CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004

DateRun: 03/08/2004

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 last 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, Magnaflux Zyglo Penetrant ZL-60D (8042-47-5, 69227-21-0, 68131-40-8, 37311-02-7, 37251-67-5, 52232-09-4, 111-05-7, 75-28-5). 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: Seven of the eight products removed over 92% of this contaminant using immersion cleaning for five minutes. The other product removed just under 80%. The table below lists the amount of contaminant added, the amount remaining after cleaning and the efficiencies for each coupon cleaned.

Cleaner	Initial wt	Final wt	% Removed
Liquinox	0.0835	0.0031	96.29
	0.0354	0.0010	97.18
	0.0343	0.0007	97.96
SC Aircraft	0.0620	0.0006	99.03
	0.0334	0.0004	98.80
	0.0655	0.0018	97.25
Micro 90	0.0579	0.0043	92.57
	0.0547	0.0006	98.90
	0.0649	0.0090	86.13
Aquavantage 1400	0.0574	0.0018	96.86
	0.0469	0.0023	95.10
	0.0880	0.0082	90.68
E3HB	0.0692	-0.0001	100.14
	0.0635	0.0004	99.37
	0.0688	0.0001	99.85
Aeromaster	0.0404	0.0067	83.42
	0.0464	0.0063	86.42
	0.0474	0.0149	68.57
Ink Zapper	0.0972	0.0006	99.38
	0.0588	0.0006	98.98
	0.0871	0.0005	99.43
DBE 6	0.0587	0.0009	98.47
	0.0508	0.0011	97.83
	0.0864	0.0008	99.07

Summary:

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

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Alconox Inc	Liquinox	10	97.14	☑	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	10	98.36	☑	
International Products Corporation	Micro 90 Conc.	10	92.54	☑	
Brulin Corporation	Aquavantage 1400	10	94.21	☑	
Metabolix Inc	Metabolix E3HB	100	99.79	☑	
Buckeye International	Aeromaster	10	79.47	☐	
Vertec BioSolvents	Ink Zapper	100	99.26	☑	
Invista S.a.r.l	Flexisolv DBE 6 ester	100	98.46	☑	

Conclusion: Since seven of the eight products removed over 92% of the contaminant using immersion cleaning only, ultrasonic testing will not be performed. Piloting of cleaning products on actual parts should be conducted in order to verify results found in the laboratory setting.