DSP 215D (Sn/Ag/Cu)
LEAD FREE
R.M.A. DISPENSING
DELTA® SOLDER PASTE

CORPORATE HEADQUARTERS USA: 315 Fairbank St. Addison, IL 60101 ⁄ 630-628-8083⁄ FAX 630-628-6543
EUROPE UK: Unit 9 Apex Ct. Bassendale Rd. Bromborough, Wirral CH62 3RE ⁄ 44 151 334 0888⁄ FAX 44 151 346 1408
ASIA-PACIFIC HEADQUARTERS SINGAPORE: 6 Tuas South St. 5 Singapore 637790 ⁄ 65 6795 7757 ⁄ FAX 65 6795 7767
PHILIPPINES: Phase 1 Qualitek Ave. Mariveles, Bataan Philippines C-2106 ⁄ 6347 935 4119 ⁄ FAX 6347 935 5608
CHINA: 3B/F, YiPa Print Bldg. 351 # JiHua Rd., Buji Shenzhen, China 518112 ⁄ 86 755 28522814 ⁄ FAX 86 755 28522787

Description

Qualitek has developed a unique R.M.A. dispensing flux system designed for both leaded and lead free alloys, such as SAC or Sn/Ag. DSP 215D is available in 10cc and 30cc syringes for easy dispensing for rework applications.

In addition, DSP 215D Lead Free solder paste exhibits superior joint strength and excellent wettability. 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

Technical Data

	Specification	Test Method
Flux Classification	ROL0	IPC-J-STD-004B
Copper Mirror	No removal of copper film	IPC-TM-650 2.3.32
Corrosion	Pass	IPC-TM-650 2.6.15
SIR	>1.00 x 10^{10}ohms	IPC-TM-650 2.6.3.3
Electromigration	Pass	Bellcore GR-78-CORE 13.1.4
Post Reflow Flux Residue	55%	TGA Analysis
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
Thixotropic Index	0.50-0.60	
Solder Ball Test	Pass	IPC-TM-650 2.4.43

Physical Properties

Solder Composition

Qualitek Sn/Ag/Cu (Tin/Silver/Copper) alloys are designed as a lead-free alternative for Sn/Pb alloys for electronics assembly operations. Qualitek Sn/Ag/Cu alloys conform and exceed the impurity requirements of IPC-J-STD-006C and all other relevant international standards.

Typical Analysis

	Sn	Ag	Cu	Al	Au	As	Bi	Cd	Fe	In	Ni	Pb	Sb	Zn
LF955-38	Bal	3.6-4.0	0.5-0.9	0.005 Max	0.050 Max	0.030 Max	0.100 Max	0.002 Max	0.020 Max	0.100 Max	0.010 Max	0.070 Max	0.200 Max	0.003 Max
LF958-35	Bal	3.3-3.7	0.5-0.9	0.005 Max	0.050 Max	0.030 Max	0.100 Max	0.002 Max	0.020 Max	0.100 Max	0.010 Max	0.070 Max	0.200 Max	0.003 Max
LF965-30	Bal	2.8-3.2	0.3-0.7	0.005 Max	0.050 Max	0.030 Max	0.100 Max	0.002 Max	0.020 Max	0.100 Max	0.010 Max	0.070 Max	0.200 Max	0.003 Max
LF217	Bal	3.8-4.2	0.3-0.7	0.005 Max	0.050 Max	0.030 Max	0.100 Max	0.002 Max	0.020 Max	0.100 Max	0.010 Max	0.070 Max	0.200 Max	0.003 Max

	Sn/Ag/Cu
Melting Point, °C	217-221
Hardness, Brinell	15HB
Coefficient of Thermal Expansion	Pure Sn= 23.5
Tensile Strength, psi	4312
Density, g/cc	7.39
Electrical Resistivity (μohm-cm)	13.0
Electrical Conductivity, %IACS	16.6

	Sn/Ag/Cu
Yield Strength, psi	3724
Total Elongation, %	27
Joint Shear Strength, at 0.1mm/min 20 °C	27
Joint Shear Strength, at 0.1mm/min 100 °C	17
Creep Strength, N/mm^2 at 0.1mm/min 20 °C	13.0
Creep Strength, N/mm^2 at 0.1mm/min 100 °C	5
Thermal Conductivity, W/m.K	58.7

Particle Size

SAC alloys are available in 3(45-25μm), 4(38-20μm) and 5(25-15μm) IPC-J-STD-005A 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 **85-87%.** Compared to typical Sn63/Sn62 solder pastes manufactured with 88% by weight metal loading, DSP 215D Lead Free provides as much as 10-12% higher metal volume than Sn63/Sn62. This increased in volume of DSP 215D promotes better wetting and spreading of Sn/Ag/Cu lead free alloy.

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 will perform during continuous dispensing for up to 2 hrs. The paste can be left in the dispensing unit for up to 2 hours without paste drying out. If extended downtime is expected (>2 hrs) , the whole dispensing sysem should be flushed without leaving any paste in any part of the system.

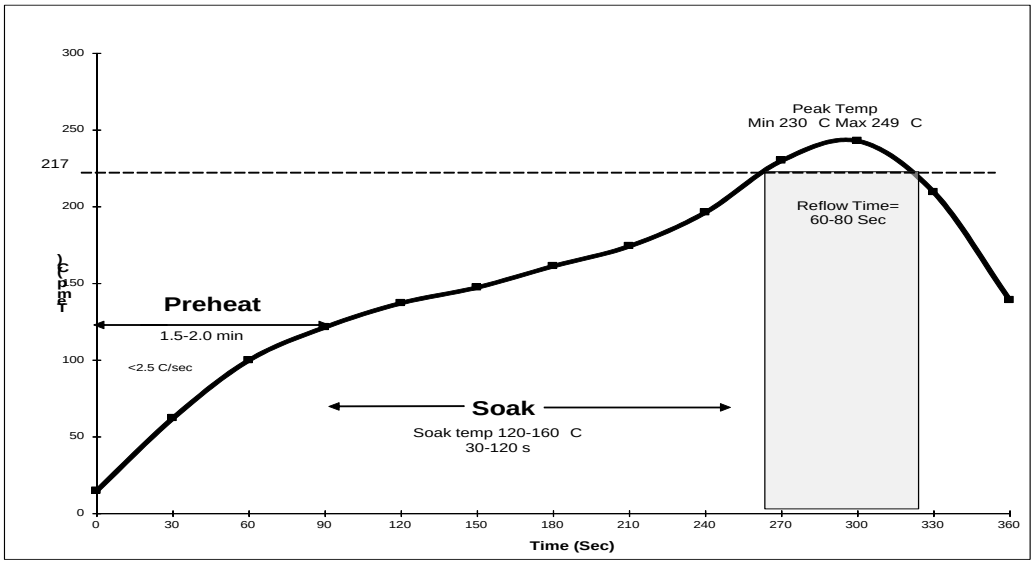
Paste Application

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 R.M.A. formulation, therefore, the residues should be removed for typical 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. Shelf life is 6 months from date of manufacture.

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

Sn/Ag/Cu alloy DSP 215D should be stored in a sealed container and disposed of in accordance with all local, regional, national and international regulations.