Silicone Conformal Coating 422B Technical Data Sheet

422B-Liquid

Description

The 422B *Silicone Conformal Coating* is a clear and flexible coating that is ideal for protecting electronic circuits in high temperature environments or applications requiring extreme flexibility. It protects against moisture, dirt, dust, and other particulates, and thus avoids corrosion of electronic components. It also insulates against high-voltage arcing, shorts, and static discharges. As well, it protects against thermal shock, and puts very little stress on components during temperature cycling.

The 422B product is a one-part, acrylated silicone, so compared to typical silicones it is easier to apply, remove, and rework. Also, it has a faster cure time, and a much longer shelf life. It is available in both aerosol and liquid forms, and may be applied by spraying, dipping, or brushing.

The 422B protective coating is UL certified under the *Coatings for Use on Recognized Printed Wiring Boards—Component* category. It performs as a 94V-0 non-flammable coating. It is intended as an easy to use cost-effective solution for protection against the typical risks PCB's face in high temperature environments. It is not intended for high voltage applications (>1500 V) with extended exposures (days) to very high humidity (>95%) in high temperature environments (>65 °C [149 °F]). (Customers with such applications should inquire about our line of silicone conformal coatings from Momentive Performance Materials.)

Applications & Usages

Improve reliability and lengthen the life of electronic circuitry with 422B. Its primary applications are in the automobile, marine, aerospace, aviation, communication, instrumentation, and industrial control equipment involving high temperatures.

Benefits and Features

- **Certified *UL 94V-0*** (File # E203094)
- **Maximum Service Temperature of 200 °C**
- **Fast cure**—tack free in 6 min at room temperature, full cure in 20 min at 65 °C
- **Protects electronics** from moisture, corrosion, fungus, thermal shock, and static discharges
- **Easy to inspect**: fluoresces blue at 437 nm ± 65 nm under UVA light
- **Extended Shelf Life** avoids worries about premature hardening and wastage
- **Easy rework and repairs**: Solders through the coat • removable with Cat. No. 435 thinner or Cat. No. 8310 stripper

Curing & Work Schedule

Properties	*Value*
Tack Free	5-7 minute
Shelf life	5 year
Full Cure[a)] @20°C [68 °F]	48 hour
Full Cure[a)] @65°C [149 °F]	20 minute

a) Cure times assume a minimum thickness of 25 μm [1 mil] and standard conditions.

Service Ranges

Properties	*Value*
Service Temperature	-40 to +200 °C [-40 to +392 °F]
Max Coverage[b)] per 1 L for 25 μm [1 mil]	<109 000 cm^2 [<117 ft^2]

b) Estimated based on ideal values. Actual value will be somewhat less than quoted.

Principal Components

Name	***CAS Number***
Silicone and acrylic resin combination	*proprietary*
Xylene	*1330-20-7*
Acetone	*67-64-1*
Ethyl benzene	*100-41-4*

Properties - Cured

Physical Properties	***Method***	***Value***
Color	Visual	Clear
Solderability	—	Fair
Flexibility	—	Excellent
Flammability	94V (UL File # E203094)	94V-0
UV inspection absorption max	Absorption spectrum	375 nm (near UV)
fluorescence max	Emission spectrum	437 nm (blue)

Electric Properties	***Method***	***Value***
Dielectric Strength at 0.0150 inches	IPC-TM-650 Test 2.5.6.1	1056 V/mil
Volume Resistivity @23 °C 50% RH	ASTM D 257-07	1.2×10^{15} Ω·cm
Surface Resistivity	"	4.5×10^{16} Ω/sq
Dielectric Constant @60 Hz & 25 °C	ASTM D 150-98	2.35
Dielectric Constant @1 MHz & 25 °C	"	1.99
Dissipation Factor @60 Hz & 25 °C	"	0.037
@1 MHz & 25 °C	ASTM D 150-98	0.012

Thermal Properties	***Method***	***Value***
Coefficient of Thermal Expansion	IPC-TM-650 Test 2.4.24	253.3 ppm/°C
Glass Transition Temperature	"	none detected
Softening Point	"	31.4 °C [88.5 °F]

Environmental & Ageing Study	***Method***	***Value***
Salt Spray Test: 7 day @35 °C +Salt/Fog	ASTM B117-2011	
Cross-hatch adhesion	ASTM D3359-2009	5B = 0% area removed
Cracking, unwashed area	ASTM D661-93	None
Visual Color, unwashed area	ASTM D1729-96	No change
Peeling, unwashed area	ASTM D1729-96	None

Properties - Uncured

Physical Property	*Method*	*Value*
Odor	—	Ethereal
Viscosity at 23°C [73 °F]	Brookfield SP1	13 cP [0.013 Pa·s]
Density		0.90 g/mL
Flash Point	Closed Cup	-18°C [-0.40 °F]
Boiling Point		55 °C [131 °F]
Solids Content (w/w)		27% (liquid); 17% (aerosol)

Compatibility with Substrate

The 422B silicone is compatible with most materials found on printed circuit assemblies; however, in an uncured state it is not compatible with contaminants like water, oil, and greasy flux residues. Therefore, it is extremely important to clean the printed circuit assembly thoroughly with a suitable electronic cleaner before applying the coating.

The chosen electronic cleaner should remove moisture, wax, greases, oils, and all other contaminants that are known to cause defects in this type of conformal coating. (See recommended cleaners on page 5.)

Health, Safety, and Environmental Awareness

Please see the 422B-aerosol **Material Safety Data Sheet** (MSDS) for more details on transportation, storage, handling and other security guidelines.

Environmental Impact: The 422B formulation is free from ozone depletion compounds. It has a lesser volatile organic content of 32.1% (w/w) [or 289 g/L] than the older 422A formulation. After dilution with 435 Thinner Cleaner, the regulated VOC drops to 21.3% (~187 g/L).The coating is RoHS compliant.

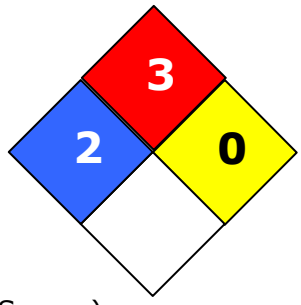
Health and Safety: The aerosol is flammable and should be kept away from flames and other ignition sources. As with most paint materials, avoid breathing in fumes or direct contact with the material. Solvents therein can cause irritation and other symptoms like headaches, pain, as well as having long term exposure effects. The cured coating presents no known hazard.

Wear safety glasses and disposable nitrile gloves for short contact (<4 hours). For extended contact use viton gloves. Wash hands thoroughly after use. Use in the open air, in fume hoods, or in well ventilated area. For short or long term (8 hours) at levels of exposures exceeding 100 ppm xylene or 750 ppm acetone, use NIOSH approved respirator with organic vapor cartridges rated for this order of concentrations.

HMIS® RATING

HEALTH:	**2**
FLAMMABILITY:	**3**
PHYSICAL HAZARD:	**0**
PERSONAL PROTECTION:	

NFPA® 704 CODES



Approximate HMIS and NFPA Risk Ratings Legend:
0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

Spray Gun Application Instructions

Read the procedure below and make necessary adjustments according to your spray gun equipment usage instructions. When diluted 1:1, each coat results in a dry film thickness of roughly 0.5 mil [13 μm].

ATTENTION! MG Chemicals recommends a dry film thickness of 25 to 38 μm [1 to 1.5 mil]. Since it is a solvent-based and acrylated silicone system, the thickness upper limit is below 75 μm [3 mil]. The usual limits for solventless silicone systems that have thermosetting cure mechanisms do not apply.

To apply the required thickness by weight

1. Mix thoroughly, and spray a test pattern.
   This step ensures good flow quality and helps establish appropriate distance to avoid runs.
2. At a distance of 20 to 25 cm (8 to 10 inches), hold the gun at around 45°, and spray a thin and even coat onto the horizontal board. For best results, use spray-and-release strokes with an even motion to avoid excess paint in one spot.
3. Before the next coat, rotate the board 90° to ensure good coverage.
4. Wait at least 5 minutes, and spray another coat. The delay avoids trapping solvent between coats.
5. Apply other coats until desired thickness is achieved. (Go to Step 3)
6. Let dry for 7 minutes (flash off time) at room temperature.

To cure the conformal coating

Full cure can be achieved in 20 minutes or less by using an infrared lamp or in convection oven at 65 °C [149 °F]. At room temperature, the coat dries to the touch in 7 minutes. And full cure takes about 48 hours.

The procedure above is based on a minimum thickness of 25 μm (1 mil) conformal coating. After full cure, measure the actual conformal coating thickness to ensure it meets the applications requirements.

Packaging and Supporting Products

Cat. No.	*Form*	*Net Volume*		*Net Weight*		*Shipping Weight*	
422B-340G	Aerosol	250 mL	8.6 fl oz	340 g	12 oz	4.8 kg	10.5 lb (×10) [a]
422B-55ML	Liquid	55 mL	1.9 fl oz	50 g	1.8 oz	1.0 kg	2.1 lb (×5) [b]
422B-1L	Liquid	950 mL	1 qt	0.9 kg	1.9 lb	5.5 kg	11.5 lb (×5) [b]
422B-4L	Liquid	3.8 L	1 gal	3.4 kg	7.6 lb	3.8 kg	8.3 lb
422B-20L	Liquid	19 L	5 gal	17.1 kg	37.7 lb	19 kg	42 lb
Contact MG Chemicals if custom packaging or sizes are required							

a) Pack of ten cans
b) Pack of five bottles

Thinners & Conformal Coating Removers

- Cat. No. 435-55ML (2 oz), 435-1L (33 oz), 435-4L (1 gal) Conformal Coating Thinner
- Cat. No. 8310-100ML Conformal Coating Stripper

Electronic Cleaners

- Cat. No. 4050A-340G, 4050-1L, 4050-4L, 4050-20L Safety Wash Electronics Cleaner
- Cat. No. 406B-450G Superwash Cleaner Degreaser
- Cat. No. 824 Isopropyl Alcohol

Technical Support

Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at www.mgchemicals.com .

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