

SOLDER CONNECTION

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QUALITEK® Technical Bulletin

Delta DSP SAC305 825HF

DESCRIPTION

DSP 825HF is a lead-free, no clean, halogen-free solder paste designed specifically with robust flux activity and enhanced printing characteristics for ultra-fine pitch applications. DSP 825HF offers enhanced features such as enhanced shelf life, room temperature stable at 6 months. It provides an x-treme fluxing activity level with excellent wetting on copper OSP-coatings. Wide reflow process windows combined with high thermal stability yield solder joints with smooth surfaces. In addition, DSP 825HF offers repeatable, consistent printing characteristics combined with long stencil and tack life to accommodate high speed printing. This material yields excellent printing capabilities across various board designs and ultra-fine pitch down to 0.3mm pitch with excellent paste release to achieve brick like print results.

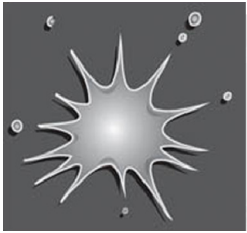
FEATURES AND BENEFITS

- Enhanced print characteristics utilizing proprietary paste flux manufacturing techniques
- Temperature Stable 6 months < 25 °C at room temperature
- Excellent wetting and coalescence for pads as small as 0.25 µm (0.010") with 4 mil stencil
- Superior resistance to hot slump
- Extended Stencil Life and Tack
- Extended Shelf Life
- Medium soft non-cracking residue/pin testable
- More forgiving TAL flux formulation to minimize and eliminate Voids
- Suitable with air or nitrogen atmosphere
- Complies with RoHS Directive 2011/65/EC

FEATURES AND BENEFITS

	Specification	Test Method
Flux Classification	ROLO	JSTD-004B
Copper Mirror	No removal of copper film	IPC-TM-650 2.3.32
Corrosion	Pass	IPC-TM-650 2.6.15
SIR	2.01 x 10 ¹⁰ ohms	IPC-TM-650 2.6.3.3
Electromigration	Pass	Bellcore GR-78-CORE 13.1.4
Post Reflow Flux Residue Acid Value	55%	TGA Analysis
Metal Loading	88.5%	IPC-TM-650 2.2.20
Viscosity		
Malcom (2), poise	1600-1900	IPC-TM-650 2.4.34.3 modified
Thixotropic Index	0.50-0.60	
Slump Test	Pass	IPC-TM-650 2.4.35
Solder Ball Test	Pass	IPC-TM-650 2.4.43
Tack		
Initial	124gm	JIS Z 3284
Tack retention @ 24 hr	111 gm	JIS Z 3284
Tack retention @ 72 hr	98 gm	JIS Z 3284
Stencil Life	>8 hrs	QIT 3.44.5
Abandon Time	60 min	QIT 3.44.6

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AVAILABILITY

- SAC305 (Sn96.5/Ag3.0/Cu0.5) – See Particle Size section below
- Ecolloy™ – Available in Types 3 and 4
- LF217 (Sn95.5/Ag4.0/Cu0.5) – Available in Types 3 and 4
- Sn100e (Sn99.3/Cu0.7/Co<0.1) – Available in Type 3
- Sn96.5/Ag3.5 – Available in Types 3 and 4
- For alloys other than those listed above, contact sales.

PARTICLE SIZE

SAC305 alloy is available in Type 3(25-45 µm), Type 4(20-38µm) and Type 5(25-15µm) per IPC J-STD-005 powder distribution.

PACKAGING

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

SOLDER COMPOSITION

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

PRINTING

Stencil:

PHD, FG, Nickel Coated Stainless Stencil and Electroformed Stencil are preferred. DSP 825HF has been used successfully with 6 mil, 5 mil, and 4 mil foil thickness with excellent paste release.

Squeegee:

Blades: Metal (stainless steel) squeegee blades angled from 45-60o give the best print definition. Metal (nickel) squeegee blades angled from 45-60o give the best performance. 90 durometer polyurethane may also be used.

Pressure: Pressure should be adjusted at the point where the paste leaves a relatively clean stencil after each print pass. Typical pressure setting 0.6-1.5lb per linear inch of blade.

Speed: Normal print speeds are 1.0-2.5 (25-50mm) per second. As print speeds increase pressure will need to be increased.

PRINT DEFINITION

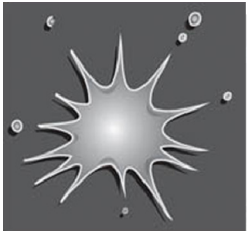
DSP 825HF provides excellent print definition characterized by brick-like prints. Good release is seen on 12-9 mil apertures.

APPLICATION

DSP 825HF should come to thermal equilibrium with the environment before use. New unopened containers should be gently mixed for at least one minute with a spatula. Be sure not to mix the paste too vigorously, as this will degrade the paste's viscosity characteristics and introduce entrapped air into the paste. The purpose of the mixing is to insure paste rheology is smooth and consistent and at its optimum.

OPEN & ABANDON TIME

Tests have proven that DSP 825HF will perform during continuous printing for up to 8 hrs. Field test have shown that an abandon time of at least 1 hr is possible, resulting in a perfect 1st pass print on resumption of printing.



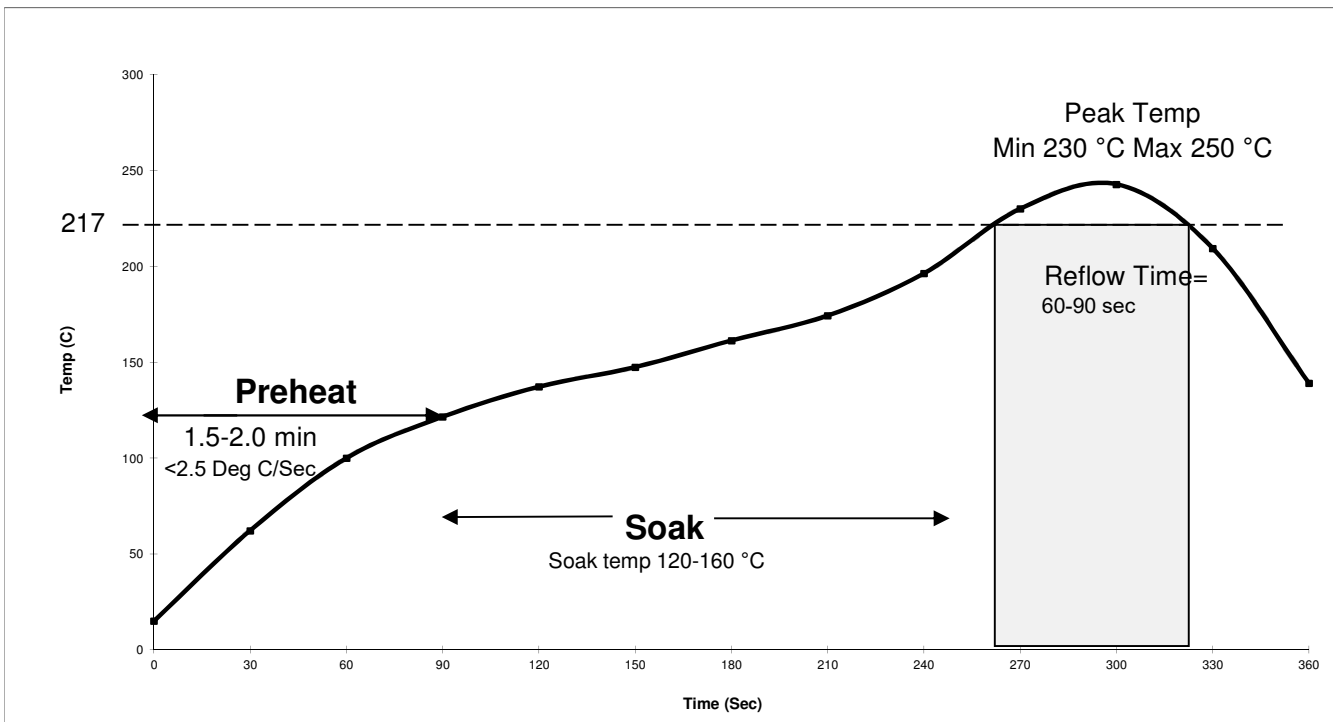
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REFLOW

Best results have been achieved when DSP 825HF is reflowed in a forced air convection oven with a minimum of 7 zones (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

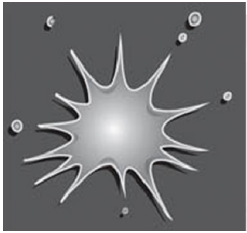
DSP 825HF is a no clean formulation therefore the residues are non-conductive and non-corrosive. The flux residues do not need to be removed as they are completely benign and aids in the insulation of the solder joints. Flux residues after reflow are clear and light in color. Flux residues are compatible with standard electronic grade conformal coating such as: acrylic, polyurethane, silicon resins, epoxy resins and parylene. If residue removal is desired, the use of eco-friendly aqueous cleaning chemistries can be used.

STORAGE & SHELF LIFE

It is recommended that solder paste be stored at a temperature of between 35-78 °F (2- 25° C) to minimize solvent evaporation, flux separation, and chemical activity. If room temperature storage is necessary it should be maintained between 68-77°F (20-25 °C).

Unopened Container (35-50°F/2-10 °C) 12 months (from DOM)

Unopened Container (68-77°F/20-25 °C) 6 months (from DOM)



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AVAILABILITY

Once you have opened a new jar and have exposed the solder paste to ambient air, we do not recommend mixing the used paste with fresh paste. Used paste should be tightly sealed with plastic insert plunger depressed and no trapped air exists between paste and jar insert. Though 825HF has a low evaporation solvent system, the life of the solder paste is dependent on working environment and is variable, paste dry-out due to solvent evaporation is normal. Used solder paste significantly thickened compared to its original properties will cause significant printing problems. If significant printing problems occur, discard the paste.

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 stencil cleaner solutions.

STENCIL CLEANING

Periodic cleaning of the stencil during production is recommended to prevent any paste from being deposited in unwanted areas of the board. We recommend a periodic dry wipe (every 5 to 10 boards) with an occasional wet wipe (every 5 to 10 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. Isopropyl Alcohol is designed for this purpose. When cleaning the stencil at the end of a job, the cleaning should be more thorough.

DISPOSAL

DSP 825HF should be stored in a sealed container and disposed of in accordance with state & local authority requirements.

The information contained herein is based on data considered accurate and is offered at no charge. No warranty is expressed or implied regarding the accuracy of this data. Liability is expressly disclaimed for any loss or injury arising out of the use of this information or the use of the materials designated.