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 **Author****Topic: How to Remove White Residue on PCBs (Read 4057 times)**


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 **jpanhalt**

Super Contributor



Posts: 3044

Country:  **Re: How to Remove White Residue on PCBs**
« Reply #25 on: Yesterday at 11:07:50 am »

Quote from: bostonman on Yesterday at 01:59:28 am

I've used a few things over the years for cleaning (not PCBs) such as brake cleaner and either electronic cleaner or intake manifold cleaner, and sometimes it ruins the plastic.

You have to look at the chemicals involved, not what some marketing person calls it. For example, I have 2 types of brake cleaner on the shelf. One is virtually pure TCE (tetrachloroethylene/perchloroethylene/PERC) the other is labeled "non chlorinated" and has methanol, acetone, toluene, ethylbenzene (related to toluene) and various short-chain hydrocarbons. Those are quite different. PERC is relatively insoluble in water (0.015% or 0.15g/liter) ; acetone and methanol are miscible with water. There are both designed to remove oils. Neither is designed for flux; although, I suspect the non chlorinated version would be better.

Quote

For the most part, I've never had IPA ruin anything and would assume letting the PCB sit in a IPA bath would clear away everything. I know that in the past I've poured IPA into a metal pan only to find it got discolored with mixing with whatever metal the pan was made from. So I was wondering what a safe metal pan would be to avoid this.

Alcohols show a striking difference in solvent properties when water is added. Absolute ethanol is great for fats; 95% is not so good. As for your metal pan, IPA is not known to attack vigorously common cooking pans. Of course, magnesium and lithium are not used for cooking. Under some conditions, aluminum might react a tiny bit. I suspect your observation is simply related to removing some cooked on residues.

Cellosolves are an ether and alcohol in the same molecule (e.g. alkoxy glycols). Alkoxy describes an ether linkage (R-O-R'); glycol describes a molecule with two hydroxy (alcohol) groups (e.g., ethylene glycol [https://en.wikipedia.org/wiki/Ethylene_glycol]). Diethyl ether (a simple ether) is a good solvent for oils and some fats but not polymers.

It's the combination of the two classes that gives cellosolves their unique solvent properties. That is, water soluble and dissolves oils, baked on oil, polymers (e.g. acrylic wax) and so forth. In their pure state, they attack paint and are used as paint solvents, but adding water diminishes that effect. The recipe I gave is the same composition as Kester's newer, water-based flux removers.

I use it in an ultrasonic for 2 minutes, then rinse under running water, and another 2 minutes with DI/distilled water to get rid of any remaining salts.

You are worried about the effect on plastic. That is hard to predict. Some solvents may not seem to attack the plastic right away, but months to years later cause crazing.

And alternative is a kitchen dishwasher with common dish detergent. It is reported that name brand manufactures, e.g., Tektronix, used a dishwasher in its repair area.

Lastly, just live with the white residue.


 Logged

 **bostonman** 

Super Contributor



Posts: 1474

Country: 



Re: How to Remove White Residue on PCBs

« **Reply #26 on: Today** at 03:38:37 am »

Personally I think leaving white residue behind looks ugly, and, in high frequency circuits, thought it could cause issues.

In any case, my feeling is simply that white residue gives the impression the job was done half fast. In almost all cases, anything I've fixed is something I care enough about to not experiment with and/or has components that may not be sealed along with mechanical plastic parts.

My plan several months ago was to get some sort of pan, pour four or five bottles of IPA in it, leave the section of PCB with the flux residue soaking, and then clean with an acid brush. These are the steps I took at my old job and seemed to still have residue remaining. As a previous post suggested, I use one pan as the "dirty" IPA and a second pan with "clean" IPA. While this may work, it certain will eat up quite a bit of IPA bottles.

The way I do it now, and maybe this is the issue: I keep a bottle of IPA (maybe 10-12oz bottle) nearby along with acid brushes and a tooth brush. Usually I turn the PCB sideways, scrub with the brush(s), dunk the brush in the IPA again, scrub more, and let air dry.

I've planned to buy an air compressor just so I could blow off the alcohol as using a can of air seemed to have better results.

One thing I don't understand is why the flux doesn't get burned off during soldering. It seems a dab of solder results in a puddle of flux many factors more than the dab of solder used.

 Logged

 **ian.M**

Super Contributor



Posts: 12321



Re: How to Remove White Residue on PCBs

« **Reply #27 on: Today** at 05:48:28 am »

That's seriously sub-optimal as IPA is hygroscopic, so if exposed to the air for an extended period, dilutes itself with the moisture in the air and as the water content increases, it passes a threshold and tends to drop the dissolved rosin out of solution leaving whitish gooeey residue.

By all means, pre-soak in your tray of used IPA to soften the deposits, but to actually wash them off you need fresh dry IPA applied by spray or brush, sufficient to run off the edge of the board into your catch tray, + usually a fair bit of scrubbing. After the final IPA rinse put the board on edge on kitchen towel to let as much as possible run off and to blot the edge to prevent droplets forming and drying to leave sticky patches.

Also, to keep it as dry as possible, try to avoid opening your stock IPA bottle frequently by dispensing into a smaller well stoppered container for bench use, no more than can be used in a couple of weeks, and keep the bench container tightly stoppered when not in use.

Ionic residue (metal salts from flux action) can also leave white deposits, and the water in somewhat dilute IPA helps remove them but if the IPA is wet enough to precipitate rosin, it cant get to the metal salts embedded in the rosin.

« Last Edit: **Today** at 05:56:26 am by *ian.M* »


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 **jpanhalt**

Super Contributor



Posts: 3044

Country: 



Re: How to Remove White Residue on PCBs

« **Reply #28 on: Today** at 05:49:47 am »

Have you not seen the Kester paper on white residue?

https://www.kester.com/Portals/0/Documents/FAQs/White_Residue.pdf

Also look up the SDS for Kester 5768 and its other water-based flux cleaner.

You say you don't want to experiment with the meaningful boards, yet that is exactly what you are doing. You have tried IPA. It didn't work. So, now you seem to want to keep trying insignificant variations until it works. Never say never.

Kester is a pretty well known name in the business. It has already researched the subject. Its discussion of the problem makes sense, and my personal experience is consistent with that. My usual method until I switched was absolute ethanol with or without a little acetone. I tried IPA and found absolute ethanol faster and better.

On a recent PCB with a TQFP 44 chip, I could not get the residue completely off. Board didn't look bad, but between the pins there was the precipitate. So I tried the Kester formula, and it was like magic. The attached picture was taken about a year later so there is some dust and lint on the board. As for how to dry the board? When taken out of the wash bath and rinsed with water, the board was effectively dry. Solder resist is also water resist. It is quite hydrophobic when clean.

IPA is miscible with water. Why do you need an air compressor to blow it off? If it is clean, it should just evaporate without leaving a residue. If it is not clean, then get some that is. Lack of an air compressor is not the problem. Have you considered a water rinse to remove slightly contaminated IPA?

Anyway, you seem to ask questions for information, then argue against any suggestion that is contrary to your original plans. I have given you the best advice I can and will be moving on. BTW, soaking in IPA may not be the best thing long term for some plastics. It may remove plasticizers without causing any immediate effect, but long term, the plastic may show crazing or be more brittle.



PIC16F1789_0116.jpg (205.43 kB, 900x900 - viewed 4 times.)

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Ian.M

Super Contributor



Posts: 12321



Re: How to Remove White Residue on PCBs

« **Reply #29 on: Today** at 05:54:55 am »

Chemtronics' notes on the subject are also worth a read:

<https://www.chemtronics.com/the-dreaded-white-residues-why-they-form-what-to-do-about-them>

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