

CircuitSAF™ MA-420

SURFACE MOUNT ADHESIVE

SNAP CURE, HIGH SPEED

DISPENSABLE AND PRINTABLE

Description:

CircuitSAF™ MA-420 is an epoxy surface mount adhesive that cures rapidly at elevated temperatures and has been designed for use in high speed printed circuit board assembly for the attachment of surface mount components. This product is unique in that it can be used for both high speed dispensing and rapid printing without sacrificing any performance in either application. The high shear thinning and excellent viscosity recovery makes the material an excellent choice for high speed SMT applications. CircuitSAF™ MA-420 has been successfully used in high speed placement systems with integrated dispense heads. A list of equipment and the corresponding packaging can be found in the CircuitSAF™ MA-420 Brochure. CircuitSAF™ MA-420 also shows superior performance in non-contact dispense systems such as the Asymtek Dispense Jet™. The superior dot profile and high dot aspect ratio make it ideal for rapid printing. CircuitSAF™ MA-420 is fully compatible with the DEK ProFlow DirEKt Imaging™ system and is available in DEK ProFlow™ Cassettes.

High green strength, during component placement, is maintained with CircuitSAF™ MA-420, which results in less skewing and component loss. This translates into higher product yield and lower cost. CircuitSAF™ MA-420 is also cure process friendly and can be snap-cured in 60-90 seconds at 150°C.

CircuitSAF™ MA-420 is extremely stable at room temperature. This allows the material to have a long pot life and a 9-month storage time at 0° to 25°C. In contrast to other SMA's, CircuitSAF™ MA-420 does not have to be refrigerated to maintain its rheology and dispensing performance. Syringes and cartridges, when not in use, should be kept capped.

Key Features and Benefits:

- Excellent Dispensability at Speeds in Excess of 50k dph.
- Superior Performance in Dispense Jet™ Equipment
- Superb Printing Performance at High Print Speeds
- Can Be Used For Both Dispensing & Printing
- Available in DEK ProFlow™ Cassettes
- Consistent Dot Profile
- 9 Month RT Stability (2° to 25°C)
- No Heavy Metals (Cd, Se)
- Easy Clean Up of Uncured Adhesive

Typical Uncured Properties:

Appearance	Red or Yellow
Viscosity (cps)	
Brookfield 2HB CP52 Spindle @ 0.1 rpm	2,100,000
Brookfield 2HB CP52 Spindle @ 4.6 rpm	100,000
Shear Thinning Index (Thixotropic Index)	12.1
ASTM D2196 (1 and 10 rpm)	
Flash Point (°C)	>93
Particle Size (microns)	<50
(mean particle size, 5 microns)	
Shelf Life (months @ 0° to 25°C)	9
Density (g/cm³)	1.36

Cured Properties:

Coefficient of Thermal Expansion (ppm/°C)	
Alpha1	45
Alpha2	140
Modulus DMTA @ 1kHz (GPa)	2.29
Glass Transition Temperature (°C)	70
Volume Resistivity (ohm-cm)	9 x 10 ¹⁵
Thermal Conductivity (W/m²K)	0.28
Shear Strength (IPC817) 5 min 125° C cure (psi)	>2000
	>13.7 N-mm ⁻²

(On bare FR4 and solder mask. Bond strength will vary depending on dot size, type of solder mask and type of SMD component.)

IPC 817 (Hot Solder Dip)	No chip displacement or
IPC-TM-650,	loss occurred, test passed
Method 2.4.42.1	
Torque Strength on 1206 Devices (N-mm)	68
Surface Insulation Resistance (Bellcore GR-78)	
After 4 Days (ohms)	>10 ⁹
After 7 Days (ohms)	>10 ⁹
Electromigration (Bellcore GR-78)	Passed

Cleaning:

General purpose cleaning of uncured CircuitSAF™ MA-420 can be accomplished by using Isopropyl Alcohol. For more

Cleaning (cont'd):

demanding cleaning applications such as the cleaning of reusable nozzles or stencils refer to the information below.

The ease of removal of uncured CircuitSAF™ MA-420 was also tested using the following ZESTRON products:

ZESTRON Product	Ability to Remove
· VIGON® SC	+
· VIGON® SC 200	+
· VIGON® SC 202	++
· ZESTRON® SD 300	++
· ZESTRON® VD	++
· ZESTRON® SD 100	-
· ZESTRON® HC	++
· ZESTRON® ES 200	++

Results of the testing ranged from very easy (++) to not recommend (-).

Very Easy	++
Easy	+
Not Recommended	-

Very easy (++) indicates that a clean surface was achieved in 2-6 minutes; easy (+) indicates that a clean surface was achieved in 6-10 minutes; and not recommended (-) indicates that another cleaning agent would be recommended.

Testing:

Testing was performed under the following parameters:

Time (minutes)	2-10
Equipment	Typical spray-in-air cleaner
Temperature	Ambient (exception: VIGON® SC)

Trace Labs ran dielectric strength tests on CircuitSAF™ MA-420. Each data point is an average for three test specimens. ASTM methods are referenced.

Dielectric Strength (per ASTM-D-149-97a is 1379 volts/mil)

FRQ. Factor	Test Method	Dielectric Constant	Dissipation
1 kHz	ASTM-D-2520-95	3.74	0.0083
10 kHz	ASTM-D-2520-95	3.80	0.0137
1 MHz	ASTM-D150-95	4.56	0.0310
1 GHz	ASTM-D-150-95	3.73	0.0168
10 GHz	ASTM-D-2520-95	3.90	0.0415

Curing:

CircuitSAF™ MA-420 is designed to cure in 60-90 seconds at 150°C and in 3 minutes at a temperature of 120°C.

Handling Precautions:

The labels on containers of Lord materials contain current information on the hazards associated with each particular product. Before using this or any other Lord product, refer to the Material Safety Data Sheet (MSDS) and label for safe use and handling.

Storage:

Material can be stored in a temperature-controlled area at 25°C for 9 months. CircuitSAF™ MA-420 can also be kept in refrigerated storage (≥4°C) with a 12 hour equilibration period at room temperature prior to use. **DO NOT STORE BELOW 2° C or above 25°C.**

Shipping and Unpacking Procedure:

This material is packed and shipped in Johnny Blue Ice at approximately 5°C to protect it from thermal excursions during shipment. The substantially engineered system of an insulated container and packing material is designed to protect the material for up to 6 days in transit (international) and up to 48 hours in transit (domestic). It is critical that the shipping container is not opened in transit and that the shipment be expedited during transit to its final destination. **DO NOT ALLOW THE SHIPMENT TO BE LEFT ON LOADING DOCKS, IN CUSTOMS WAREHOUSES, OR ON FREIGHT TRUCKS FOR LONG TIME PERIODS.**

Maintaining temperature at or below 25°C, but not lower than 2°C, upon receipt is critical to maintain the functionality and performance of the material. Failure to maintain temperature at 2°C – 25°C will void any warranties and will adversely affect performance.

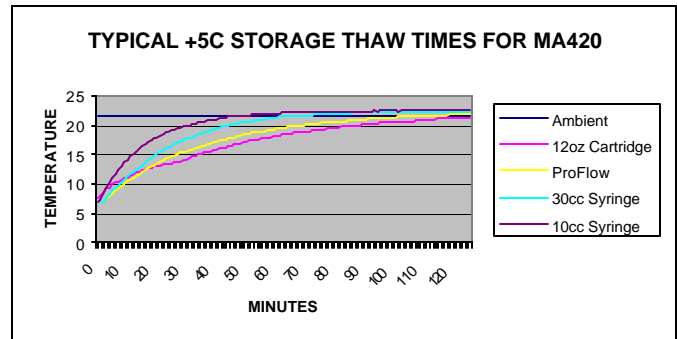
Upon receipt, the syringes must be transferred from the shipping container and be stored at 2°C - 25°C.

Storage and Thaw Procedure:

ALL SYRINGES MUST BE MAINTAINED AT 2°C - 25°C IN AN UPRIGHT (VERTICAL) POSITION WITH THE SYRINGE TIP FACING DOWN. DO NOT LAY SYRINGES ON THEIR SIDES (HORIZONTALLY) UNDER ANY CIRCUMSTANCES.

Prior to application, the material must be allowed to thaw naturally to room temperature (ideally 20 - 25°C) by placing the syringes in a vertical position with dispense tip facing downward in an ambient environment. This is a critical step for obtaining optimum dispensing performance.

Under no circumstance should artificial heat sources be used to increase thaw speed. Do not place the syringes in warm water or near any heat source including ovens, hot plates, hot air guns, etc. Thaw time varies by package style and size and is typically 45 to 120 minutes based on ambient temperature. However, as CircuitSAF™ MA-420 is designed for high speed dispensing and provides superior room temperature stability, it is recommended that CircuitSAF™ MA-420 be allowed to stabilize under ambient temperature for 12 hours prior to use. Please refer to the chart below.



Do not use the syringes before contents reach ambient temperature. Wipe all excess moisture from the syringes prior to use. A small amount of air in the tip – cap area is normal. Carefully remove the tip cover and manually extrude a small amount of material, displacing any air that may be in the tip – cap interface. Mount the syringe onto dispense equipment that has been thoroughly cleaned and purge material through the system until an unbroken flow of material is extruded. The system is now ready to begin dispensing

Once thawed to room temperature, the syringes must be consumed within the allotted working life specified then discarded. Under no circumstances should the material be refrozen for reuse or consumed after the working life has expired.

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