DSP 798LF (Ecolloy™)
LEAD FREE
WATER SOLUBLE
SOLDER PASTE

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Description

Qualitek has developed a new patented lead free alloy, Ecolloy™ that performs better than SAC305 in the drop test. Ecolloy has a melting point range in between SAC305 and Sn/Cu alloys for better performance during reflow. Ecolloy is available in both no clean and water soluble solder paste types.

DSP 798LF lead-free solder paste with Ecolloy exhibits superior joint strength, excellent wettability and print definition. DSP 798LF residues are easily removed so yields bright, shiny solder joints.

Main Features

- Ecolloy has greater tensile strength than SAC alloys
- Ecolloy has better workability during reflow than Sn/Cu alloys
- Bright, shiny joints
- Extended stencil life
- Excellent wettability

Technical Data

	Specification	Test Method
Flux Classification	ORH1	J-STD-004
Copper Mirror	> 50% removal of copper film	IPC-TM-650 2.3.32
Corrosion	Pass	IPC-TM-650 2.6.15
SIR		
J-STD-004	4.45 x 10^{10} ohms	IPC-TM-650 2.6.3.3
Post Reflow Flux Residue	60%	TGA Analysis
Acid Value	55	IPC-TM-650 2.3.13
Metal Loading	89%	IPC-TM-650 2.2.20
Viscosity		
Brookfield (1), kcps	900+/-10% kcps	IPC-TM-650 2.4.34 modified
Malcom (2), poise	2400-2850	IPC-TM-650 2.4.34.3 modified
Thixotropic Index	0.50-0.60	
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	62 gm	JIS Z 3284
Tack retention @ 24 hr	47.2 gm	JIS Z 3284
Tack retention @ 48 hr	25.0 gm	JIS Z 3284
Stencil Life	4-6 hrs	QIT 3.44.5
Abandon Time	30 min	QIT 3.44.6
Ionic Residues (Cleaned)	<1.56 ug/cm^2	IPC-TM-650 2.4.25

Physical Properties

Solder Composition

Ecolloy™ conforms and exceeds the impurity requirements of J-STD-006C and all other relevant international standards.

Typical Analysis

	Sn	Ag	Cu	Pb	Sb	Bi	In	As	Fe	Ni	Cd	Al	Zn	Au
Ecolloy™	Bal	0.100 Max	0.1-1	0.070 Max	0.200 Max	<6.0	0.100 Max	0.030 Max	0.020 Max	0-0.1	0.002 Max	0.005 Max	0.003 Max	0.050 Max

	Ecolloy™	SAC305
Melting Point, °C	221 - 227	217 - 221
Hardness, HV	23	14.1
Coefficient of Thermal Expansion, ppm/ °C	23	23
Tensile Strength, MPa	63	49
Density, g/cc	7.4	7.4
Electrical Resistivity (µohm-cm)	12	12
Electrical Conductivity, %IACS	14.3	14.3
Elongation, %	50	63
Specific Heat, J/g.K	0.23	0.23

Particle Size

Ecolloy™ is available in 3(45-25µm) and 4(38-20µm) according J-STD-005 powder distribution.

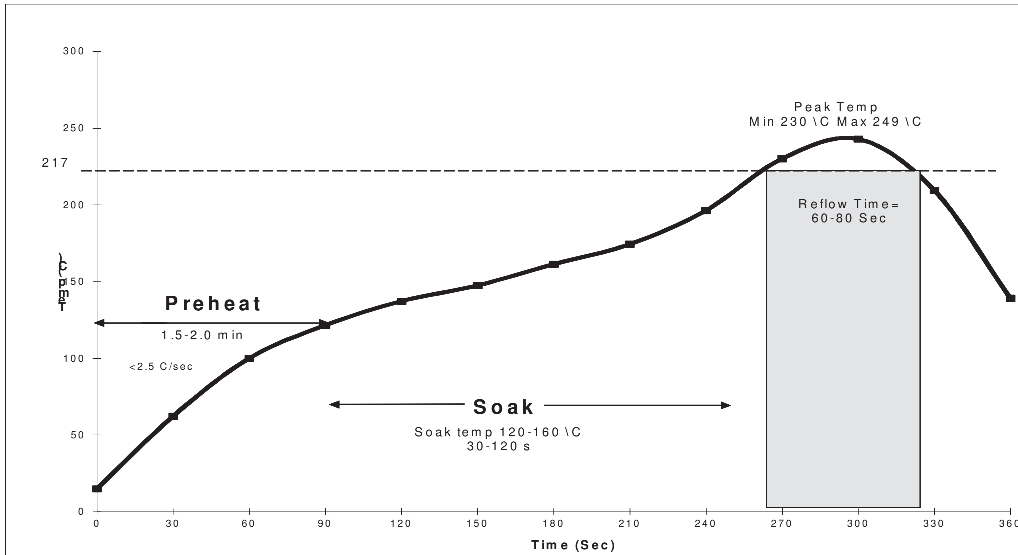
Metal Loading

Typical metal loading for lead-free stencil printing application is **88-89%** compared to typical Sn/Pb solder pastes manufactured with 90% by weight metal loading,

Reflow

Best results have been acheived when DSP 798LF 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 798LF is water-soluble formulation, therefore, residue removal is required. Residue removal is easily achieved, with the use of hot 60 ℃ (140 ℉) de-ionized water in either a batch or conveyor cleaner system. Spray pressures should be maintained at 20-30 psi and conveyor speed of 3-6ft/min.

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 of between 68-77 °F (20-25 °C) at a relative humidity of 40-65% will ensure consistent performance and maximum life of paste.

Cleaning Misprint Boards

If you should have a misprinted board, the paste may be cleaned off manually with alcohol (IPA) or Qualitek stencil cleaner, SK-11. If you have a more elaborate board cleaner, the paste may be easily removed with use of a 5% saponifier solution in hot DI water. Qualitek SK-45 Stencil Cleaner could be used in this process.

Stencil Cleaning

Periodic cleaning of the stencil during production is recommended to prevent any paste from being deposited in unwanted areas of the board. Solder balls production increases without periodic stencil cleaning. We recommend a periodic dry wipe (every 5 to 10 boards) with an occasional wet wipe (every 15 to 25 boards). When running fine pitch boards, the cleaning may need to become more frequent. The wet wipes should be performed with either alcohol or a stencil cleaner. Qualitek SK-11 stencil cleaner is designed for this purpose. If you have stencil cleaning equipment, Qualitek SK- 45 Stencil Cleaner is highly recommended for stencil cleaning purposes.

Packaging

6 oz. Jar	250-500 gm
6 oz. Cartridge	500-700 gm
12 oz. Cartridge	1000-1400gm

Disposal

DSP 798LF should be stored in a sealed container and disposed of in accordance with state & local authority requirements.