CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004

DateRun: 02/22/2004

Experimenters: Jason Marshall

ClientType: Manufacturer of Ceramic Capacitors

ProjectNumber: Project #1

Substrates: Ceramics

PartType: Coupon

Contaminants: Paints

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate successful products at longer cleaning times

Experimental Procedure: The two products from the previous trial were heated to 110 F on a hot plate. A third product was included for testing. Nine preweighed ceramic coupons were coated with client supplied lacquer, Microshield Stop Off (78-93-3, 108-88-3, 109-99-9, 75-56-9, 842-07-9). The contaminant was applied directly to the coupon surface using a swab. The coupons were allowed to dry at room temperature before weighing a second time. Three coupons were cleaned in each solution for 10 minute intervals, up to 30 minutes, using stir-bar 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: The DuPont DBE 6 was successful after 20 minutes of immersion cleaning, removing over 94% of the Stop Off from the coupons. The Vertec Ink Zapper removed around 50% of the paint after 30 minutes. Visual observations noted that this cleaner could be improved with additional mechanical energy. The Metabolix E3HB again showed positive dissolving of the contaminant but resulted in an increase in weight. The cleaning solution would also benefit from additional mechanical energy.

Cleaner	Initial wt	Final wt	% Removed
E3HB at 30 minutes	0.1046	0.1300	-24.28
	0.1191	0.1779	-49.37
	0.1189	0.1802	-51.56
DBE 6 at 20 minutes	0.0398	0.0048	87.94
	0.0667	0.0015	97.75
	0.0692	0.0025	96.39
Ink Zapper at 30 minutes	0.0719	0.0347	51.74
	0.1078	0.0419	61.13
	0.0705	0.0291	58.72

Summary:

Substrates:	Ceramics				
Contaminants:	Paints				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Metabolix Inc	Metabolix E3HB	100	-41.74	☑	
Invista S.a.r.l	Flexisolv DBE 6 ester	100	94.03	☑	
Vertec BioSolvents	Ink Zapper	100	57.20	☑	

Conclusion: Two products will be tested using ultrasonic energy.