



Special Features: **Assembly and Production**



Coating Complex Electronics with Flexible Dispensing Systems

By the Equipment Staff of Specialty Coating Systems (SCS), Inc.

The use of conformal coatings and materials is rising, offering the protection necessary for complex electronic products to function in harsh environments. To provide that protection, numerous conformal coatings and materials are available, such as acrylics, silicones, epoxies, urethanes, latex, adhesives, thermal pastes and greases, sealants, solder masks and room-temperature-vulcanizing (RTV) silicones.

For more than 50 years, conformal coatings and materials have been a tried-and-true method of protecting electronic devices and components. The versatility of these materials has made them an integral part of an impressive range of industries, including industrial and consumer electronics, military, aerospace, automotive, maritime, medical, renewable energy, LED lighting, and many others.

Choosing the best material, understanding how it needs to be handled and applying it correctly are factors critical to a manufacturer's success. Having a system in-house that can manage multiple materials and applications processes — for both current and future applications — is a great asset to the manufacturer or component supplier.

Ongoing development of new conformal coating materials and application processes is creating opportunities for manufacturers to improve the quality and effectiveness of their products. In many cases, taking advantage of these industry advances requires existing application equipment to be upgraded or com-

pletely replaced. Manufacturers are discovering that if they can invest in a versatile system — one that performs numerous operations and/or can meet the needs of current and future applications — they save significant time and money in the long run.

The PrecisionCoat V and PrecisionCoat BT are two such systems available from Specialty Coating Systems (SCS). Whether a manufacturer is just entering the world of automated coating and dispensing or they are experienced with in-line coating and curing equipment, SCS offers systems and features that are designed to be flexible and reliable. These systems are also built to grow with a manufacturer to handle the complex electronic requirements of today and of the future.

SCS PrecisionCoat

SCS PrecisionCoat systems are designed to apply numerous types of materials with speed and accuracy. Available in multiple configurations, these systems are able to coat and/or dispense material onto complex components. Materials are applied using one or more spray heads and dispense valves, or a combination of each, in addition to other valves and custom configurations. Spray heads apply either a flat or round pattern for overall coverage, while dispense valves use either cartridges or material lines and a needle to accurately dispense materials into restricted spaces and areas.

The PrecisionCoat's motion system is a three-axis platform with servomotor-driven ball screw slides and optical



Automatic quick change (AQC) allows the use of five separate tools within a single machine.

encoder feedback. A standard system is capable of coating substrate lengths and widths up to 20 in. (50.8 cm) each and component heights up to 4 in. (10.2 cm). An optional conveyor system can be used to move substrates into and out of the coating area.

Material valves move along the PrecisionCoat's direct-drive, three-axis system, with optional fourth and fifth axes available for tilt and rotation. The system's multi-valve technology is able to handle dots, lines, fills and glob tops, spray coating, and dispensing, including two-part mixing, if required. Operated by SCS' proprietary software, offline programming is a standard feature that minimizes machine downtime and enables profile sharing between multiple coating systems. SMEMA transfer protocols and safety interlocks are standard with all systems.

Along with five-axis programmable tilt and rotate capabilities, additional options include coating flow meter, programmable atomized pressure, programmable coating pot pressure, material temperature control system, laser height-mapping, and the ability to turn valves on/off while they move across the board. PrecisionCoat options also include an advanced proprietary vision system, which utilizes fiducial recognition for accurate programming and position compensation. Coupled with the automated needle calibration feature and a barcode reader, PrecisionCoat systems ensure that each and every assembly is coated according to process specification.

Integrated UV Cure

The use of UV materials in electronics is expanding at an unprecedented rate as material technology improves and environmental efforts lead customers to low- or no-VOC materials. The PrecisionCoat UV wand aids in the control and application of UV materials used in masking, moating, adhesive and/or gasketing applications. With the UV wand on the head of a machine, the PrecisionCoat can apply a set amount of material and immediately follow with a localized, programmable dose of UV.

Of the many applications that may benefit from having the ability to immediately cure UV material, dam-and-fill techniques and glob top application are two examples. These materials are often used to secure components mechanically on a board and require controlled amounts of material and cure. In appli-

cations where the wand is used repeatedly, it can be mounted to the application head to enable repeated deployment without any loss of processing time.

Fiducial Alignment

Fiducial recognition and alignment enables coating programs to autocorrect based on component location inside the machine, as compared with a set point.



PrecisionCoat V conformal coating and dispensing system.

The camera-based fiducial alignment feature of the PrecisionCoat has been developed to compensate for changes in a product as it moves through manufacturing processes. The camera integrates with the machine software to permit the user to capture an image of various shapes.

The SCS camera system reduces the effects of lighting changes and finish imperfections that often accompany boards as they move through SMT and through-hole soldering steps. When these attributes are compromised, the fiducial alignment feature will accept user input to intelligently find the mark position. By opening the logic to this user interface, the operator can confidently replicate spray patterns, regardless of fiducial conditions presented to the machine.

Automatic Tool Changing

With its automatic quick change (AQC) feature, the SCS PrecisionCoat can apply multiple materials with multiple valves and cure them, all within a single coating profile with fully-automated positioning in all five axes. In standard systems, using multiple heads on the same machine will limit head travel, reducing the overall work envelope of the system.

AQC allows customers to use up to five valves or heads, independently positioned with different materials and functions. This functionality enables

users to automate and control the application and cure of multiple materials and masking agents and how they integrate with one another, while maintaining the full work envelope.

AQC provides incredible flexibility to manufacturers across applications. One example is unsealed components on boards. A logic board with tight component proximity placement may have components that are not sealed. The use of a liquid coating may be difficult, as the material may migrate to areas of the assembly based on board design, solder mask finish and/or ambient conditions.

To combat this, the PrecisionCoat AQC feature enables customers to isolate the components with a masking material (e.g., a gel coat, RTV, etc.) prior to spray coating the balance of the board. AQC can accomplish this easily in a few steps:

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

It is important to note that with the SCS PrecisionCoat and AQC, all of the above steps, including many possible variations, can be programmed in a single coating profile, which can be executed without any user intervention. One of the biggest benefits of an SCS PrecisionCoat is that the platform is designed for not only immediate needs, but is versatile to meet future demands as well. The flexibility of five heads/ valves and the AQC feature is enabling the PrecisionCoat system to be long-term solution for future applications.

Contact: Speciality Coating Systems, Inc., 7645 Woodland Drive, Indianapolis, IN

☎ 317-451-8549 fax: 317-240-2739

Web: www.scscoatings.com □





7645 Woodland Drive, Indianapolis, IN 46278 United States
TF 800.356.8260 | **P** 317.244.1200 | **W** scscoatings.com