



DuPont *i*Technologies

Printed Circuit Materials

Water Cleaning OA Fluxes After Wave Soldering

VACREL® Photopolymer Film Solder Mask

Technical Bulletin TB-0053

BACKGROUND

Some printed wiring board assemblers have reported a white, hazy residue on boards made with DuPont VACREL® solder masks. The residue appeared on boards that were wave soldered with organic acid (OA) fluxes and cleaned in conveyORIZED equipment using only hot water.

TEST SUMMARY

Tests were run on boards coated with VACREL® 8140. The boards were processed using two different OA fluxes. Ionic and visible residues were compared after cleaning with only water after wave soldering. Cleaning with a saponifier was used as a control. The following conclusions were reached.

- All OA fluxes are not the same and may interact differently with different solder masks. For example, in the test, one flux had considerably better ionics and less visible residue than the other flux when cleaned in water only.
- Increasing the water temperature to 68° C (155°F) from 57° C (135°F), and using longer dwell times in the hot water, reduced ionic and visible residues.

- Cleaning with water alone resulted in ionic contamination levels that were two to three times higher than the control boards cleaned with a saponifier.
- The visible residues contain glycol derivatives from the fluxes. Glycol derivatives tend to capture tin, which would cause the white haze.

CONCLUSIONS

The best method of cleaning OA fluxes is to use a 2% - 5% saponifier solution in hot water. With good rinsing, ionics will approach or meet Bellcore requirements. Neither flux caused residues when the boards were cleaned with a saponifier.

Although internal tests using a standard conveyORIZED cleaner showed some residues, actual results will be process dependent. Some DuPont customers have used both of the tested fluxes successfully in either a dishwasher-type system or a *high-pressure* conveyORIZED cleaner. Both methods were residue-free with good ionics when cleaned without a saponifier.

The ability to clean with water alone is highly dependent on the process and the equipment; it is not just a mask compatibility issue. Systems that give long dwell times in water temperatures between 65° C and 71° C (150° F and 160° F) should be used whenever possible. High pressure scrubbing action from nozzles or cascading water also will improve cleaning. It is important to remove standing water and dry the boards immediately after cleaning to avoid water spotting.



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