ALPHA® LR-725

No-Clean Solder Paste

Type L3NC Per IPC-SP-819, Bellcore Compliant Per TR-NWT-000078

DESCRIPTION

ALPHA LR-725 is a modified weight rosin, no-clean solder paste designed for surface mount processes and other demanding electronics assembly applications where post reflow cleaning is not required. Because of its unique activator package, other special additives and its low rosin content, **ALPHA LR-725** is suitable to be left on the circuit board without cleaning and without unsightly, difficult to probe residues.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

APPLICATION GUIDELINES

ALPHA LR-725 is applied by stencil printing. Working time on the stencil is at least six hours. Tack life is equally as long. In the number 3 particle size configuration, it is suitable for printing through stencil apertures as small as 8 mils in the smallest dimension. ALPHA LR-725 is especially suitable for ultra-fine pitch applications. Crisp, well-defined print definitions are repeatedly attainable on 16 mil pitch pads. Some 12 mil pitch work has also been accomplished with this formulation.

ALPHA LR-725's activator system enables the flux to penetrate even moderately tarnished surfaces among the following metals & coatings:

Copper	Imidazole Coatings	Solder (Creams)	Tin (Hot Dip)
Gold	Silver	Solder (Hot Dip)	Tin (Plate)

Residue

ALPHA LR-725 can be safely left on the circuit board after reflow without cleaning. If cleaning is desired, most commercially available electronic assembly cleaning solvents are effective including ALPHA 565, BIOACT® EC-7 or EC-7R. BIOACT is a semi-aqueous cleaner designed to meet the most demanding cleaning requirements with complete environmental compatibility. Flux residues can also be removed by saponification with ALPHA 2110 in water.

RHEOLOGY & VISCOMETRY

ALPHA LR-725 was developed using spiral viscometry. Because of its unusual weight of carrier material, ALPHA LR 725's rheology is unique. Nominal readings of 2100 poise, (210 Pascal Seconds) are typical at 5 RPM using a spiral viscometer. Readings of 770 poise (77 Pascal Seconds) are typical at 30 RPM. Typical absolute magnitude of the slope is 0.50 to 0.60. This rheology, like that of many low residue products, does not fit precisely into one of Alpha's ten spiral viscosity groups. For product identity and purposes of nomenclature, ALPHA LR-725 uses the M10 spiral viscosity designation.

Typical tack and penetration using 90% metal loading and particle size 3 are:

Tack Force: > 3.0 grams/mm2 at 6 hours

Penetration: > 6.0 mils on 10 mil print at 6 hours

Total thixotropy is in the 2.2 - 2.4 x 106 dynes/cm2/sec range, with regression of 0.996 using fixed stress rheometry.

PLACEMENT

Nominal squeegee speeds from 20mm/second to 25mm/second are suitable as baseline settings. Faster speeds are possible but depend upon other process parameters. Roll diameter cross-section should be 1.25 to 1.50 cm. Stencil aspect ratio (width of smallest aperture divided by stencil thickness; Wa/Ts) can be 1.75 when using a high quality chemically etched stencil. Aspect ratios of 1.5 or smaller are suitable when using a laser cut stencil. Process parameters for stencil printing may exceed these baseline recommendations depending upon other process conditions. Experimentation and SQC techniques may be employed to individualize and to optimize a particular printing process using ALPHA LR-725.

PHYSICAL PROPERTIES

Category	Results
Water Extract Resistivity	>100,000 ohm-cm; RMA class
Corrosiveness	Passes Copper Mirror
Halide Content	Passes Silver Chromate Paper Test
SIR (ohms), IPC	> 5.0 x 109 after 7 days, uncleaned
SIR (ohms), Bellcore	> 9.0 x 1011 after 4 days, uncleaned
Electromigration	> 5.0 x 109, no clean,500 Hours, Bellcore passes visually & electrically
Residues	Approximately 5.5% by weight; light amber, tack free

PROCESSING GUIDELINES

Shipping & Handling

High ambient temperatures should be avoided in the handling of ALPHA LR-725. It is shipped in thermally controlled cartons and should be stored refrigerated upon receipt. Storage temperatures of 0 to 10 °C (32 to 50 °F) are sufficient to maintain ALPHA LR-725's nominal shelf life of six months. ALPHA LR-725 should be permitted to reach room temperature before unsealing its package.

The production environment should be 18 to 27 °C (65 to 80 °F) and 30 to 60% relative humidity. Production stencils can be cleaned using BIOACT® EC-8™ at 60 to 66 °C (140 to 150 °F) followed by hot air drying. Misregistered boards and used stencils may also be cleaned using isopropyl alcohol. Other process area clean-up may be accomplished using the same methods.

REFLOW PROFILES

ALPHA LR-725 can be successfully reflowed with or without nitrogen in infrared, convection, hot stage, hot bar, belt or vapor phase systems. Since circuit boards and components come to thermal equilibrium based on surface area and mass, the following board-level temperatures are provided as an initial guide to reflow of ALPHA LR-725. These were established with an ELECTROVERT ATMOS 2000™ oven. Wider reflow process windows may be established through experimentation with different board/component thermal masses.

Ramp Rate	0.25 to 0.5 °C/second
Cure	110 °C for 1 minute
Ramp Rate	1 to 2 °C / second
Reflow (for Sn63/Pb37 alloy)	210 to 220 °C for 45 seconds

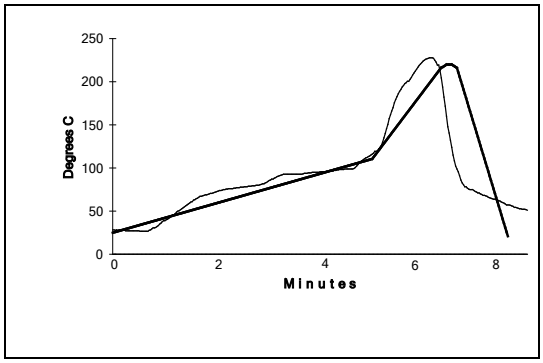

Figure 1

AVAILABILITY

ALPHA LR-725 is available in 63/37 alloy; in particle size number three (3) and in a variety of sealed jars and cartridges.

SAFETY & WARNING

It is recommended that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use. **Safety Data Sheets are available at MacdermidAlpha.com/assembly-solutions/knowledge-base**

CONTACT INFORMATION

To confirm this document is the most recent version, please contact Assembly@MacDermidAlpha.com

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Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE. Emergency safety directory assistance: US 1 202 464 2554, Europe + 44 1235 239 670, Asia + 65 3158 1074, Brazil 0800 707 7022 and 0800 172 020, Mexico 01800 002 1400 and (55) 5559 1588