Removal of Conformal Coating with Small Sandblasters

Jim Norton

The development of conformal coating technology was driven to a large degree by the military and aerospace industries. While conformal coatings are mostly used on populated, printed wiring boards (PWBs), they are also used to protect components such as transistors, diodes, rectifiers, resistors, integrated circuits (ICs), and hybrid circuits including multi-chip modules (MCMs) and chip on board (COB).

Recent environmental regulations and concerns have had a significant impact on both coating materials and application methods, particularly with regard to control of volatile organic compounds and chlorofluorocarbon compounds. Both VOCs and CFCs have been extensively used as solvent carriers. Manufacturers and suppliers of conformal coating materials have responded by developing non-solvent based coatings and environmentally acceptable methods of application, curing, and removal.

It is important to consider how the choice of a conformal coating material affects the rework and repair issues. The need for rework or repair of a conformal coating can occur any time after completion of an assembly due to a variety of process or product requirements and component replacement issues.

A number of methods are available for rework of conformal coatings. These include thermal, chemical, mechanical, plasma and laser-based systems, and small sandblasters or “micro abrasive blasters,” which will be the focus of this column.

Micro-abrasive blasters used for conformal coating removal are small sandblasting systems that are commonly used for metal deburring and etching as well as surface preparation. The cutting media is introduced into a compressed air stream and is ejected through a hand piece utilizing tips as small as 0.026 in. This is directed at a component or surface area on PCB where the conformal coating has to be removed.

This system can remove conformal coating from a single test node, an axial leaded component, a through-hole IC, a SMT component, or an entire PCB without any modification to the system for a variety of coating materials. This method provides the most practical and environmentally friendly means for removing conformal coating from PWAs.

Although these small micro abrasive blasters provide the most practical and environmentally friendly means of removal, they also pose a problem. Micro abrasive blasters can generate static electricity as the high velocity air and particles impinge on the PWB surface. The ESD voltage generated at the point of contact can cause damage to components and electrical circuits on a PWA.

Equipment manufacturers have used several different approaches to solving the ESD problem. These are:

- The installation of AC or DC pulsed ionizer bars in the chamber results in a rapid decay of ESD voltages in the work cell and tubing
- The installation of a point ionizer at the end of the nozzle to dissipate any static charge built-up in the media stream at the point of contact
- The use of an in-line, auto balanced ionizer where the air source is split, one side flowing to the media and the other side flowing to the in-line ionizer. This ionized air is then injected into the media stream just before it leaves the nozzle, eliminating the static charge build-up in the media chamber. The ionized air is also pumped into the work chamber. With this type of system, ESD levels are reportedly in the + 10 volts range.

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