DSP 215D (Sn63/Pb37) R.M.A. DISPENSING SOLDER PASTE

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Description

Delta Solder Paste 215D is a non-corrosive and mildly activated rosin solder paste designed for surface mount applications using a syringe dispensing method. The post soldering residues of DSP 215D are non-conductive, non-corrosive and highly insulated.

Main Features

- Easily dispensable
- Excellent wettability
- Hard non-conductive residues

	Specification	Test Method
Flux Classification	ROM0	J-STD-004
Copper Mirror	No removal of copper film	IPC-TM-650 2.3.32
Corrosion	Pass	IPC-TM-650 2.6.15
SIR		
J-STD-004	3.32 x 10^{10} ohms	IPC-TM-650 2.6.3.3
Electromigration	Pass	Bellcore GR-78-CORE 13.1.4
Post Reflow Flux Residue	60%	TGA Analysis
Acid Value	60	IPC-TM-650 2.3.13
Metal Loading	86%	IPC-TM-650 2.2.20
Viscosity		
Brookfield (1), kcps	400+/-10% kcps	IPC-TM-650 2.4.34 modified
Malcom (2), poise	850-1100	IPC-TM-650 2.4.34.3 modified
Slump Test		
25 ℃, 0.63 vertical/horizontal	No bridges all spacings	IPC-TM-650 2.4.35
150 ℃, 0.63 vertical/horizontal	No bridges all spacings	IPC-TM-650 2.4.35
25 ℃, 0.33 vertical/horizontal	0.15 /0.15	IPC-TM-650 2.4.35
150 ℃, 0.33 vertical/horizontal	0.20/0.20	IPC-TM-650 2.4.35
Solder Ball Test	Pass	IPC-TM-650 2.4.43
Tack		
Initial	82 gm	JIS Z 3284
Tack retention @ 24 hr	68gm	JIS Z 3284
Tack retention @ 72 hr	55 gm	JIS Z 3284

Physical Properties

Solder Composition

Sn63/Pb37 alloy is the conventional eutectic solder used in most electronic assemblies. The Sn63 alloy conforms and exceeds the impurity requirements of J-STD-006 and all other relevant international standards.

Typical Analysis

Sn	Pb	Cu	Ag	Sb	Bi	In	As	Fe	Ni	Cd	Al	Zn	Au
62.5-63.5	Bal.	0.080 Max	0.100 Max	0.200 Max	0.100 Max	0.100 Max	0.030 Max	0.020 Max	0.010 Max	0.002 Max	0.005 Max	0.003 Max	0.050 Max

	Sn63/Pb37
Melting Point, ℃	183 E
Hardness, Brinell	14HB
Coefficient of Thermal Expansion	24.7
Tensile Strength, psi	4442
Density, g/cc	8.42
Electrical Resistivity , (µohm-cm)	14.5
Electrical Conductivity, 10^4/ohm-cm	6.9

	Sn63/Pb37
Yield Strength, psi	3950
Total Elongation,%	48
Joint Shear Strength, at 0.1mm/min 20 ℃	23
Joint Shear Strength, at 0.1mm/min 100 ℃	14
Creep Strength, N/mm^2 at 0.1mm/min 20 ℃	3.3
Creep Strength, N/mm^2 at 0.1mm/min 20 ℃	1
Thermal Conductivity, W/m.K	50.9

Particle Size

Sn63 alloy is available in Type 3(45-25µm), 4(38-20µm), and 5 (25-15µm) J-STD-005 powder distribution. Solder powder distribution is measured utilizing laser diffraction, optical analysis and sieve analysis. Careful control of solder powder manufacturing processes ensures the particles' shape are 95% spherical minimum (aspect ratio < 1.5) and that the alloy contains a typical maximum oxide level of 80 ppm.

Metal Loading

Typical metal loading for dispensing application is **85.0-87.0 %.**

Printing of Solder Paste

Dispensing

	Needle inner diameter		Applicable powder
Needle Gauge	in.	µm	(mesh cut)
18	0.033	838	-200+325
20	0.023	584	-325+500
21	0.020	508	-325+500
22	0.016	406	-325+500
23	0.013	330	-325+500
25	0.010	254	-400+635
27	0.008	203	-500

The clearance gap between the needle and the substrate affects the shape and quality of the dot dispensed. If the clearance is too little, the dot tends to be flattened out, and if too large, the dot tends to have long tailing.

Pressure

The pressure applied in the syringe should be kept at a minimum, and the proper head pressure kept in the range of 15-25 lb/in^2 (1.05-1.76 kg/cm^2). In cases where a paste requires much higher pressure (more than 40 lb/in^2 or 2.82 kg/cm^2) to dispense, the paste will become inconsistent and clogging may be expected. The external air pressure supply should be maintained constant.

Open & Abandon Time

Tests have proven that DSP 215D without paste drying out. If extended downtime is expected (>4 hrs) , the whole dispensing sysem should be flushed without leaving any paste in any part of the system.

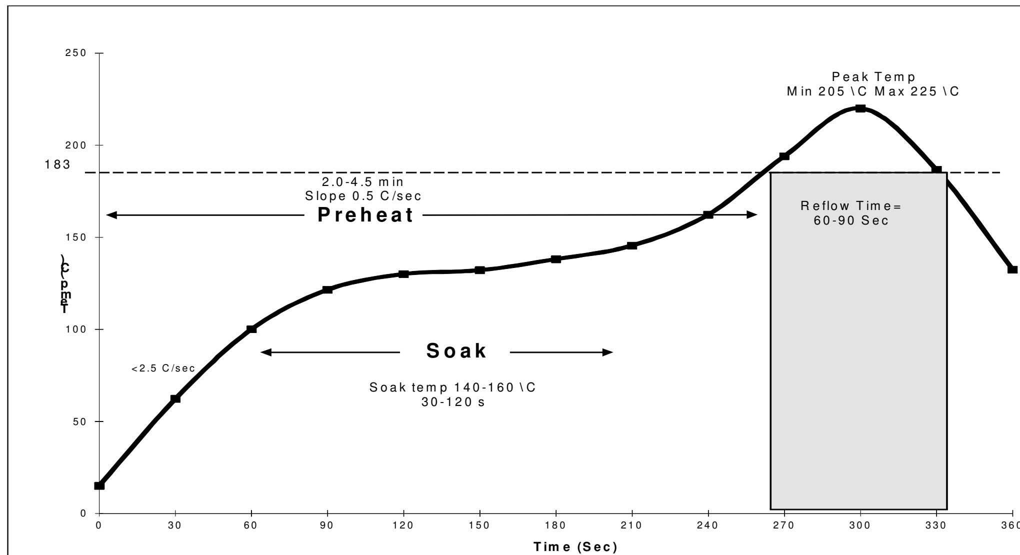
Paste Application

Solder paste should be taken out of the refrigerator at least 3 to 6 hours prior to use. This will give the paste enough time to come to thermal equilibrium with the environment. The flow rate of paste in a dispensing application depends on viscosity, which cn be altered by temperature change. If solder paste is supplied in syringes pre-mixing is not necessary due to the shear action produced from the dispensing.

Reflow

Best results have been acheived when DSP 215D is reflowed in a ***forced air convection*** oven with a minimum of 8 zones (top & bottom), however, reflow is possible with a 4 zone oven (top & bottom).

The following is a recommended profile for a forced air convection reflow process. The melting temperature of the solder, the heat resistance of the components, and the characteristics of the PCB (i.e. density, thickness, etc.) determine the actual reflow profile.



***Preheat Zone**- The preheat zone, is also referred to as the ramp zone, and is used to elevate the temperature of the PCB to the desired soak temperature. In the preheat zone the temperature of the PCB is constantly rising, at a rate that should not exceed 2.5 C/sec. The oven's preheat zone should normally occupy 25-33% of the total heated tunnel length.*

***The Soak Zone-** normally occupies 33-50% of the total heated tunnel length exposes the PCB to a relatively steady temperature that will allow the components of different mass to be uniform in temperature. The soak zone also allows the flux to concentrate and the volatiles to escape from the paste.*

***The Reflow Zone-** or spike zone is to elevate the temperature of the PCB assembly from the activation temperature to the recommended peak temperature. The activation temperature is always somewhat below the melting point of the alloy, while the peak temperature is always above the melting point.*

Flux Residues & Cleaning

DSP 215D is an RMA formulation, therefore, the residues may not need to be removed for certain applications. If residue removal is desired, the use of Everkleen 1005 Buffered Saponifier with a 5-15% concentration in hot 60 °C (140 °F) will aid in residue removal.

Storage & Shelf Life

It is recommended that solder paste be stored at a temperature of between 35-50 °F (2-10 °C) to minimize solvent evaporation, flux separation, and chemical activity. If room temperature storage is necessary it should be maintain between 68-77 °F (20-25 °C).

Shelf Life
Unopened Container (35-50°F/2-10°C) 6 months (from DOM)
Unopened Container (68-77°F/20-25°C) 3 months (from DOM)

Working Environment

Solder paste performs best when used in a controlled environment. Maintaining ambient temperature between 68-77 °F (20-25 °C) at a relative humidity of 40-65% will ensure consistent performance and maximum life of paste.

Packaging

10cc	35 gm
30cc	100 gm

Disposal

DSP 215D should be stored in a sealed container and disposed of in accordance with state & local authority requirements.