CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1999
DateRun:	09/07/1999
Experimenters:	Jason Marshall
ClientType:	Consultant
ProjectNumber:	Project #1
Substrates:	Ceramics, Alumina
PartType:	Coupon
Contaminants:	Alcohol
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Black light, Colorimeter, Gravimetric
Purpose:	To evaluate cleaning at 85 F, eeping all other parameters the same.

Experimental Procedure:

The solutions were heated to 85 F on a hot plate. Thirty coupons were wiped with Isopropyl Alcohol and air dried. The coupons were weighed to establish a baseline level of cleanliness. All 30 coupons were observed for particulate matter using an UVP Inc. Black light, Model UVL-56 longwave UV-366nm.

The coupons were coated with the Evanol and dried overnight at room temperature. Five coupons were cleaned in two solutions and four were cleaned in the remaining solutions for five minutes using stir-bar agitation. Parts were rinsed for two minutes in DI water also with stir-bar agitation. Rinsing was performed for two minutes with heated DI water at 100 F. The parts were dried in a convection oven at 212 F for 15 minutes. After allowing parts to cool to room temperature, final weights were recorded. All coupons were observed again under black light for particulate matter and any remaining Evanol. Visual observations were made on all the coupons for any signs of contamination. The sample was measured for chlorine concentration using LaMotte's Smart Colorimeter. Readings were made before and after cleaning.
Solutions examined were:
Micro 90 @ 2% with 5, 10, 15% soil loading
Wastewater @ < 2%
DI Water with 5, 10, 15% soil loading

SUBSTRATE MATERIAL: Ceramic-Alumina coupons
CONTAMINANTS: DuPont Evanol Concentrated (Vinyl Alcohol Polymers & Copolymers CAS#s: 9002-89-5, 25213-24-5, 54626-91-4; Methanol Bulk/Packaged CAS #: 67-56-1; Sodium Acetate CAS#: 127-09-3)
CONTAMINATING PROCESS USED: Dip coupons into contaminant solution and dry overnight at room temperature.

Results:

Cleaning was less effective at 85 F than at 100 F. As the concentration of evanol increased, the level of cleanliness went down. The waste water stream was almost as effective as the Micro 90 with 5% soil loading. The Highest level of cleaning was less than 75%. In the previous cleaning trial at 100 F, the best cleaning was nearly 99%. Table 1 lists the results of cleaning at the lower temperature.

Table 1. Cleaning Efficiencies at 85 Deg F

All the coupons had visible amounts of the Evanol solution on them. Again, black light fluorescence did not reveal any substantial results. The colorimeter readings varied slightly from the pre-wash to the post wash measurements. Table 2 lists the colorimeter values.

Table 2. Colorimeter Readings

	Micro 5	Micro 10	Micro 15	WWS	DI 5	DI 10	DI 15
Coupon 1	90.53	58.96	58.59	80.43	56.78	63.9	41.48
Coupon 2	61.04	72.68	57.58	64.38	82.64	55.61	40.29
Coupon 3	77.36	64.68	54.38	67.29	68.99	55.23	43.75
Coupon 4	75.98	56.95	58.67	78.43	65	52.73	74.2
Coupon 5	65.94	50.29					
Average	74.17	60.71	57.3	72.63	68.35	56.86	49.93

Solution	Soil Loading (%)			
Micro 90	5	10	15	~5
Pre-wash	0.04	0.1	0.16	
Post-wash	0.04	0.11	0.15	
DI Water				

CLEANING LABORATORY EVALUATION SUMMARY

Pre-wash	0.1	0.16	0.2	
Post-wash	0.11	0.16	0.19	
Waste Stream				
Pre-wash				0.04
Post-wash				0.05

Summary:

Substrates:	Ceramics, Alumina				
Contaminants:	Alcohol				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
International Products Corporation	Micro 90 Conc.	2	74.00	☐	
International Products Corporation	Micro 90 Conc.	2	73.00	☐	
Water	DI Water	100	68.35	☐	

Conclusion: The 85 F cleaning was proven to be ineffective with immersion cleaning. The level of cleaning was nearly 25% lower than the cleaning at 100 F.