CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1999
DateRun:	09/22/1999
Experimenters:	Jason Marshall, Nicole Vayo
ClientType:	Consultant
ProjectNumber:	Project #1
Substrates:	Ceramics, Alumina
PartType:	Coupon
Contaminants:	Alcohol
Cleaning Methods:	Ultrasonics
Analytical Methods:	Gravimetric
Purpose:	To evaluate cleaning at 85 F using ultrasonic cleaning.

Experimental Procedure:

A 2% solution was made of the cleaner using DI water in 600 mL beakers. Three concentrations of the contaminant were added to different beakers of the cleaner and DI water, based on volume percent (5, 10 and 15). DI water samples were also contaminated with the same Evanol amounts. Each were heated to 85 F on a hot plate.
Fifteen coupons were cleaned in Micro 90 at 2% using ultrasonic energy for 10 minutes. The coupons were weighed to establish a baseline level of cleanliness.

The coupons were coated with the Evanol and dried overnight at room temperature. Five coupons were cleaned in the Evanol loaded solutions for five minutes using ultrasonic cleaning at 40 kHz using a Crest ultrasonic tank model 4Ht 1014-6. Parts were rinsed for two minutes in DI water at 85oF. 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.

Solutions examined were:
Micro 90 @ 2% 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:

All three levels of Evanol loaded cleaners were effective in removing the contaminants from the coupons. Both the 5 and 10% soil loading samples removed over 99% of the contaminant from the ceramic coupons. The 15% solution removed just under 99%. Table 1 lists the results for cleaning coupons at the lower temperature.

Table 1. Cleaning Results at 85deg F

Evanol %	5	10	15
Coupon 1	100	99.57	98.7
Coupon 2	99.92	99.14	98.86
Coupon 3	99.39	99.57	98.86
Coupon 4	99.19	99.43	98.13
Coupon 5	99.55	99.67	99.01
Average	99.61	99.48	98.71

Summary:

Substrates:	Ceramics, Alumina				
Contaminants:	Alcohol				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
International Products Corporation	Micro 90 Conc.	2	98.71	☑	

Conclusion:

Micro 90 was effective in removing the Evanol from the coupons at all three soil loading levels. The cleaning efficiencies were all around 99% removal. Despite the high cleaning levels, these results were lower slightly lower than the cleaning at 100 F performed earlier.