

Silicone experts help circuit board manufacturer find fast solution

INTRODUCTION

Manufacturers depend on secure supply chains to keep their businesses up and running. A break in the link in those chains—or worse, the complete elimination of one of those links—can lead any manufacturer to hit the panic button. When that happens, having an agile, versatile supplier with the resources and technical know-how to quickly forge a new supply chain link can be invaluable.

Recently, a manufacturer of printed circuit boards (PCBs) faced a critical situation: Its existing coating supplier decided to exit the business entirely. The PCB manufacturer needed to find a replacement for its current silicone coating—and do so in a condensed time frame, with the least amount of impact on production.

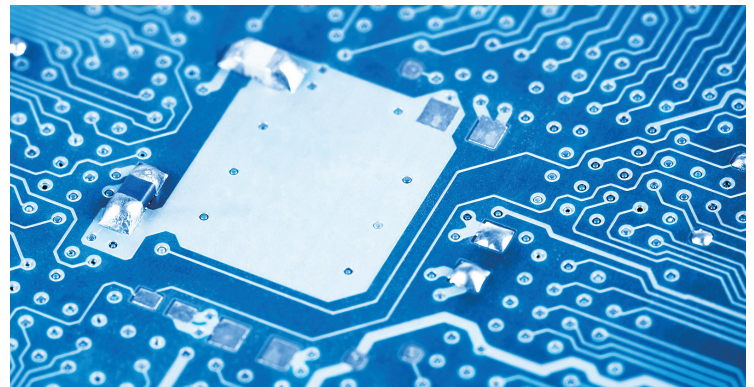
At first, the manufacturer investigated other materials, like epoxy and polyurethanes. At the same time, they reached out to the silicone experts at the Avantor® NuSil® brand. Could NuSil possibly have a product that had similar material properties—viscosity, cure rates, rheology—to replace the discontinued coating, and be able to supply sufficient volume of material to keep their PCB production from grinding to a halt?

“At NuSil, we pride ourselves on the ability to customize our materials for unique requirements. But in some cases, what our customer really needs is our ability to find the right silicone that meets our customer’s requirements—and provide the technical support to enable them to rapidly and successfully introduce that product into their manufacturing processes,” said Michelle Velderrain, Sr. Product & Application Specialist.

”

At NuSil, we pride ourselves on the ability to customize our materials for unique requirements. But in some cases, what our customer really needs is our ability to find the right silicone that meets our customer’s requirements—and provide the technical support to enable them to rapidly and successfully introduce that product into their manufacturing processes. ”

— Michelle Velderrain
Sr. Product & Application Specialist



PROTECTING ELECTRONICS

Electronic components mounted on PCBs form the foundation of our digital world and are critical to the performance of everything from smartphones to avionics. Today, many electronic components are now used in environments with conditions that can degrade or even destroy electronic chips and components mounted on PCBs. These PCBs face a wide range of environmental risk factors, such as:



TEMPERATURE EXTREMES

In some applications, electronic components can be exposed to extremely high and low temperatures.



MOISTURE

Delicate electronic connections can fail from excess moisture or condensation.



DUST AND PARTICLES

Although typically enclosed in housing, even minute amounts of dust can lead to electrical failure.



VIBRATION

Electronics used in vehicles, aircraft or other equipment undergo continuous, high levels of vibration.

One of the most common ways PCBs are protected is through conformal coatings. These coatings are applied either through spray applicators or immersion, and can be composed of a variety of materials, including epoxy, polyurethane, acrylics or silicone polymers.

The PCB manufacturer needing a new conformal coating supplier produces boards used in applications and environments where several of the stresses identified above are common—heavy, “shock”-type vibrations, excessive dust and particles and wide temperature swings. The manufacturer engineers their PCBs to perform under these rugged conditions, and that includes sealing the finished board with a silicone conformal coating.

“The manufacturer came to us while they were evaluating several other types of conformal coatings,” said Michelle Velderrain, Sr. Product & Application Specialist.

“We quickly learned their key requirements. The replacement coating needed to have specific viscosity to be able to work in their dip immersion equipment, a specific cure rate—approximately 24 hours—and be able to provide the required protection when subjected to testing.”

READY WITH THE RIGHT MATERIAL

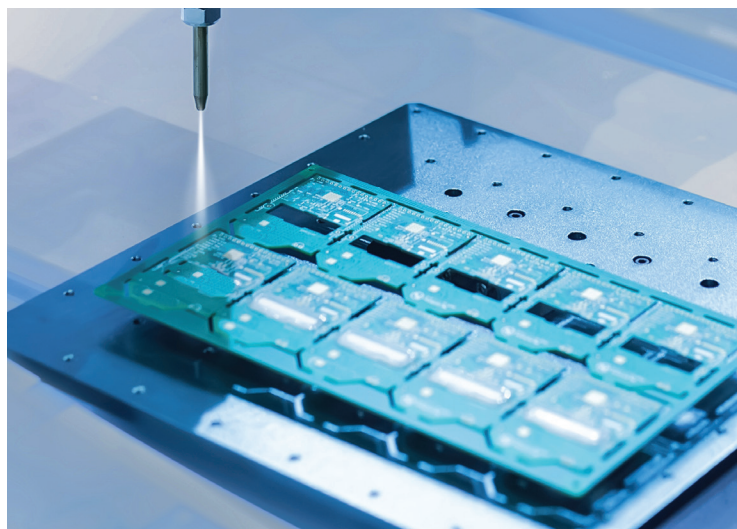
When the PCB manufacturer contacted NuSil, the company reviewed all its potential solutions.

“We carefully considered the manufacturer’s processing requirements, and then identified a product line with characteristics that met their specifications,” Michelle said.

NuSil supplied samples for the manufacturer to test the performance of the treated PCBs with NuSil’s coating. The PCB manufacturer performed two reliability tests:

- A saltwater immersion test to evaluate how well the conformal coating resisted moisture and corrosion. After the boards were submerged for a set period of time and removed, voltage was run through the board to assess whether there were any short circuits or electrical failures.
- A standard thermal cycling test to determine the stability of the coating when exposed to a range of temperatures, typically 40° C to 125° C. A similar voltage test was performed after the thermal cycling as well.

There was also a manufacturability test performed to determine whether the board’s surface would need any priming or pretreating prior to applying the coating.



“

For NuSil, collaboration happens in a lot of ways. In this case, the collaboration was built around listening to the customer, understanding exactly what was needed to solve the issue and then drawing on NuSil's decades of technical expertise, proven portfolio and commitment to customer care to deliver the right silicone for their application. ”

— Robert Umland
Director, Advanced Technologies

THE RESULT

NuSil's silicone conformal coating turned out to be exactly what they needed—and more. The coating was able to run in the company's immersion equipment with no modification. The viscosity matched their existing solution and there was no need to dilute the coating and avoid an extra process step.

The electronics manufacturer even found that there was no need to prime the PCB prior to coating, which was an improvement from the previous material, reducing processing time and costs. They also determined that the NuSil coating provided more complete and uniform adhesion to the board, especially around the solder joints.

“After reliability testing, our coating performed as well or better than the previous coating the manufacturer was using,” said Robert Umland, Director, Advanced Technologies for NuSil. “And NuSil was able to ship the material to the manufacturer to keep production going with no interruption.”

“For NuSil, collaboration happens in a lot of ways,” Robert said. “In this case, the collaboration was built around listening to the customer, understanding exactly what was needed to solve the issue and then drawing on NuSil's decades of technical expertise, proven portfolio and commitment to customer care to deliver the right silicone for their application.”

Contact NuSil® to Get Started

The NuSil team is ready to supply you with the right silicone conformal coatings you need to deliver PCBs with reliable performance and protection.

To learn more, visit www.nusil.com/conformalcoatings or contact NuSil experts today at advancedtechnology@nusil.com or +1 (805) 684-8780.