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Technical Data | July 2018

3M™ Thermally Conductive Epoxy Adhesive TC-2810

Product Description

3M™ Thermally Conductive Epoxy Adhesive TC-2810 is a thermally conductive, 2-part epoxy using high performance filler for good thermal conductivity with high adhesion.

Key Features

- High adhesive strength
- Slight tack allows pre-assembly
- Good surface wet out
- Low viscosity for potting applications
- Good gap filling
- Thin bonding line
- Good thermal conductivity (0.8-1.4 W/m-K)
- Low chloride (Cl) ion content and outgassing

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.

3M™ Thermally Conductive Epoxy Adhesive TC-2810		
Property		**Value**
***Viscosity**	Base Accelerator Mixed	40,000-90,000 cps 11,000-21,000 cps 40,000-80,000 cps
Base Resin	Base Accelerator	Epoxy Amine
Filler	Ceramic	24% by weight
Mix Ratio (B:A)	Volume	2:1
Worklife		100-120 minutes at 23°C (72°F)
New Weight (lb/gal)	Base Accelerator Mixed	10.58 10.28 10.37

*Viscosity is measured using 40 mm, 2° cone, at 10 S^{-1}.

Applications

- LED Assembly
- Thermal fixing battery cell and thermal management for EV/HEV battery
- Potting applications
- General gap filling

Application Techniques and Product Use

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

1. Bond Strength
2. Thermal Resistance

A typical suggested bond line is in the 3-7 mil (0.076- 0.018mm) 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 correct balance between thermal and mechanical properties.

Bond Line Thickness vs Thermal Resistance vs Bond Strength

A "fillet" at the edge 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™ Thermal Conductive Epoxy TC-2810 is supplied in dual syringe plastic duo-pak cartridges as part of the 3M™ Scotch-Weld™ EPX™ Plus II Applicator. The duo-pak cartridges are supplied in 37ml or 50 ml configuration. To use the cartridge simply insert the duo-pak cartridge into the EPX Plus II 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™ Scotch-Weld™ EPX™ Mixing Nozzle to the duo-pak cartridge to ensure proper and uniform missing of the Part A and Part B and begin dispensing the adhesive.

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™ Scotch-Weld™ EPX™ Plus II Applicator and 3M™ Scotch-Weld™ EPX™ Mixing Nozzle

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

Typical Cured Physical Properties and Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is shipped with the commercialized product once it is approved by 3M for general commercialization and development work is completed.

3M™ Thermally Conductive Epoxy Adhesive TC-2810		
Property	**Method***	**Value**
Color		Cream
Glass Transition Temperature	ASTM 1356	See Chart on page 3
Thermal Coefficient of Expansion	ASTM E831	85 X 10 $^{-6}$/K (below Tg) 240 X10 $^{-6}$/K (above Tg)
Thermal Conductivity	ASTM D5470	0.80-1.4 W/m-K
Volume Resistivity	ASTM D257	1.5 x 10^{14} ohm-cm
Dielectric Breakdown Voltage	ASTM D149	44.0 kV/mm (1119 Volts/mil)
Dielectric Constant	ASTM 150	4.1
Total Outgassing	ASTM 5116	<1000 µg/g (GC/MS, 85 C/3 hours)
Siloxane Outgassing	ASTM 5116	<5 µg/g (GC/MS, 85C/3 hours)
Extractable Chloride	ASTM D7994	<30 µg/g (hexane extraction)

*Methods listed as ASTM are tested in accordance with the ASTM method noted

*Disclaimer if applicable to chart above

Curing

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

Please contact 3M Application Engineers for more data on curing conditions.

Typical Shear Strength, Peel Strength, Tg vs Cure Temperature/Time

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3M™ Thermally Conductive Epoxy Adhesive TC-2810			
	23° C (72 °F) 24 hours	90 °C (194 °F) 30 minutes	120 °C (248 °F) 10 minutes
Overlap Shear N/mm² (psi) (ASTM D-1002)*	18.62 (2700)	18.62 (2700)	18.62 (2700)
T-Peel (piw) (ASTM D-1876)	7	7	7
Shore D Hardness (ASTM D2240)	75	80	80
Tg (°C) (ASTM E-1356)	60	73	64

*Methods listed as ASTM are tested in accordance with the ASTM method noted

*Disclaimer if applicable to chart above

Storage and Shelf Life

The shelf life of 3M™ Thermally Conductive Epoxy Adhesive TC-2810 is 12 months from the date of manufacture when stored in original cartons at 21° C (70° F) and 50% relative humidity

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is commercially available from 3M. The commercially available product will have a COA specification established. The COA contains the 3M specifications and test methods for the products performance limits that the product will be supplied against. The 3M product is supplied to 3M COA test specifications and the COA test methods. Contact your local 3M representative for this product's COA.

Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is provided once the product is approved by 3M for general commercialization and development work is completed.

Safety Data Sheet: Consult Safety Data Sheet before use.

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