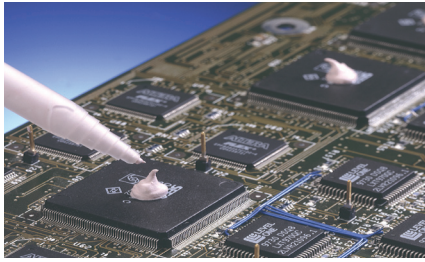


THERM-A-FORM™ T64x and 164x Series

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 x 10 ¹⁴ | 1.0 x 10 ¹⁴ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 10 ¹³ | 1.0 x 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.

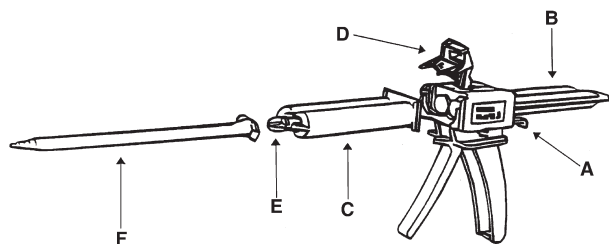


Figure 1: Typical Applicator

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.

MIXPAC is a trademark of ConProTec, Inc.
 SEMCO is a trademark of Bergdahl Associates, Inc.

Ordering 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) | 1:1 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) | |