CHO-THERM® T609
Thermally Conductive Elastomer Insulators

MATERIAL DESCRIPTION

CHO-THERM T609 interface material is a cost-effective, ceramic-filled-silicone designed to provide superior thermal and electrical properties. Reinforced with fiberglass cloth, it offers maximum resistance to tear, cut-through and punctures from burrs and other mating surface irregularities. CHO-THERM T609 elastomer is formulated to be softer than other thermally conductive insulators to provide excellent performance at lower pressures. See Figure 1.

CHO-THERM T609 material is recommended for use in all electronic systems where maximum heat transfer and good electrical isolation are required. These include computers, automotive electronics, power supplies and high power controls. In contrast to mica insulators with thermal grease, CHO-THERM T609 material does not crack or otherwise fail when torqued between metal mating surfaces. T609 insulators eliminate the problems associated with silicone migration, contamination or drying out. A pressure-sensitive adhesive coating is available to aid assembly and fabrication.

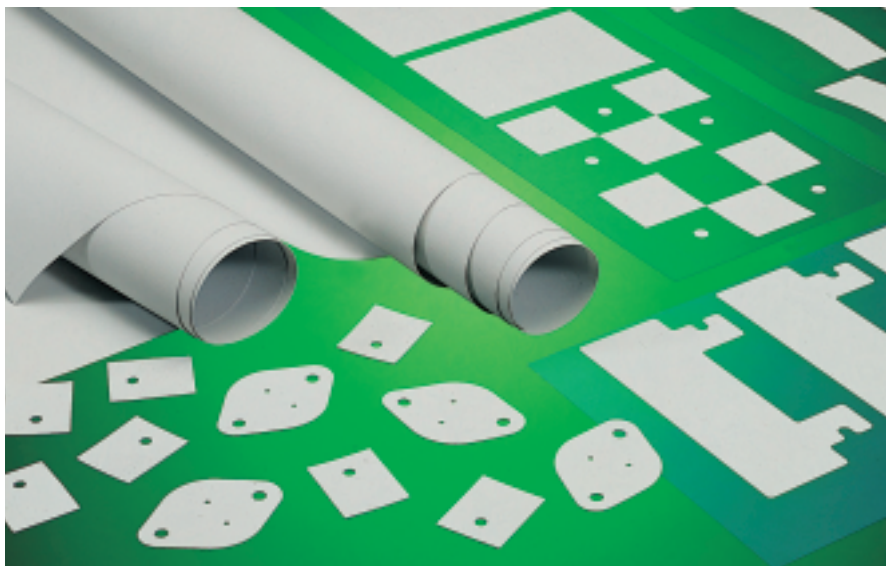
CONTACT PRESSURE & MOUNTING TORQUE

The optimum contact pressure range for CHO-THERM materials is 300-500 psi ($2.07 \times 10^6 - 3.45 \times 10^6 N/m^2$). Beyond this range, performance gains are negligible.

To convert mounting torque into contact pressure use the following equation:

$$P = \frac{(T)\ (N)}{(0.2)\ (D)\ (A)}$$

P = Contact Pressure (psi or N/m^2)
T = Torque (in-lbs or N-m)
N = Number of Fasteners
(0.2) = Average Friction Factor
D = Diameter (in. or m)
A = Contact Area (in^2 or m^2)



	TYPICAL PROPERTIES	T609	TEST METHOD
CONSTRUCTION	Binder	Silicone	—
	Filler	Aluminum Oxide	—
	Carrier	Fiberglass	—
	Color	Lt. Green	Visual
	Thickness, inch (mm)	0.010 (0.25)	ASTM D374
THERMAL	Thermal Impedance, °C-in^2/W (°C-cm^2/W)	0.33 (2.13)	ASTM D5470
	Thermal Conductivity, W/m-K	1.5	ASTM D5470
	Operating Temperature Range, °C	–60 to +225	—
ELECTRICAL	Voltage Breakdown, Vac	4000	ASTM D149
	Volume Resistivity, ohm-cm	3×10^{15}	ASTM D257
	Dielectric Constant 100 Hz 100 kHz	 5.25 4.93	ASTM D150
	Dissipation Factor 100 Hz 100 kHz	 0.0085 0.0053	ASTM D150
MECHANICAL	Tensile Strength, psi (MPa)	3000 (26.87)	ASTM D412
	Tear Strength, lb/in (kN/m)	300 (61.5)	ASTM D624
	Elongation, %	30	ASTM D412
	Hardness (Shore A)	65	ASTM D2240
	Specific Gravity	2.1	ASTM D792
	UL Recognized	File No. E57104	QMFZ2

IMPROVEMENT IN THERMAL IMPEDANCE WITH TIME

The thermal impedance characteristics of CHO-THERM materials can be expected to improve during use due to stress relaxation of the elastomer and consequent additional filling of the microscopic voids in the interface surfaces. Improvement can be as much as 10-15% after the first few weeks of use.

THERMAL INTERFACE IMPEDANCE

The thermal performance of interface materials is generally characterized by the thermal impedance across the interface in °C-in²/watt.

The lower the value of thermal interface impedance, the better the thermal performance.

The thermal impedance of an interface depends greatly on a number of different parameters, including the flatness and smoothness of the mating surfaces forming the interface and the contact pressure between them, as well as the thickness of the interface material, its thermal conductivity and conformability.

VOLTAGE BREAKDOWN CHARACTERISTICS

When using thermal interface pads to electrically isolate a component from a metal heat sink or chassis, the critical material property for the pad is its dielectric strength. Dielectric strength is a measure of how well a material can prevent the voltage on the component case from arcing through the material and allowing an electrical short circuit between the component and the metal mounting surface. This property is commonly presented as the voltage breakdown shown in the Typical Properties Table, and is determined by electrical testing of multiple flat sheet samples in accordance with the test procedures detailed in ASTM D149. The higher the value of voltage breakdown, the better the material is at withstanding applied voltages.

The dielectric strength of a material can also be affected by many external factors including: insulator thickness, area of the contact surfaces, temperature, humidity, mechanical stress applied to the insulator, the presence of partial discharge, etc. Contact Chomerics Applications Engineering for details of test methods and assistance with the electrical requirements of your specific application.

CHEMICAL & SOLVENT RESISTANCE

Exposure to petrochemicals or chlorinated solvents, such as trichlorethylene, freon, toluene, trichlorethane and other cleaning agents, chemicals and solvents used in vapor degreasing, defluxing and cleaning operations is not harmful to CHO-THERM T609 material although exposed edges do tend to swell. The amount of swelling is a function of exposure time and type of solvent. After drying out, the exposed edges will return to their former size and condition with no effect on thermal or electrical properties.

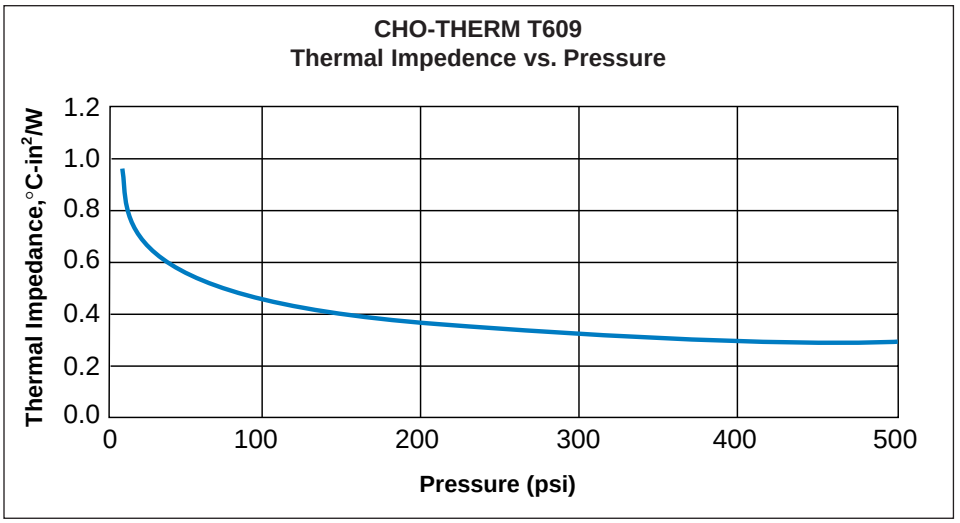
ORDERING INFORMATION

Using the diagram below, construct the appropriate part number: WW-XX-YYYY-T609. Part numbers for non-standard configurations will be assigned by Chomerics.

For customized die-cut parts, submit a detailed drawing of the desired part, including all dimensions, tolerances, hole locations and profile. When specifying pressure-sensitive adhesive (PSA) on non-symmetrical die-cut parts, indicate to which side PSA is to be applied. Note:T609 material with PSA has a shelf life of 6 months.

All CHO-THERM products are available through local Chomerics distributors. Contact Chomerics for the distributor in your area.

Figure 1



WW -- XX -- YYYY -- T609

WW
60 = Standard die-cut part 64 = Roll stock 66 = Roll stock PSA one side

YYYY	
Die-Cut Parts	**Roll Stock**
Contact Chomerics for Standard Configurations and Part Numbers.	Width 2200 = 22 in. (55.9 cm)

XX	
Die-Cut Parts	**Roll Stock**
11 = Without PSA 12 = PSA, one side	Length 10 = 100 ft. (30.5 m) 40 = 400 ft. (121.9 m)

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