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Properties of Thermally Conductive Adhesives

When the heat is on, 3M™ Thermally Conductive Adhesive Transfer Tapes can help control it.

As today's electronics continue to get smaller and their circuit density increases, the amount of heat they generate has substantially increased. If this heat isn't removed, the operational lifetime and reliability of the products will be reduced. [Thermally conductive adhesives](#) are essentially adhesives mixed with conductive fillers such as ceramic, aluminum silicate or metal. The main role of the adhesive is to form a bond at interconnections. The filler in the adhesives is what helps transport heat away from otherwise hot surfaces and dissipates it to other, non-critical areas of the assembly, usually with use of a heat sink. The tapes are used often in electronic assemblies such as high-density circuitry or heat sinks. As with other adhesive solutions, 3M™ Thermally Conductive Adhesives Transfer Tapes provide an alternative to other forms of assembly attachment such as screws or rivets.

Some things to consider when choosing a thermally conductive adhesive include:

Thermal Properties - Thermal conductivity is the measure of a material's ability to transfer heat and is measured by W/m-K. This measurement is the heat energy transferred per unit of time and per unit surface area divided by the temperature difference. Thermal impedance, measured in °C cm²/W, is the measure of how a material of a specific thickness resists the flow of heat. Finally, operating temperature range also plays an important role in a product's ultimate selection.

Mechanical Factors - Understanding where and how and where a product is being used and how thick the substrates are that will ultimately be bonded.

Dielectric Properties - Dielectric strength measures the maximum electric field a material can withstand without breaking down and is typically measured in KV/mm. Volume resistivity, measured in ohm/cm, quantifies how strongly the material conducts an electric current. For instance, low resistivity indicates that a material easily allows the flow of an electric current.

Which Product is Right for My Application?

3M has several "go to" thermally conductive adhesive transfer tape options to consider when you're looking to beat the heat. These tapes are designed to conduct heat between heat-generating components and heat sinks or other cooling devices such as fans, heat spreaders or heat pipes. The tapes acrylic resin has a typical operating temperature of 90 °C.

3M™ Thermally Conductive Adhesive Transfer Tape 8800 Series includes [8805](#) (5 mil), [8810](#) (10 mil), [8815](#) (15 mil) and [8820](#) (20 mil). 3M tape 8800 series has 0.6 W/m-K and is filled with ceramic thermally conductive fillers. The tape features high mechanical strength and good "wet-out" properties making it ideal for rough surfaces and LSE (low surface energy) substrates.

[3M™ Thermally Conductive Interface Tape 8926](#) Series includes 8926-02 (7.9 mil), 8926-025 (10 mil), and 8926-05 (20 mil). 3M tape 8926 series has high thermal conductivity of 1.5 W/m-K. The tape is very conformable and has medium adhesion.

Need additional help? Call Tekra today at 1-800-448-3572 for expert assistance or request a quote for 3M products designed for thermal management applications.