

State-of-the-Art Robotic Selective Conformal Coating and Aqueous Wash Systems allow North Atlantic Industries to provide the highest quality products for the Military and Aerospace Industry.

North Atlantic Industries is continuously striving to improve product quality and consistency. As a leading supplier of Embedded I/O Boards, Military Power Supplies, Motion Simulation and Measurement Instruments, we are constantly developing new techniques for providing leading edge products. NAI has made a prominent investment in a state-of-the-art robotic selective coating and dispensing system for applying conformal coatings to electronic circuits. This advanced system features a servo-driven three-axis motion gantry which provides a high level of accuracy (25 microns) and repeatability. Closed Loop Material Flow Control and micron-level encoder resolution ensure that the most advanced conformal coating techniques available are being employed. NAI also utilizes a fully automatic defluxing and on-board cleanliness testing system designed specifically for the electronic assembly industry. This aqueous wash system process removes all contamination from post-reflowed circuit assemblies. Additionally, this “green” cleaning system is equipped with a closed-loop wash solution recycling system, which eliminates waste water discharge. As a result, NAI’s rugged military products deliver the highest level of protection and can perform in the most demanding environmental conditions.

Conformal coatings are materials applied in thin layers onto printed circuits for enhancing the long term reliability and performance of electronic assemblies, particularly when exposed to harsh conditions such as high humidity, corrosive chemicals and extreme temperatures. Conformal coating prevents ionizable contaminants, such as salts, from reaching circuit nodes and combining there with water to form a microscopically thin electrolyte film, thus preventing short circuits and corrosion of conductors and solder joints. Additionally, conformal coating is used in order to reduce the effects of mechanical stress and vibrations on the circuit. In this way, the life of the components and circuitry are significantly extended.

Conformal coatings are traditionally applied by dipping, spraying or by selective coating. Dipping and spraying are commonly used procedures for the application of conformal coatings. However, there can be considerable disadvantages to these procedures. Inconsistency in material thickness can lead to trapped air bubbles or pin holes, which reduce insulation resistance, can cause shorts and contribute to possible arcing. Additionally, spraying and dipping are not controlled applications. Therefore, certain parts need to be masked off. After the curing process, the de-masking stage can result in tears and lifting off of the coating.

Selective coating eliminates the need for masking because the material is dispensed only on selected areas of the circuit. This robotic process dispenses / sprays the coating material in selective areas. Flow rates and material viscosity are programmed into the computer system controlling the applicator so that the desired coating thickness is maintained, virtually eliminating bubbles and pin holes.

Coating is also far more effective if all surface contamination is removed first. Typical processes for cleaning surfaces are vapor degreasing, semi-aqueous or aqueous washing. Rosin and entrapped solvents can form bubbles and burst out. Cleaning also greatly improves adhesion of the coating material.



Fig 1. – Robotic Selective Coating Systems, such as the system used by NAI, provide the highest quality conformal coating available.