CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2000
DateRun:	11/05/2000
Experimenters:	Jason Marshall
ClientType:	Vessel Cleaning Company
ProjectNumber:	Project #2
Substrates:	Liquid
PartType:	Coupon
Contaminants:	Adhesive
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric, Visual
Purpose:	To identify potential replacement cleaners for an adhesive contaminant that has been difficult in removing.
Experimental Procedure:	Eight solutions were selected from the lab's databases based on past effective cleaning of similar contaminants and vendor supplied information. Table 1 lists the cleaners selected. Each cleaner was poured into a 20 ml glass vial at full strength. The weight of the full container was recorded. A small portion of the adhesive was placed into each vial and weighed again to determine the amount of contaminant that was added. Observations were made at 10-minute intervals during the first hour of the trial. At the 40-minute mark, the adhesive was removed from the vial. The vial was then reweighed to determine if the adhesive was being dissolved by the solutions or was the adhesive absorbing the cleaners. An increase in weight would signify that the adhesive was being dissolved and with a decrease in vial weight, it could be assumed that the adhesive was gaining weight by absorbing the cleaning solution. After the first hour, observations were made every hour for a total of six hours. Additional weighing of the vial was taken at three and six hours to determine the extent of the interaction between the solutions and the adhesive. SUBSTRATE MATERIAL: Liquid (cleaning solution) CONTAMINANTS: Adhesive- National Starch & Chemical Co Duro-Tak Experimental Product (CAS #s: 108-88-3, 1330-20-7, 64742-88-8)
Results:	Three of the eight cleaners demonstrated dissolving action during the trial. Bio T Max dissolved all of the added adhesive within the first two hours of immersion. DS-104 took four hours to complete the same task. The final dissolver was D Greeze 500 LO. The other five products resulted in increased weights at the three weighing periods. Table 2 lists the percent weight dissolved/absorbed for each of the solutions evaluated.

Table 2. Dissolving/Absorbing

Cleaner	Vial	V w/ C	40 min	3 hours	6 hours	Wt of Adhesive	40 min	3 hrs	6 hrs	Mechanism
1	24.6935	26.2415	24.8390	25.7082	25.8393	1.5480	9.40	65.55	74.02	% Dissolved
2	26.3185	27.5650	25.0972	24.6384	24.2175	1.2465	-97.98	-134.79	-168.55	% Absorbed
3	23.6354	24.4545	23.8932	24.3551	X	0.8191	31.47	87.86	X	% Dissolved
4	25.7664	27.3111	25.0141	24.5052	24.1574	1.5447	-48.70	-81.65	-104.16	% Absorbed
5	25.4519	26.4086	24.8529	24.3058	23.7153	0.9567	-62.61	-119.80	-181.52	% Absorbed
6	24.6970	25.9200	23.4662	22.8774	22.6854	1.2230	-100.64	-148.78	-164.48	% Absorbed
7	27.1368	28.6917	25.7088	24.8834	24.5203	1.5549	-91.84	-144.92	-168.27	% Absorbed
8	22.9946	24.5722	22.7374	23.3378	23.8792	1.5776	-16.30	21.75	56.07	% Dissolved
				2 hours	3.5 hours					

The visual observations made for the 11 time periods are recorded in Table 3. The ranking of the cleaning chemistries: Bio T Max (3, Dissolve) > DS-104(1, Dissolve) > Safe Strip(2, Absorb), D-Greeze 500 LO (8, Dissolve) > SI No 8 (7, Absorb) > Concrete/Graffiti Remover (6, Absorb) > SC Supersolve (4, Absorb) > Biosolve (5, Absorb).

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Table 3. Observations

Cleaner	10 min	20 min	30 min	**40 min**	50 min	1 hr	2 hr	**3 hr**	4 hr	5 hr	**6 hr**	Score	Rating
1 (Dissolve)	P	F	G/E	E	E	E	E	E	Gone	X	X	48.5	80.17
2 (Absorb)	F	F/O	G	G	E	E	E	E	E	E	E	47.5	78.51
3 (Dissolve)	F	F/O	G/E	E	E	E	Gone	X	X	X	X	51.0	84.30
4 (Absorb)	F	F	P	F	O	O	F/O	O	O/G	O/G	G	29.5	48.76
5 (Absorb)	P	P	F	O	O	O	F/O	O	O	F/O	O	28.0	46.28
6 (Absorb)	F	F	F	O	O	G	G	G	O/G	O	O/G	34.0	56.20
7 (Absorb)	F	F	F	F	O	O/G	G	G/E	E	G/E	E	37.5	61.98
8 (Dissolve)	P	P	O	G	G	G	G/E	E	E	E	E	41.6	68.76

Scoring System: **E**xcellentè **G**ood è **O**kay è **F**air-è **P**oor

E= 5, G/E = 4.5, G =4, O/G = 3.5, O = 3, F/O = 2.5, F = 2, P/F = 1.5, P = 1

X - not evaluated = 5.5, Gone = E

Rating = (Score/Maximum Score) x 100% (Max Score = 11*5.5 = 60.5)

Summary:

Substrates:	Liquid
Contaminants:	Adhesive

Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Dysol	DS 104 Wipe Solvent	100	80.17	☑	
EcoLink	Safe Strip	100	78.51	☑	
Bio Chem Systems	Bio T Max	100	84.30	☑	
Gemtek Products	SC Supersolve Safety Solvent	100	48.76	☐	
Westford Chemical Corporation	Biosolve	100	46.28	☐	
Safe Science Inc	Safe Science Concrete/Graffiti (Industrial)	100	56.20	☐	
Savogran Company	SI #8 Coating Remover	100	61.98	☐	
Transene Company, Inc.	D Greeze 500 LO	100	68.76	☐	

Conclusion:

Three cleaners were effective dissolvers and five were absorbers. Each product showed signs of altering the appearance of the adhesive. The final overall rating of the cleaning chemistries is as follows: Bio T Max 84.30%, DS-104 80.17%, Safe Strip 78.51%, D-Greeze 500 LO 68.76%, SI No 8 61.98%, Concrete/Graffiti Remover 56.20%, SC Supersolve 48.76% and Biosolve 46.28%.