Technical Bulletin

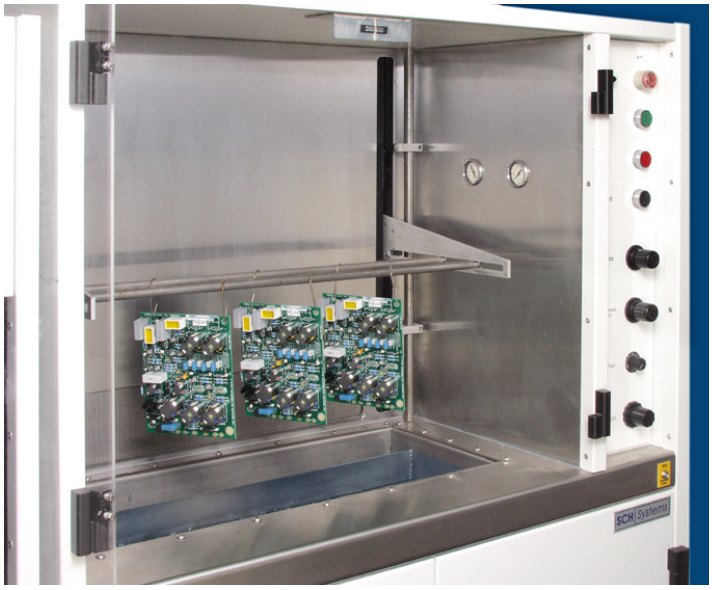
Conformal Coating Dipping

The conformal coat dip process is used extensively in conformal coating application. The dipping process can be carried out manually or with an automated dip coating system using most conformal coating materials including solvent based, silicones and water based materials.

Conformal Coating Dipping

Automatic Dip Coating is one of the most efficient methods for application of conformal coatings and is excellent for all volume production whether large or small.

The process of dipping a circuit boards into a conformal coating material contained in a tank ensures complete coverage, including underneath components and around difficult large 3D boards and there is no over spray or material wastage.



How do I monitor the viscosity of the dip tank?

The viscosity is monitored by utilizing a zahn type measuring cup. This is essentially an eggcup with a hole in the base on a wire. You dip the cup into the liquid and lift it out of the coating. Since the volume of the cup is known and fixed, if you time the flow of the coating out of the cup you get a relatively accurate and simple method of measuring viscosity which is certainly suitable in 99% of cases.

How do you control the coating thickness in the dipping process and what is the tolerance of the coating thickness?

The dip speed is controlled by air over oil hydraulics which can control the speed down to 2" (50mm) per minute which is very slow and more than adequate for conformal coating. Repeatability is about getting accurate viscosity control since the withdrawal rates and viscosity control the coating thickness.

Typical speeds for conformal coatings at viscosity of 200 cps are 6" (150mm) withdrawal speed giving a 25-50um coating for an acrylic coating. This does vary from coating material to material so control measures should be put in place if accurate thickness is required.

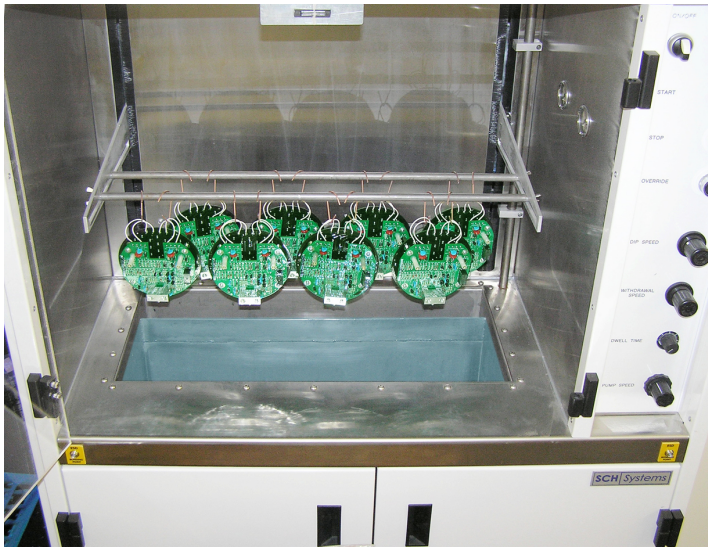
The typical coating tolerance is depending on what you measuring on? If it is a flat coupon, then with a known viscosity of product you should be able to achieve +/- 5um.

Can I horizontally dip into the conformal coating?

It is perfectly possible to horizontally dip PCBs using the automated batch systems such as the DS101 conformal coating dip system. There are factors such as the size of the board, the depth of dipping allowed, the type of conformal coating to be used and the masking & components on the board that must be considered but SCH regularly use this technique in their coating service to minimise costs for customers. Issues include ensuring the material is thinned appropriately to allow flow across the surface and that adequate drainage can be achieved of the conformal coating.

How is the height of the conformal coating material in the tank controlled on the DS101 dip coating system?

On the DS101 dip coating system there are two parts to the tank. These are the dipping area and the sump, which are separated by the weir edge. The material is pumped into the tank, over the weir into the sump. Therefore, the weir edge holds the height constant and the weir sump drops with material use.



DS101 Conformal Coating Dip System with PCBs Loaded

We recommend a 25mm (1") edge difference between the top of the weir and the sump material and keeping the material close to that avoids a wide evaporation area over the weir which means more solvent evaporation.

This can also be critical with materials that do not re-dissolve into the material when dry like water based coatings. If they do dry /cure then these bits float around in the sump and then eventually could clog the pump.

We would recommend using a stainless steel basket that we have designed to catch these bits like a sieve and any other bits floating (or even PCBs dropped!).

How often do you recommend a viscosity check on the conformal coating material in the DS101 tank?

Checking viscosity is down to the time the tank lid is off. If it is off all day I would suggest twice a day check to ensure control. If it is a few hours then each time you start. The main issue is building a pattern of use. As you use the dip coating system, record the hours, volume of boards and the conformal coating thinners used, and chart this. Then, you will be able to anticipate when it needs checking and when it doesn't. Also, contributes to the lean manufacture processing.

Is the argon blanket an important option?

The argon blanket is a useful accessory for overlaying conformal coatings that are sensitive to moisture such as moisture cure silicones. The principle is the argon gas is heavier than air and using a series of valves a blanket of argon gas is bled over the conformal coating tank, effectively trapping the solvents under the argon. This is also effective in regions of high humidity and can help prevent moisture ingress.

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