CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004

DateRun: 02/12/2004

Experimenters: Jason Marshall

ClientType: Manufacturer of Ceramic Capacitors

ProjectNumber: Project #1

Substrates: Ceramics

PartType: Coupon

Contaminants: Waxes

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric

Purpose: To evaluate successful cleaners using ultrasonic energy

Experimental Procedure: Four cleaners were selected from the past trials for this wax. All products were used at full strength also in 250 ml beakers. All products were degassed for 5 minutes in a Branson 3510, 40 kHz ultrasonic tank. Twelve preweighed ceramic coupons were coated with client supplied wax, Zopher Mills Inc No 1563 Wax (mixture of waxes and resins). The wax was first melted using a Master Appliance heat gun in a beaker and applied directly to the coupon surface. The coupons were allowed to cool to room temperature before weighing a second time. Three coupons were cleaned in each solution for 30 minutes using ultrasonic agitation. Coupons were rinsed in tap water for 15 seconds at 120 F, followed by air blow off at room temperature. Once dry, coupons were weighed a final time and efficiencies for each cleaner were calculated.

Results: All four products were successful in removing over 89% of the wax within 15 minutes of ultrasonic cleaning. Two products were tested at an additional 3 minutes. Both removed over 97% of the soil. The table list the amount soil added to the coupons, the amount remaining after cleaning and the efficiencies for each coupon.

Cleaner	Initial wt	Final wt	% Removed
Uni Clear	0.3416	0.0614	82.03
	0.2421	0.0195	91.95
	0.2496	0.0135	94.59
Bio T 300 B	0.2388	0.0090	96.23
	0.3614	0.0397	89.01
	0.2912	0.0050	98.28
D Limonene	0.3135	0.0616	80.35
	0.2959	0.0192	93.51
	0.3550	0.0288	91.89
Citrus Pure	0.2951	0.0014	99.53
	0.2996	0.0083	97.23
	0.4239	0.0095	97.76

Summary:

Substrates:	Ceramics				
Contaminants:	Waxes				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Universal Photonics	Uni Clear	100	89.52	☑	97.66% at 18 minutes
Bio Chem Systems	Bio T 300 B	100	94.51	☑	97.80% at 18 minutes
Florida Chemical Company	D-Limonene	100	88.58	☑	
Abatement Technologies	Citrus Pure AS850	100	98.17	☑	

Conclusion: Either immersion soaking at an elevated temperature for 30 minutes or ultrasonic cleaning at room temperature for 20 minutes should remove all of the wax on parts. The next set of testing will focus on the second priority, the Stop Off.