

# 3M™ Thermally Conductive Epoxy Adhesive TC-2707

## Product Description

3M™ Thermally Conductive Epoxy Adhesive TC-2707 is an aluminum metal filled, two-part, thermally conductive epoxy adhesive.

## Key Features

- Improved thermal conductivity.
- Curing performance comparable to 3M™ Scotch-Weld™ Epoxy Adhesive DP-460 and DP-460 EG.
- Low outgassing comparable to Scotch-Weld DP-460 EG.
- Lower chloride ion content than standard epoxies.

## Typical Uncured Properties

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Product		3M™ Thermally Conductive Epoxy Adhesive TC-2707
Viscosity	Base	170,000 cps
	Accelerator	25,000 cps
	Mixed	100,000 cps
Base Resin	Base	Epoxy
	Accelerator	Amine
Filler	Aluminum	50% by weight
Mix Ratio (B:A)	Volume	2:1
	Weight	2.00 : 0.96
Worklife		60 minutes at 72°F (23°C)



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## Typical Cured Properties

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Product	
	3M™ Thermally Conductive Epoxy Adhesive TC-2707
<b>Color</b>	Gray
<b>Shore D Hardness</b>	84
<b>Glass Transition Temperature</b>	60°C (tan delta) See Chart on page 3
<b>Thermal Coefficient of Expansion</b>	56 x 10 <sup>-6</sup> /°C (below T <sub>g</sub> ) 132 x 10 <sup>-6</sup> /°C (above T <sub>g</sub> )
<b>Thermal Conductivity</b>	0.72 W/m-°K
<b>Thermal Impedance</b>	3.51 x 10 <sup>-5</sup> m <sup>2</sup> °K/W (1 mil)
<b>Volume Resistivity<sup>1</sup></b>	1.6 x 10 <sup>11</sup> ohm-cm
<b>Total Outgassing</b>	<25 micro-gm/gm (GC/MS, 85°C/3 hours)
<b>Hydrocarbon Outgassing</b>	<25 micro-gm/gm (GC/MS, 85°C/3 hours)
<b>Siloxane Outgassing</b>	<2 micro-gm/gm (GC/MS, 85°C/3 hours)
<b>Extractable Siloxane</b>	<10 micro-gm/gm (hexane extraction)
<b>Extractable Chloride</b>	<10 micro-gm/gm (hexane extraction)

<sup>1</sup>As the 3M™ Thermally Conductive Epoxy Adhesive TC-2707 uses aluminum metal fillers, under certain end use application conditions the effective resistivity and/or effective dielectric strength could be significantly lower than noted. If the metal fillers are “trapped” or “pinched” between two surfaces, an electrical bridge path via the aluminum fillers could occur between these surfaces. Epoxy Adhesive TC-2707 is not suggested for applications where a powered electrical circuit is used or where a reliable volume resistivity and/or dielectric strength is desired. 3M™ Thermally Conductive Epoxy Adhesive TC-2810 uses a ceramic filler and is a suggested product to test for these type of application performance needs.

# 3M™ Thermally Conductive Epoxy Adhesive TC-2707

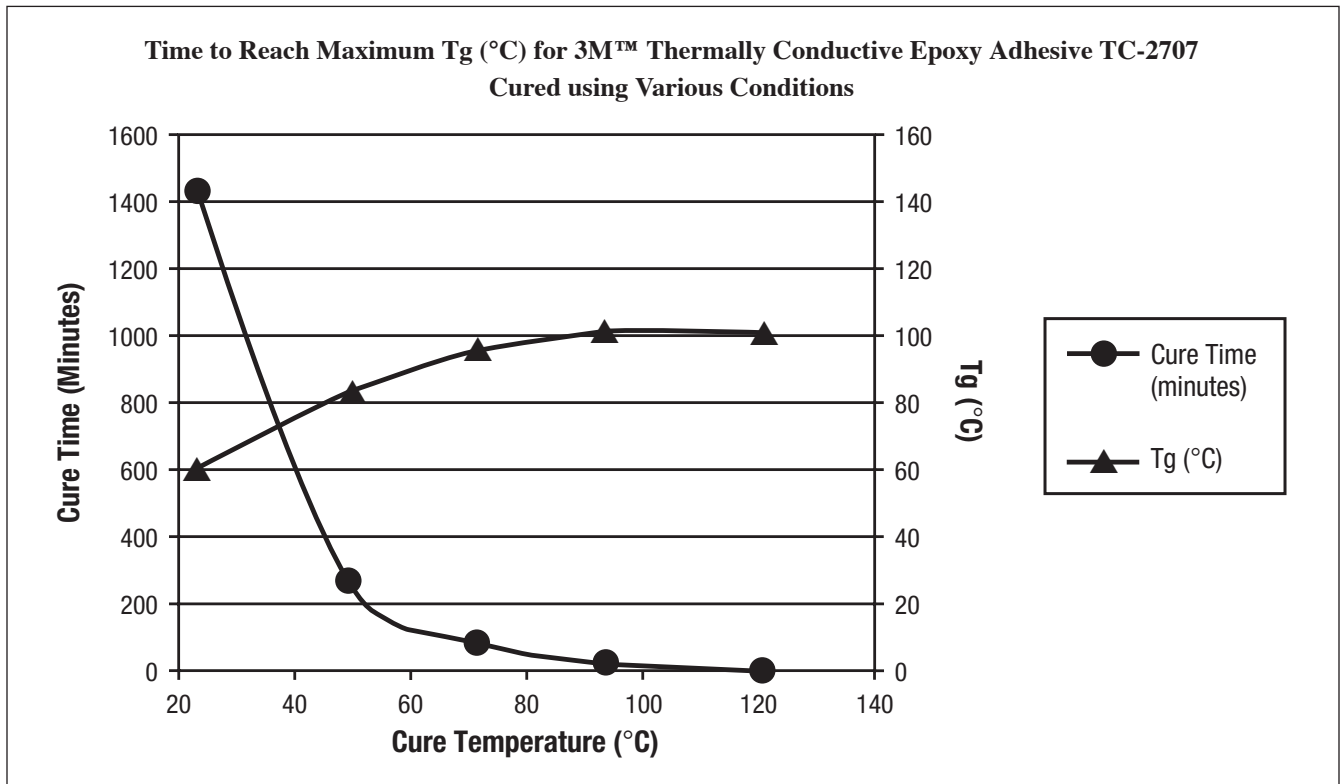
## Curing

- Cure Schedule:** 23°C/24 hours  
 50°C/270 minutes  
 70°C/90 minutes  
 90°C/30 minutes  
 120°C/10 minutes

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

### Shear Strength, Peel Strength, Tg vs. Cure Temperature/Time

	72°F (23°C) 24 hours	122°F (50°C) 270 minutes	158°F (70°C) 90 minutes	194°F (90°C) 30 minutes	248°F (120°C) 10 minutes
Overlap Shear (psi) (ASTM D-1002)	>3000	>3000	>3000	>4000	>4000
T-Peel (piw) (ASTM D-1876)	>7	>7	>7	>7	>7
Tg (°C) Tan Delta	60	83	95	100	100
Tg (°C) Storage Modulus	48	73	85	86	89



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## Application and Product Use Notes

For bonding rigid to rigid parts it is suggested that the bond line thickness and edge fillet be designed to optimize:

- i) Bond Strength;
- ii) Thermal Resistance.

A typical suggested bond line is in the 3-7mil thickness range

For improved thermal performance (lower Thermal Resistance), a thinner bond line is suggested. A thinner bond line can reduce the bond strength so each application needs to be tested to find the correct balance between:

### “Bond Line Thickness vs. Thermal Resistance vs. Bond Strength”

A “fillet” at the edges of a bond line is suggested to increase bond strength. The fillets are formed as the epoxy squeezes out past the side edges. Fillets can add strength to the assembly.

3M™ Thermally Conductive Epoxy TC-2707 is supplied in dual syringe plastic duo-pak cartridges as part of the 3M™ EPX™ Applicator System. The duo-pak cartridges are supplied in a 37 ml configuration. To use the 37 ml cartridge simply insert the duo-pak cartridge into the EPX applicator and start the plunger into the cylinders using light pressure on the trigger. Next, remove the duo-pak cartridge cap and expel and discard a small amount of adhesive to be sure both sides of the duo-pak cartridge are flowing evenly and freely (ie: no voids, “plugs of adhesive”, dis-continuity in flow, etc.) Once even side to side and uniform flow from both sides of the duo-pak is confirmed, attach the 3M™ EPX™ Mixing Nozzle to the duo-pak cartridge to ensure proper and uniform mixing of the Part A and Part B and begin dispensing the adhesive.

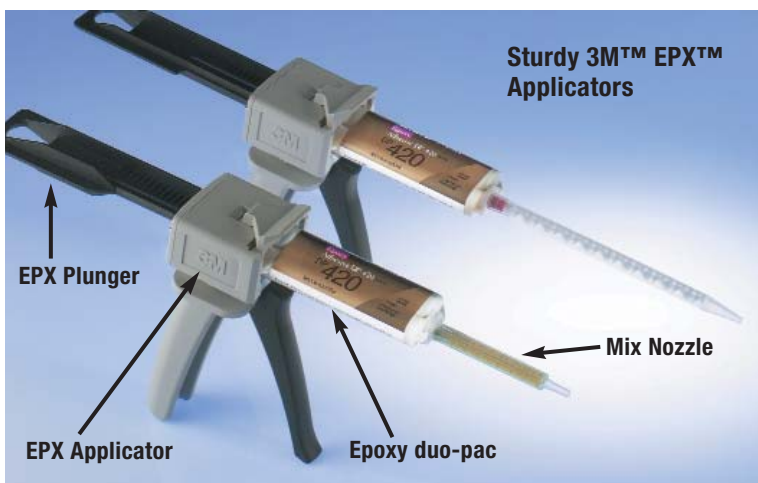
With a 200mil cartridge, the nozzle must be attached before dispensing any material to prevent unmixed adhesive from getting into the applicator cartridge holder. A quantity of material should be dispensed through the mix nozzle and discarded until a uniform color, consistency of product, freely flowing and even side to side flow is evident.

Partially used cartridges must follow the above use instructions to ensure consistent product performance.

Complete and uniform mixing as noted above of the two components is required to obtain consistent product performance.

## 3M™ EPX™ Applicator and Mix Nozzles

Use only 3M™ EPX™ Applicator and Mix Nozzles to ensure optimum product performance.



# 3M™ Thermally Conductive Epoxy Adhesive TC-2707

## Storage and Shelf Life

**Storage:** Store 3M™ Thermally Conductive Epoxy Adhesive TC-2707 at 60-80°F (15-27°C) or refrigerate for maximum shelf life and to reduce filler settling.

**Shelf Life:** Epoxy Adhesive TC-2707 has a shelf life of 12 months after date of shipment in its original container.

## General Information

Product selection table for 3M™ Thermally Conductive Materials.

Product	Thickness (mm)	Bulk Thermal Conductivity (W/m-K)	Typical Applications
<b>3M™ Thermally Conductive Tapes</b>			
<b>8805</b>	0.127	0.6	Applications requiring thin bonding with good thermal transfer; CPU, flex circuit and power transformer bonding to heat sinks and other cooling devices. Superior tack and wetting properties.
<b>8810</b>	0.25		
<b>8815</b>	0.375		
<b>8820</b>	0.50		
<b>9889FR</b>	1.0	0.5	Applications requiring gap filling and bonding with good thermal transfer; plasma display, IC packages and PCB bonding to heat sinks, metal cases and other cooling devices.
<b>3M™ Thermally Conductive Pads</b>			
<b>5516/5516S</b>	0.5, 1.0, 1.5, 2.0	2.3	Applications requiring gap filling and superior thermal performance without bonding. IC package and PCB thermal interfacing with heat sinks or other cooling devices and metal cases.
<b>5519/5519S</b>	0.5, 1.0, 1.5, 2.0	4.3	
<b>5591S</b>	0.5, 1.0, 1.5, 2.0	1.0	
<b>5592/5592S</b>	0.5, 1.0, 1.5, 2.0	1.1	
<b>5595/5595S</b>	0.5, 1.0, 1.5, 2.0	1.6	
<b>3M™ Thermally Conductive Pads (Acrylic)</b>			
<b>5598H</b>	1.0, 1.5	2.0	These pads use an acrylic elastomer for applications that require a non-silicone thermal pad. Provides IC package and PCB thermal interfacing with heat sinks or other cooling devices, and metal cases.
<b>5590H</b>	0.5, 1.0, 1.5	3.0	
<b>3M™ Thermally Conductive Epoxy Adhesives</b>			
<b>TC-2810</b>	—	1.0	Applications requiring high adhesive strength, good surface wet-out, gap filling and good thermal transfer. Provides IC package and PCB thermal interfacing with heat sinks or other cooling devices.
<b>DP-190 Gray</b>	—	0.4	

Only the “S” versions are available in 0.5 mm thicknesses.

“S” designation signifies a polyester film on one side to provide a non-tacky surface.

“H” designation signifies a product with one one-tacky surface without the use of PET film.

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## Precautionary Information

Refer to Product Label and Material Safety Data Sheet for Health and Safety Information before using this product. For additional health and safety information, call 1-800-364-3577 or (651) 737-6501.

## For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-251-8634. Address correspondence to: 3M Electronics Markets Materials Division, Building 21-1W-10, 900 Bush Avenue, St. Paul, MN 55144-1000. Our fax number is 651-778-4244 or 1-877-369-2923. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

## Important Notice

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product which are not contained in 3M's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.

## Warranty; Limited Remedy; Limited Liability.

This product will be free from defects in material and manufacture at the time of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**



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