CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1996
DateRun:	01/18/1996
Experimenters:	Jay Jankauskas
ClientType:	Electronics Manufacturer
ProjectNumber:	Project #1
Substrates:	Electronics
PartType:	Part
Contaminants:	Coatings, Fluxes
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Black light, Visual
Purpose:	To evalaute possible alternatives form hummiseal and flux removal
Experimental Procedure:	Twelve various circuit boards obtained from a receiver were cut down to a smaller size (approximately 3"x 3") and precleaned. The Flux and Humiseal was applied on all boards with a swab. Both contaminants were allowed to set on the parts for six days in a convection oven set at 110 F. Six different chemistries were tested for removal of both the flux and the Humiseal. All chemistries were used at their maximum recommended concentration, and at recommended temperatures. A cleaning time of 15 minutes was used for each cleaner. Rinsing was performed in a tap water rinse tank of 130 F for one minute. The parts were run under air knives for 1 minute and then placed in a convection oven at 140 F for 20 minutes to dry. After drying, the parts were inspected for cleanliness. Black light was used to detect the Humiseal coating, and the flux was detected by simple visual examination.
Results:	The six cleaners were rated in 3 categories (flux removal, humiseal removal, environmental health & safety). Ratings were done on a scale of one to six with one being the best tested.

GRAVIMETRIC RESULTS

Cleaning Solution: Tech Spray Inc. Aqueous Defluxer

sample #	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
1	34.0402	34.4275	34.4950	-0.0675	-17.43%
2	22.5303	22.9010	22.8220	0.079	21.31%
				Average	1.94%

Cleaning Solution: Chemtronics Super Bio-Wash

sample #	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
3	18.5089	18.9178	18.9144	0.0034	0.83%
4	16.7197	17.1085	17.1187	-0.0102	-2.62%
				Average	-0.90%

Cleaning Solution: Valtech Corp. Valtron SP2201

sample #	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
5	16.1899	16.4580	16.4592	-0.0012	-0.45%
6	25.0008	25.2955	25.2718	0.0237	8.04%
				Average	3.80%

Cleaning Solution: Innovative Organics SC11

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sample #	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
7	24.8917	25.2485	25.1977	0.0508	14.24%
8	21.9369	22.0782	22.0415	0.0367	25.97%
				Average	20.11%

Cleaning Solution: Church & Dwight Armakleene E-2001

sample #	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
9	19.7927	20.1263	20.1480	0.0217	6.50%
10	14.9243	15.2423	15.2331	-0.0092	-2.89%
				Average	1.81%

Cleaning Solution: WR Grace Daraclean 211

sample #	clean mass (g)	mass with contamination (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
11	23.1156	23.3780	23.3075	0.0705	26.87%
12	14.9087	15.0416	15.0259	0.0157	11.81%
				Average	19.34%

Tech Spray Defluxer-Removed all but a small portion of flux, showed some removal of the Humiseal. Not the friendliest chemical, contains 35-40% Diethylene Glycol Monomethyl ether. Super Bio-Wash-Performed poor in all three categories. Valtech Valtron 2200-Wasn't too effective in removing the flux, didn't even touch the Humiseal. Innovative Organics-A majority of the flux was removed, didn't even touch the Humiseal. Armakleen E-2001-Removed all flux and softened up the Humiseal quite a bit. Very worker friendly chemical. Daraclean 282-Removed all flux and started to lift up the Humiseal. Contains up to 3% Glycol Ethers.

Summary:

Substrates:	Electronics				
Contaminants:	Coatings, Fluxes				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Tech Spray Inc	Concentrated Aqueous Defluxer	6		☐	
Chemtronics Inc	Super Bio Wash	20		☐	
Valtech Corporation	Valtron SP 2200	4		☐	
Innovative Organics Inc	Amberclean SC 11	5		☐	
Church & Dwight Co Inc.	Armakleen E 2001	10		☑	
Magnaflux	Daraclean 282	15		☑	

Conclusion:

The Ersin RMA flux should not be a problem to remove with most aqueous defluxers. Out of the chemistries tested, the Armakleen E-2001 and the Daraclean 282 performed the best and should be considered by Radar Technology, Inc.
The Humiseal coating will be very tough to remove. We are currently ordering chemicals that will hopefully remove the Humiseal. Products are expected from Terpene Technologies, Finger Lakes Chemical and Ecolink in a few weeks.