Premium Polyurethane Conformal Coating 4223D Technical Data Sheet

Description

Our 4223D Polyurethane Conformal Coating is an IPC-CC-830B and UL 94-V0 certified, heat curing, one part product that provides an excellent scratch and chemical resistant finish. This one part coating is easy to use and repair: it does not require special or costly equipment or materials. It is ideal for chemically challenging environments.

The 4223D urethane protects electric circuits against aggressive chemicals, moisture, dirt, dust, thermal shocks, and scratches. This avoids corrosion and physical damages to electric components. It insulates against high-voltage arcing, shorts, and static discharges, allowing for traces to be put closer to one another.

Applications & Usages

The 4223D coating improves reliability, operational range, and lengthens the life of electrical and electronic components and assemblies. It finds application especially for corrosive environments such as those found in the farming, mining, smelting, oil exploration, and marine industries.

Common urethane conformal coatings uses are with electric generators, motors, transformers, relays, and air bag controllers. Commercial applications include fire alarms components, sensors, automotive electronics, electrical connectors, and porcelains.

Benefits

- **Certified *UL 94V-0*** (File # E203094)
- **Externally Qualified** to ***IPC-CC-830B-***class A, by Pacific Testing Laboratories
- **Excellent finish**—smooth, flexible, mar resistant
- **High Chemical Resistance**—resists water, solvents, and most household chemicals
- **Durable**—abrasion resistant
- **Protects electronics from** moisture, corrosion, fungus, and static discharges
- **Easy to inspect**—fluoresces under black light (UV light)
- **Easy rework and repairs**—can solder through coat • removable with MG 8312 Urethane Conformal Coating Stripper
- **Free of isocyanate**

Usage Parameters

Properties	*Value*
Tack Free	10 to 15 min
Recoat time	2 to 3 min
Full Cure @80 °C [176 °F]	18 h
Shelf Life	3 y
Maximum coverage per liter [b)]	≤114 000 cm^2 [≤123 ft^2]
Maximum coverage per US gallon [b)]	≤435 000 cm^2 [≤468 ft^2]

a) Assumes let 1:1 let down with MG 4354 Thinner solvent
b) Idealized estimate based on a coat thickness of 25 μm [1.0 mil] and 65% transfer efficiency.

Temperature Ranges

Properties	*Value*
Constant Service Temperature	-65 to 125 °C [-85 to 257 °F]
Storage Temperature Limits	-5 to 40 °C [23 to 104 °F]

Chemical Components

Name	***CAS Number***
Polyurethane Resin	*proprietary*
Xylene (mixture)	*1330-20-7*
Ethylbenzene	*100-41-4*
Methyl Ethyl Ketone (MEK)	*78-93-3*

Properties of Cured 4223D

Physical Properties	*Method*	*Value*
Color	Visual	Clear, amber tint
Solderability	—	Good
Chemical Resistance	—	Excellent
Weather Resistance	—	Excellent
Fungus Resistance	IPC-TM-650 2.6.1.1	Pending
Flexibility	IPC-TM-650 2.4.5.1	Pending
Flammability	*UL registered E203094*	94V-0
Electric Properties	***Method***	***Value***
Dielectric Withstand Voltage	per IPC-TM-650	>1500 V
Insulation Resistance (after 24 hours)	IPC-TM-650 Test 2.6.3.4	9×10^{12} Ω

Note: See Appendix A for UL 94V-0 and IPC-CC-830B standards test results.

Properties of Uncured 4223D

Physical Properties	*Method*	*Value*
Odor	—	Mild, pungent
Viscosity @25 °C [77 °F]	Brookfield SP1	330 cP [0.330 Pa·s]
Density	ASTM D 1475	0.97 g/ml
Flash Point	Closed Cup	-3 °C [26 °F]
Boiling Point		≥80 °C [≥176 °F]
Solids Content (w/w)		44.8%

Compatibility

The 4223D polyurethane coating 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 3.)

Health, Safety, and Environmental Awareness

Please see the 4223D-Liquid **Material Safety Data Sheet** (MSDS) for more details on transportation, storage, handling and other security guidelines.

Environmental Impact: The volatile organic content is 55.2% (534 g/L) by EPA and WHMIS standards.

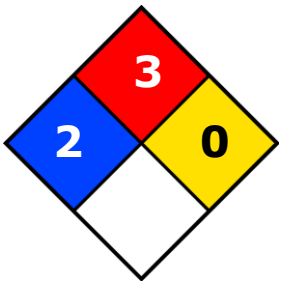
This product meets the European Directive 2011/65/EU Annex II (ROHS); recasting 2002/95/EC.

Health and Safety: The liquid and spray 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.

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)

Wear safety glasses and disposable 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 of 100 ppm of xylene or ethylbenzene, use NIOSH approved respirator with organic vapor cartridges rated for this order of concentrations.

The cured coating presents no known hazard.

Spray Gun Application Instructions

Follow the procedure below for best results.

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 2 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 3-5 minutes (flash off time) at room temperature.

To accelerate cure by heat

- After flash off, put in oven or under heat lamp at ≤80 °C for 18 hours.

Packaging and Supporting Products

Cat. No.	*Packaging*	*Net Volume*		*Net Weight*	
4223D-1L	Can	0.90 L	32.0 fl oz	0.92 kg	2.00 lb
4223D-4L	Can	3.80 L	1.00 gal	3.69 kg	8.10 lb
4223D-20L	Pail	20.0 L	5.00 gal	18.4 kg	40.6 lb

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.

Email: support@mgchemicals.com

Phone: 1-800-340-0772 Ext. 1030 (Canada, Mexico & USA)
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Disclaimer

This information is believed to be accurate. It is intended for professional end users having the skills to evaluate and use the data properly. *M.G. Chemicals Ltd.* does not guarantee the accuracy of the data and assumes no liability in connection with damages incurred while using it.

Appendix A

Standards Qualification

Certified UL 94V-0 and IPC-CC-830B qualified.

Qualification Criteria	*Test Method*	*Results*
UL 94V-0		
Coating flammability	UL 94V (File # E203094)	94V-0
Qualified IPC-CC-830B*		
Appearance	IPC-CC-830B 3.5.2	pass
Fluorescence	IPC-CC-830B 3.5.3	pass
Flammability	IPC-CC-830B 3.5.6	pass
Fungus Resistance	IPC-TM-650 2.6.1.1	pass
Flexibility	IPC-TM-650 2.4.5.1	pass
Dielectric Withstand Voltage	IPC-TM-650 2.5.7.1	pass
Moisture and Insulation Resistance	IPC-TM-650 2.6.3.4	pass
Thermal Shock	IPC-TM-650 2.6.7.1	pass
Temperature Humidity Aging (Optional)	IPC-TM-650 2.6.11.1	fail

Note: The optional humidity ageing test failed due to a late stage loss of clarity that prevented color codes and identification marking to be viewed; this product thus meets only the IPC-CC-830B Class A requirements.

*Qualified independently by Pacific Testing Laboratories, Inc.