



SCS AEROSPACE & DEFENSE COATINGS

Reliable protection for critical applications.



SCS

SCS CONFORMAL COATINGS

SCS' industry-leading portfolio of conformal coatings includes Parylene coatings, liquid coatings, plasma polymerized coatings, atomic layer deposition (ALD) coatings and multilayer coatings. Combining the properties of these coatings with over 50 years of experience, vast technology and worldwide resources, SCS provides the aerospace and defense industries with reliable coatings and services, including products like Parylene HT®, which is specifically engineered to withstand the most extreme conditions in the industry.

SCS coatings offer unmatched protection for many aerospace and defense applications, including aircraft,

space programs and defense systems, providing reliable barrier protection against elements such as moisture, chemicals, dust, sand and biological agents. Over the past 5 decades, SCS conformal coatings have protected components that traveled to an asteroid, explored Mars and orbited Jupiter.

SCS coatings offer a host of beneficial attributes, including:

- Superior fluid, chemical and moisture barrier properties
- Excellent dielectric properties
- Excellent multi-layer penetration
- Thermal stability up to 450°C (short-term)

PROPERTIES OF SCS CONFORMAL COATINGS

Following is an overview of the most common properties and benefits of SCS conformal coatings. Because each coating maintains its own unique properties and every application requires specialized protection, SCS' sales and engineering teams stand ready to help customers select the best coating for their specific application based on environmental and performance requirements.

BARRIER PROPERTIES

SCS conformal coatings are commonly used to provide barrier protection against a wide range of corrosive liquids, fluids, acids and bases, gases and chemicals, even at elevated temperatures.

Several types of conformal coatings provide protection against corrosion; one example is circuit boards coated with Parylene HT that were salt-fog tested by an independent facility. The coated boards showed no corrosion or salt deposits after 144 hours of exposure in accordance to ASTM B117-(03) (See Figure 1). Boards coated with SCS Parylenes C and ParyFree® exhibited similar results.

DIELECTRIC PROPERTIES

Dielectric properties of conformal coatings are critical in powered applications, including circuit boards and sensors. Low dielectric constants and dissipation factors, for example, enable coatings to transfer electrical signals without absorption or loss.

THERMAL & CRYOGENIC STABILITY

Aerospace and defense applications are exposed to a wide range of temperatures. SCS coatings provide thermal

stability to ensure the trouble-free life of components within these harsh operating environments that span from the cryogenic levels of space (-150°C to -273°C) to extreme temperatures of 450°C.

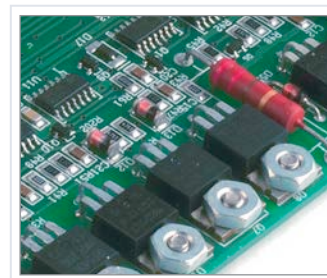
LOW OUTGASSING/VACUUM STABILITY

Materials used to protect components in space applications must be vacuum stable and low outgassing in nature. Parylene coatings and some variants of polyurethane coatings (e.g., ARATHANE® 5750) meet these requirements. For more information on outgassing, please visit <http://outgassing.nasa.gov> or contact SCS.

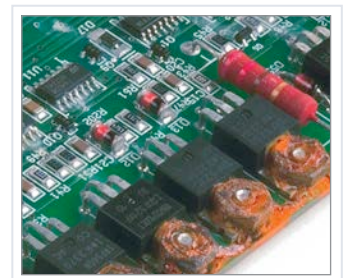
METAL WHISKER MITIGATION

As a result of industry directives, pure metal plating is replacing lead in the solders used throughout the worldwide electronics industry. While safer for the environment, metal plating is known to form whiskers, which cause reliability problems for electronic systems. Conformal coatings have been shown to suppress the formation of metallic whiskers, OSEs (odd shape eruptions) and dendrites.

FIGURE 1: Circuit boards after 144 hours of salt-fog exposure



Coated with SCS Parylene HT



Uncoated

PROTECTION FOR ADVANCED APPLICATIONS

SCS can apply conformal coatings to virtually any surface material, including metals, elastomers, resins, plastics and ceramics, in thicknesses ranging from a few hundred angstroms to several mils. By definition, conformal coatings conform to surfaces, edges and crevices of a substrate. Ultra-thin coatings and nanocoatings also conform to the interior of multi-layer electronic packages and add little dimension or mass to critical, weight-sensitive components.

The properties of these unique materials coupled with over 5 decades of coating and applications experience provide reliable solutions to customers in a variety of industries.

AEROSPACE

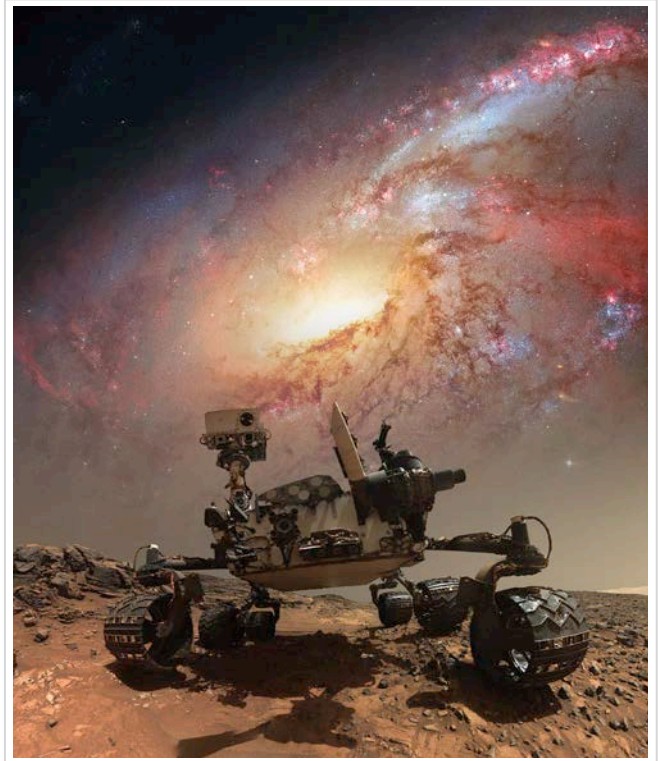
Manufacturers are continually seeking ways to reduce weight in order to increase operating efficiencies. Thin-film coatings and nanocoatings, which are typically applied in micron and nano-level thicknesses, respectively, are ultra-lightweight. They provide aerospace components with excellent barrier properties, including protection from corrosive liquids, fluids, gases and chemicals. Thin films are ideal coatings for circuit boards, sensors and other components used to monitor electrical, air handling, fuel and engine systems, flight control systems and LEDs.

UAV

The Uncrewed Aerial Vehicle (UAV) segment continues to expand into new categories such as micro, autonomous land and underwater vehicles. SCS' ultra-thin coatings are ideal for these applications due to their lightweight nature. Additionally, coatings that are optically clear, including Parylene coatings, do not interfere with electrical, optical or RF signals.

DEFENSE

As the defense industry continues to integrate COTS (commercial off-the-shelf) components, which were not specifically designed for demanding environments, into their systems, conformal coatings provide necessary protection to increase the life of these components. SCS' portfolio of coatings offers outstanding barrier and complete encapsulation properties, providing reliable protection for critical applications.



SPACE

Conformal coatings have a long history of protecting components used in satellites, space-borne instrumentation and vehicles. Vacuum-deposited coatings, including Parylenes, do not have hidden voids or incomplete coverage that, when exposed to altitude, can present pathways for failure.

AAM & UAM

The Advanced Air Mobility (AAM) and Urban Air Mobility (UAM) industries continue to utilize the latest technologies in avionics for applications such as navigation, flight control, battery management and collision avoidance. These vehicles and associated avionics must be designed to operate safely in varying environments. SCS has a long history of providing proven protective coatings for avionics, and our expansive portfolio of coating solutions allows us to match the right coating to the right application.



INNOVATIVE SOLUTIONS FROM THE LEADER IN CONFORMAL COATINGS

With over 50 years of experience in conformal coating engineering and applications, Specialty Coating Systems (SCS) is the world leader in Parylene, liquid, plasma polymerized, ALD and multilayer conformal coating technologies. We're a direct descendant of the companies that originally developed Parylene, and we leverage that expertise on every project – from initial planning to process application.



SCS employs some of the world's foremost conformal coating specialists, highly experienced sales engineers and expert manufacturing personnel, working in state-of-the-art coating facilities around the world. Our extensive, proactive approach to production and quality requirements gives our customers peace of mind and minimizes the resources they need to meet even the most challenging requirements and specifications.

As worldwide industry requirements and directives continue to evolve, SCS is at the forefront, ensuring our facilities, products and services comply with relevant regulatory and environmental standards.

- AS/EN 9100 and ISO 9001 certifications
- Nadcap® accreditation
- Requirements of IPC-CC-830
- QPL for MIL-I-46058C
- UL (QMJU2) recognized coatings
- Listings in the International Aerospace Database (OASIS)
- REACH and RoHS compliance
- ITAR (International Traffic in Arms Regulations) registered

For additional standards and certifications to which SCS and/or SCS coatings comply, please visit SCScomplies.com or contact SCS.



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