

Technical Bulletin

Spraying conformal coatings using a spray gun or aerosol

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

Why choose the conformal coating spraying process?

Dipping of conformal coating is the most efficient conformal coating application method available. However, conformal coating spray application is the widest used method in the global electronics industry.

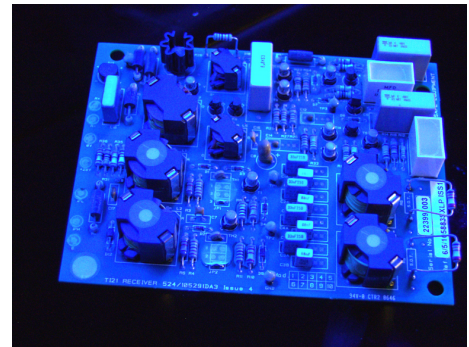
The reason that the conformal coating dip process is not used as the main choice is that, generally, printed circuit boards (PCBs) have devices that must not be conformal coated across the PCB. This can lead to a far more demanding labour process in masking and de-masking, being potentially more time consuming and expensive.

Therefore, spraying of conformal coating can often reduce significantly these costs, and the savings and performance depend on the conformal coating spray process selected.

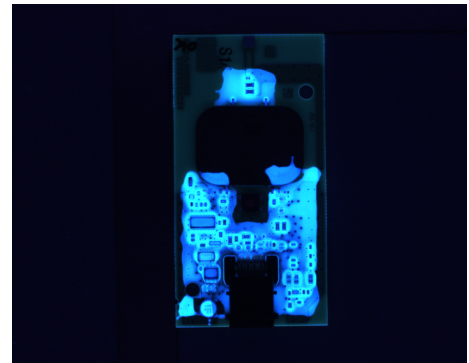
Conformal Coating Spray Application Method - Complete versus Selective Coverage Processing

Due to the reduction costs associated with conformal coating spraying, the correct selection of the appropriate spray method is critical and is based upon two factors.

The first factor is the type of conformal coating spray finish that is required. Different spray processes give alternative finishes and can affect both the long-term reliability of the printed circuit board (PCB) and the aesthetic finish of the conformal coating. A completely covered PCB looks and is different for long term reliability compared to a selectively coated PCB (See pictures opposite).



A complete coverage conformal coated spray PCB



A conformal coated automated selective spray PCB

The second factor is purely a financial calculation. The difference in costs between a fully automated conformal coating robotic system and a set of aerosol cans is considerable but need to be balanced against the labour costs of masking, de-masking and hand processing and the volume of boards to be processed.

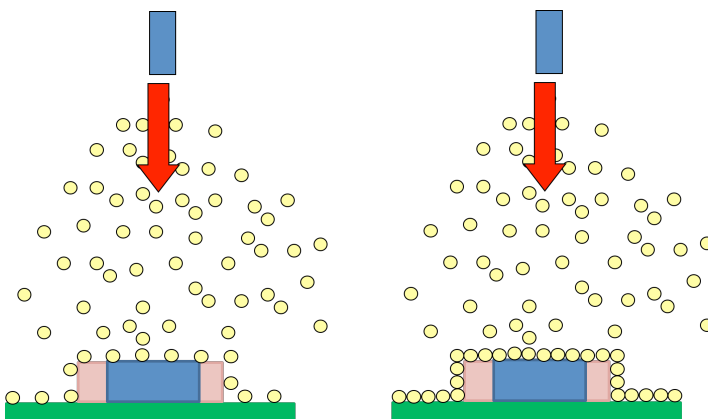
Therefore, the selection of the correct spray process is an important decision balanced between performance and costs.

Complete Coverage Methods

Complete coverage methods include aerosol and spray booth conformal coating techniques. The conformal coating is applied right across the PCB and any areas that must not be coated must be suitably masked.

Normally, the conformal coating material is applied using an atomised spray process where the conformal coating is sprayed through a valve or gun by compressed air and is atomised into tiny particles that deposit evenly across the PCB.

Due to the atomising effect, the particles "stick" to the area applied, and slumping, the effect of the conformal coating pulling away from sharp edges is minimised.



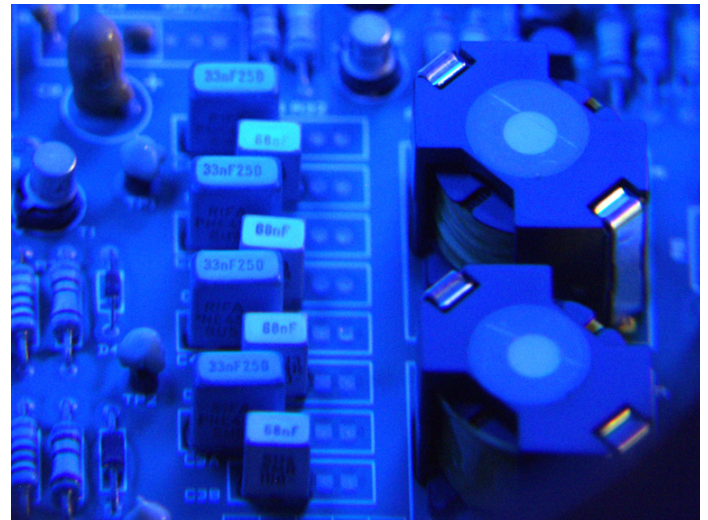
Build up over sharp edges using atomised spray and applying layers forms a complete film of conformal coating from aerosol or spray gun



The completed atomised spray film (left) protects the tips whereas a dip or limited atomised spray layer can suffer from slumping and poor tip coverage

Using this technique the layers of conformal coating are built up (nominally 2-3 applications) and the conformal coating thickness is optimised.

Since the conformal coating "conforms" to all edges minimising the slumping effect the performance of the coating is superior to all other methods when tip coverage failures are an issue. Further, the cosmetic finish across the PCB will be aesthetically pleasing to the end user.



Conformal Coating aerosols are suitable for very low volume application where investment in conformal coating equipment is prohibitive.

Conformal Coating Spray booths become economic when the use of aerosols reaches > 10 aerosols per month giving a quick return on investment.

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