

# Parylene News

## Quality... A Never-Ending Process



By Bill Gleason,  
General Manager

Parylene is often  
the material of

choice for conformal coating applications that require optimum performance including very thin, conformal layers, excellent dielectric properties and good resistance to chemicals, gases and moisture.

While PTC customers in the medical, aerospace, electronics and industrial industries each have their own specialized coating requirements, they all demand the highest performance standards. In response, we focus on completing every aspect of our work in accordance with established procedures, and that involves multiple checks and balances and ongoing performance monitoring.

Under the direction of quality assurance manager Patricia Langraphi, PTC began operating according to ISO 9001:2000 in July of 2005, and in October of this year the company was certi-

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## PTC Achieves ISO 9001:2000 Certification

Intensive review by an accredited external auditor has determined that PTC's Quality Management System is compliant with demanding best practice standards, and on October 18, 2006, PTC headquarter operations were officially certified to the internationally-recognized quality standard of ISO 9001:2000. This certification confirms that all PTC's internal processes and protocol meet and exceed customers' expectations for quality.

The International Organization for Standardization (ISO) is a worldwide federation of

national standard bodies and represents international consensus, with the aim of creating global product and service standards.

This ISO certification relates to all aspects of our business, from design and development to production, installation and service.

Consistent quality requires extensive and intensive processes, and PTC is committed to continued pursuit of excellence in every aspect of our operation. ■



## PTC Coats Advanced Bionics Cochlear Implant Wire

Advanced Bionics Corporation, a manufacturer of implantable neuron-stimulation devices, uses Parylene to protectively coat very fine wire leads for the firm's proprietary cochlear implants. This Sylmar, California firm, a unit of Boston Scientific Corporation, was founded in 1993 to develop and manufacture hearing devices for profoundly deaf children and adults.

Greg Palermo, supplier quality engineer for Advanced Bionics, explains, "A cochlear implant hearing device consists of an external sound processor that captures and digitizes sound information and transmits it to an implanted receiver by means of a delicate wire lead to the auditory nerve. The brain perceives these pulses as sound."

The cochlear implant's wire lead requires a very thin, biocompatible and biostable coating that satisfies stringent U.S. Food and Drug Administration (FDA) require-



Photo courtesy of Advanced Bionics Corporation

**The Advanced Bionics Corporation cochlear implant is designed for children and adults with severe or profound hearing loss**

ments and complies with USP biological testing requirements for Class VI Plastics. According to Palermo, this wire coating must be of a precise thickness, free of voids and pin holes, and suitable for permanent implantation.

The deposited coating must also be free of minute entrapped contaminants, microscopic irregularities or coating nod-

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## ...Quality – A Never-Ending Process cont. from page 1

fied as operating to this standard after just one review (see adjacent article),

This level of performance demands constant attention to detail. Even before a customer's parts are unpacked, we conduct a contractual review of project requirements, match every detail in the spec with our planned operations and record the process in traveling documents that accompany each order. After 100% of incoming uncoated parts are inspected and results recorded, the job is released to production for cleaning and masking.

Each cleaned and masked part is again inspected for conformance to requirements before being sent on for coating. Responsible professionals record and sign off accompanying paperwork at every step. After the parts are treated, yet another inspection is held to verify coating thickness and quality. When approved, parts go on to the demasking step.

Finally, coated and unmasked parts are once more 100% inspected for damage or defects and then packed for return to the customer. Large volumes of small parts that have been coated using the tumble process are generally inspected on a sample basis.

We greatly appreciate the patience and support of our customers throughout the rigorous ISO qualification process, and reaffirm our intent to serve your coating needs with the very best in materials, systems and quality processes. ■

## Parylene Technology Advantages – Part 2



By Gustavo Arredondo, Technical Manager  
Para Tech Coating, Inc.

Proprietary Parylene coating methods give PTC unique process and efficiency advantages compared to traditional vacuum deposition coating system design. Part 1 in this series described our patented deposition control method, and in this issue we review PTC's unique tangential flow chamber design.

Unlike conventional Parylene systems that introduce monomer gas indirectly through a baffled entry at the side of the vacuum chamber, the PTC design delivers gas to the chamber tangentially through a port so that polymerizing molecules flow in a circular manner around the inside periphery of the chamber. Fixtured parts to be coated are mounted on a rotating structure that moves counter to monomer flow (see illustration).

This tangential flow enhances the uniformity of coating thickness across substrate surfaces throughout the chamber and eliminates need for diverting baffles, which create unwanted turbulence and raw material waste. Directing the gas to substrates in this manner reduces the amount of dimer required to achieve desired coating result.

Fixtured parts rest on perforated shelves in the chamber to allow for vertical dispersion of the monomer

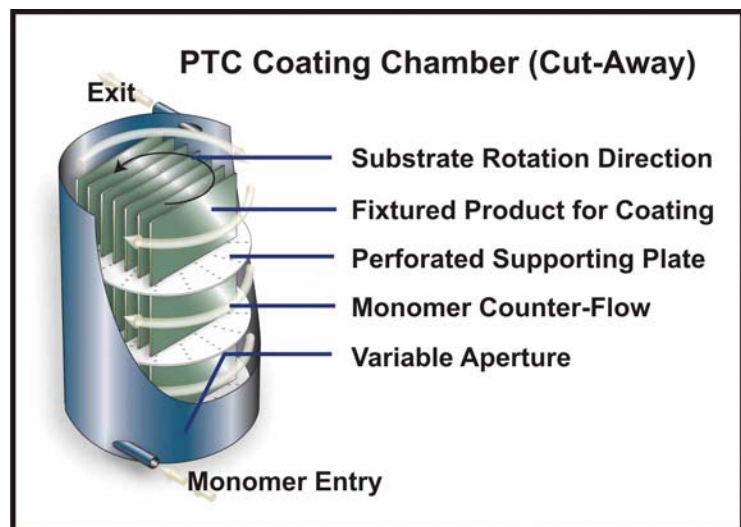


*Tangential monomer flow design proprietary to PTC systems results in efficient dimer use and even gas dispersion in the chamber.*

gas, and variable aperture plates at the bottom of the fixture stack are adjusted in relation to the surface area and geometry of each load to further control gas flow.

The tangential flow design and specific fixturing developed by PTC through decades of experience result in more efficient use of Parylene raw material than conventional chamber design can deliver, and yields faster coating cycle turnaround time. Proprietary PTC vacuum deposition techniques benefit custom coating customers as well as on-site users of PTC coating equipment. Contact us for more information on this and other aspects of PTC's advanced coating technology. ■

*With PTC's patented tangential flow chamber concept, monomer gas enters and flows around the coating chamber in a direction counter to fixture rotation*



## The LabTop® 3000 – A Fully-Integrated, Self-Contained Parylene Coating System

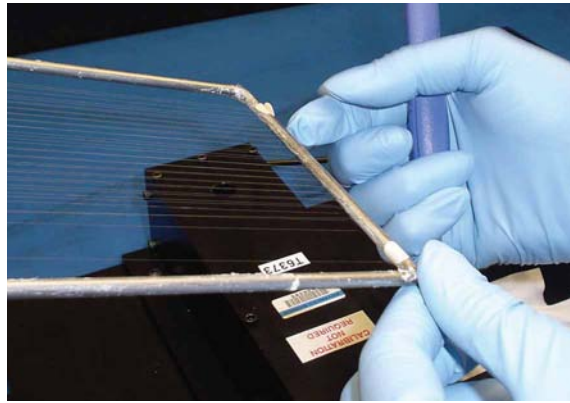
Companies with limited floor space or a restricted budget can take advantage of the useful properties of Parylene through the PTC LabTop® Model 3000 Compact Bench Top Parylene Coating System. The self-contained and fully-functional 3000 measures just 2 feet by 4 feet in size, and its 8-inch wide by 9-inch high coating chamber is suited for laboratory and R&D testing as well as short-run production applications with small substrates.



**The PTC LabTop® 3000 Compact Bench Top Parylene Coating System**

PTC equipment manager Mark Hanington explains that this table-top deposition system incorporates all of PTC's patented advantages, including tangential monomer flow, a baffle-free chamber, and stepped time/temperature deposition control. It has a built-in programmable operator interface with flat panel display and boasts the same automated process features as full-size production units. Click on the Equipment tab at [www.parylene.com](http://www.parylene.com), or call Mark at (800) 999-4943 for more information on the PTC LabTop® 3000.

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**Very fine cochlear implant lead wire is machine-wound on a frame for Parylene coating**

ules, exhibit good adhesion and withstand stresses of implantation and use. Other FDA approved coating materials for medical implants are not sufficiently durable or uniform in thickness for this application.

PTC teamed with Advanced Bionics engineers to develop an effective process for Parylene coating these delicate wire electrodes uniformly, conforming to an acceptable thickness variation of only +/- one micron.

Advanced Bionics ships bare lead wire to the PTC coating center, where it is carefully wound onto coating fixtures for Parylene coating. Winding is done with a custom machine that incorporates precise tension control of the delicate wire, and cleaning to remove

particulate and accumulated oils.

PTC inspects randomly selected wire segments for film clarity, uniformity and freedom from surface anomalies. Any out-of-tolerance film thickness, surface defect or over-coated contaminants in tested segments trigger rejection of the entire batch. No rework or corrective action is permissible.



**The coating must be uniform and free from surface defects.**

"At Advanced Bionics we are extremely particular in the choice of our suppliers, since absolute reliability is critical in every step of our production process," said Palermo. "The team at PTC takes their work very seriously, and we rely on them for coating integrity and consistency." ■

## The IPC 830B Specification – What Is It?

Commercial and industrial coating specifications have traditionally been measured in accordance with the U.S. Defense Department's MIL-STD 46058C. More recently, the Institute for Interconnecting and Packaging Electronic Circuits (IPC) developed the IPC 830 as a more specific and industry-applicable standard for qualification of conformal coating in non-military commercial and industrial applications. Revision B to the IPC standard, released in August of 2002, incorporated sample reports to document qualification, retention and conformance inspection details.

IPC certification includes test and evaluation of material properties using standardized test vehicles, and incorporates somewhat more detailed requirements than the MIL coating specification. Unlike MIL-I-46058C, which is covered by an authorizing authority that maintains qualified products list (QPL) records, IPC 830B is not managed by a governing body. Substantiation of IPC 830B performance is defined by and limited to certifying documentation supplied by authorized testing organizations.



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It is possible that this IPC specification will eventually supersede MIL-I-46058C for non-military applications. However, at present many companies require that coating processes for commercial applications meet the requirements of both IPC 830B and MIL-I-46058C. Independent laboratory analysis and documentation confirms PTC's ability to meet both of these important coating standards. ■

## Meet Our People

Gustavo Arrendondo, PTC's technical manager, has been a PTC team member since 1997. He began his career at Para Tech Coating in 1997 in customer service and internal operations. Today his responsibilities include direct involvement in coating production, process quality, coating system development and staff/customer training. His goal in each of these areas is continued process improvement and quality performance.



A graduate of UC Santa Cruz, Gustavo holds a degree in international economics with a minor in physics. His interests include music, backpacking, travel and Spanish literature. ■

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