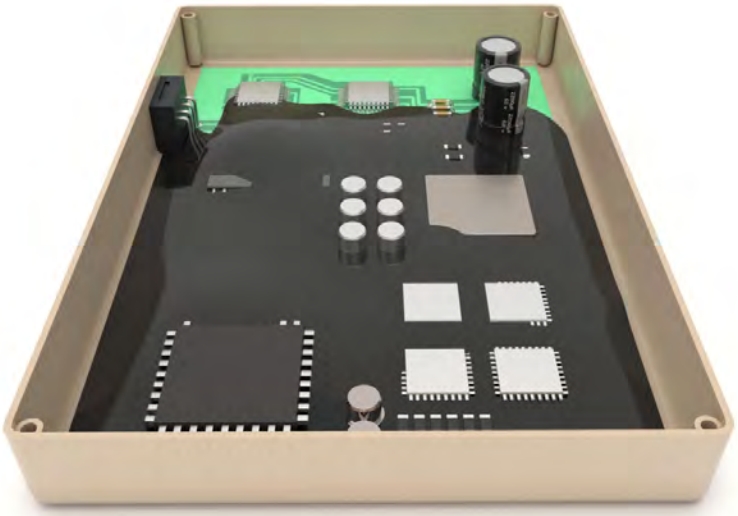
Potting Compounds



MG Chemicals has a series of high-quality potting compounds and encapsulation resins for the electronics industry. They add mechanical strength to assembly housings, fill large voids, insulate components from static discharge, and protect against exposure to chemicals, humidity, and salt water.

Our electrical potting compound portfolio includes flame retardancy, thermal conductivity, and optical clarity.

Applications

- PCB protection
- IP protection
- Encapsulating surface mount devices
- Castings and molds

Industries

- Aerospace
- Communications
- Consumer Electronics
- Electric Vehicles
- Instrumentation
- Medical equipment

Epoxy Potting Compounds

1 and 2-part systems that cure to a tough, durable finish. Epoxies offer premium ruggedization and are unmatched for their chemical resistance and shock protection.

Silicone Potting Compounds

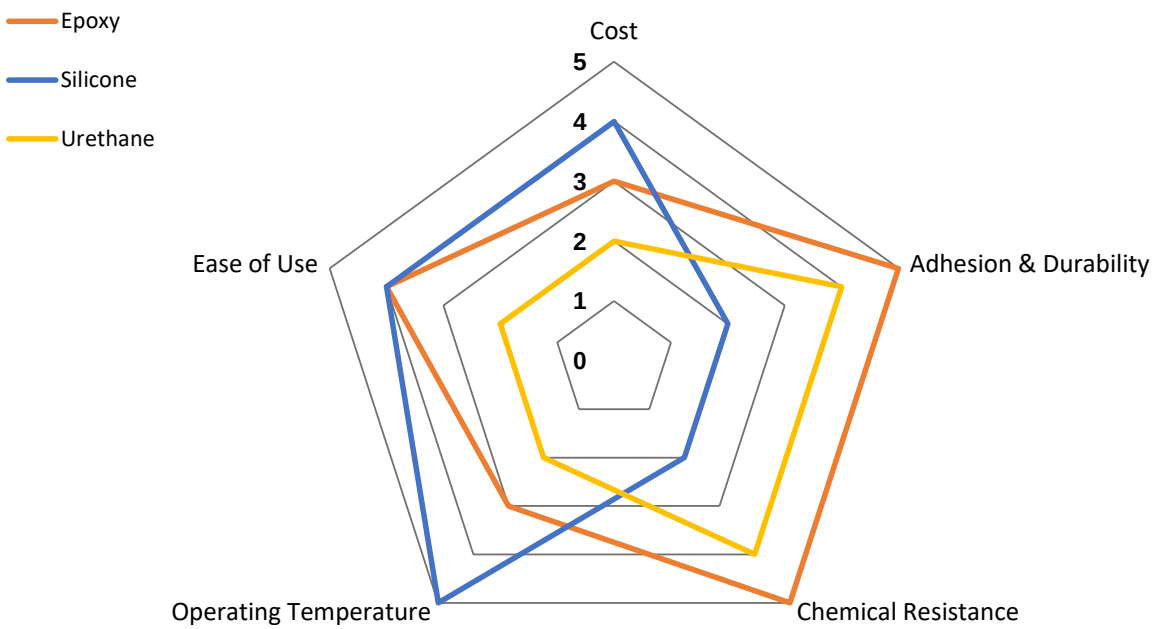
Compared with other potting materials, silicone offers premium latitude in operating temperatures ranging from -60 °C to 200 °C with short durations (~30 minutes) up to 260 °C without loss of adhesion. Their low modulus also makes them a premiere choice when encapsulating delicate surface mount components.

Urethane Potting Compounds

Polyurethanes offer superior protection against water ingression for submersion applications and retain elasticity at very low temperatures.

Potting Compounds

The general properties of potting compounds vary by their binder system. Therefore, it is important to choose the right combination for your specific application. The below graph qualitatively compare the performance of the potting compounds.



Graph 1. Performance comparison of the potting compounds based on the binder type. 5 represents the highest performance and 1 represents the lowest performance.

Product Availability

EPOXY			SILICONE*	URETHANE
1-Part	2-Part	2-Part Flame Retardant		
9510	832B	834B	RTV11	8800
	832HD	834HTC	RTV12	8810
	832C	834FX	RTV60	8820
	832WC	834BLV	RTV88	
	832FX		RTV615	
	832HT		RTV630	
	832TC			

*Products listed above are stocked items and represent a small portion of all available RTV silicones. For more options, please visit our website or contact support@mgchemicals.com.

Epoxy Potting Compounds

Encapsulant for Protecting PCB's and Electronics

MG Chemicals offers a wide range of epoxy potting compounds for protecting printed circuit boards and electronic devices. It provide superior protection against water damage and chemical, mechanical, thermal or electrical shock.

Features & Benefits

- Convenient mix ratios
- UL94 V-0 and UL 746A grades available
- Thermally conductive options available
- Low exotherm
- Excellent dielectric properties
- Wide service temperature range
- Primeless adhesion to most substrates
- Superior physical and mechanical properties
- RoHS compliant

Applications

- PCBs protection in commercial transportation
- Circuit protection for oil and gas sensors
- Encapsulation of transmitter components in deep sea telecom cables
- Ruggedization for LED drivers
- IP protection

One-Part

9510 • Black, rigid, unlimited working time

Two-Part

832B • Black, 2:1 mix ratio, 1 hour working time

832HD • Black, 1:1 mix ratio, 45 minutes working time

832C • Translucent, 2:1 mix ratio, 1 hour working time

832WC • Optically clear, 2:1 mix ratio, 2.5 hours working time

832FX • Flexible, 1:1 mix ratio, 1 hour working time

832HT • High service temperature, 1:1 mix ratio, 45 minutes working time

832TC • Thermally conductive. 1:1 mix ratio, 2 hour working time

Two-Part Flame Retardant

834B • Meets UL 94V-0 standard, thermal conductivity of 0.8 W/(m·K), 2:1 mix ratio, 1 hour working time

834HTC • UL 746A certified, thermal conductivity of 0.94 W/(m·K), 5:1 mix ratio, 1.5 hour working time

834FX • Flexible, meets UL 94V-0 standard, thermal conductivity of 0.6 W/(m·K), 1:1 mix ratio, 2.5 hour working time

834BLV • Meets UL 94V-0 standard, thermal conductivity of 0.5 W/(m·K), 2:1 mix ratio, 2 hour working time

Epoxy Potting Compounds

	ONE-PART	TWO-PART						
	9510	832B	832HD	832C	832WC	832FX	832HT	832TC
UNCURED PROPERTIES								
Color	Black	Black	Black	Translucent	Optically clear	Black	Black	Black
Mixed density [g/mL]	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.7
Viscosity [Pa·s]								
Mixture	4.8	3.3	4.1	2.7	0.98	0.70	22	27
Part A	—	2.5	5.9	1.9	2.9	0.80	46	33
Part B	—	5.3	2.3	6.6	0.3	0.17	6.6	12
Mix ratio by volume [A:B]	—	2:1	1:1	2:1	2:1	1:1	1.6:1	1:1
Working time [min]	Unlimited	60	45	60	60	150	60	120
Cure time [min @ °C]	180 @ 80	60 @ 65	120 @ 65	60 @ 65	120 @ 65	120 @ 65	60 @ 65	120 @ 65
	60 @ 90	30 @ 80	60 @ 80	30 @ 80	60 @ 80	60 @ 80	30 @ 80	60 @ 80
	300 @ 120	20 @ 100	20 @ 100	15 @ 100	30 @ 100	30 @ 100	15 @ 100	45 @ 100
CURED PROPERTIES								
Tensile strength [N/mm^2]	20	57	32	45	10	9.6	48	23
Compressive strength [N/mm^2]	90	155	75	164	160	—	132	87
Lap shear [N/mm^2]								
Stainless steel	9.2	17	21	17	3.3	2.5	15	13
Aluminum	5.8	16	14	18	6.8	3.4	7.4	16
Hardness	84D	80D	80D	84D	82D	88A	87D	81D
TC @ 25 °C [W/(m·K)]	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.7
T_g [°C]	70	49	41	53	33	8.8	89	50
CTE prior T_g [ppm/°C]	74	79	73	150	80	114	86	142
CTE after T_g [ppm/°C]	217	196	207	161	192	218	152	114
Resistivity [Ω·cm]	2.6×10^{13}	5.3×10^{12}	1.4×10^{13}	6.7×10^{12}	1.6×10^{17}	5.8×10^{12}	1.0×10^{13}	8.2×10^{12}
Breakdown voltage [V]	36 700	51 900	41 700	60 400	41 000	36 300	>50 000	48 300
Dielectric strength [V/mil]	540	472	400	480	465	370	470	386
Service temperature [°C]	-65 to 150	-40 to 140	-40 to 150	-40 to 140	-40 to 140	-40 to 140	-40 to 225	-30 to 175
AVAILABLE PACKAGING								
Net contents	30 mL	375 mL	25 mL	375 mL	375 mL	450 mL	375 mL	450 mL
	300 mL	450 mL	50 mL	450 mL	3 L	1.7 L	3 L	2 L
	3.6 L	3 L	400 mL	3 L	12 L	7.4 L		8 L
		60 L	7.4 L	60 L	60 L	40 L		40 L
			40 L					

9510 832B 832HD 832C 832WC 832FX 832HT 832TC

Epoxy Potting Compounds

	TWO-PART FLAME RETARDANT			
	834B	834HTC	834FX	834BLV
UNCURED PROPERTIES				
Certification	Meets UL 94V-0	UL 746A certified	Meets UL 94V-0	Meets UL 94V-0
Color	Black	Black	Black	Black
Mixed density [g/mL]	1.6	1.7	1.6	1.4
Viscosity [Pa·s]				
Mixture	16	10	15	3.0
Part A	28	56	8.0	3.9
Part B	2.1	0.024	16	2.5
Mix ratio by volume [A:B]	2:1	5:1	1:1	2:1
Working time [min]	60	90	150	120
Cure time [min @ °C]	150 @ 65	120 @ 65	120 @ 65	120 @ 65
	60 @ 80	60 @ 80	60 @ 80	60 @ 80
	20 @ 100	30 @ 100	30 @ 100	20 @ 100
CURED PROPERTIES				
Tensile strength [N/mm^2]	17	22	5.3	20
Compressive strength [N/mm^2]	74	123	21	90
Lap shear [N/mm^2]				
Stainless steel	8.2	6.7	3.7	15
Aluminum	11	4.7	2.7	19
Hardness	85D	91D	88A	87D
TC @ 25 °C [W/(m·K)]	0.8	0.9	0.6	0.5
T_g [°C]	56	117	0.7	74
CTE prior T_g [ppm/°C]	74	34	71	78
CTE after T_g [ppm/°C]	107	116	137	111
Resistivity [Ω·cm]	2.1×10^{12}	3.0×10^{13}	7.5×10^{11}	1.6×10^{13}
Breakdown voltage [V]	40 700	37 500	36 300	40 300
Dielectric strength [V/mil]	430	395	365	395
Service temperature [°C]	-40 to 175	-50 to 150	-50 to 125	-80 to 200
AVAILABLE PACKAGING				
Net contents	375 mL	900 mL	450 mL	450 mL
	2.7 L	60 L	1.7 L	3 L
	10.8 L		7.2 L	
	60 L		40 L	

Urethane Potting Compounds

Ideal Potting Compounds for Marine Applications

MG Chemicals polyurethane resins provide cost-effective alternatives to other chemistries for protecting printed circuit boards and electronic devices. These 2-part potting compounds are especially suitable where low temperature flexibility is required. They provide strong protection from moisture, sea water, solvents, and mechanical stress. They are an ideal potting compound for underwater applications.

Features & Benefits

- 2:1 mix ratio
- Excellent dielectric properties
- Retains elastomeric properties down to -50 °C
- Superior physical and mechanical properties
- Variety of working times available
- RoHS compliant

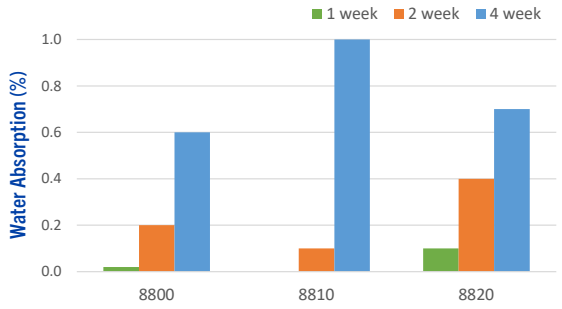
Applications

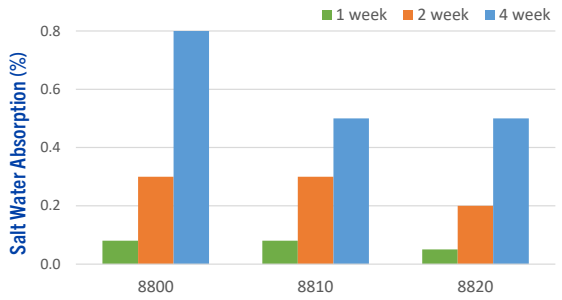
- IP protection
- Undersea telecom infrastructure
- Circuits in mining equipment
- Encapsulating delicate surface mount devices
- Cable jointing

8800 — Black, flexible, and short working time. Maintains excellent flexibility at low temperatures and creates minimum stress on circuit boards and surface-mounted devices.

8810 — Black, rigid, long working time, and low exotherm. Provides excellent moisture resistance.

8820 — Black, rigid, high temperature, and low exotherm. Offers properties similar to epoxy compounds, but with exceptional low temperature stability.





Urethane Potting Compounds

	8800	8810	8820
UNCURED PROPERTIES			
Color	Black	Black	Black
Mixed density [g/mL]	1.1	1.1	1.1
Viscosity [Pa·s]			
Part A	300	320	10 700
Part B	640	220	250
Mix ratio by volume [A:B]	2:1	2:1	2:1
Mix ratio by weight [A:B]	7.4:1	1.7:1	1.85:1
Working time [min] Based on 100 g sample. Varies by volume and geometry.	10	45	15
Cure time [min @ °C]	30 @ 65 25 @ 80	60 @ 65 45 @ 80	120 @ 65 90 @ 80
CURED PROPERTIES			
Tensile strength [N/mm^2]	4.5	10	15
Compressive strength [N/mm^2]	—	253	295
Lap shear [N/mm^2]			
Stainless steel	4.4	4.9	13
Aluminum	3.1	7.5	12
Hardness	74A	80D	73D
TC @ 25 °C [W/(m·K)]	0.3	0.3	0.3
T_g [°C]	11	44	44
CTE prior T_g [ppm/°C]	86	83	94
CTE after T_g [ppm/°C]	221	210	195
Resistivity [Ω·cm]	8.4 x 10^{12}	1.9 x 10^{13}	1.4 x 10^{13}
Breakdown voltage [V]	46 200	50 900	47 300
Dielectric strength [V/mil]	370	407	380
Service temperature [°C]	-50 — 120	-50 — 120	-50 — 150
Intermittent temperature [°C]	130	130	175
AVAILABLE PACKAGING			
Net contents	375 mL (2 bottle kit) 2.55 L (3 can kit) 10.8 L (3 can kit) 60 L (3 pail kit)	375 mL (2 bottle kit) 2.55 L (3 can kit) 60 L (3 pail kit)	375 mL (2 bottle kit) 2.55 L (3 can kit) 10.8 L (3 can kit) 60 L (3 pail kit)

Dispensing Accessories

Dispensing Guns and Static Mixers to Aid in Application

MG Chemicals offers dispensing accessories to aid in the application of adhesives and epoxy potting compounds. Dispensing guns allow the user to apply more pressure to the cartridge than they could by hand, allowing viscous materials to be dispensed through mixing tips.

Dispensing Guns Features & Benefits

- Solid plastic casing
- Simple slide in and slide out insertion system
- Trigger activated control provides a steady incremental flow
- Dispenses an accurate and smooth flow of materials

Static Mixers Features & Benefits

- Narrow cylindrical tubes with a stationary mixing elements
- For 2-part low to medium viscosity cartridge systems
- Provides a homogeneous and perfect mix of hardener and resin
- Eases precise application
- Single use

Dispensing Guns

8DG-30-1 Solid plastic gun, for use with 30 mL 1-part cartridges

8DG-50-1-1 Solid plastic gun, for use with 50 mL dual cartridges

8DG-400-1-1 Manual gun with two steel piston arms for use with 1:1 400 mL cartridges

8DG-450-2-1 Manual gun with two steel piston arms for use with 2:1 450 mL cartridges

Static Mixers

8MT-450 Large, standard flow tip for use with 2:1 450 mL and 1:1 400 mL cartridges

8MT-50 Standard flow tip for use with 1:1 50 mL cartridges and 1:1 25 mL syringes

8MT-50-FT Fine flow tip allowing greater precision for use with 1:1 50 mL cartridges

8MT-25 Standard flow tip for use with 832HD 1:1 50 mL cartridge and 1:1 25 mL dual syringes

Dispensing Accessories

	DISPENSING GUNS				STATIC MIXERS			
	8DG-450-2-1	8DG-400-1-1	8DG-50-1-1	8DG-30-1	8MT-25	8MT-50	8MT-50FT	8MT-450
832C-450ML	Yes	—	—	—	—	—	—	Yes
832B-450ML	Yes	—	—	—	—	—	—	Yes
832HD-400ML	—	Yes	—	—	—	—	—	Yes
832HD-50ML	—	—	Yes	—	Yes	Yes	—	—
832HD-25ML	—	—	—	—	Yes	Yes	—	—
8329TFF-50ML	—	—	Yes	—	Yes	Yes	—	—
8329TFM-50ML	—	—	Yes	—	Yes	Yes	Yes	—
8329TFS-50ML	—	—	Yes	—	Yes	Yes	Yes	—
8332-25ML	—	—	—	—	Yes	—	—	—
8332-50ML	—	—	Yes	—	—	Yes	—	—
8349TFM-50ML	—	—	Yes	—	—	Yes	Yes	—
9200-50ML	—	—	Yes	—	Yes	Yes	Yes	—
9200FR-50ML	—	—	Yes	—	Yes	Yes	Yes	—
9400-30ML	—	—	—	Yes	—	—	—	—
9410-30ML	—	—	—	Yes	—	—	—	—
9510-30ML	—	—	—	Yes	—	—	—	—

AVAILABLE PACKAGING

Content(s)	1 unit	1 unit	1 unit	1 unit	5 tips (bag)	5 tips (bag)	5 tips (bag)	5 tips (bag)





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Application Guide

Potting Compounds

This application guide describes the equipment and processes recommended for applying MG Chemicals' 1-part and 2-part potting compound products. It is the user's responsibility to determine the chemical, mechanical and thermal compatibility of substrates prior to using any of the suggested methods.

Epoxy potting compounds can be applied by hand mixing, meter mixing, or with the help of MG Chemicals' dispensing guns and static mixers.

Substrate Preparation

Many defects result from the presence of moisture, grease, oil, dirt, flux, and other board contaminants. Therefore, it is highly recommended that the user ensures the cleanliness and dryness of a surface prior to potting.

1. Put on disposable gloves and clean the surface with MG's 824 Isopropyl Alcohol or any other degreasing solvent.
2. Let the surface dry completely. Elevated temperatures can accelerate drying.

Crystallization/Solidification

Crystallization is the formation of solid crystals, and is common in epoxy resins. Over time the crystals may settle, causing the material to be more dense or harder at the bottom of the container. They may appear as tiny particles or cloudiness in clear resins. This phenomenon does not indicate that the material is defective, and it is easy to reverse.

If crystallization occurs, reconstitute the product by warming it to between 55 and 65 °C until it becomes fully re-liquified. Let the material cool to room temperature before mixing to prevent flash cure.

When dealing with large production volumes, contact MG Chemicals Technical Support for assistance. See Table 1 for the recommended amount of hand-mixed batches.

Cat. No.	Max. Amount for Hand-Mixed Batches
9510	Not applicable
832B	500 g
832HD	500 g
832C	500 g
832WC	500 g
832FX	500 g
832HT	500 g
832TC	3 kg
834B	1 kg
834HTC	1 kg
834FX	1 kg

Table 1. Mixing more than the amount indicated in the table above decreases working time and can lead to flash cure.

Mix Ratios and Working Time

Estimate the part A and B volumes that will be needed for the potting application prior to mixing. To avoid waste, mix required epoxy amounts only when ready to encapsulate components. Ensure the material is used and applied within the working time. If the working time is exceeded, the material will begin to gel or harden.

See Table 2 or the product's TDS for the appropriate mix ratios and working times of MG Chemicals' epoxy potting compounds.

Cat. No.	Mix Ratio by Volume (A:B)	Working Time (min)
9510	1-part	Unlimited
832B	2:1	60
832HD	1:1	45
832C	2:1	60
832WC	2:1	60
832FX	1:1	150
832HT	1.6:1	60
832TC	1:1	120
834B	2:1	60
834HTC	5:1	90
834FX	1:1	150

Table 2. Mix ratios and working time of MG Chemical's products.

Hand Mixing

Pre-Heating (Optional)

Pre-heating results in lower viscosity for easier mixing and faster de-airing; however, it will reduce the working time. To pre-heat, place individual parts into an oven at 65 °C for 90 minutes.

Pre-Stirring

Failure to properly stir individual parts before mixing them together can cause surface defects, degrade the cured properties, and even cause cure failure. Furthermore, improper pre-stirring of parts can result in inaccurate mix ratios.

1. Ensure that the individual parts are homogenous by thoroughly mixing and scraping settled material from the bottom and sides of the part A and part B containers.
2. Use a paint shaker if available.

Mixing Parts A and B

1. Measure the appropriate amount by volume of part A and pour into the mixing container. See product's TDS for mix ratios and working times.
2. Close the part A and part B containers tightly between use to prevent skinning.
3. Ensure all contents are transferred by scraping the container. To avoid cross contamination, use different mixing tools for parts A and B.
4. Repeat steps 1 and 2 for part B.
5. Thoroughly mix parts A and B together until homogenous. Avoid introducing air bubbles by gently stirring in one direction.
6. To de-air, let mixture sit for 15 minutes, or place in a vacuum chamber at 25 inHg for 2 minutes, or until bubbles are removed.
7. If bubbles are present at the top, break them gently with a mixing tool.

Potting Components

1. Pour the mixture into an enclosure holding the components to be protected.
2. Cure the mixture at the appropriate cure schedule. See the product's TDS.

Dispensing Accessories

MG Chemicals' dispensing accessories facilitate mixing, which makes the application process easier and more efficient. Static mixers eliminate the need for hand mixing. Potting compounds can be applied by hand, dispensing gun, or pneumatic applicator. Some of MG's pottinig compounds are also available in dual cartridge format.

Consult the Dispensing Accessories Catalogue when selecting the appropriate accessory for each product.

Dispensing Guns and Cartridges

Cartridges require manual dispensing guns or pneumatic applicators to dispense material. Dispensing guns are not required for MG Chemicals' 25 mL dual syringes.

8DG-30-1 and 8DG-50-1-1

Assembling the Gun

1. Lift the hinge all the way up to the top of the gun.
2. There is a tab located at the back of the gun. Push this tab up and hold it there.
3. Insert the piston all the way through the front of the gun, with the grooves facing down.
4. When the trigger is pulled, the piston moves forward. To return the piston to its original position, push up the tab on the back of the gun and pull the piston back.

Assembling the Cartridge in the Gun

1. Ensure that the gun is properly assembled with the piston fully retracted.
2. Lift the hinge on the top of the gun and insert the cartridge through the slot.
3. Once the cartridge is in place, close the hinge on the top of the gun over it.

For video instructions, click here.

8DG-400-1-1 and 8DG-450-2-1

1. Ensure that the piston is fully retracted by pulling it all the way to the back of the gun.
2. Insert the cartridge into the gun through the slot.
3. When the trigger is pulled, the piston moves forward. To return the piston to its original position, pull it back.

For video instructions, click here.

Static Mixers

Mixing tips are disposable and for single-use only. Do not store cartridges with mixing tips still attached because the material in the tip will cure.

8MT-450

1. Remove the ring cap and plug from the cartridge nozzle. Do not discard ring cap and plug.
2. Attach static mixer and place the ring cap back over the static mixer.
3. Dispense and discard 20 to 30 mL of the product to ensure a homogeneous mixture.
4. To stop the flow, pull back on the plunger.
5. Dispose of static mixer and clean nozzle to prevent contamination and material buildup.
6. Replace plug and ring cap on the cartridge.

8MT-25, 8MT-50 and 8MT-50FT

1. Twist and remove cap from the cartridge or syringe. Do not discard cap.
2. Dispense a small amount from the cartridge to ensure even flow of both parts.
3. Attach static mixer and turn clockwise to lock.
4. Dispense and discard 5 to 10 mL of the product to ensure a homogeneous mixture.
5. To stop the flow, pull back on the plunger.
6. Dispose of static mixer and clean nozzle to prevent contamination and material buildup.
7. Replace the cap on the cartridge or syringe.

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.

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