Emerson & Cuming
a National Starch & Chemical Company

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XE-1218
Fast Flow, Reworkable Underfill For CSP And BGA Assemblies

Key Feature:	Benefit:
• Reworkable chemistry	• Less end-product waste due to easy removal and redressing of components.
• Snap cure	• In-line SMT processing
• Fast, void-free underfill of area array devices	• Maximum SMT processing rate
• Excellent adhesion and strength	• Excellent reliability performance in thermal cycle and mechanical shock testing

Product Description:
XE-1218 is a new, innovative reworkable capillary flow underfill for CSP and BGA devices. XE-1218 is designed for high volume assembly operations that requires an underfill that flows very fast. XE-1218 was specially formulated to allow easy rework of components post underfill curing operation.

Applications:
XE-1218 is designed to improve the attachment strength of CSP and BGA devices during mechanical stress testing such as drop and bend testing, while not degrading the thermal cycle performance inherent in the area array package itself. XE-1218 is designed to allow for easy removal of components should the need arise to replace them. These combined attributes of this innovative underfill make it an ideal candidate for use in high volume assembly of CSP and BGA devices.

Instructions for Use:
Thoroughly read the information concerning health and safety contained in this bulletin before using. Observe all precautionary statements that appear on the product label and/or contained in individual Material Safety Data Sheets (MSDS).

XE-1218 flows under the area array device by capillary action. While it is not essential, the underfill area should be cleaned of contaminants and obstructions to optimize the speed and quality underfill. Preheat assembly to between 75°C and 90°C. Higher temperatures reduce underfill times. Use the graph below to determine the estimated underfilling time for your desired assembly preheat temperature.

Dispense a bead of the underfill using a syringe fitted with a 21 gauge needle (or larger) on one (line) or two sides (L-shape) of the device perimeter. Syringe tip heating is not needed, but can be used. Very large devices may require multiple beads of underfill, but for most no second or 'fillet pass' is required. Because of its low viscosity and outstanding wetting characteristics, XE-1218 is designed to 'self-fillet', the opposite sides of the device.

Properties of Material as Supplied:

Property	Test Method	Unit	Value
Chemical Type			Epoxy
Appearance	Visual		Black
Brookfield Viscosity	ASTM-D-2393 CP-41 @ 10 rpm	Pa.s cP	1.4 1,400
Pot Life	ASTMD2393 @3°C ASTMD2393 @25°C ASTMD2393 @40°C	Days Days Hours	30 days 10 days 30 Hours
Underfill Time*	1 cm travel @ 80°C, conducted on glass slides	200 micron gap	6 seconds

*Device bump count & configuration, standoff height, soldermask, and other surface types may effect underfill times

Cure Schedule:
Cure schedules are 'the time at cure temperature to achieve full product cure'; the times do not include the time needed to ramp-up to cure temperature. Contact an E&C Technical Service representative if an alternate cure schedule is desired.

Cure Schedule
35 min @ 90°C
20 min @ 100°C
10 min @ 110°C
5 min @ 120°C
2 min @ 130°C
1 min @ 150°C

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Properties of Material after Application:

Property	Test Method	Unit	Value
Coefficient of Thermal Expansion α^1*	ASTM-D-3386	10^{-6}/°C	75
Glass Transition Temperature*	ASTM-D-3418	°C	15
Volume resistivity		Ohm-cm	4×10^{11}
Storage Modulus	DMA	MPa	400

*CTE and Tg information obtained from 1st run sample exposures using a TMA.

Storage and Handling:
The shelf life of XE-1218 is 9 months at -20°C storage temperature. The usable shelf life will vary depending on temperature of storage. For best results, store in original, tightly covered containers, in a clean and dry environment.

Syringes of XE-1218 should be removed from cold storage and allowed to stand, tip down, at room temperature to thaw depending on package size as follows: 30cc for 1.5 hours, 55cc for 2 hours, 6oz for 3 hours and 20oz for 6 hours.

Rework Procedure:
The preferred method is with a non-contact rework machine which minimizes potential damage to the PCB and soldermask. Remove the component from the substrate by using local application of heat onto the component. The recommended heat profile is an identical profile used during initial assembly. Once the solder has reached temperatures above it's reflow temperatures, lift the component off by using a slight twisting motion. The site then should be cleaned, removing any excess underfill and solder remaining on the PCB site. Again, a non-contact, vacuum method is preferred. Total time required for component removal is about 5-7 minutes.

Health and Safety:
Many epoxy compounds have been reported to cause skin irritation to sensitive persons. Minimize contact with the uncured product. The use of protective clothing is recommended. If contact occurs, the skin should be washed with mild soap and water. In case of eye contact, flush immediately with water and secure medical attention. Use in a well-ventilated area and avoid prolonged or repeated breathing of vapors. Please refer to Material Safety Data Sheet for further information regarding safety.

This information is a brief summary of the available safety and health data. Thoroughly review the MSDS for more complete information before using this product.

Attention Specification Writers:
The values contained herein are considered typical properties only and are not intended to be used as specification limits. For assistance in preparing specifications, please contact Emerson & Cuming Quality Assurance for further details.

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Electrically Conductive Coatings and Adhesives

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