CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004

DateRun: 03/07/2004

Experimenters: Jason Marshall

ClientType: Manufacturer of Ceramic Capacitors

ProjectNumber: Project #1

Substrates: Ceramics

PartType: Coupon

Contaminants: Inks

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate past cleaners on next supplied contaminant

Experimental Procedure: Seven cleaners were selected from the laboratories database of past testing based on supplied data from client. Four aqueous based cleaners were diluted to 10% using DI water in 250 ml beakers. Three semi-aqueous products were used at full strength also in 250 ml beakers. An eighth product was added as the client's current cleaner and diluted to 10%. All eight products were heated to 130 F on a hot plate. Twenty-four preweighed ceramic coupons were coated with client supplied dye, Sherwin Incorporated Dubl-Ckek Penetrant DB-51 (68131-40-8). The dye was applied directly to the coupon surface using a swab and then weighed a second time. Three coupons were cleaned in each solution for 5 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 for 30 seconds. Once dry, coupons were weighed a final time and efficiencies for each cleaner were calculated.

Results: All eight products removed over 80% of the red dye from the ceramic coupons within five minutes of immersion cleaning. Half of the products still little to no visible amounts of the dye. Of these four products, DBE 6 performed the best, followed by Ink Zapper, SC Aircraft & Metal cleaner and Metabolix E3HB. The table lists the amount of dye initially added, the amount remaining after cleaning and the efficiency for each coupon cleaned.

Cleaner	Initial wt	Final wt	% Removed
Liquinox	0.0265	0.0052	80.38
	0.0160	0.0040	75.00
	0.0293	0.0032	89.08
SC Aircraft	0.0117	0.0013	88.89
	0.0254	0.0023	90.94
	0.0283	0.0013	95.41
Micro 90	0.0254	0.0031	87.80
	0.0182	0.0032	82.42
	0.0174	0.0025	85.63
Metalnox 6314	0.0315	0.0041	86.98
	0.0204	0.0027	86.76
	0.0215	0.0063	70.70
E3HB	0.0373	0.0010	97.32
	0.0140	0.0014	90.00
	0.0114	0.0020	82.46
Inproclean 3800	0.0212	0.0030	85.85
	0.0277	0.0048	82.67
	0.0256	0.0043	83.20
Ink Zapper	0.0164	0.0019	88.41
	0.0106	0.0002	98.11
	0.0224	0.0014	93.75
DBE 6	0.0171	0.0007	95.91
	0.0361	0.0002	99.45
	0.0126	0.0005	96.03

Summary:

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

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Alconox Inc	Liquinox	10	81.49	☐	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	10	91.75	☑	
International Products Corporation	Micro 90 Conc.	10	85.28	☑	
Kyzen Corporation	Metalnox M6314 (For Comparison Only)	10	81.48	☐	
Metabolix Inc	Metabolix E3HB	100	89.93	☑	
Oakite Products	Inproclean 3800	10	83.91	☐	
Vertec BioSolvents	Ink Zapper	100	93.43	☑	
Invista S.a.r.l	Flexisolv DBE 6 ester	100	97.13	☑	

Conclusion: The five successful products will be retested using ultrasonic energy.