



May 12, 2008

AAT Laboratory Report

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Subject: Closed loop batch cleaning of flux to J-STD-001

Purpose: The purpose of this test is to determine the best method of meeting J-STD-001 cleaning requirements in an AAT closed loop batch cleaning system.

Background: 8 samples were customer supplied for testing (see photo and table 1)

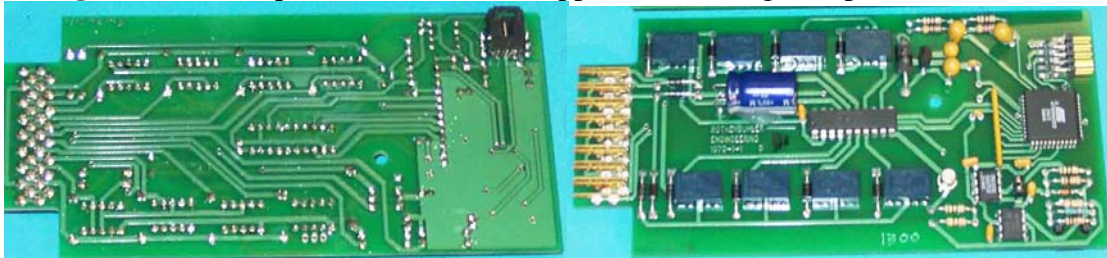


Photo 1 Top & bottom of PWA as received

Board #	Flux	Solvent	Time	Temperature
1295	RMA	MegaSolv JB	5 min.	75F
1298	RMA	MegaSolv JB	10 min.	75F
1294	RMA	MegaSolv JB	15 min.	75F
1297	RMA	MegaSolv JB	10 min.	110F
1301	OA	DI water	10 min.	120F
1300	OA	DI water	10 min.	130F
1296	RMA	Saponifier 25%	10 min.	125F
1299	RMA	Neutral pH semi-aqueous 25%	10 min.	125F

Table 1 Sample protocol

Quality Requirements The results will be judged pass fail by the published IPC J-STD-001 standard.

Testing Protocol: Two flux types were used. Of the eight samples, two were water soluble organic acid (OA) fluxed boards and six were rosin mildly activated (RMA) fluxed boards.



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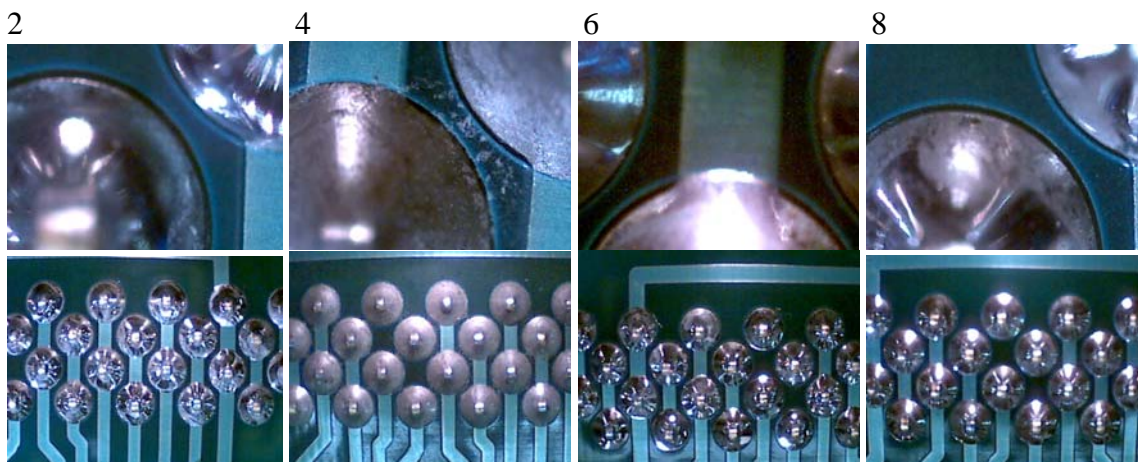
The two boards soldered with water soluble organic acid were cleaned in de-ionized (DI) water at temperatures 120F and 130F respectively.

Four of the six RMA fluxed samples were cleaned in 100% MegaSolv JB simulating cleaning in an AAT Mega II spray under immersion closed loop cleaner varying time and temperature. The last two samples with RMA flux were cleaned using commercial aqueous cleaning agents in an AAT AB-1500 spray in air batch cleaner as defined in Table 1. The AquaBatch-1500 has been replaced by the new AquaTherm series.

Each sample was visually examined as per IPC J-STD-001C standard, paragraph 8.3.2.2 and ionic residues were assessed as per paragraph 8.3.6.

Data or Results Summary:

Board #	Flux	Solvent	Time	Temperature	Visual Test	Ionic Test
1295	RMA	MegaSolv JB	5 min.	75F	Pass	Pass
1298	RMA	MegaSolv JB	10 min.	75F	Pass	Pass
1294	RMA	MegaSolv JB	15 min.	75F	Pass	Pass
1297	RMA	MegaSolv JB	10 min.	110F	Pass	Pass
1301	OA	DI water	10 min.	120F	Fail	Fail
1300	OA	DI water	10 min.	130F	Fail	Fail
1296	RMA	Saponifier 25%	10 min.	125F	Pass	Pass
1299	RMA	Neutral pH 25%	10 min.	125F	Pass	Pass



2,3 MegaSolv JB 4,5 DI water 6,7 Saponifier 8,9 Neutral pH
 Photo 2-9 – low and high magnification shots of representative areas of test groups



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Conclusions:

The RMA fluxed samples were all successfully cleaned to J-STD-001 class 3 (high reliability) criteria in the Mega II process and in the AB-1500 with the alkaline and neutral pH aqueous chemistries.

The water soluble organic acid fluxed boards failed the visual and ionic standards of the IPC J-STD. It would be fair to say that the results of this group would have turned out different if the cleaning process would have occurred within one hour of the soldering process.

Recommendations: AAT offers several closed loop batch cleaning systems for removing RMA flux residue. The Mega II is a spray under immersion solvent type cleaning system offering ionic contamination removal and solvent regeneration with very little emissions and no liquid waste stream. The AquaTherm 9200 is a spray in air system with a closed loop aqueous chemical bath and open loop rinse. The following table identifies a few of the process factors to consider when defining a RMA flux cleaning solution.

AAT Machine	Solvent	Cycle time wash-dry	Boards per cycle	Maximum board size	Rinse	Machine cost
Mega II	MegaSolv JB	20 min	50	18" x 10"*	no	\$55K
AquaTherm 9200	Aqueous cleaning agent	90 min	100	18" x 20"	water	\$32K

* Custom process chambers are available for larger boards and special applications