DSP 825HF X-TREME ACTIVITY HALOGEN FREE LEAD FREE NO CLEAN SOLDER PASTE

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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.

Main Features

- 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 Pm (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

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 x 10^8 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	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	124 gm	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

Available Alloys & Particle Size

1. SAC305 (Sn96.5/Ag3.0/Cu0.5) – See Particle Size section below
2. LF217 (Sn95.5/Ag4.0/Cu0.5) – Available in Types 3 and 4

3. Sn100e
   (Sn99.3/Cu0.7/Co<0.1) – Available in Type 3
4. Delta 99C (Sn99.3/Cu0.7/Ni<0.1/Ge<0.01) – Available in Type 3
5. Sn96.5/Ag3.5 – Available in Types 3 and 4
6. For alloys other than those listed above, contact sales.

Particle Size

SAC305 alloy is available in Type 3(25-45 Pm), Type 4(20-38Pm) and Type 5(25-15Pm) per IPC J-STD-005 powder distribution. All other lead-free alloys are available in Type 3(25-45 Pm) and Type 4(20-38Pm) powder distribution.

Packaging

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

Solder Composition

Qualitek Sn/Ag/Cu (Tin/Silver/Cu) 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.

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 are1.0-2.5 (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.

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.

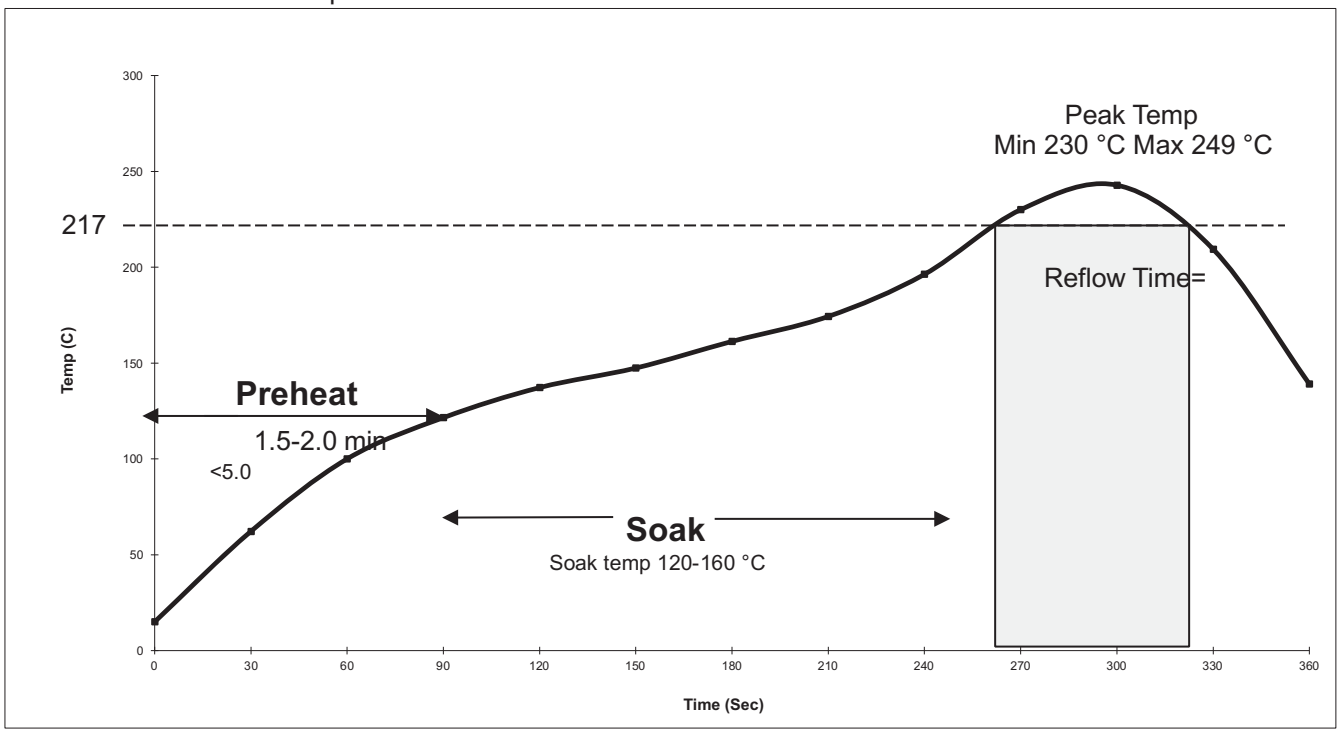
Paste Application

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.

Reflow

Best results have been acheived 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.



Reflow Segment	Recommended Range	Acceptable Range	Comments / Engineering Purpose
Ramp (ambient → soak)	1.0 – 2.5 °C/s	≤ 5.0 °C/s	Controls flux volatiles and prevents solder balling or component stress.
Soak Temp Zone	120 – 160 °C	140 – 190 °C	Ensures uniform PCB temperature and complete flux activation; helps void reduction on BTC/QFN pads.
Soak Time	60 – 120 s	45 – 150 s	Stabilizes component delta-T prior to reflow peak.
Time Above Liquidus (>217 °C)	45 – 90 s	30 – 100 s	Guarantees complete alloy melting and wetting without excessive IMC growth.

Reflow Segment	Recommended Range	Acceptable Range	Comments / Engineering Purpose
Peak Temperature (component)	235 – 245 °C	230 – 249 °C	Target within 15–25 °C above liquidus; lower end for small/light boards, higher for high-mass assemblies.
Cooling Rate	2 – 4 °C/s	1 – 6 °C/s	Controls grain structure; faster cooling promotes fine intermetallic and joint reliability.
Atmosphere	Air or N_2	N_2 preferred for dense/OSP assemblies	Reduces oxidation, improves wetting, lowers voiding tendency.

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 ecofriendly aqueous cleaning chemistries can be used.

Storage & Shelf Life

It is recommended that solder paste be stored at a temperature of between 35-77 °F (2- 25° C) to minimize solvent evaporation, flux separation, and chemical activity. DSP 825HF is a temperature stable paste, with a shelf life of 6 months from date of manufacture at 68-77°F (20-25 °C). Shelf life at refrigerated temperatures is 1 year from date of manufacture.

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. Qualitek SK-45 stencil cleaner or Multi-Cleaner 1515 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 cool, dry environment and disposed of in accordance with local, regional, national and international regulations.

Qualitek® and Delta® are brands of Qualitek International, Inc. For Health and Safety information refer to Safety Data Sheet.