TECHNICAL BULLETIN

Alpha Metals ULTRAPRINT 78

No-Clean Solder Paste

DESCRIPTION

*Ultraprint **78*** is a No Clean solder paste with a **post-reflow residue that is clear and colourless and is penetrable enough to allow easy ATE compatibility (pin testability)**. The residue is engineered to be soft and non-tacky to allow the lowest level of false rejects during pin testing.
*Ultraprint **78*** is designed for stencil application and air reflow in surface mounting processes where post reflow cleaning is not required.

FEATURES & BENEFITS

- Long stencil life & stable tack for minimum change in performance over 8 hour shifts under varying humidity exposure.
- Tolerant to a variety of reflow profiles for easy reflow on varying board designs.
- Highly penetrable residue to allow easy ATE compatibility (pin testing) and minimal false fails.
- Clear and colourless residue after reflow for the best board cosmetics.

AVAILABILITY

- Alloy: 63Sn/37Pb, 62Sn/36Pb/2Ag
- Rheology: Stencil printing
- Metal Percentage: 89.2%
- Powder Size: Type #3 (per IPC J-STD-005)
- Packaging Sizes: 500 gram and 1Kg jars and cartridges.

APPLICATION

Formulated for standard and fine pitch printing through stencil apertures as small as 0.008 inches (0.2 mm). *Ultraprint **78*** is especially suitable for ultra fine pitch applications when used in conjunction with AΣTEC™ laser cut stencils. Crisp, well defined print definitions are repeatably attainable on 0.016 inch (0.4mm) pitch pads with type 3 powder.

SAFETY

While the *Ultraprint **78*** flux system is not considered toxic, its use in typical reflow will generate a small amount of reaction and decomposition vapors. These vapors should be adequately exhausted from the work area. Consult the MSDS for additional safety information, and for toxicity data on alloys containing lead and silver.

STORAGE

*Ultraprint **78*** should be stored in a refrigerator upon receipt at 1° to 7°C. This will be sufficient to maintain a nominal shelf life of six months. *Ultraprint **78*** should be permitted to reach room temperature before unsealing its package prior to use.

Ultraprint™78 TECHNICAL DATA

CATEGORY	RESULTS	PROCEDURES/REMARKS
FLUXING ABILITY	Reflowed Solder Paste, Hot Solder Dip, Tin Plate, Tin Hot Dip, Silver Plate, Copper, Gold, Ag/Pd Plate, Cu Protective Coatings	Fluxing ability on tarnished surfaces
CHEMICAL PROPERTIES		
Corrosivity	Copper Mirror Test (L)	IPC J-STD-004
Halide Content	Silver Chromate Paper Test (pass)	CLASSIFICATION: **REL-1**
ELECTRICAL PROPERTIES		
SIR (IPC J-STD-004)	All Readings > 1.0 x 10E9 ohms	Pass, 7 days, uncleaned
SIR (Bellcore TR-NWT-000078)	All Readings > 1.0 x 10E13 ohms	Pass, 4 days, uncleaned
Electromigration (500 hour Bell-core)	1.3 x 10E9 ohms, initial, 6.5 x 10E9 ohms, 500hr	Passes visual and electrical
PHYSICAL PROPERTIES		Using 89% Metal, Type#3 Powder
Color and Specific Gravity	Clear, Colorless; 4.9g/cc	
Reflowed Residue	~ 5.5% ww, tack free after reflow	
Tack Force	> 2.4 g/mm^2 @ 6 hours (72%RH, 25°C)	J-STD-005, See figure #2
Viscosity	Designated M-13. Viscosity is suitable for all typi-cal stencil printing applications.	Malcom Spiral Viscometer; ICP-029
Stencil Life	> 36 hours	50%RH, 25°C
Slump	Suitable for fine pitch printing	IPC TM-650
ATE Compatibility (Pin Testability)	24 grams (<1.0 ounce) on 11.5 mil thick flux de-posit	Force to Contact Test (30° spear geometry)

Ultraprint™78 PROCESSING GUIDELINES

(The following is a review of general application notes and precautions)

STORAGE-HANDLING	PRINTING	REFLOW (See Figure #1)	CLEANING (If desired)
•Refrigerate to guarantee stability @ 1-7°C •Shelf life of refrigerated paste is six months. •Warm-up of jar or cartridge to room temperature should be ~ 6 hours. Set up printer with room tem-perature paste. Check paste temperature with a thermometer. •Do not remove worked paste from stencil and mix with unused paste in jar. This will alter rheol-ogy of unused paste.	STENCIL: Recommend Alpha laser cut stencil @ 0.006 inch thick for 0.020 inch pitch (.008 inch thick for 0.025 inch pitch) or Alpha manufactured chemically etched stencil. SQUEEGEE: Recommend metal. Ni formed gives best per-formance. 90 durometer polyurethane is also used. PRESSURE: 1-2.5 pounds per linear inch of print pattern. DOWNSTOP: 1.5-2.0mm STENCIL SEPARATION: Slow SQUEEGEE SPEED: 15-50 mm per second PASTE ROLL: 1-1.5 cm di-ameter and make additions when roll reaches 0.5cm diameter.	•Use convection, IR, or combi-nation ovens, belt, hot -plate, vapor phase. •Clean-dry air or nitrogen atmos-phere. PROFILE: - Ramp @ 60-120°C/min. to 120-160°C. - Dwell @ 120-160°C for 1.0-1.5 minutes. - Ramp @ 60-120°C/min to 215-220°C peak temp. Time over 183°C for 30-60 seconds - Ramp down to R.T. @ 90-120°C/min. -Ensure solder is frozen at exit of last heated zone to avoid disturbed joint defects.	•**Although designed as a no-clean flux system, the resi**due may be cleaned with: • BIOACT EC-ULTRA™ or, •BIOACT EC7-R™ or •10% Alpha 2110 saponifier with water. •Water washing will not turn residues cloudy. • Clean stencils with Alpha SC-10 stencil cleaner

Figure 1: **Reflow Profile Envelope**

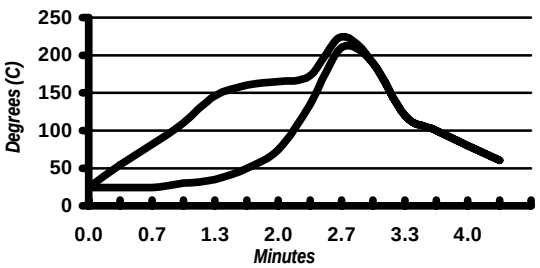
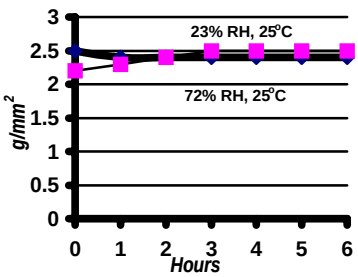


Figure 2: **Tack vs. Time**



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Rev 11 / 97

Bellcore Electromigration
(per TR-NWT-000078 Issue 3, Dec.1991)

Request:
Test #: 692-3 Start date:11/20/96bias = 10 V T/H: 85/85
Tested by: A.Zapp Reported by: K. Tellefsen

MATERIAL TESTED/ CONDITION	SIR 96 hr.	SIR 500 hr.	COMMENTS bias
UP78 (FEP30A)	8.4E+08	4.5E+09	No visual
IPC-B-25 pattern B	7.5E+08	5.3E+09	evidence of
Comb up	9.1E+08	7.2E+09	elec'migration
uncleaned	8.8E+08	5.6E+09	or corrosion.
	1.6E+09	8.1E+09	
	1.5E+09	8.8E+09	
	1.5E+09	7.9E+09	
	1.0E+09	3.1E+09	
	1.7E+09	6.8E+09	
	2.2E+09	8.3E+09	
	1.7E+09	8.0E+09	
	1.3E+09	7.3E+09	Pass/Fail
Geometric mean:	**1.3E+09**	**6.5E+09**	final > initial/10