4223F Liquid

Premium Polyurethane Conformal Coating

4223F is a 1-part, heat curing, UL 746E certified, thermoset polyurethane conformal coating. It cures to a durable, flexible, scratch resistant, and smooth finish. It is easy to apply and can be handled in 15 minutes. It cures in only 2 hours at 100 °C. It may be removed with appropriate strippers, or soldered through for repair or rework.

4223F protects printed circuit boards in chemically challenging environments. It provides strong protection against aggressive chemicals, corrosion, moisture, fungus, dirt, dust, thermal shock, abrasion, short circuit, high-voltage arcing, and static discharge.



Features & Benefits

Certified UL 746E (File# E203094) for outdoor use

Certified IPC-CC-830B

Excellent corrosion resistance

Xylene and isocyanate free

Fluoresces under UV-A light

Suitable for use with selective coating equipment

Cure Instructions

Full cure will take up to 30 days to fully cross link at room temperature in order to reach its optimum properties, however, the coating will be dry to handle 30 minutes after coating application.

Faster curing can be achieved by allowing the coating a minimum of 15 minutes at ambient temperature prior to any heat curing, this is necessary to allow the solvent to evaporate.

The following curing schedules can then be used:

Temperature	65 °C	80 °C	100 °C
Time	21 hours	16 hours	2 hours

Storage and Handling

Store between -5 and 27 ˚C in a in a dry area, away from sunlight (see SDS).

Available Packaging

Part #	Packaging	Net Vol.	Net Wt.
4223F-55ML	Bottle	55 mL	48.68 g
4223F-1L	Can	945 mL	841 g
4223F-4L	Can	3.78 L	3.36 kg
4223F-20L	Pail	18.9 L	16.8 kg
4223F-205L	Drum	205 L	182 kg

4223F Liquid

Liquid Properties

Binder System	Polyurethane	—
Dry Time to Handle	15 min (1 coat) 25 min (2 coats)	—
Minimum Recoat Time	5 min	—
Recommended Film Thickness	25–75 µm	—
Density	0.9 g/mL	ASTM D1475
Viscosity @ 25 ˚C	290 cP	Brookfield Engineering labs Inc. IPCTM-65- Method 2.4.24.4
Percent Solids	45%	—
Theroretical Coverage @ Recommended Thickness	109 400 cm^2/L	Calculated
Calculated VOC	482 g/L	—
Shelf Life	5 y	—

Cured Properties

UL	746E	—
IPC-CC-830	B revision	—
Color	Clear	—
Resistivity	3.5 x 10^{13} Ω·cm	ASTM D257
Breakdown Voltage Dielectric Strength	>1 500 V 1 000 V/mil	ASTM D149
Dielectric Constant @ 1 MHz Dissipation Factor @ 1 MHz	2.86 0.009	ASTM D150
Insulation Resistance	1 x 10^{13} Ω·cm	IPC-TM-650 2.5.7.1
Moisture Insultation Resistance	1 x 10^{12} Ω·cm	IPC-TM-650 2.6.3.4
Glass Transition Temperature (T_g)	57 ˚C	ASTM E1545
Coefficient of Thermal Expansion (CTE)	130 ppm/˚C (Prior T_g) 190 ppm/˚C (After T_g)	ASTM E831
Service Temperature Range	-65–125 ˚C	—

4223F Liquid

Application Instructions

Read the product SDS before using this product (downloadable at www.mgchemicals.com).

Recommended Preparation

Clean the substrate with MG #824 99.9% Isopropyl Alcohol, so the surface is free of oils, dust, and other residues.

Recommended Thinner

When thinning is required, use MG #4352 Thinner 2.

Brush

This product can be applied by brush for rework or touch-ups. Thinning is not required for most brush applications. Desired coating thickness can be achieved in a single application. Applied coating can be cured immediately.

Manual Spray Guns

Use a standard fluid nozzle gun with a minimum tip diameter of 0.8–1.0 mm. The settings listed below are recommendations; however, performance will vary with different brands:

Inlet	Air Flow	Air Cap
20–40 psi	10–15 SCFM	8–10 psi

1. Dilute 1-part coating to 1-part thinner (MG #4352 Thinner 2). Adjust ratio if required.
2. Stir the coating gently, but thoroughly.
3. Spray a test pattern to ensure good flow quality.
4. Tilt the board at 45° and spray a thin even coat from a distance of 20–25 cm (8–10 in). Use spray-and-release strokes with an even motion to avoid paint buildup in one spot. Start and end each stroke off the surface.
5. Wait 5 min between coats to avoid trapping solvent.
6. Rotate the board 90° and spray again to ensure good coverage.
7. Apply additional coats until desired thickness is achieved (go to step 3).
8. Let dry for 15 min at room temperature before applying heat cure.

Dip Coat

Use a Ford or Zahn cup to monitor the viscosity of the coating, as the solvent will evaporate over time.

1. Hang the PCB on a dipping arm.
2. Slowly lower the PCB into a tank and leave immersed in the coating for 2 min to allow penetration.
3. Slowly withdraw the PCB from the tank at a rate of approximately 6" per minute.
4. Let dry for 5 min before applying additional coats or 15 min before heat cure.

Selective Coating

For higher volume applications, coating can be applied via selective coating equipment. The settings listed below are recommendations and performance will vary with different brands.

Settings	PVA	Nordson Asymtek
Platform	PVA 650	SL 940E
Valve	FC100-CF	SC 280N
Dilution	2:1 with 435	5:1 with 4352
Air Pressure	Not available	80 psi
Fluid Pressure	17 psi	23 psi
Dispense Height	10 mm	12.7 mm
Pass Width	8 mm	Not available
Coating Speed	400 mm/s	381 mm/s

Clean-up

Clean spray system and equipment with MEK or acetone, MG #434.

Disclaimer: This information is believed to be accurate. It is intended for professional end-users who have the skills required 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.