

## Viscosity of Thermaphase

Thanks to the superior visco-elastic properties of Thermaphase materials and their limited thermal expansion characteristics, these products will not flow or migrate away from the interface area. The viscosity of these materials coupled with the surface-tension relationship between the component/heat sink surfaces and the thermal material, reduce undesired flow of excess material.

Thermaphase has a high viscosity (typically in excess of 100 poise) even at elevated temperatures in excess of 100°C.

Viscosity testing is performed on all of our materials during manufacturing using a Brookfield RVT Model Viscometer.

In popular parlance, the word "Thixotropic" is used to mean that a material does not flow under its own weight. Thixotropy and rheopecty and characteristics of some fluids which undergo a change in viscosity, with time under conditions of constant shear rate.

### **THIXOTROPY:**

A thixotropic material undergoes a decrease in viscosity with time when it is subjected to constant shear.

### **RHEOPEXY:**

This is the opposite of thixotropic. Here a fluid's viscosity increases over time if sheared at a constant rate.

Thixotropy and rheopecty can occur in combination with various flow behaviors, or only at certain shear rates. The time it takes a material to reach final viscosity may range from a few seconds up to several days.

Rheopectic behavior is infrequently encountered. Thixotropic materials are quite common and exhibited by materials such as greases printing inks.

### **Laminar and Turbulent Flow:**

Laminar flow is when two liquid layers flow past each other with no transfer of matter from one to the other. Viscosity is the friction between the layers. There are a number of factors which govern the maximum speed at which a layer can move with respect to the other. If they move faster than this speed, transfer of material will occur. This transfer of material is called "turbulence". During the process, molecules pass from one layer to another. The result is that more energy is required to maintain turbulent flow than laminar flow for a given velocity. The evolution of laminar flow into turbulent flow depends on several factors in addition to velocity. The viscosity and specific gravity as well as solids contents and characteristics can have a great effect on both

viscosity and laminar flow.

Thermaphase materials are engineered to have characteristics unavailable in any other phase change product. **ORCUS'** many years of experience in materials development has given us the technical edge you need to achieve the coolest, fastest operation of your power devices, from microprocessors and other semiconductor devices.