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 cleaners on second contaminant

Experimental Procedure: Eight cleaners were selected from the laboratories database of past testing based on supplied data from client. One aqueous based cleaner was diluted to 10% using DI water in a 250 ml beaker. The semi-aqueous products were used at full strength also in 250 ml beakers. The eight products were heated to 110 F on a hot plate. Twenty-four 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 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: Two of the eight products, Metabolix E3HB and DuPont DBE-6, tested showed visual signs of dissolving the Stop Off within the 10 minutes. Gravimetric analysis revealed that E3HB cleaned coupons actually gained weight. The DBE-6 removed around half of the contaminant. The other products removed less than 10%. The table lists the amount of Stop Off that was added, how much remained after cleaning and the efficiency for each coupon.

Cleaner	Initial wt	Final wt	% Removed
Uni Clear	0.0459	0.0435	5.23
	0.0490	0.0483	1.43
	0.1078	0.0932	13.54
Bio T 300B	0.0690	0.0647	6.23
	0.0570	0.0536	5.96
	0.1006	0.0917	8.85
D Limonene	0.0807	0.0778	3.59
	0.0815	0.0778	4.54
	0.1294	0.1169	9.66
Citrus Pure	0.0709	0.0650	8.32
	0.0509	0.0480	5.70
	0.1035	0.0955	7.73
E3HB	0.0983	0.1046	-6.41
	0.1111	0.1191	-7.20
	0.1140	0.1189	-4.30
DBE 6	0.0702	0.0398	43.30
	0.1167	0.0667	42.84
	0.1181	0.0692	41.41
SC Supersolve	0.0724	0.0719	0.69
	0.1193	0.1078	9.64
	0.0710	0.0705	0.70
Micro 90	0.0844	0.0803	4.86
	0.1632	0.1525	6.56
	0.1110	0.1039	6.40

Summary:

Substrates:	Ceramics				
Contaminants:	Paints				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**

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Universal Photonics	Uni Clear	100	6.73	☐	
Bio Chem Systems	Bio T 300 B	100	7.01	☐	
Florida Chemical Company	D-Limonene	100	5.93	☐	
Abatement Technologies	Citrus Pure AS850	100	7.25	☐	
Metabolix Inc	Metabolix E3HB	100	-5.97	☑	Dissolving contaminant
Invista S.a.r.l	Flexisolv DBE 6 ester	100	42.52	☑	Dissolving contaminant
Gemtek Products	SC Supersolve Safety Solvent	100	3.68	☐	
International Products Corporation	Micro 90 Conc.	10	6.40	☐	

Conclusion: Based on the visual evidence, both the Metabolix and DuPont products will be tested at an extended cleaning time. Additional products may also be tested.