CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1996
DateRun:	01/02/1996
Experimenters:	Jay Jankauskas
ClientType:	Electronics Manufacturer
ProjectNumber:	Project #1
Substrates:	Plastic, Electronics
PartType:	Coupon
Contaminants:	Coatings, Fluxes
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Black light, Gravimetric, Visual
Purpose:	Identify cleaners to remove flux and Hummiseal

Experimental Procedure:

Twelve various circuit boards obtained from a receiver were cut down to a smaller size (approximately 3"x 3") and precleaned. Each part was weighed after precleaning and then contaminated with Humiseal 1B31 and Ersin 5381 RMA Flux. Both contaminants were allowed to set on the parts for six days in a convection oven set at 110 F. The parts were then weighed before cleaning.
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.
SUBSTRATE MATERIAL: Circuit Boards
CONTAMINANTS: Humiseal 1B31& Ersin 5381 RMA Flux
CONTAMINATING PROCESS USED: Flux and coating applied on with a brush and allowed to set for 6 days.
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 weighed again to get a percent removal of contaminants and inspected under a black light to see how much residual contaminant was present.

Results:

Gravimetric results were all screwed up so the results will not be judged on them.
Two chemistries seemed to show potential. Tech Spray Defluxer and WR Grace Daraclean 282. The Daraclean 282 removed all flux. The humiseal was not removed, but started to peel off after 15 minutes. After drying the humiseal was quite tacky on both of the circuit boards. The Tech Spray has a dissolving action on the Humiseal which I feel will end up in better cleaning than a lifting action. A slight bit of flux remained on the Tech Spray boards.
The Chemtronics, Valtron, Armakleen 2001 and Innovative Organics cleaners were all ineffective in removing both contaminants and will not be tested further.

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%

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6	25.0008	25.2955	25.2718	0.0237	8.04%
				Average	3.80%

Cleaning Solution: Innovative Organics SC11

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%

Summary:

Substrates:	Plastic, 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 2201	4		☐	
Innovative Organics Inc	Amberclean SC 11	5		☐	
Church & Dwight Co Inc.	Armakleen E 2002	10		☐	
Magnaflux	Daraclean 282 GF	15		☐	

Conclusion:

Cleaning time will have to be increased. Temperature should be kept as high as possible without damaging parts (maximum temp of 150-160 F). If longer cleaning times are not effective, new chemistries will have to be scoped out. Possible chemicals to be ordered:
Finger Lakes Company-Semi-Aqueous Electrical Cleaner
ADF Systems Ltd-Nutraclean 9 aqueous cleaner
Chem-Tech International-CT-24 Flux Remover
Envirosense Inc.-Envirogold Aqueous Cleaner
Rochester Midland Corp.-Alpha Excel
Terpene Tech.-Tarksol Semi Aqueous Terpene
Today & Beyond- Beyond 2003
London Chemical Co.-Longoterge