

Heat and vibration are two of the biggest enemies of the electronics industry. Even specially-designed electronics can have a meltdown when exposed to extremely high temperatures. And when you have sensitive electronics, it often doesn't take much energy in the form of shock or external vibration to cause damage.

Many industries, however, need to use electronics in environments that are less than ideal: aerospace, oil and gas exploration, and the military, to name just a few.

When you're deploying electronics in locations with excessive temperatures, shock, or vibration, how can you make sure your components will handle those extremes?

### **State-of-the-Art Protection**

*Preforms*, made by Houston-based Ultimate Solutions, are emerging as one of today's most innovative and effective ways to protect electronics. This patent-pending technology is designed to protect mission-critical electronic components from damage due to heat, shock, and vibration.

*Preforms* extend the life of electronics deployed in the most hostile environments and keep them performing reliably.

The custom-made *Preforms* fit electronic components, assemblies, and chassis like a glove. They are injection molded of state-of-the-art silicone that damps vibration and enables high thermal conductivity.

### **"Plug & Play" *Preforms* offer Advantages Over Potting and Encapsulation**

Traditional methods of protecting electronics by potting and encapsulation often fall short. These techniques involve placing the component in a potting vessel, pouring a potting compound over it, and then curing the potting compound for a period that can range anywhere from one to 24 hours. This procedure produces a component that's permanently encased in the potting medium.

Potting and encapsulation are useful techniques in some applications, but they have several shortcomings that make them unsuitable or too expensive for many uses. *Preforms* solve a number of these problems:

**Manufacturing Costs:** One of the drawbacks of potting and encapsulation is that they are labor-intensive procedures that can significantly increase the time and expense of manufacturing.

*Preforms* can take just a few seconds to apply during the electronics assembly process, greatly reducing the time and cost involved.

**Product Integrity:** With potting & encapsulation, impurities on the electronics can prevent the potting compound from curing properly. While the resulting device may look fine from the outside, the interior may retain a pasty consistency. This compromised physical structure diminishes the potting compound's ability to protect the electronics, and performance can suffer.

With *Preforms*, you can physically inspect the protection in just a few seconds, as you apply it during the assembly process — so you can be assured of its integrity.

**Thermal Expansion:** Many materials used for potting or encapsulation expand at high temperatures, so they can actually damage the electronics they are intended to protect.

*Preforms*, on the other hand, protect fragile components by surrounding them with minimal clearances that compensate for thermal expansion.

**Access to Protected Electronics:** Once an electronic device is potted or encapsulated, regaining access to calibrate or repair the device can be expensive and time-consuming. Re-entry comes with the risk of damage to the components inside. Also, the process to reapply this type of protection is labor-intensive and costly, because it must be started over as if it were the first time.

*Preforms*, on the other hand, can be easily removed (Photos 1, 2 & 3), so parts can be quickly serviced, calibrated, or replaced. This can be accomplished in a fraction of the time required for potting and encapsulation protection, with less risk to the devices inside. Once a component is repaired or replaced, its *Preform* can usually be re-applied and reused.



Photo 1: a single-molded *Preform*

## Flexible Configurations

Ultimate Solutions uses mold-design software to create designs that maximize the performance of each *Preform*. In some cases, the designers add reinforcing mesh, metal, wiring, shielding, or stiffeners to enhance performance.

If an application calls for a non-standard thickness, or if clearance is required to accommodate fragile chips and components, *Preforms* may be the perfect solution.

*Preform* protection includes both 2-dimensional and 3-dimensional geometries. This enables flexibility, as problems can arise when using 2-dimensional die-cut flat sheets to protect high value electronics.

Three-dimensional configurations are handled by encasing the PCBs in single-molded (Photo 1) or co-molded (Photo 4) *Preforms*.



Photos 2 & 3

*Single-molded Preforms allow easy access to electronics after installation.*

Single-molded *Preforms* are useful for protecting PCB assemblies in sensors and detectors deployed in high-vibration environments, and when you need to regain access to the electronics (Photos 2 and 3).

Co-molded *Preforms* are ideal for electronic assemblies operating inside chasses, hatches, and other restricted spaces (Photo 4). Each co-molded *Preform* consists of a hard, thin outer shell molded to the soft, inner material that surrounds the electronics. The shell promotes rigidity, durability, and easy insertion.



Photo 4: A co-molded *Preform*

## A Multitude of Uses

*Preforms* can be used with a wide range of applications including circuit boards, sensors, detectors, battery packs and others.

Because of their ease of use, durability, and adaptability, *Preforms* are suitable for many industries. From military applications to deep-sea wells, to manufacturing and car engines, *Preforms* can keep electronics working reliably in the most inhospitable environments.

*Preforms* provide a significant advantage over potting and encapsulation when you need to reduce manufacturing costs, protect against thermal expansion, ensure product integrity, and gain easy access to your electronics after protection has been applied.



**ultimate solutions**

*Rev up your electronics.*

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