

Parylene News

Keeping in Touch



By Bill Gleason,
General Manager

This new year is
an important one

for PTC as we reflect on four successful decades in the Parylene business. I am pleased to report that business continues to expand as we follow careful validation processes and the requirements of full ISO certification. PTC continues to invest in intensive training and audit processes at each of our locations.

We are making important changes to the PTC infrastructure to better meet customer needs, including implementation of new order fulfillment software to integrate operating functions all the way from order entry to shipping.

This system will tie together PTC's domestic and international locations, eliminating duplication of effort and allowing greater focus on the efficient delivery of services.

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PTC Celebrates 40th Anniversary

Para Tech Coating, Inc. celebrates 40 years as a leader in the commercial application of Parylene coating. PTC was an early licensee of Union Carbide Corporation's poly-para-xylylene film coating process, and the first company to offer commercial Parylene coating services. The company has been a major contributor to coating technology and the development of Parylene applications and deposition equipment since 1968.

PTC founder Jeffrey Stewart explains, "The very first commercial Parylene application was coating of ferrite components for miniature transformers. As a very thin and conformal film, Parylene offered important advantages over traditional materials. It improved coil winding properties, added dielectric protection and reduced wire abrasion while adding very little physical mass."

It was soon apparent that these and other Parylene characteristics made the coating uniquely suitable for many conformal coating applications, and a number of Parylene uses were developed and refined in the early days of the company.

Over the years Jeffrey Stewart developed and patented eight useful

improvements in the Parylene deposition process that dramatically improved the performance, consistency and reliability of the Parylene vacuum deposition process.

These innovations continue to distinguish PTC as a standard setter for parylene deposition efficiency and precision, in the company's coating centers as well as in PTC coating systems designed and built for on-site customer use.



PTC founder Jeffrey Stewart

While the basic technology is essentially unchanged after forty years of use, Parylene is used today in applications that were unimaginable in the 1960s, before the advent of medical implants, micro-electronics, nanotechnology and sophisticated aerospace and industrial applications. PTC has successfully embraced the challenges of myriad coating applications, and is uniquely equipped to serve as an effective partner in delivering conformal coating solutions. See the Resource Library link at www.parylene.com for more details. ■



PTC to Show at APEX

Look for PTC in **Booth 2177** at the 2008 IPC Printed Circuits Expo®, APEX® and Designers Summit, April 1-3, 2008, in Las Vegas, NV.



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We expect to add new sales offices in the Midwest during 2008, with the goal of expanding them into regional coating service operations as the business grows.

The PTC organization has been upgraded to better serve high technology and medical coating applications. A fully functional structure with individual department heads allows us to efficiently address operations, regional sales management, technology, quality control and site management, with intentional focus on customer needs. We will continue to rigorously pursue quality control and service to maintain high standards as we continue to grow.

Follow-on services are under development for coating equipment customers, with support programs including predictive and preventive maintenance, on-line support, after-care and warranty as well as extended warranty. New sophisticated process control capabilities have been added to PTC coating systems to augment the patented vacuum deposition features that already distinguish the PTC line.

We are grateful for the trust that our customers place in PTC, and pledge to continue investing in the resources and capabilities required to make us the Parylene coating service and equipment supplier of choice." ■

Parylene Technology – Coating Ferrite Parts



By Gustavo Arredondo, Technical Manager

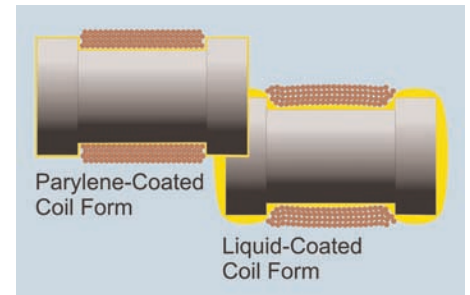
Miniature transformer coils are commonly wound on pressed metal powder or ferrite cores to achieve required inductive properties. The thin, varnished copper wire used for such devices can be abraded by rough ferrite micro-surfaces during coil winding, and a thin coating of Parylene on ferrite surfaces reduces winding friction and improves production rates.

PTC has coated ferrites for 40 years, developing specialized techniques for this application. Parylene is superior to dimensional liquid coatings because it smoothes and insulates ferrite surfaces electrically without adding mass or restricting winding space.

In contrast, liquid coatings draw away from edges, and collect in low areas and inside corners. It may be necessary to apply an excessive amount of coating in some areas to achieve the necessary overall coverage. Liquid coatings have a typical cured thickness ranging from 0.005 and 0.010-in on a single part.

Another issue with dimensional liquid coating is thermal expansion. If a liquid

coating's thermal properties differ from the underlying substrate, temperature changes may result in physical stress that breaks leads and fractures fragile parts.



Parylene coating preserves ferrite dimensions for efficient coil winding

Parylene contributes the required protective coverage and mechanical and physical properties with essentially no change in coil form dimensions and no stress. This material is effective at a nominal overall thickness of 0.00075 (0.75 mils). Ferrites can be easily coated in bulk without fixturing, and thickness is consistent across surfaces and from part-to-part for cost-effective coating. Contact PTC for experienced Parylene coating application assistance. ■

PTC Qualified to NASA Software Assurance Standard



PTC recently completed training on NASA Standard 8739.1 and recently-added provisions.

The resulting certification qualifies PTC for conformal coating work related to projects governed by this standard, titled "Workmanship Standard for Staking and Conformal Coating of Printed Wiring Boards and Electronic Assemblies."

The NASA standard was first implemented in 1999, and the updated version is anticipated shortly. NASA describes Standard 8739.1 as a mechanism for assessing software systems for their contribution to safety and quality. It provides basic procedures for estab-

lishing, operating, and maintaining a software assurance program to provide a common framework for consistent practices across NASA programs.

"The hands-on NASA training covered staking of materials to PCBs as well as various conformal coating methods, their theory, process, and inspection criteria including Parylene," said Gustavo Arredondo, PTC Technical Manager. "This NASA certification demonstrates that PTC understands and is capable of conforming to NASA conformal coating criteria." PTC is ready, equipped and certified to deliver qualified conformal coating services for NASA-related work, and invites requests for quotation. ■

Parylene Protects High-Tech Flashlights

Most people probably don't consider flashlights high-tech devices, but Southern California-based SureFire, LLC designs and manufactures a line of sophisticated, high-intensity flashlights (referred to as "illumination tools") that play a critical role in military and law enforcement applications. These compact, powerful flashlights are also invaluable tools to general consumers—especially in the areas of public safety, self-defense, disaster preparedness, and outdoor activities that require a reliable, lightweight and portable lighting source. The rugged dependability of these high-performance lights is due in no small part to the Parylene coating covering their circuit boards.

According to David Kluegel, SureFire's Director of Materials Management, SureFire illumination tools use cutting-edge electrical engineering to help achieve the intense, near-flawless beams of light for which the company is renowned.

"Our flashlights incorporate complex power and regulation circuitry that must tolerate rugged handling and tough environmental conditions," said Kluegel. "While anodized aluminum flashlight housings are sealed with multiple O-

rings, it's still important to guard against damage that could occur as a result of a compromised seal. That's why Parylene plays such a critical role."

Kluegel explained that it's not possible to effectively coat and protect individual circuit layers.

Instead, each multi-layer electronics assembly must be coated and sealed after it is assembled. "We find vacuum-deposited Parylene to be ideal for this application because of its ability to penetrate crevices as a vapor-deposited gas, and protect the entire device with a thin protective layer," said Kluegel. "Parylene gives us consistent, reliable circuit protection. It adheres well to all surfaces, maintains permanent adhesion, and handles the wide range of temperatures that these devices can experience."

SureFire's electronic assemblies are all coated at PTC's Aliso Viejo, California, facility. The process consists of incoming



Dave Kluegel of Surefire holds an assortment of the company's high performance illumination tools.

A cutaway of the SureFire K2 Kroma (top) reveals the complex Parylene-coated circuit assembly. Also pictured is a SureFire U2 Digital Ultra.



inspection, cleaning, masking, fixturing and coating, followed by 100% QPL inspection of coated parts. SureFire then conducts its own confirming QPL review on returned parts prior to moving them into production.

"We enjoy a cooperative and supportive relationship with PTC," said Kluegel. "This supplier ranks high in the quality of their work among our outside partners."

For more information on SureFire and their line of illumination tools, visit www.surefire.com. ■

The PTC Customer Support Process

By Erika Partida, PTC Customer Support

PTC follows a detailed nine-step process for each Parylene coating order, as introduced in the last newsletter. This progression is intended to ensure conformance with customer coating requirements and ISO 9001:2000 standards. The illustration shows the step-by-step effort that takes place during the standard 5-7 day turnaround period.

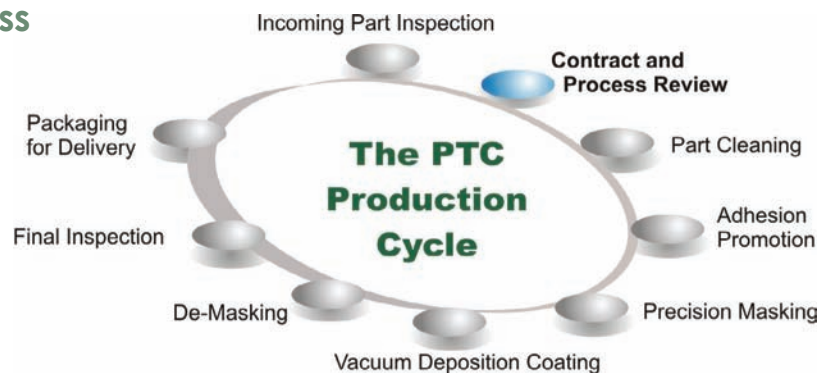
After Incoming Part Inspection, a **Contract and Process Review** is conducted, beginning with customer service department verification of Purchase Order details including price, dock date and part number. If necessary, an order is put on hold to resolve discrepancies. Approved orders are stamped with PTC's PO Acceptance

Stamp (POAS) or First Article Run Acceptance Stamp (1st ARAS).

POAS orders require the approval of Customer Support, the Production Manager and Quality Control, and 1st ARAS orders are approved by Engineering, the Production Manager, General Manager and Customer Support. When approvals are

obtained, project paperwork is released to Quality Control for inspection and approval of parts. Any voids, scratches, broken components are tagged to indicate hold status, and approved parts and paperwork are released for Production.

Next up... Part Cleaning ■



Meet Our People



PTC Office Manager
Tiffany Brookhart

Tiffany Brookhart is PTC's Office Manager. She is responsible for human resources as well as accounting and book-keeping, accounts receivable

and payable, and the company's purchasing functions.

In addition to managing the front office and financial activities, and overseeing administrative support, Tiffany has successfully managed several PTC projects, including the employee implementation of various HR and safety training programs, financial software upgrades, IT coordination and

the new VoIP phone system. Tiffany has been part of the PTC team for more than ten years and is an important contributor to the success of the business.

PTC General Manager Bill Gleason said, "Tiffany is an outstanding performer and her team does a fine job managing day-to-day office operations. She welcomes new employees warmly and communicates a positive and professional image for the company. Tiffany is considerate and supportive, and lends compassion to management decisions."

"I enjoy working with my colleagues and dealing with the variety of challenges that come up each day," Tiffany said. Apart from work, she and her husband enjoy a variety of outdoor activities and the joys of raising three children. ■

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