



GLOBAL COVERAGE

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Wisconsin Lt. Governor Kleefisch Tours SCS' Clear Lake Facility

As part of her effort to showcase Wisconsin's aerospace industry, Lt. Governor Rebecca Kleefisch, along with members of the Wisconsin Economic Development Corporation (WEDC), Wisconsin Aerospace Partners (WASP) and the Wisconsin Procurement Institute (WPI), recently visited SCS' Clear Lake facility. Lt. Governor Kleefisch is currently the chairperson of the Aerospace States Association (ASA), a group that represents states' interests in federal aerospace and aviation policy development. ASA advocates on behalf of all 50 states for research and design funding, workforce training, economic development in aerospace and aviation, excellence in science, technology, engineering and math (STEM) education and in keeping states competitive in a global marketplace.

During their visit to the Clear Lake coating operation, the team learned about Specialty Coating Systems, the benefits of Parylene technologies and the role of conformal coatings in the aerospace industry. With over

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Parylene Safeguards Performance in Emerging Medical Sensors



Today's medical technologies allow practitioners to provide an increased quality of care through comprehensive and real-time evaluation of a patient's overall health. This is true for all facets of medical care – preventative, diagnostic, therapeutic and overall assessment.

Diagnostic evaluation may be one of the most common categories of medical care. When a medical event has occurred, practitioners use diagnostic care to continuously monitor vitals such as temperature, pulse rate, respiration and blood pressure. Many of the instruments used to measure these vitals are driven by a variety of sensors, which are often organized into key categories – pressure, temperature, flow and imaging.

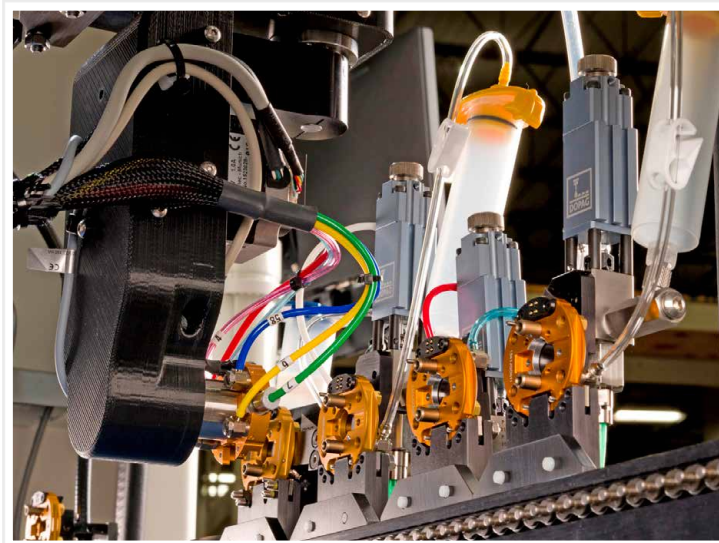
Blood oxygen measurement is a primary example of a sensor-driven technology. Like respiration and pulse, measuring oxygen content in the blood is critical in the real-time monitoring of a patient's health. Pulse oximetry measures the oxygen saturation in a part of the blood called hemoglobin. This is accomplished with a unique sensor technology

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SCS PrecisionCoat AQC: A Robust Solution

Since its introduction in 2006, SCS' PrecisionCoat spray coating and dispense system has allowed manufacturers to effortlessly apply numerous types of materials with speed and accuracy. Available in multiple configurations, the PrecisionCoat system is able to distribute acrylics, silicones, epoxies, urethanes, latex, adhesives and more on any number of the most complex components, while providing incredible flexibility to manufacturers across applications. Materials are applied using spray heads and dispense valves, or a combination of both, in addition to other valves and custom configurations. Spray heads apply a flat or round pattern for overall coverage, and dispense valves use cartridges or material lines and a needle to accurately distribute materials into restricted spaces and areas.

Recently, manufacturers have experienced even more ease and versatility with the introduction of the PrecisionCoat's Automatic Quick Change (AQC) — a feature that allows the use of five separate tools within a single machine. In standard systems, using multiple valves on the same machine limits head travel, which reduces the overall work envelop of the system. In contrast, the AQC feature allows customers to use up to five valves or heads, individually positioned with independent materials and functionality. This industry-leading feature enables users to automate and control the application of multiple materials, including cure functionality, and how each integrate with one another within a single coating profile.



The PrecisionCoat AQC feature provides a robust solution to manufacturers looking to solve any number of challenges. To demonstrate the system's

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SCS Presents at International Conferences



Dr. Rakesh Kumar

As a long-standing leader in the Parylene industry, SCS provides numerous opportunities for students and professionals to learn about Parylene polymers – what they are, the roles they serve as a material and coating, how they are created and/or applied, the properties and benefits they provide, and how they fit into an overall conformal coatings toolbox. This spring, Vice President of Technology Dr. Rakesh Kumar presented at two such conferences – BIT's 4th Annual World Congress

of Smart Materials in Osaka, Japan, and SMTA Electronics in Harsh Environments Conference in Amsterdam, Netherlands.

BIT's 4th Annual World Congress of Smart Materials

During his presentation, "A High-Temperature Nano/Micro Vapor Phase Conformal Coating for Electronic Application," Dr. Kumar highlighted the properties of Parylene HT[®] as both a conformal coating and a nanolevel (100nm/0.1 μ) structural material. Focusing on nanomaterials such as nanotubes and sponges, Dr. Kumar discussed how Parylene has increased the mechanical and chemical stability of nanotubes as well as provided super-hydrophobicity and excellent heat insulation features for sponges.

Some of the nano technologies currently being developed include nanoparticles that can deliver medication directly to cancer cells, nanomaterials used to make flexible, stretchable substrates for wearable sensors, and embedded nanoscale sensors that monitor the structural

integrity of bridges, tunnels and pavement. Researchers have also tested reusable carbon nanotube sponges for cleaning up oil as they can absorb up to 100 times their weight. While nanocoatings were more of a futuristic thought not that many years ago, research has come a long way and commercialization of products that utilize these technologies is in sight.

SMTA Electronics in Harsh Environments Conference

Dr. Kumar presented "A High-Temperature Vapor Phase Conformal Coating for Electronics in Harsh Environments" at SMTA's Electronics in Harsh Environments conference in April. Dr. Kumar discussed several factors that create harsh operating environments, including:

- **Temperatures:** The typical operating range for electronic components is between -20°C and 85°C. Harsh environment temperatures range from lower than -40°C to above 120°C, up to 275°C.
- **Chemical and UV Exposure:** Industry guidelines state that it is necessary to review and consider the impact of chemicals, moisture, gases and exposure to different types of fuels on electronic components. Manufacturers should also evaluate whether UV exposure is a potential issue.
- **Vibration:** Consideration must be given to excessive vibrations in applications such as gas/oil/rock drilling rigs, automotive and truck vehicles, food packaging and construction equipment.
- **Atmospheric Conditions:** Exposure to the outer limits of space (and the sudden change in atmospheric conditions to get there) and the darkest depths of the earth (a mile underground, for example) create extremely harsh environments for electronics.

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Wisconsin Lt. Governor Kleefisch Tours SCS' Clear Lake Facility (continued)

45 years of experience in the aerospace industry, SCS Parylene conformal coatings provide aerospace applications with the protection they demand. From protecting various components on UAVs and commercial aircraft to the International Space Station and Juno spacecraft, Parylene provides a long-lasting barrier that is crucial in taxing environments.

Applied as a gas in a vacuum, Parylene is truly conformal and free from air gaps and voids that can outgas in atmospheric pressure, exposing parts

to the environment. Parylene delivers an excellent dielectric, chemical and moisture barrier and offers metal whisker mitigation, wire-bond strength and solder joint reliability to electronic components, all while adding minimal weight to the substrate.

To schedule an educational presentation on how Parylene conformal coatings can benefit your aerospace application, contact Tim Seifert at 317.244.1200, ext. 0220, or tseifert@scscoatings.com.

Parylene Safeguards Performance in Emerging Medical Sensors (continued)

that utilizes light-emitting diodes (LEDs) of two specific wavelengths to measure absorbance through a part of the body. In most cases, a finger is used, but the technology will also work on an earlobe. Two different types of LEDs shine energy through the appendage; one is a red light that has a wavelength of 660nm and the other is infrared energy at a wavelength of 940nm. Built into the opposite side of the finger clip are photodiode sensors that measure the transmission of energy through the tissue and blood of the finger. Calculations are applied to the measurements to determine the saturation level of oxygen bound to hemoglobin in the blood.

A second type of diagnostic measurement is imaging technology. Today's ultrasound devices use high-frequency soundwaves and their echoes to generate images using a piezoelectric material. Both produce the ultrasonic signal and sense its return after echoing off surfaces. The ultrasound beam is created by electrical pulses resulting in mechanical oscillations of crystalline material in a transducer or probe; this is what's called the piezoelectric effect, wherein one type of energy is converted into another (electrical into sound). The generated ultrasound waves travel to and through different tissues and return to the transducer as reflected echoes. The returned echoes are converted back into electrical impulses by the transducer crystals and are further processed to form the ultrasound image presented on the screen.

A new kind of sensor has the potential to replace traditional piezoelectric crystal material technologies. Wafer-generated capacitive micromachined ultrasound transducers (CMUTs) are based on the same physics of capturing echoes but are manufactured with a different type of generator/sensor. This sensor is miniaturized and capable of being manufactured on the same chip that processes all of the data to generate an image. The chip can be mounted on a cell phone and operated as a portable handheld device, which would rival cart-mounted systems that cost up to \$100,000. While it is currently unable to generate the vivid images that standard ultrasound units can, it is adequate for a variety of imaging requirements in a portable, low-cost unit. The FDA recently approved an early version of this CMUT technology.

The use of force sensors in surgical tools is a final example to review. For generations, highly experienced surgeons have relied on the feel of tissue-tool interaction forces to perform delicate surgical techniques. The direct feedback they rely upon while handling medical instruments is largely lost when the surgery is performed in a minimally invasive fashion. While Minimally Invasive Surgery (MIS) offers tremendous benefits, including increased safety, decreased scarring, faster recovery and reduced hospital stay, one downside is experienced by surgeons regarding the lack of force,

distance or depth they sense. With the advent of robotic surgery, the feedback mechanism can be lost entirely, requiring a variety of sensors to measure force and displacement to result in the successful completion of a surgical task. Part of restoring the feedback mechanism is the use of force sensors, including load cells, strain gauges and tactile force sensors, on the surgical tools themselves. These allow for a more reliable and repeatable outcome while imparting the least amount of induced trauma to tissue and organs. Probes, jaws and staplers are just a few types of devices that have been functionally enhanced with the use of advanced sensing technologies.

These are only a few examples that highlight the use of sensors in the medical world, all of which are geared toward improving the quality of healthcare for patients around the globe. As a Parylene conformal coatings provider, SCS is actively engaged with sensor and device manufacturers to improve performance and reliability of a host of sensor types. For more information on Parylene conformal coatings and how they enhance sensors and medical devices, contact Dick Molin at 317.244.1200, ext. 0271, or dmolin@scscoatings.com.



SCS PrecisionCoat AQC: A Robust Solution (continued)

flexibility, consider the following example: A manufacturer has a logic board with components in close proximity and areas that are not sealed. The use of a liquid coating may pose an issue as the material may migrate to unwanted areas (unsealed) of the assembly. The PrecisionCoat AQC enables customers to isolate the components with a masking material prior to spray coating the balance of the board, all via a single coating profile without operator intervention:

- The PrecisionCoat begins by picking up a dispense valve, which can be connected to either a cartridge of masking material or a material line.
- After the masking material is dispensed, the system sets the valve back into place and picks up the UV wand, which is then used to cure the material.

- When the cure process is complete, the PrecisionCoat will select a second dispense valve, which is tied to a different material line and will outline various components, including between tight areas.
- After the dispense valve is put back in its place, the spray tool will be selected to complete the application of conformal coating on the PCB.

One of the main benefits of the PrecisionCoat AQC feature is that the platform is designed for immediate needs, but also with the versatility to meet future demands as well. The flexibility of five heads and valves on the AQC enables the PrecisionCoat system to be a long-term solution for growing manufacturers. To receive more information on the PrecisionCoat or AQC feature, or to request a quotation, contact Hans Bok at 508.997.4136, or hbok@scscoatings.com.

The SCS PrecisionCoat provides a host of benefits to manufacturers.



Standard features:

- Operated by SCS' proprietary software
- Offline programming and profile sharing between multiple systems
- Precision ball screw gantry system
- Interior lighting
- SMEMA transfer protocols and safety interlocks
- 5" pass through clearance
- Adjustable height keyboard and monitor arm
- Choice of tubing, handling system, valve options and material reservoir

Optional features:

- Advanced proprietary vision system, which utilizes fiducial recognition for accurate programming and position compensation
- Programming camera
- Interior LED black lighting
- Coating flow meter
- Programmable coating pot pressure
- Programmable atomized pressure
- Cleaning system
- Needle calibration
- Barcode reader
- Fume extractor

SCS Presents at International Conferences (continued)



Dr. Kumar went on to share that Parylene HT was designed to meet the needs of applications exposed to harsh environments, including temperatures up to 350°C (short term to 450°C). Additionally, Parylene meets the requirements of IPC-CC-830.

The presentation ended with a discussion on AdPro Plus® and AdPro Poly®, which have demonstrated stability at elevated temperatures, making them excellent adhesion promotion options for harsh environment applications.

To learn more about Parylene conformal coatings and their use in nano applications or the protection they offer applications that must survive harsh environments, contact Alan Hardy at 317.244.1200,

Personnel Highlights



As SCS' Customer Service Manager, **John Winkler's** focus is to ensure customer priorities and expectations are being met, while also challenging existing processes in order to streamline and improve customer service for SCS and its customers.

John attended Ball State University where he majored

in communications with an emphasis on marketing, sales and management. He brought over 20 years of customer service experience and management to SCS when he joined in the fall of 2017.

John enjoys spending time with his son, snow skiing, playing racquetball and working on house projects.



In his role as European Sales Manager, **John Barraclough** provides oversight to the European sales team and works to define and implement regional sales plans in line with SCS' objectives and goals.

John began his career with an electrical and electronics apprenticeship with British Aerospace in Bristol, United

Kingdom, before working for several companies within the valve actuation industry over the past 25 years. Just prior to joining SCS earlier this year, John was Sales Director for a company that manufactures chemicals and supplies tooling to the HVAC industry.

John is married with two children. He enjoys watching his children's activities, traveling with his family and is a qualified SCUBA diving instructor.



Aaron Thomas joined SCS in the fall of 2017 as Director of Market Segments at SCS' headquarters in Indianapolis, Indiana. In this position, Aaron leads the development of SCS' global market segment strategies and initiatives.

Aaron has over 20 years of domestic and international experience in sales, product and sales management, strategic pricing and group marketing and has worked at a diverse group of companies. He received his undergraduate degree in organizational leadership from Purdue University and his MBA from Butler University.

Aaron and his wife have two children. While much of Aaron's personal time centers on his children's activities, he also enjoys golf and cycling.

Surface Modification Seminar: Advances in Conformal Coatings Enhance Reliability of Electronics

Specialty Coating Systems invites you to a half-day seminar offering industry expertise on coating with the unique polymer Parylene. This interactive presentation will present multi-industry coating topics designed to address some of the most common surface modification challenges facing the electronics, transportation, defense, aerospace and medical device industries.

The following seminars are currently being offered:

Thursday, July 19, 2018

9:00 a.m. – 1:30 p.m.

Orchard Parade Hotel, Singapore

Tuesday, July 24, 2018

9:00 a.m. – 1:30 p.m.

Eastin Hotel, Penang, Malaysia

FREE SEMINAR, REGISTER TODAY!

Seating at the seminars is limited, so do not delay. Registrations close on Thursday, July 12, 2018. **To register, visit www.SCSseminars.com.**

Learn about Parylene's...

- Moisture barrier properties
- Thermal capabilities up to 450° C
- Chemical resistance against almost all chemicals
- Dielectric withstand to 7,000 V at 25 microns
- Dry-film lubricity competing with PTFE
- Biostability and biocompatibility for medical implants

Discover why Parylene is used in...

- Coronary stents, pacemakers and ocular and cochlear implants
- Pharmaceutical applications
- Avionics electronics
- Transportation electronics
- MEMS and semiconductor fabrication devices
- and many more applications

Connect with SCS

Specialty Coating Systems welcomes you to connect with us on social media. Be one of the first to explore new advances in Parylene technology, upcoming educational opportunities, trade show appearances and much more! Find us on Facebook, LinkedIn and Twitter.



Coating Center Spotlight: San Jose, California



In 2005, KISCO Conformal Coating, now Specialty Coating Systems, opened a coating operation in San Jose, California. Since opening, the operation has provided high-quality Parylene conformal coating services to customers in the medical device, transportation, electronics, defense and aerospace industries.

The San Jose facility, which formally joined the SCS family in January 2016, is led by Production Manager Dominic Raad. Dominic joined the company in 2012 as a Sales Support Engineer and transitioned into his current role in 2017. He is responsible for managing the daily operations of the site, including continuous improvement initiatives and meeting customers' growing production needs. The San Jose site recently achieved ISO 9001:2015 certification and serves customers in the northwest United States, many of whom are located in the San Francisco Bay Area.

To learn more about Parylene conformal coatings or any of SCS' worldwide facilities, visit scscoatings.com/locations.

Upcoming SCS Trade Shows

- **June 25, 2018** | MedInnovation Boston | Boston, Massachusetts
- **June 26 - 28, 2018** | SENSOR+TEST | Nürnberg, Germany
- **June 27 - 28, 2018** | Sensors Expo | San Jose, California
- **July 3 - 6, 2018** | MTA Vietnam | Ho Chi Minh, Vietnam
- **August 27 - 30, 2018** | ONS | Stavanger, Norway
- **August 29 - 31, 2018** | Medical Manufacturing Asia | Singapore
- **September 26 - 27, 2018** | Medical Technology Ireland | Galway, Ireland
- **September 26 - 28, 2018** | Medtec China | Shanghai, China
- **September 26 - 28, 2018** | Sensor Expo Japan | Tokyo, Japan
- **October 16 - 17, 2018** | Sensors Midwest | Rosemont, Illinois
- **October 16 - 17, 2018** | SMTA International | Rosemont, Illinois
- **October 31 - November 1, 2018** | MD&M Minneapolis | Minneapolis, Minnesota

For more information and booth numbers, visit scscoatings.com/shows.

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Electronics and Transportation Applications | Alan Hardy, Ext. 0261

Aerospace and Defense Applications | Tim Seifert, Ext. 0220

Inside Sales – Coating Service | Meredith Rhodes, Ext. 0255

Customer Service – Coating Service | John Winkler, Ext. 0283

PrecisionCoat and Cure Systems | Hans Bok, 508.997.4136

Spin Coating, Instruments and Lab Systems | Kurtis Olson, Ext. 0268

Equipment Technical Support | Steve Spencer, Ext. 0223

Customer Service – Equipment | Joanna Sellars, Ext. 0280

Regional Coating Sites

Amherst, New Hampshire, USA | Chase Markey, 603.883.3339

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Clear Lake, Wisconsin, USA | Alex Dix, 715.263.2333

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The Global Coverage exists to promote a better understanding of Parylene and the capabilities of Specialty Coating Systems. For previous issues, visit scscoatings.com.

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