

Description

Our 419D *Overcoat Pen* are solder resist coatings that are a fast drying, xylene and toluene free. The pen provides an excellent finish in multiple colors. They are ideal for high moisture environments and applications requiring easy repair and rework.

Applications & Usages

The 419D pen protect area of a printed circuit board from taking solder, helping confine solder to intended areas only. This prevents formation of unintentional solder bridges, which could cause short circuits. It also protects electric circuits against moisture, dirt, dust, thermal shocks, and scratches that could corrode, or otherwise damage the electric components. It insulates against high-voltage arcing, shorts, and static discharges.

The 419D pen improves reliability, operational range, and lengthens the life of electrical and electronic components and assemblies. Its primary applications are in the automobile, marine, aerospace, aviation, communication, instrumentation, industrial control equipment, and consumer electronics industries.

Benefits and Features

- **Clear Overcoat Pen** (Cat No. 419D-P-CL) **is certified to UL 94-V0 and IPC-CC-830B**
- **No Hazardous Air Pollutants**—free of toluene or xylene
- **Excellent finish**—smooth, homogeneous, and durable
- **Protects electronics from** moisture, corrosion, fungus, and static discharges
- **Easy rework and repairs**—removable with Cat. No. 435, 4352 thinner or 8310A stripper
- **Comes in variety of colors**—blue, black, clear, green, and white

Usage Parameters ^{a), b)}

<i>Properties</i>	<i>Value</i>
Tack Free	10 to 15 min
Recoat time	2 to 3 min
Full Cure @22 °C [72 °C]	24 h
Full Cure @65 °C [149 °F]	1 h
Shelf Life	5 y

a) Values based on the 419D without colorants

b) Assumes let 1:1 let down with MG 4352 Thinner 2

Temperature Ranges

<i>Properties</i>	<i>Value</i>
Constant Service Temperature	-65 to 125 °C [-85 to 257 °F]
Storage Temperature Limits ^{c)}	-5 to 40 °C [23 to 104 °F]

c) The product must stay within the storage temperature limits stated.

Properties of Cured 419D without colorants

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i>
Color	Visual	Crystal Clear
Solderability	—	Excellent
Weather Resistance	—	Excellent
Fungus Resistance	IPC-TM-650 2.6.1.1	Pass
Flexibility	IPC-TM-650 2.4.5.1	Pass
Flammability	UL registered <u>E203094</u>	94V-0
<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>
Dielectric Withstand Voltage	IPC-TM-650	>1500 V
Insulation Resistance (after 24 h)	IPC-TM-650 Test 2.6.3.4	$1 \times 10^{12} \Omega$

Note: See Appendix A for UL 94V-0 and IPC-CC-830B standards test results based on the clear Overcoat Pen (Cat No. 419D-P-CL).

Properties of Uncured 419D without colorants

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i>
Odor	—	Slight
Viscosity @23 °C [73 °F]	Brookfield SP1	100 cP [0.10 Pa·s]
Density	ASTM D 1475	0.92 g/mL
Flash Point	Closed Cup	-3 °C [26 °F]
Boiling Point	—	≥80 °C [≥176 °F]
Solids Content (w/w)	—	29.5%

Compatibility

The 419D pen 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 and Safety

Please see the 419D-Pen **Safety Data Sheet** (SDS) for further details on transportation, storage, handling, safety guidelines, and regulatory compliance.

Pen Application Instructions

For best results, follow the procedure below.

To apply the liquid pen:

1. Ensure that the surface to be coated is clean and oil-free.
2. Shake the pen vigorously. Ensure that you hear the clicking of the mixing bearing hitting both ends of the barrel.
3. Test on a blank to ensure good flow quality and uniformity during application.
4. Touch the pen lightly on the surface while squeezing the barrel to apply thin and even coat.
5. Let dry for 3-5 minutes (flash off time) at room temperature before handling.

Room temperature cure:

- Let air dry 24 hours

Heat cure:

- After flash off, put in oven or under heat lamp at ≤ 65 °C for 60 min.

NOTE: Coats that are very thick require more time to dry.

ATTENTION! If heat curing, do not exceed 65 °C as this may cause surface defects due to solvents evaporating off too quickly.

Packaging and Supporting Products

<i>Cat. No.</i>	<i>Color</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Packaging Weight</i>	
419D-P-BK	Black	Pen	5 mL	0.17 fl oz	4.6 g	0.14 oz	25 g	0.8 oz
419D-P-BL	Blue	Pen	5 mL	0.17 fl oz	4.6 g	0.14 oz	25 g	0.8 oz
419D-P-CL	Clear	Pen	5 mL	0.17 fl oz	4.6 g	0.14 oz	25 g	0.8 oz
419D-P-GR	Green	Pen	5 mL	0.17 fl oz	4.6 g	0.14 oz	25 g	0.8 oz
419D-P-WH	White	Pen	5 mL	0.17 fl oz	4.6 g	0.14 oz	25 g	0.8 oz

Thinners & Conformal Coating Removers

- *Thinner 2:* Cat. No. 4352-945ML, 4352-4L (1 gal), 4352-20L, 4352-200L
- *Conformal Coating Stripper:* Cat. No. 8310-100ML

Electronic Cleaners

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



419D Technical Data Sheet Overcoat Pen

ISO 9001:2008 Registered Quality System. Burlington, Ontario, CANADA SAI Global File: 004008

419D-Pen

Technical Support

Please contact us regarding any questions, suggestions for improvements, or problems with this product. Application notes, instructions and FAQs are located at www.mgchemicals.com.

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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.

Appendix A

Standards Qualification

The clear Overcoat Pen (Cat No. 419D-P-CL) was certified UL 94V-0 and IPC-CC-830B qualified. The colorants were not tested, but they are expected to be insulating and non-flammable.

<i>Qualification Criteria</i>	<i>Test Method</i>	<i>Results</i>
UL 94V-0		
Coating flammability	UL 94V (File # E203094)	94V-0
Qualified IPC-CC-830B ^{a)}		
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	Pass

Note: All tests passed; this product thus meets the full IPC-CC-830B Class B requirements.

a) Qualified independently by Pacific Testing Laboratories, Inc.