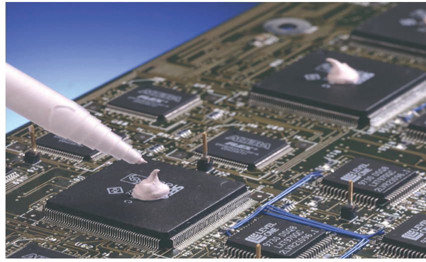
THERM-A-FORM™ T64x and 164x Series

Cure-in-Place Potting and Underfill Materials



Description

THERM-A-FORM™ thermally conductive silicone elastomer products are dispensable form-in-place compounds designed for heat transfer without excessive compressive force in electronics cooling applications. These versatile liquid reactive materials can be dispensed and then cured into complex geometries for cooling of multi-height components on a PCB without the expense of a molded sheet. Each compound is available in ready-to-use cartridge systems, eliminating weighing, mixing, and degassing procedures.

THERM-A-FORM™ Cure-in-Place Potting and Underfill Materials

	Typical Properties	T647	T646	T644	T642	1642	1641	Test Method
Physical	Color	Gray	Yellow	Pink	Blue	Blue	White	Visual
	Binder	Silicone	Silicone	Silicone	Silicone	Silicone	Silicone	--
	Filler	Aluminum Oxide	Aluminum Oxide	Boron Nitride	Boron Nitride	Aluminum Oxide	Aluminum Oxide	--
	Number of Components	2-part	2-part	2-part	2-part	2-part	1-part	--
	Mix Ratio	1 : 1	1 : 1	1 : 1	10 : 1	100 : 3	N/A	--
	Specific Gravity	2.80	2.45	1.45	1.50	2.30	2.10	ASTM D792
	Hardness, Shore A	25	50	15	70	76	56	ASTM D2240
	Viscosity, poise	> 5000	> 5000	3000	2500	2500	3000	ASTM D2196
	Pot Life, minutes	300	300	360	60	60	30	Time to 2X Starting Viscosity at 23 °C
	Cure Cycles	3 min. @ 150 °C 60 min. @ 60 °C 48 hrs. @ 23 °C	3 min. @ 150 °C 60 min. @ 60 °C 48 hrs. @ 23 °C	3 min. @ 150 °C 60 min. @ 60 °C 72 hrs. @ 23 °C	3 min. @ 150 °C 30 min. @ 70 °C 48 hrs. @ 23 °C	60 min. @ 100 °C 4 hrs. @ 65 °C 1 week @ 23 °C	48 hrs. @ 23 °C @ 50% RH	Chomerics
	Brittle Point, °F (°C)	-67 (-55)	-67 (-55)	-67 (-55)	-67 (-55)	-103 (-75)	-103 (-75)	ASTM D2137
	Extractable Silicone, %	4	8.5	15	1 - 2	Not Tested	Not Tested	Chomerics
Thermal	Thermal Conductivity, W/m-K	3.00	0.90	1.20	1.20	0.95	0.90	ASTM D5470
	Heat Capacity, J/g-K	0.9	1.0	1.0	1.0	1.0	1.0	ASTM E1269
	Coefficient of Thermal Expansion, ppm/K	150	250	300	300	200	150	ASTM E831
	Operating Temperature Range, °F (°C)	-58 to 302 (-50 to 150)	-58 to 302 (-50 to 150)	-58 to 302 (-50 to 150)	-58 to 302 (-50 to 150)	-94 to 392 (-70 to 200)	-94 to 392 (-70 to 200)	--
Electrical	Dielectric Strength, KVac/mm (Vac / mil)	10 (250)	10 (250)	20 (500)	20 (500)	20 (500)	20 (500)	ASTM D149
	Volume Resistivity, ohm-cm	1.0×10^{14}	1.0×10^{14}	1.0×10^{13}	1.0×10^{13}	1.0×10^{13}	1.0×10^{13}	ASTM D257
	Dielectric Constant @1,000 kHz	8	6.5	4.0	4.0	3.9	3.9	ASTM D150
	Dissipation Factor @ 1,000 kHz	0.010	0.013	0.001	0.001	0.010	0.010	Chomerics
Regulatory	Flammability Rating (See UL File E140244)	UL 94-V0	UL 94-V0	Not Tested	Not Tested	Not Tested	Not Tested	UL 94
	RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Chomerics Certification
	Outgassing, % TML (%CVCM)	Not Tested	0.17 (0.10)	0.39 (0.29)	0.32 (0.21)	0.40 (0.18)	Not Tested	ASTM E595
	Shelf Life, months from date of manufacture	3	3	3	3	12	6	Chomerics

Features / Benefits

- Dispensable form-in-place gap filling, potting, sealing, and encapsulating
- Excellent blend of high thermal conductivity, flexibility, and ease of use
- Conformable to irregular shapes without excessive force on components
- Ready-to-use cartridge system eliminates weighing, mixing, and de-gassing steps
- Variety of kit sizes and configurations available to suit any application (handheld twin-barrel cartridges, Semco® tubes, and pneumatic applicators)
- Vibration damping

Product Attributes

1641

- One-component moisture-cure RTV, supplied with primer 1086 (primer is not required for cure but promotes adhesion)
- Non-acetic acid generating

1642

- General duty, economical thermal solution
- Two-component thermally conductive encapsulant/sealant/caulk/potting compound, supplied with primer 1087. (primer is not required for cure but promotes adhesion)

T642

- High thermal performance with flexibility
- Ideal for underfilling
- Low outgassing

T644

- Very low modulus material for transferring heat from fragile electronic components

T646

- Provides combination of high thermal performance and low cost

T647

- Superior thermal performance while maintaining low modulus
- Flows into complex geometries to maintain intimate contact with components

Application Instructions

35cc and 45cc Kits (See Figure 1)

Push safety latch (A) upward. Insert the pushrod (B) into the applicator with the pushrod gear teeth facing downward. Insert the cartridge (C) into the slots on top of the applicator. Push the retainer clamp (D) down firmly to lock the cartridge in place. Remove the cartridge cap (E) with a 1/4 turn counter-clockwise. Attach the static mixer (F) to the cartridge. (For the 10:1 cartridge, make certain that the small notch on the mixer tube face is toward the large barrel containing Part A.) Turn the mixer tube 1/4 turn clockwise to lock it in place. Cut the tip of the mixing nozzle to obtain the desired bead size, or attach a needle with the Luer adapter. After use, discard the static mixer and replace the cap on any remaining material.

Ordering Information

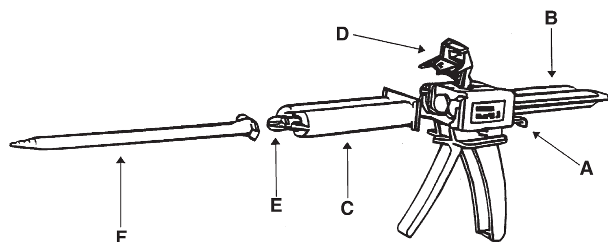


Figure 1: Typical Applicator

Mixpac® Dispensing Systems are available from multiple sources. When contacting Mixpac® equipment suppliers, reference cartridge volume (cc) and dual element cartridge A:B mix ratio. Refer to table for volume and mix ratio information.

Product	Part Number	Volume (mass)	Description
1641	65-00-1641-0000	2.5 fluid ounces (70 grams)	1-Component squeeze tube
	65-01-1641-0000	12 fluid ounces (340 grams)	1-Component SEMCO® cartridge
1642	65-00-1642-0000	277 grams (approx 120 cc)	1-Pint Plastic jar A / vial of B
T642	65-00-T642-0035	35 cc (53 grams)	10:1 Dual element Cartridge
	65-00-T642-0250	250 cc (372 grams)	
T644	65-00-T644-0045	45 cc (68 grams)	1:1 Dual element Cartridge
	65-00-T644-0200	200 cc (300 grams)	
T646	65-00-T646-0045	45 cc (115 grams)	
	65-00-T646-0200	200 cc (507 grams)	
T647	65-00-T647-0045	45 cc (125 grams)	
	65-00-T647-0200	200 cc (560 grams)	

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