



**acc**<sup>®</sup>  
*silicones europe*

## **SILCOTHERM<sup>®</sup>**

**Thermal Transfer Materials**

**Potting and Encapsulation Compounds**

**Heat Sink Greases/Compounds**

**Silicone Adhesives**

**Gap Fillers**

***World Class Silicones  
for Worldwide Solutions***





# Principles of Thermal Transfer Compounds

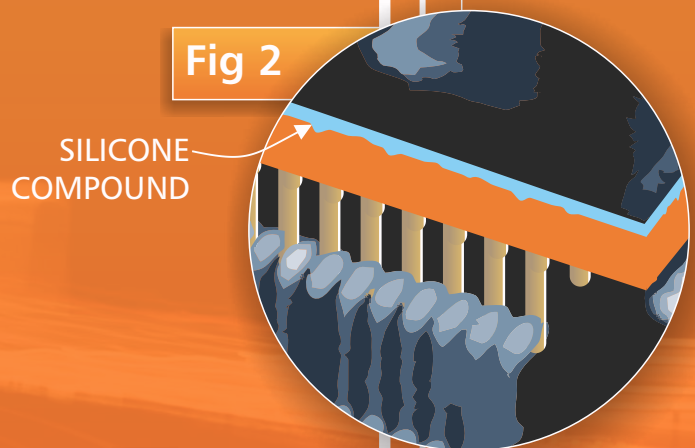
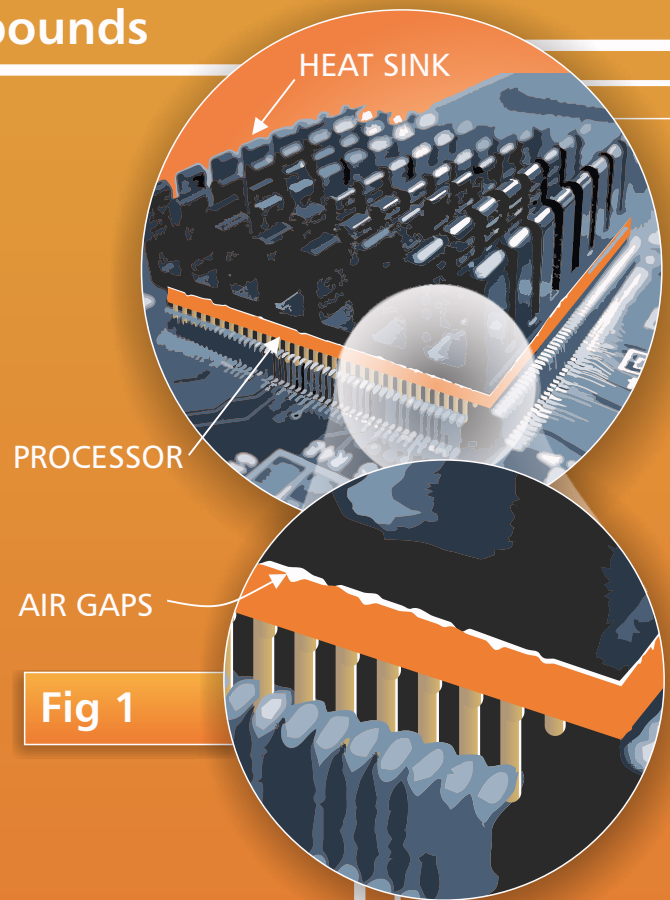
Most electronic components produce heat when in use. The unwanted heat has to be dissipated away from the components to maintain performance and avoid premature failure of the components or device. The need for efficient transfer of heat has become a key design requirement as components continue to reduce in size and increase in power, this is particularly apparent with microchip processors, LED's and power packs.

Designs will vary but in essence all involve some form of heat sink which may be a specialised unit or simply the enclosure or base plate. There needs to be an efficient pathway for the heat to travel between this and the components in order to dissipate the heat. It is the interface between the heat sink and component that calls for the use of thermal transfer compounds, without their use any air gaps that exist regardless of size will act as an insulator and prevent heat transfer (see Fig1 & Fig 2). Silicone polymers are loaded with microscopic, thermally conductive particles, the combination of the two, produce adhesives and other compounds that give superior performance in terms of flexibility, elongation and heat resistance when compared with many other organic and epoxy based products.

Selection of a suitable thermal transfer compound will depend upon the required level of thermal conductivity, mechanical constraints, operating environment and production methods. Within the **SILCOTHERM®** range there is a wide selection to choose from.

## Typical Applications

- Computer's
- Automotive electronics
- LED's
- Power packs
- PCB assembly
- Sensors
- Radiator systems
- Photovoltaic junction boxes



# SILCOTHERM® - Product Range

## Silicone Adhesives

The obvious benefits of having a thermally conductive adhesive enable you to permanently bond your component to some form of heat sink and eliminate the need for additional mechanical fixings.

When components and heat sinks are made from materials with different CTE's, air gaps can be created during thermal cycles, although these may only be seen at a micro level they will cause heat to build up. Using a flexible silicone adhesive will prevent this from happening and ensure maximum heat dissipation in all circumstances.

Silicone adhesives can also be used to form gaskets which will not only transfer heat but also form a seal against moisture and other environmental contaminants. They may be used to secure or provide support and vibration resistance to large capacitors and other components that generate heat.

Silicone adhesives utilise two basic chemistries:

- **Condensation Cure (RTV)**
  - 1-part systems which will cure at room temperature
  - 2-part systems with accelerated room temperature cure
- **Addition Cure**
  - 1-part systems which offer rapid cure but require the use of heat

## Gap Fillers

The **SILCOTHERM®** gap fillers are very soft thermally conductive, 1:1 paste materials designed to be used as a flexible Gap Filler within electronic assemblies. They are designed to be used when there is a wide tolerance or gap between component and heat sink ranging from several mm's down to zero. The cured material is not self-bonding but remains flexible allowing for a good interface without creating stress fractures when under compression. For ease of use they are supplied in Semco® twin pack cartridges with static mixers which are widely used within the electronics industry.

## Key Features

- Very soft
- Good thermal conductivity with controlled volatile content
- Convenient twin side by side cartridge system
- Remain flexible over a wide temperature range

## Encapsulation & Potting Compounds

Thermally conductive encapsulants can be used when trying to remove heat from a number of components within a single device. Selection of a suitable flowable silicone will facilitate removal of all the air gaps in and around a number of components, thereby providing an effective path for the transmission of any unwanted heat.

In addition to the dissipation of heat, silicone encapsulants will also provide protection from harsh environments, vibration and thermal shock.

## Heat Sink Grease/Compounds

Silicone thermal transfer compounds are non-setting in that they do not cure, have no adhesion and retain their physical properties, similar to that of grease. The main reason to choose a compound rather than adhesive is the ability to easily rework the component.

They are used when there is a requirement for a very thin layer of material. Under normal circumstances the component would be held in place with some form of mechanical fixing and the compound applied to fill any uneven surfaces, eliminating any air gaps and therefore improve heat dissipation. These silicone compounds are work stable and will withstand reasonably high temperatures.





# ACC Silicones has been manufacturing silicone compounds for over 40 years

During that time, we have acquired a great deal of experience and expertise and have gained an enviable reputation for producing high quality materials which have been proven to perform to a very high standard in the most demanding applications, including the aerospace and automotive industries.

We now have a brand new R&D facility in the UK and much of our research work is focused on electrical and electronic applications developing coatings, thermal transfer compounds and non-corrosive sealants. Our customer focused development programme and flexible production facility enable us to keep pace with the needs of today's modern production methods and design requirements.

Qualified, experienced sales and technical staff are readily available to make site visits throughout Europe and advise on product selection and production methods. Our expertise extends into all areas of 1 and 2 part RTV silicone chemistry with a strong bias towards application based solutions.

ACC Silicones is now part of the ICM Silicones Group enabling us to draw on additional expertise from around the world and benefit from additional manufacturing facilities in Europe, China and the US.

## Bespoke service

Our adaptable facilities based upon batch production allow us to offer formulations specially developed to meet very specific application requirements. Subject to strict commercial evaluation we are able to chemically engineer our products and change any of the following properties:

- Rheology – paste to free flowing low viscosity
- Cure speed and tack free times
- Thermal conductivity
- Hardness
- Colour
- Operating temperature range
- Cure mechanism
- Packaging and delivery systems



PART OF THE ICM SILICONES GROUP

## Other ICM Group Companies

ICM Products Inc, Cassopolis, Michigan, USA  
Quantum Silicones, Richmond, Virginia, USA  
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