

## Technical Bulletin

### Spraying conformal coatings selectively with a robotic system

Today, several methods for spray application of conformal coatings exist including conformal coating aerosols conformal coating spray booths and automated selective conformal coating spray robots. However, they fall into one of two process categories being complete and selective coverage processing.

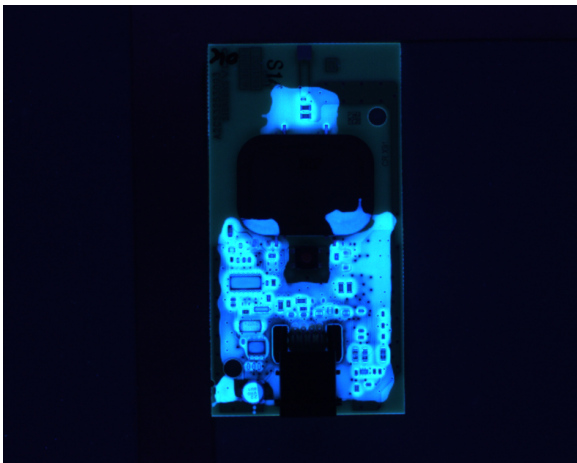
In part two of a two-part bulletin, the Selective Coverage Method will be examined looking at the advantages and disadvantages of the process.

#### Why choose the conformal coating selective spraying process?

A typical conformal coating selective robotic spray process consists of a programmable XYZ coordinate platform with a valve or valves attached to a controllable arm, depositing coating onto a printed circuit board (PCB) in areas specified by the programmers of the system. Extra angles including rotation of the valve head can increase the flexibility of the system.

Technology varies between the platforms and the valves but essentially they achieve the same result. The principle is to deposit coating where you want it, removing the issue of masking which is required in batch processing with dip or spray booths.

This "selective" application genuinely offers in most cases a more cost-effective solution to batch spray coating.



*A conformal coated automated selective spray PCB*

Advantages to be gained include:

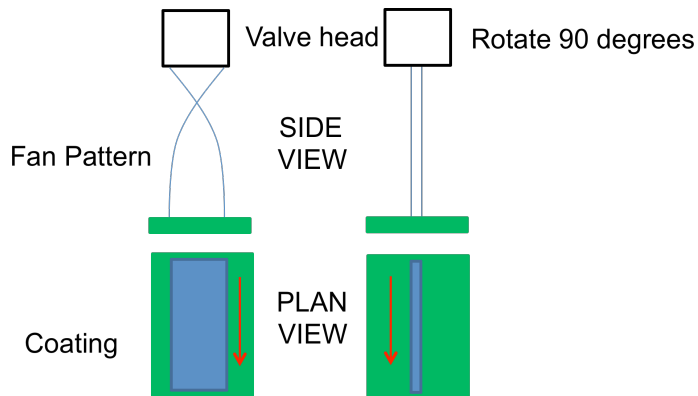
- Masking and subsequent de-masking stages can often be minimised or completely eliminated. Consequently masking mistakes, which can cause expensive stripping and rework, are also largely eliminated.
- The process is infinitely repeatable. A far more controlled coating thickness can be achieved from board to board and from batch to batch.
- The process no longer requires a skilled operator to operate the machinery during application of the coating.
- Finishing is minimised after coating, as there is little or no masking to be removed, tears or lifting in the coating can be minimised.
- Less material is used, since the system only sprays sufficient coating to cover the relevant areas of the board, offering another reduction in cost.

#### Selective Spray Conformal Coating Issues

However, there are several issues that need to be considered before making the move. These include:

- Complete board edge coverage can be tricky using a selective spray robot, although it is achievable on some systems.
- The edges of a PCB need to be solid enough to be held by the rails of the machine jig, otherwise the board will not be held horizontally. a

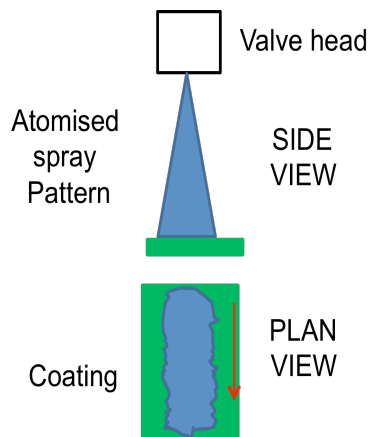
### Typical Valve Spray Patterns



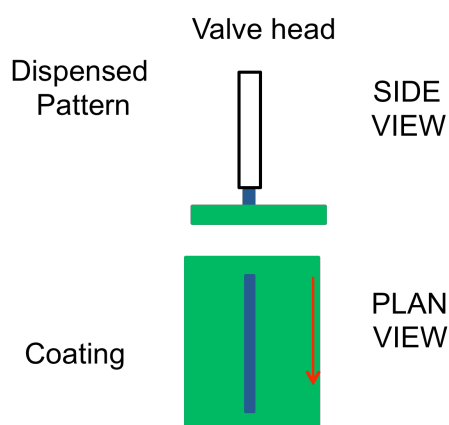
- Selective coating does not automatically remove the requirement for masking. There can be several reasons for masking a board during selective spraying, including the requirement to coat extremely close to connectors, which can "wick" coating
- Misaligned components on the PCB can potentially damage the spray heads which are moving along a set pattern on the board and the components themselves be damaged by the heads as they travel.
- Coating of large 3D components is difficult in most cases due to the nature of the heads operating in a vertical plane.
- In all cases, there is an initial one-off "set up" cost for programming which needs to be amortised over the length of the project.

Therefore, these issues need to be carefully considered and addressed to ensure a smooth transition from batch spray to selective spray conformal coating.

### Non-atomised Selective Spray Valve Pattern



### Atomised Selective Spray Pattern



### Dispense Spray Pattern

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