- Changeover in seconds - change the syringe, select the program and run.



## Selecting Solder Paste

The Best **Materials**  
+ The Best **Tools**  
= The Best **Results**

Alloy	Solidus (°C)	Liquidus (°C)	Tensile Strength (psi)	Shear Strength (psi)
Sn42 Bi58	-E-	138	8000	NA
Sn43 Pb43 Bi14	144	163	6120	NA
Sn62 Pb36 Ag2	179	189	6700	6250
Sn63 Pb37	-E-	183	6700	6060
Sn60 Pb40	183	191	6200	5680
Sn96.5 Ag3.0 Cu0.5	217	219	NA	NA
Sn96.3 Ag3.7	-E-	221	8900	4600
Sn100	MP	232	1800	2560
Sn95 Sb5	232	240	5900	6200
Sn95 Ag5	221	245	10100	8400
Sn10 Pb88 Ag2	268	290	4900	4300
Sn5 Pb92.5 Ag2.5	287	296	4210	2240
Sn10 Pb90	275	302	4600	3900
Sn5 Pb95	308	312	4190	3000

-E-: Eutectic    MP: Melting Point    □: Lead free

### Alloy Selection

When choosing an alloy, the three most important factors are composition, solidus and liquidus temperatures. Alloy **composition** affects joint strength, visual fillet quality, wetting, leaching, and suitability as a lead-free alternative.

The **solidus** is the temperature at which 100% of the alloy is in a solid crystalline form. Soldering begins upon reaching the solidus. The **liquidus** is the temperature at which 100% of the alloy is in a fluid, non-crystalline form. In the “**plastic range**”, between the solidus and liquidus, some portion of the alloy is solid but the majority is liquid. Alloys are eutectic when the solidus and liquidus are equal.

Step soldering, multiple soldering processes at different temperatures, requires careful alloy selection. The peak reflow temperature for the lower temperature alloy must not reach the solidus of the higher temperature alloy.

### Solder Powder Sizes

It is important to choose a solder alloy powder size that will meet your processing needs. To ensure the most consistent and robust process possible, pick the size recommended for the smallest solder feature in your application.

Powder Type	Size (microns)	Mesh Count	Dispense Dot Diameter	
			(mm)	(inches)
II	75-45μ	-200+325	0.8	0.030
III	45-25μ	-325+500	0.5	0.020
IV	38-25μ	-400+500	0.3	0.012
V	25-20μ	-500+635	0.25	0.010
VI	15-5μ	NA	0.1	0.004

### Flux Options

**No-Clean (NC)** flux consists of rosin, solvent, and a small amount of activator. NC flux has low activity and is suited to easily solderable surfaces. NC residue is clear, hard, non-corrosive, non-conductive, and designed to be left on your assembly. Residue may be removed with an appropriate solvent if so desired.

**Rosin mildly activated (RMA)** flux consists of rosin, solvent, and a small amount of activator. Most RMA flux is fairly low in activity and best suited to easily solderable surfaces. RMA flux residue is clear, soft, non-corrosive, and non-conductive. Cleaning is optional. Residue may be removed with an appropriate solvent if so desired.

**Rosin activated (RA)** flux consists of rosin, solvent, and aggressive activators. RA flux has higher activity than RMA

for moderately oxidized surfaces. RA flux residue is corrosive and should be removed as soon as possible after reflow to prevent damage to your assembly. Maximum safe time before cleaning is product dependent. Residue may be removed with an appropriate solvent.

**Water soluble (WS)** flux consists of organic acids, thixotrope, and solvent. WS flux comes in a wide range of activity levels for soldering to even the most difficult surfaces. WS flux residue is corrosive and should be removed as soon as possible after reflow to avoid damage to your assembly. Maximum safe time before cleaning is product dependent. Residue may be removed with 60°C (140°F) water and 40 psi pressure.