



AAT Application Report

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Subject: Characterization of Primary Solvents for use with the AAT Mega Closed Loop, Solvent Cleaners

Purpose: The purpose of this test is to provide a process data comparison of IPA to MegaSolv JB for cleaning RMA fluxes using the Mega II closed looped mixed ion absorption resins (Mega Resins) system.

Background: In the mid 1990's Austin American Technology developed a solvent tolerant ion exchange resin system to provide recycling of IPA and MegaSolv JB solvent systems used for ionic cleaning. This was patented and introduced as the Mega II closed loop cleaning system.

Protocol: The characterization will address 3 areas of performance.

1. Resistivity ranges and ionic efficiency
2. Drying performance
3. Cleaning performance

The resistivity ranges and ionic efficiency were measured as per the following protocol

- a. Measure and record the resistivity of the solution (neat) as received.
- b. Pour ~500ml in a 1L sealable glass jar.
- c. Add 1 ml of Alpha 615 RMA liquid flux to the solvent and re-measure the resistance.
- d. Add additional 1ml aliquots of flux stopping to measure and record solvent resistance after each addition.
- e. After the final addition of flux, add ~100grams of mixed Mega Resins to the container and re-measure and record the resistance.
- f. Continue to re-measure the resistance at the following intervals of time.
1hr, 2hrs, 1day, 2days, 3days, 4days, 5days, 7days, 14days, 21days.
Or until the reading stabilizes or is greater than meter range (80M)

The drying characterization was conducted as follows*

- a. Preclean, dry and weigh 4 similar SMT assemblies (P/Npc008 rev e from Practical Components populated both sides).

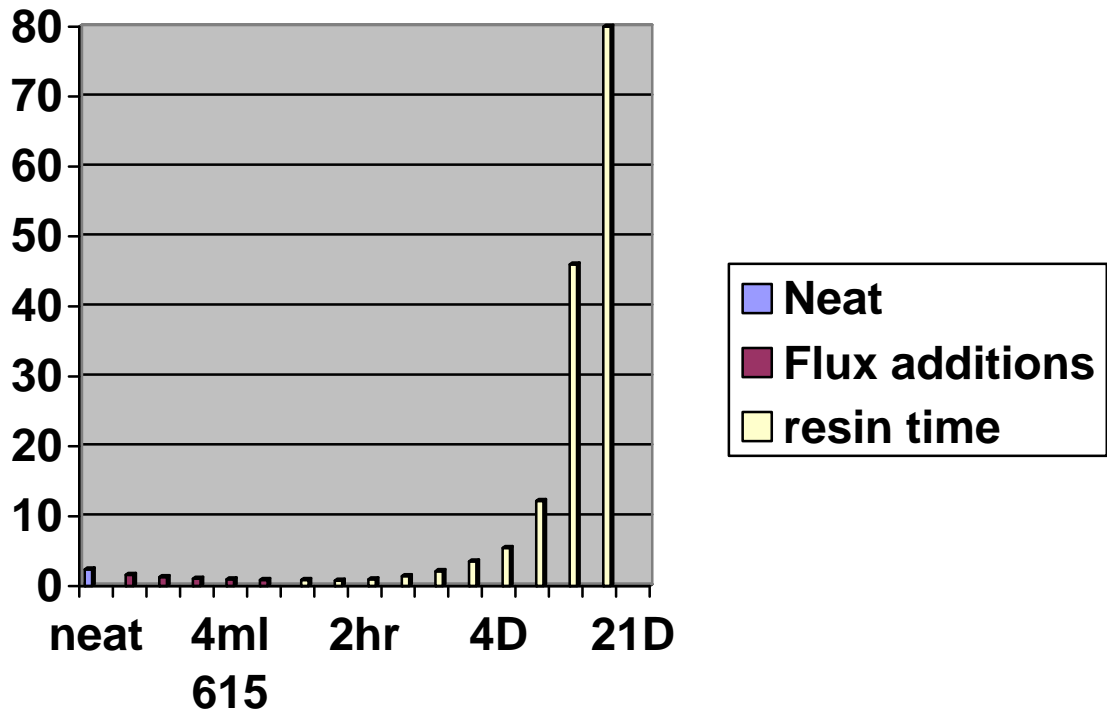
- b. Immerse each SMT assembly in the solvent blend to be tested and place in a board rack to drip for 60 seconds.
- c. Re-weigh the assembly after the 60 second drip – record value
- d. Re-weigh the assembly at the following times – record value
5min., 30min, 60min, 4hrs, 24hrs *all tests at 70F±5

The flux removal test were conducted as follows;

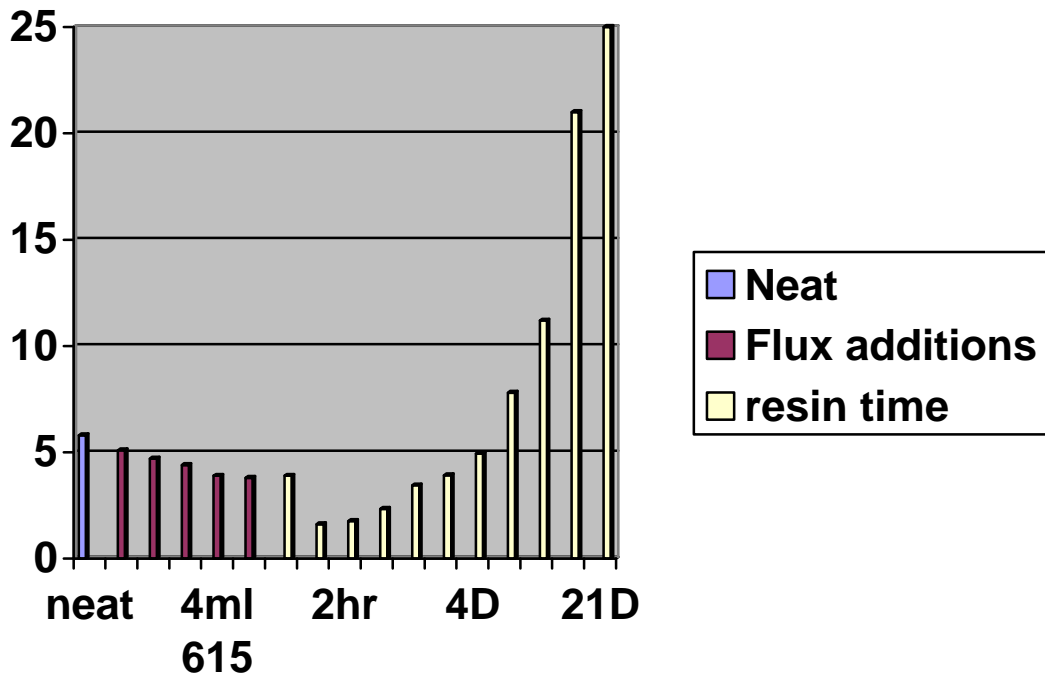
- a. Place a SOT package on a FR-4 substrate and add 1 drop of liquid RMA flux (alpha 615) to the center of the coupon. Bake in a convection oven at 220C of a for 5 minutes. Remove and cool to room temperature.
- b. Add a volume to a beaker, sufficient to immerse the test coupon in the solvent to be tested.
- c. Holding the coupon with tweezers, gently immerse the coupon and move side to side (in 1-2 second intervals) for the time indicated below. Inspect and record %flux remaining after each inspection.
1min, 2min, 3min, 4min, 5min, 6min, 7 min, 8min, 9min, 10min or until 100% removal

Test Data: Resistivity ranges and ionic efficiency (values in megohms)

	IPA	Petroferm MegaSolv JB
Neat solvent as received	2.4	5.77
1ml RMA flux add to 500ml solvent	1.64	5.1
2ml RMA flux add to 500ml solvent	1.3	4.71
3ml RMA flux add to 500ml solvent	1.07	4.38
4ml RMA flux add to 500ml solvent	0.99	3.92
5ml RMA flux add to 500ml solvent	0.88	3.8
(flux = alpha 620)		
After 100 grams of mega resins	0.9	3.86
1hr	0.8	1.62
2hr	0.995	1.77
1day	1.42	2.34
2days	2.15	3.45
3days	3.55	3.92
4days	5.46	4.95
5days	12.2	7.8
7days	46	11.2
14days	80	21
21days	∞	25



Data for IPA 99%tech



Data for Petroferm MegaSolv JB

Test Data: Drying test were performed using the boards pictured below. Both sides were populated.

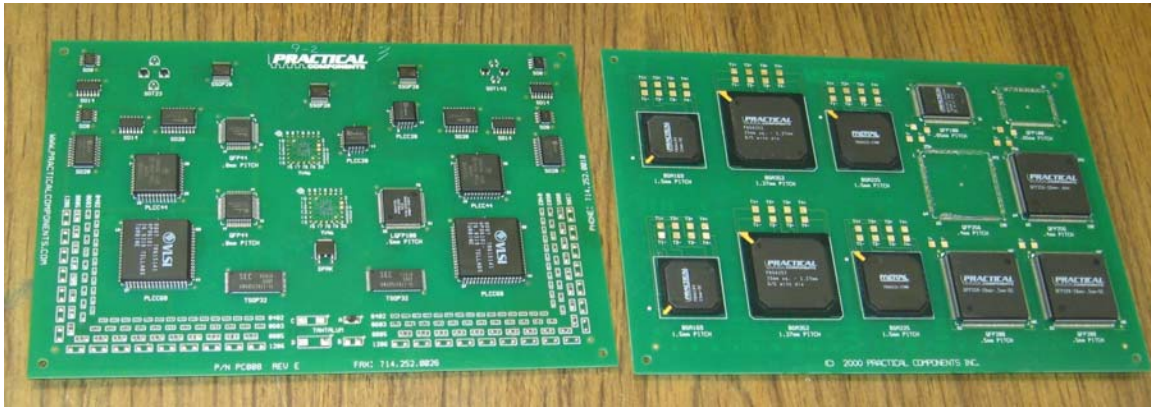


Photo of test boards used for drying tests

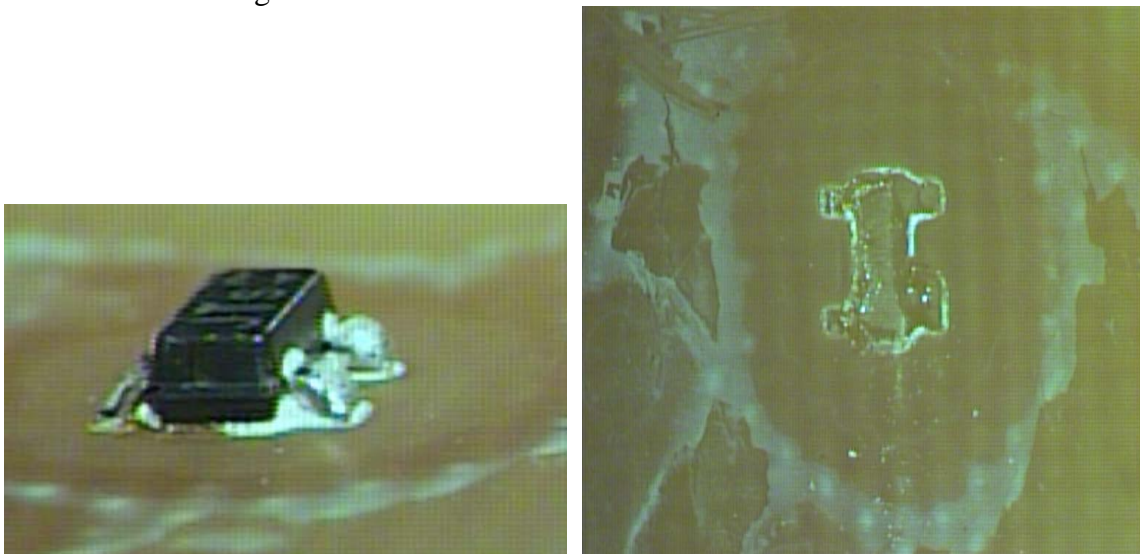
	IPA	JB
Solvent retained after 1 min. drain	1.43	3.89
After 5 minutes	0.35	2.76
After 30 minutes	0.03	1.83
After 60 minutes	0.02	1.5
After 4 hours	-0.01	0.48
After 24 hours	0	0.04

Values are expressed in grams

Visual confirmation of drying

The samples were checked by blowing compressed air under the components. The JB sample had a small amount remaining under 1 BGA package.

Test Data: Cleaning data



Results of IPA 10 minutes spray under immersion wash @ 70F



Results of MegaSolv JB 10 minutes spray under immersion wash @ 70F

Results/Conclusions:

Phase I: The resistivity ranges and ionic efficiency of all solvent tested responded with resistivity drops upon the addition of the flux aliquots. The resistivity response curves all indicate full ionic purification of the test solvents. There was no deterioration of the resins noted.

Phase II The air dry data indicates both IPA and JB can be dried at ambient temperatures and if any solvent remained under components following drying it would completely evaporate within 24hrs or so. This is consistent with field data collect from customers.

Phase III The results of the RMA flux cleaning tests showed MegaSolv JB to clean the best at room temperature. The IPA produced blooms of white residue and was less effective in removing heated RMA residue.