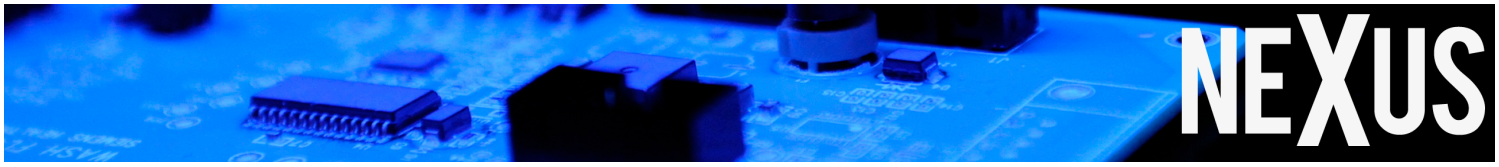


General Design Rules for Conformal Coating

By Dr Lee Hitchens, Nexus

Have a clear set of working drawings

Clearly defined all points of interest for the conformal coating process on a set of drawings.

This includes information such as:

- Conformal coating material to be used, its viscosity and any other process details
- Application method to be used for applying the coating
- The masking details if required
- Coating thickness requirements
- The inspection criteria that the circuit board is to be inspected to including any Standards to be referenced.

Understand the inspection criteria

Ensure that all team members involved in the conformal coating process understand the inspection standards.

All the operators, technicians, supervisors and production staff need to understand the quality level they are trying to achieve in the process.

Any differences in understanding will clearly lead to failures and fail criteria.

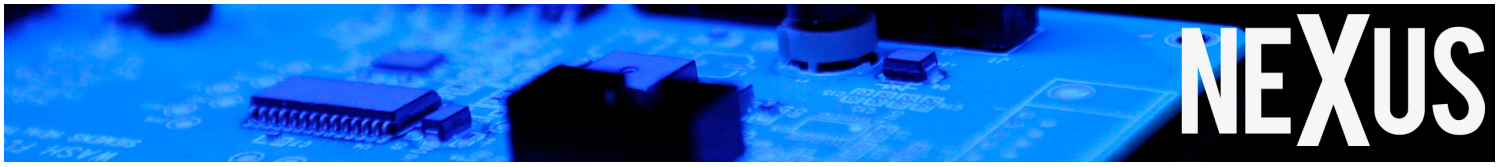
Apply the holistic approach to coating

Make sure the conformal coating, the application process and the circuit board are compatible.

Ensure that the method of application, coating material and board design chosen can actually be used together.

Also, ensure that you can meet the inspection criteria set.

Setting inspection criteria that cannot be achieved due to a limitation in the process or the material itself makes production targets impossible.



Define three areas on a conformal coating diagram

These areas are

- Areas that MUST be coated
- Areas that MUST NOT be coated
- Areas where it doesn't matter (coating is optional).

The areas that do not matter give process engineers options when setting up the production line.

Do not specify the use of conformal coating as an under fill

If a device needs to be under filled, specify a formulated under fill.

Or, consider the difference in CTE mismatch may lead to the component lifting off the PCB in the long term.

Fill the via's to avoid capillary flow

Filling via's during the board (laminate) manufacture helps to prevent the capillary flow of material from one side of the assembly to another.

This can result in coating restricted areas on the other side of the board.

Make coating the edge of a PCB optional

Conformal coating the edge of a board can be tricky and messy, especially if there is no frame or breakout around the board.

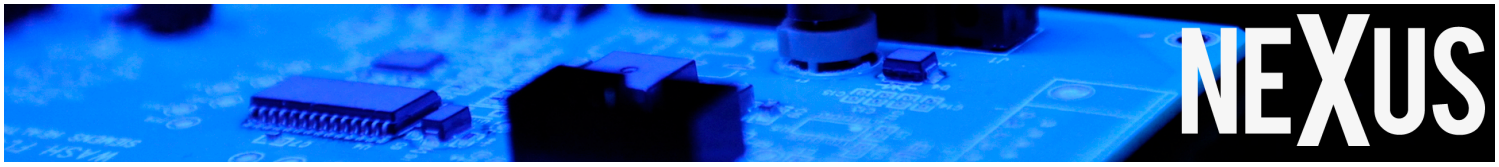
It is of questionable efficacy in improving coating or reliability performance.

Make coating some component packages optional

Coating the sides of a 3D device is difficult.

This is especially true when the coating is subject to gravity, as well as de-wetting due to mold release agents used in the component fabrication.

The plastic or metal package moldings may be more resistant to humidity or other forms of water than any conformal coating applied.



Apply silicone RTV after conformal coating

If you require a silicone staking materials for anti vibration purposes, then apply it after conformal coating.

If this is not possible, use a silicone conformal coating for compatibility.

If you don't want to use a silicone conformal coating, then use a urethane or epoxy staking so that is compatible with the coating.

Provide a repeatable method of masking

If masking by hand ensure the correct method of masking is understood by all of the technicians involved in the coating process.

Avoid operators interpreting the masking method and using their own methods.

Allow liquid latex to dry

If the masking process uses liquid latex as a masking material then ensure that enough time is allowed in the production process for the latex to be fully cured before the coating application is started.

If not then the conformal coating can interact with the latex and make it almost impossible to remove.

Use liquid latex with care

If temporary liquid latex is used to mask a connector ensure that the latex can be easily removed from under the device and not get broken off and entrapped underneath.

Match the coating thickness with the process

Ensure the conformal coating thickness specified can actually be achieved by the coating process and within the tolerance defined.

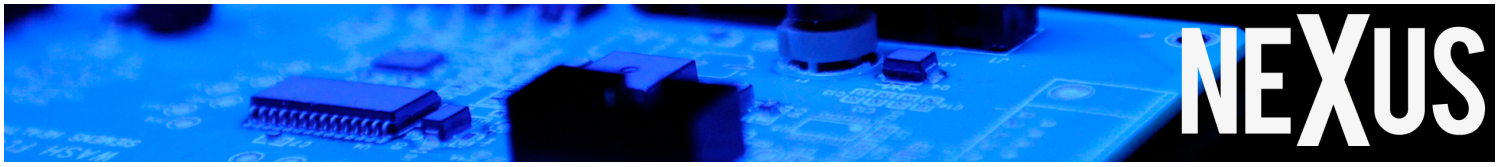
Some conformal coating processes such as dipping struggle to build greater than 25um coating thickness in a single coat.

Other processes apply a lot of coating and may go over the required thickness.

Allow a variable coating thickness

Do not define a tight conformal coating thickness tolerance if a wide tolerance is allowed.

Achieving 30±5µm dry coating thickness across a circuit board is an order of magnitude harder (or more!) than 50±25µm.



Don’t make conformal coating production harder than it needs to be.

Check conformal coating compatibility

Some conformal coatings can attack components, markings and inks on the circuit board. Others will not wet the surface or solder resist well without cleaning.

Masking sure the coating works well with the circuit is a key factor for good long-term reliability and easy processing of the board.

Match the application process with the circuit board

Ensure the coating application process is suitable for the circuit board design. . This is the holistic approach to the conformal coating process.

Can you help improve these guidelines?

Do you know a design rule or guideline for conformal coating that could help others?

Tell us how we can improve this section.

Contact us now at sales@nexus3c.com if you would like to talk about design rules or any other related topic to conformal coating and Parylene.