White Paper: Potting and encapsulating - avoiding voids

Our latest White Paper tackles the issue of voids in potting compounds and encapsulation. ***Potting and encapsulating – avoiding voids*** was written by Paul Whitehead, our Strategic Accounts Manager. It discusses voids – what are they, why they are bad, and how to prevent them happening.

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Potting and encapsulating – avoiding voids

by Paul Whitehead, BSc CEng MIET, Strategic Accounts Manager, INTERTRONICS

Introduction

Formulators of multi-component adhesives, potting and encapsulation materials are careful not to supply products with entrapped air. They do this by manufacturing under vacuum or degassing them before supplying to the end user. Consequently, entrapped air in a mixed material is usually a processing issue.

Voids Are Undesirable

Trapped air or voids (which might not actually contain air) can cause failures in electronics assemblies, whether they be micro-encapsulated wire bonds or large potted power supplies. Voids can subvert the very purpose of the encapsulating polymer, by compromising thermal conductivity and heat dissipation, or the electrical insulation properties. Voids and delamination provide pathways for moisture or other contaminants which can lead to short circuits or chemical damage. Bubbles in the polymer weaken its physical structure, allowing greater susceptibility to damage or cracking from physical or thermal shock.

Imagine some electronics which have been potted in a polymer – a PCB assembly in a block of plastic. If we grind away the block, layer by layer, we can reveal various features, including voids.

Figure 1 – Grinding away the layers, almost completely through the PCB, uncovers two copper tracks, and in the centre, the remaining solder resist. Under the resist, some voids in the potting compound are apparent.

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If you are involved with electronics potting or encapsulation, it is worth a read.

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