CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2002
DateRun:	06/25/2002
Experimenters:	Jason Marshall
ClientType:	Chemical Company
ProjectNumber:	Project #1
Substrates:	Aluminum
PartType:	Coupon
Contaminants:	Adhesive, Resins/Rosins
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To identify alternatives to MEK for adhesive/resin removal
Experimental Procedure:	Nine products were selected from the lab's databases of alternative cleaning products based on client information. Five semi-aqueous products and four aqueous based products were selected. The semi-aqueous products were used at full strength where as the aqueous based products were diluted to 10% using DI water in 600 ml beakers. All nine products were heated to 130 F on a hot plate. Twenty-seven preweighed coupons were coated with Emerson & Cuming Stycast 2651-1 Black, self-curing epoxy resin (1675-54-3, 330-54-1) using a hand held swab. Coupons were allowed to sit overnight and reweighed to determine the amount of resin applied. Three coupons were immersed into each solution at 130 F for 5 minutes using stir-bar agitation. Following cleaning, coupons were rinsed in a tap water bath for 15 seconds at 120 F and dried using a Master Appliance Heat Gun at 500 F for 30 seconds. Once coupons were at room temperature, final clean weights were recorded and cleaning efficiencies were calculated for each product.
Results:	The four aqueous products were unsuccessful in removing the resin based adhesive. Four semi aqueous products were successful in removing over 90% of the adhesive. Although Safe-Strip from Ecolink removed over 99% contaminant, its main cleaning component in n-methyl-2-pyrrolidone. Both products from Bio Chem Systems removed 90-95%. The dibasic ester from DuPont was as successful as Safe Strip, removing over 99%. The only semi-aqueous product to not perform well was National Diagnostic's Opti Clear, cleaning less than half of the adhesive. The table below lists the amount of adhesive added to each coupon as well as the calculated efficiencies

Table 1. Adhesive Removal

Cleaner	Initial wt of cont.	Final wt of cont.	%Cont Removed
Bio T Max	0.6745	0.0480	92.88
	0.2713	0.0115	95.76
	0.4727	0.0149	96.85
Solsafe	0.6520	0.0319	95.11
	0.6777	0.0668	90.14
	0.8771	0.1254	85.70
Safe-Strip	0.4848	0.0043	99.11
	0.4103	0.0023	99.44
	0.8209	0.0071	99.14
DBE	0.4491	0.0012	99.73
	0.5896	0.0013	99.78
	0.5540	0.0007	99.87
Opti Clear	0.6141	0.3041	50.48
	1.3972	0.9438	32.45
	0.5157	0.2919	43.40
Surface Cleanse	0.6083	0.4766	21.65
	0.9587	0.4855	49.36
	0.6682	0.5100	23.68
Daraclean	0.5201	0.4399	15.42
	0.3935	0.3800	3.43
	0.3777	0.3903	-3.34
Inproclean	0.7316	0.5088	30.45
	0.4382	0.4182	4.56

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	0.4761	0.4409	7.39
Beyond	0.4324	0.4362	-0.88
	0.8671	0.5498	36.59
	0.3838	0.3911	-1.90

Summary:

Substrates:	Aluminum
Contaminants:	Adhesive, Resins/Rosins

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Bio Chem Systems	Bio T Max	100	95.16	☑	
Bio Chem Systems	Solsafe 245	100	90.32	☑	
EcoLink	Safe Strip	100	99.23	☑	contains NMP
Invista S.a.r.l	Flexisolv DBE Ester	100	99.80	☑	
National Diagnostic	Opti Clear	100	42.11	☐	
International Products Corporation	Surface Cleanse Concentrated Neutral 930	10	31.56	☐	
Magnaflux	Daraclean 212	10	5.17	☐	
Oakite Products	Inproclean 3800	10	14.14	☐	
Today & Beyond	Beyond 2002	10	11.27	☐	

Conclusion: The three successful cleaners, Bio T Max, Solsafe 245 and DBE will be used in the next trial using ultrasonic energy.