

## The Facts on Heat Sink Compounds... Keeping Electronics Cool

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As computer processing power continues to follow Moore's law, components are reduced in size, boards are more densely populated, and processors run hotter. These trends make it critical to design in proper thermal management, often including heat sink compound.

Heat sink compound (also called thermal grease) is used to fill the gap between the CPU (central processing unit) or other heat generating components and the mechanical heat sink. The mechanical heat sink, a passive component made of a conductive metal, is placed over the CPU. Heat is drawn through the mechanical heat sink to its fins, where a fan blows air through to dissipate the excess heat (see fig. 1).

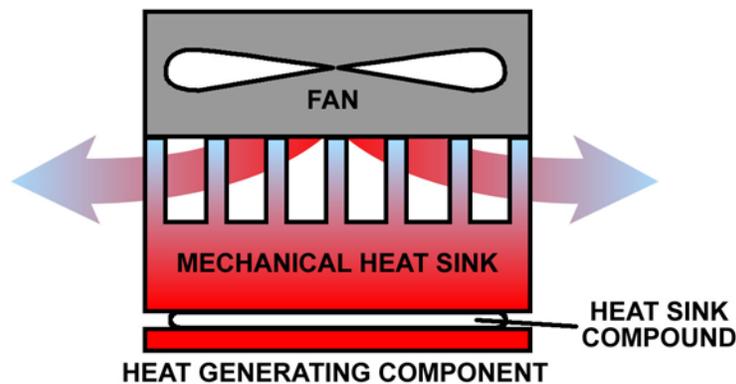


Fig. 1

Inefficiencies in the thermal transfer occur because two flat surfaces, e.g. CPU and mechanical heat sink, never join together perfectly. Inevitably there is an air gap because of imperfect surfaces. Because air is a relatively bad thermal conductor (see fig. 2), this can lead to reduction in heat dissipation, and as a result, an overheating and failing device. Heat sink compound is used to fill that gap, and is designed to efficiently transfer the heat from the heat generating component to the heat dissipating device. Although heat sink compound does not have the thermal conductivity of metals like copper and silver, the improvement over air will increase thermal responsiveness.

MATERIAL	THERMAL CONDUCTIVITY (W/mK)
Air	0.034
Heat Sink Compound	0.5-0.10
Steel	40
Aluminum	220
Copper	390
Silver	420

NOTE: Conductivity may vary depending on material type

Source: List of thermal conductivities, Wikipedia

Fig. 2

### **Techspray Heat Sink Compound**

Techspray offers two formulas of heat sink compound, silicone (part #1977-DP) and silicone-free (part #1978-DP and 1978-1). Silicone heat sink compound is an older formula more appropriate for electrical applications. Silicone can migrate and cause solderability issues and conformal coating dewetting. Silicone-free heat sink avoids silicone migration, yet has similar thermal conductivity. Both products will increase the efficiency of thermal transfer and help avoid overheating.

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*Techspray is a formulator and manufacturer of precision cleaners for industrial and electronic applications. More information on Techspray's heat sink compound and other products can be found at [www.techspray.com](http://www.techspray.com).*