

Project Title: Sample Parts Processing for a Company doing Conformal Coating Removal
Date Completed: November 11, 2002
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Overview: Testing needs to be completed on boards that are scheduled for rework. Three boards were sent to the Comco Engineering Labs with different surface coatings that needed to be selectively removed around components. The three types of coatings were an acrylic, a polyurethane, and thermal epoxy.

Set-up and Procedure: The boards were all processed by hand in an ESD sensitive work environment. Due to the selective nature of the application a single tank MicroBlaster® model MB1000 abrasive blasting machine was required. Testing was done with three different abrasives to test their effectiveness at removing the coatings without damaging the traces or board surface.

Sample Results:

Test 1

Abrasive: "G", Sodium bicarbonate
Nozzle: 0.030" Hi Performance
Pressure: 50 psi
Orifice: 0.025"

Acrylic: The sodium bicarbonate quickly removed the acrylic coating from the first board. Even at a low pressure, 50 psi, care had to be taken to make sure that the abrasive did not etch into the board. Also when using sodium bicarbonate the coating tended to peel back, making the edge definition hard to control.

Polyurethane: The sodium bicarbonate was very slow to erode the polyurethane. This process required between 1-2 minutes to remove a component. Due to the required time it was difficult to get in between all of the pins of the components without dwelling too long and cutting into the copper traces.

Epoxy: The epoxy was quickly removed with the abrasive stream. Again it may be too aggressive for this type of application. On the components tested there are areas where the copper traces are showing through.



Figure 1: Acrylic

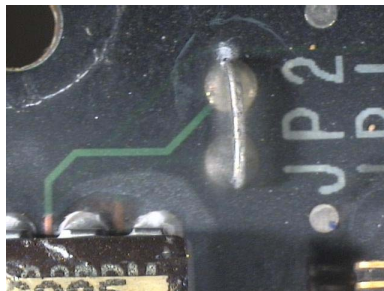


Figure 2: Polyurethane

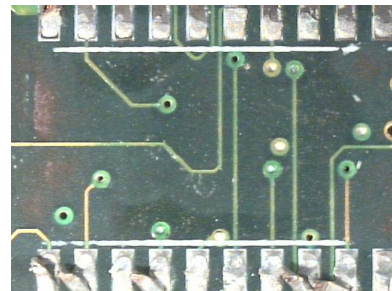


Figure 3: Epoxy

Test 2

Abrasive: "M" 200 micron plastic media
Nozzle: 0.046" Hi Performance
Pressure: 70 psi
Orifice: 0.025"

Acrylic: The plastic media was effective at removing the acrylic coating without damaging the traces underneath. It took slightly longer than the sodium bicarbonate, but does not require the operator to be as sensitive to the board condition. On areas where the coating was covering the board surface the removal was fast, where the components were attached the coating was bonded to the surface more tenaciously.

Polyurethane: The plastic media was not effective on the polyurethane coating. It took much longer to remove this coating than with the sodium bicarbonate and even with the additional time areas close to the component were still coated.

Epoxy: The plastic media worked very well at removing the epoxy coating. The coating over the copper traces had not been damaged in the process. The process required approximately 15-30 seconds to complete. This time will be determinant on the thickness of the coating. With the thin layer of epoxy under the component it did not require much effort.

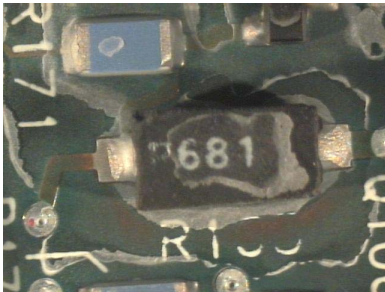


Figure 4: Acrylic



Figure 5: Polyurethane

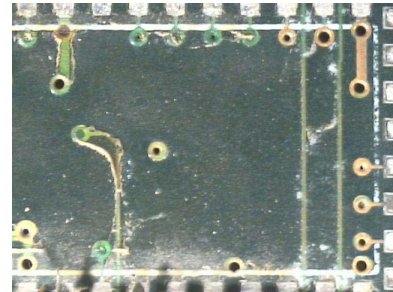


Figure 6: Epoxy

Test 3

Abrasive: "H", 250 micron walnut shell
Nozzle: 0.046" Hi Performance
Pressure: 70 psi
Orifice: 0.025"

Acrylic: The walnut shell quickly removed the thin acrylic coating around the components. Time required for this process was approximately 15-50 seconds to clean a component. This media appeared to cause less lifting of the coating and resulted in a cleaner edge than the sodium bicarbonate.

Polyurethane: This abrasive was the most effective with the polyurethane coating. When cleaning in between the leads off of the component the walnut shell was able to quickly remove the coating without damaging the board.

Epoxy: The walnut shell provided excellent results with the epoxy coating. On the first test the walnut shell was used to clean a section of the board where a component was removed. The in approximately 15-30 seconds all of the epoxy had been removed and the surface of the board was a bright green. Then the abrasive was tested on one of the thicker areas of the board, around the aluminum plate. Here it took longer due to the thickness of the epoxy, but resulted in a very clean finish.

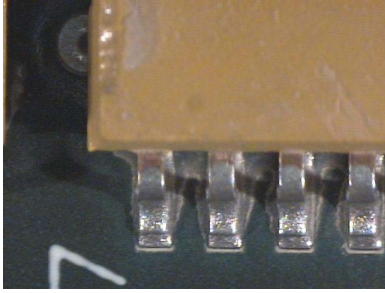


Figure 7: Acrylic

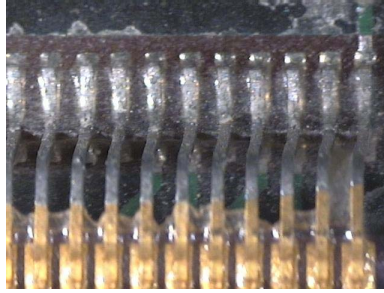


Figure 8: Polyurethane

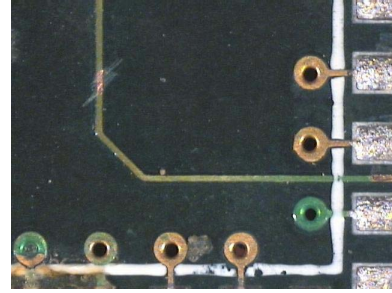


Figure 9: Epoxy

Conclusions: In the testing it appeared that the walnut shell was the most effective abrasive for all of the tests completed. Especially when working with the epoxy, the walnut shell was the most aggressive, but also had positive effect on the surface of the board.