Successful Collaboration

The Parylene coating step is the final element in the production of critical electronic assemblies, completing a long sequence of design, prototype, supply chain and assembly efforts. Timelines inevitably compress as production nears completion, and while a project might tolerate delays and schedule adjustments during earlier phases, by the time finished units are ready for coating, there is little or no room for delay.

Even a few hours lost may be intolerable, and the same is true of yield percentages. Para Tech seeks to achieve 100% yield and on-time delivery at all times. With the nature of this advanced process, this goal can be nearly impossible to meet without mutual dedication and ongoing collaboration.

Yield and delivery expectations might be basic if Parylene coating was simply a matter of dipping finished circuit assemblies in a coating bath and shipping them on. Batch vacuum coating, however, is a complex, multi-step process that necessitates repeated handling of each unit for incoming inspection, pre-cleaning as required, masking, fixturing, adhesion promotion, vacuum coating, demasking, and final inspection and packaging.

Each of these steps has a defined time requirement, and each is critical for achieving the unmatched performance and integrity of the final Parylene film. High risk circuits are often delicate, and the amount of individual manipulation required can result in part damage and yield loss.

Decisions concerning the physical format of an assembly and selection of components appropriate to vacuum coating should be made at the very outset in order to achieve timely and cost-effective coating. Precise and dependable scheduling for every aspect of work is achieved through ongoing, cooperative communication.

After nearly five decades of Parylene experience, Para Tech employs an engineered process to achieve optimum vacuum coating results within a tight time frame and continues to develop further process enhancements. Reasonable delivery and yield expectations, informed designs, a proven process regiment, customer input such as schedule/forecast, a firm commitment to detailed plans, as well as uninterrupted collaboration will deliver the desired results.

The Importance of Effective Cleaning

Para Tech engineers are improving ways to clean complex and densely populated lead-free circuits. Cleanliness testing confirms the importance of effective cleaning to the initial and long-term performance of assemblies with flat devices that are attached directly to solder pads.

Parylene film is applied in gaseous form under vacuum conditions and deposited with consistent thickness - in the range of 0.75 mils (0.00075-in.) - over, around and beneath every circuit board feature. Liquid coatings, in contrast, are too viscous to flow into narrow crevices or below devices. Additionally, liquid coatings tend to pool between components and deliver undesirable cure and thermal expansion forces. Such coatings have a cured thickness in the range of 0.005 to 0.010-in.

Since Parylene is truly conformal, it presents special cleaning challenges for assemblies with high lead count and bottom terminated devices. Full coating coverage can entrap potentially corrosive residual contaminants, and even trace amounts of surface contamination may degrade the film-to-substrate bond, cause delamination, promote corrosion, and compromise coating integrity.

Common potential contaminants include flux residues, mold release compounds, oils, fingerprints, dust and other residues on surfaces and in crevices. High risk assemblies must be absolutely free of such production remnants before they are Parylene encapsulated.

Recent laboratory test results have provided useful data on the newest solvents and systems that can help circuit manufacturers and Parylene coating providers select and refine effective cleaning methodologies and inspection techniques, and support long-term electronic assembly performance. Further news in this area can be found on page 2.

Upcoming Events

February 7 - 9, 2017
Anaheim Convention Center, CA
Visit Para Tech at Booth #741
A Strong Commitment to the Environment

Parylene is unique among encapsulants in that it requires no solvents, creates no emissions, presents no disposal issues, and poses no health hazards at any step in the process. This thin film coating is compliant with both RoHS and RoHS2. Alternate liquid coating materials present their own particular issues as to solvent and mist emissions, byproducts and potential health questions.

There are materials of environmental concern, however, such as alcohol and vapor degreasers, that are part of the traditional Parylene process. Para Tech works proactively to substantially reduce the use of such materials, including finding alternate defluxing chemistries and procedures for enhanced safety and greater environmental sensitivity.

Para Tech has established and continues to pursue the self-imposed goal of reducing alcohol consumption by fifty-percent or more, compared to traditional volumes in advance of anticipated future EPA restrictions.

Green initiatives include a proprietary vapor phase promotion method (coating assemblies with gaseous Silane in the coating chamber rather than in a Silane/alcohol/deionized water bath), the use of water-based cleaning techniques, and more favorable detergents. Our ongoing efforts with suppliers and customers are proving beneficial in the development of non-solvent defluxing chemistries and environmentally sensitive procedures.

Para Tech Presents Cleanliness Paper

Technical manager Gustavo Arredondo will present the results of extensive cleanliness testing, conducted in conjunction with industry partners, at the IPC APEX EXPO conference in San Diego, CA, on February 16, 2017, at 10:30 am.

This study was conducted with the objective of determining the benefits of cleaning under bottom terminated components before conformal coating and to evaluate a high reliability, no-clean solder paste for this application. The research clearly confirms that effective cleaning of highly dense assemblies prior to Parylene encapsulation reduces the potential of leakage currents, and improves circuit reliability.

To discuss your particular application or receive a transcript of the above referenced test results, please contact us at garredondo@parylene.com.

The Service Supply Chain

Supply chain efficiency can be described as the degree to which companies harness financial, human, technological and physical resources in the conduct of their work. Para Tech functions as a service component of each customer’s supply chain rather than merely an inventory supplier. Meeting target lead times, yields and unit cost goals depend on cooperatively addressing each element in this multi-step process, on the basis of reasonable and informed expectations.

Successful, productive relationships rely on detailed understanding of everything involved in the Parylene process.

Just as every electronic assembly is unique, each Parylene coating project is a customized task with its own parameters and refinements. After decades of experience as a supply chain source for every imaginable coating challenge, Para Tech is able to direct its considerable resources to the tasks of the day.

Education, collaboration and communication are the elements that together lead to consistent coating success. The Para Tech customer support team is ready to respond to process questions as we work together with customers in pursuit of this common goal.