

# THERM-A-FORM™

## Cure-in-Place Potting and Underfill Materials

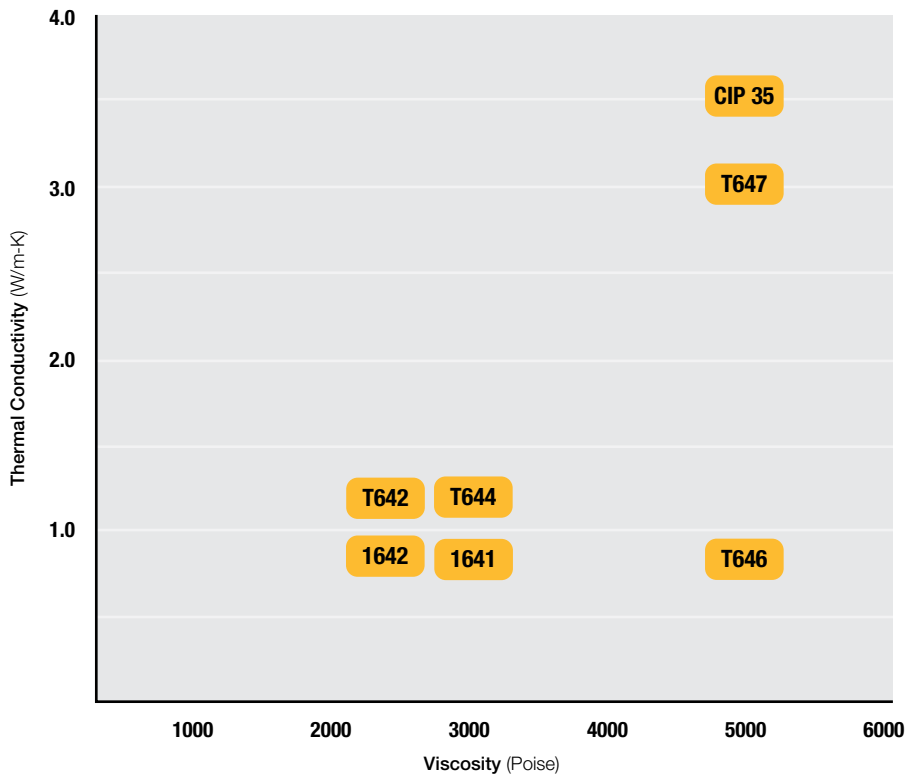
THERM-A-FORM™ thermally conductive silicone elastomer products are dispensable form-in-place compounds designed for heat transfer without excessive compressive force in electronics cooling applications.



### FEATURES / BENEFITS

- Cures in place once dispensed
- 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

### PERFORMANCE GUIDE



### TYPICAL APPLICATIONS

- Automotive electronic control units (ECUs)
  - Engine control
  - Transmission control
  - Braking/traction control
- Power conversion equipment
- Power supplies and uninterruptible power supplies
- Power semiconductors
- MOSFET arrays with common heat sinks
- Televisions and consumer electronics

## Therm-A-Form™ Cure-in-Place and Underfill Materials

Typical Properties		T646	T642	T644	T647	CIP 35	Test Method
Physical	Color	Yellow	Blue	Pink	Gray	Green	--
	Binder	Silicone	Silicone	Silicone	Silicone	Silicone	--
	Filler	Aluminum Oxide	Boron Nitride	Boron Nitride	Aluminum Oxide	Aluminum Oxide / Boron Nitride	--
	Number of Components	2-part	2-part	2-part	2-part	2-part	--
	Mix Ratio (by weight)	1 : 1	10 : 1	1 : 1	1 : 1	1 : 1	
	Specific Gravity	2.45	1.50	1.45	2.80	2.87	ASTM D792
	Hardness, Shore A	50	70	15	25	55	ASTM D2240
	Viscosity, poise	> 5000	2500	3000	> 5000	5000	ASTM D2196
	Pot Life, minutes	300	60	360	300	100	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 30 min @ 70°C 48 hrs @ 23°C	3 min @ 150°C 60 min @ 60°C 72 hrs @ 23°C	3 min @ 150°C 60 min @ 60°C 48 hrs @ 23°C	30 min @ 150°C 180 min @ 100°C 48 hrs @ 23°C	Chomerics
Thermal	Thermal Conductivity, W/m-K	0.90	1.20	1.20	3.0	3.5	ASTM D5470
	Heat Capacity, J/g-K	1.0	1.0	1.0	0.9	1.0	ASTM E1269
	Coefficient of Thermal Expansion, ppm/K	250	300	300	150	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)	-67 to 392 (-55 to 200)	--
Electrical	Dielectric Strength, kVac/mm (Vac/mil)	10 (250)	20 (500)	20 (500)	10 (250)	10 (250)	ASTM D149
	Volume Resistivity, ohm-cm	1.0 x 10 <sup>14</sup>	1.0 x 10 <sup>13</sup>	1.0 x 10 <sup>13</sup>	1.0 x 10 <sup>14</sup>	1.0 x 10 <sup>14</sup>	ASTM D257
	Dielectric Constant @ 1,000 kHz	6.5	4.0	4.0	8	8	ASTM D150
	Dissipation Factor @ 1,000 kHz	0.013	0.001	0.001	0.010	0.010	Chomerics
Regulatory	Flammability Rating (See UL File E140244 for details)	V-0	Not Tested	Not Tested	V-0	V-0	UL 94
	RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Chomerics Certification
	Outgassing, % TML (% CVCM)	0.17 (0.10)	0.32 (0.21)	0.39 (0.29)	Not Tested	0.22 (0.06)	ASTM E595
	Shelf Life, months from date of manufacture	3	3	3	3	12	Chomerics

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

	Typical Properties	1641	1642	Test Method
Physical	Color	White	Blue	--
	Binder	Silicone	Silicone	--
	Filler	Aluminum Oxide	Aluminum Oxide	--
	Number of Components	1-part	2-part	--
	Mix Ratio (by weight)	N/A	100 : 3	
	Specific Gravity	2.10	2.30	ASTM D792
	Hardness, Shore A	56	76	ASTM D2240
	Viscosity, poise	3000	2500	ASTM D2196
	Pot Life, minutes	30	60	Time to 2X Starting Viscosity at 23°C
	Cure Cycles	48 hrs @ 23°C @ 50% RH	60 min @ 100°C 4 hrs @ 65°C 1 week @ 23°C	Chomerics
Thermal	Thermal Conductivity, W/m-K	0.90	0.95	ASTM D5470
	Heat Capacity, J/g-K	1.0	1.0	ASTM E1269
	Coefficient of Thermal Expansion, ppm/K	150	200	ASTM E831
	Operating Temperature Range, °F (°C)	-94 to 392 (-70 to 200)	-94 to 392 (-70 to 200)	--
Electrical	Dielectric Strength, kVac/mm (Vac/mil)	20 (500)	20 (500)	ASTM D149
	Volume Resistivity, ohm-cm	1.0 x 10 <sup>13</sup>	1.0 x 10 <sup>13</sup>	ASTM D257
	Dielectric Constant @ 1,000 kHz	3.9	3.9	ASTM D150
	Dissipation Factor @ 1,000 kHz	0.010	0.010	Chomerics
Regulatory	Flammability Rating (See UL File E140244 for details)	Not Tested	Not Tested	UL 94
	RoHS Compliant	Yes	Yes	Chomerics Certification
	Outgassing, % TML (% CVCM)	Not Tested	0.40 (0.18)	ASTM E595
	Shelf Life, months from date of manufacture	6	12	Chomerics

# Ordering Information

## THERM-A-FORM™ T64x and 164x Series

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.

MIXPAC is a trademark of Sylzer.  
SEMCO is a registered trademark of PPG Aerospace.

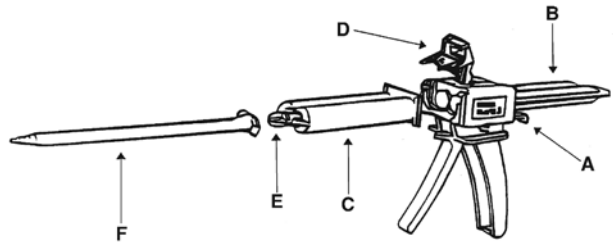


Figure 1: Typical Applicator

### APPLICATION INSTRUCTIONS

35 cc and 45 cc 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.

Product	Part Number	Volume (mass)	Description
1641	65-00-1641-0000	2.5 fluid ounces (70 grams)	1-Component foil 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)	10:1 Dual element cartridge
	65-00-T644-0200	200 cc (300 grams)	
T646	65-00-T646-0045	45 cc (115 grams)	10:1 Dual element cartridge
	65-00-T646-0200	200 cc (507 grams)	
T647	65-00-T647-0045	45 cc (125 grams)	1:1 Dual element cartridge
	65-00-T647-0200	200 cc (560 grams)	
CIP 35	65-00-CIP35-0045	45 cc (128 grams)	10:1 Dual element cartridge
	65-00-CIP35-0200	200 cc (570 grams)	
	65-00-CIP35-0400	400 cc (1140 grams)	
	65-00-CIP35-1200	1200 cc (3440 grams)	(2) 600 cc SEMCO® cartridges
	65-1P-CIP35-5600	5600 cc (16 kg)	(2) 1-Gallon pails, each pail has 8 kg
	65-5P-CIP35-10452	10,452 cc (30 kg)	(2) 5-Gallon pails, each pail has 15 kg