CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2008
DateRun:	12/11/2008
Experimenters:	Jason Marshall, Heidi Wilcox, Junhee Cho
ClientType:	Electrical Manufacturer
ProjectNumber:	Project #1
Substrates:	Steel
PartType:	Coupon
Contaminants:	Inks
Cleaning Methods:	Manual Wipe
Analytical Methods:	Gravimetric
Purpose:	To identify possible cleaners for ink removal using manual cleaning

Experimental Procedure:

Nine products were selected from the lab's on-line database, www.cleanersolutions.org, based on past testing results matching client supplied information. Two of these products were diluted to 5% using DI water in 400 ml beakers. The other product was used at full strength as recommended by the vendor. All nine products were used at room temperature.

Peweighed steel coupons were coated with the Dykem Black Staining Color ink (123-86-4, 64-17-5, 71-36-3, 9004-70-0, 141-78-6, 109-60-4, 67-63-0, 1333-86-4) contaminant using a handheld swab. The contaminant was allowed to dry for about an hour. Once dry, the coupons were weighed a second time to determine the amount of ink applied.

Three coupons were placed into a Gardner Straight Line washability unit (designed for manual cleaning testing). The cleaning solutions were applied to the three coupons and allowed to sit for one minute. Simulated manual cleaning was run for 40 cycles or about one minute. Following cleaning, the coupons were dried 30 seconds using air blow off with dry compressed air at room temperature. Final weights were measured and efficiencies were calculated for each coupon cleaned.

Results:

Several of the selected products caused the final weights of the coupons to increase. Some of these left a residue behind on the surface, resulting in the increased weights. There were four products that were able to remove the ink from the steel coupons using manual wiping. The table lists the initial weight of the ink, the final weight and the cleaning efficiency for each coupon cleaned.

Cleaner	Initial wt	Final wt	% Removed
Soyclear 1500	0.0159	0.0213	-33.96
	0.0442	0.0542	-22.62
	0.0367	0.0448	-22.07
Ink Zapper	0.0230	0.0103	55.22
	0.0375	0.0144	61.60
	0.0338	0.0216	36.09
Citrus Soy Solvent C&D	0.0373	0.0386	-3.49
	0.0429	0.0474	-10.49
	0.0323	0.0386	-19.50
Graffiti Remover SAC	0.0491	0.0288	41.34
	0.0372	0.0179	51.88
	0.0336	0.0200	40.48
Inproclean 4000 T	0.0387	0.0469	-21.19
	0.0457	0.0520	-13.79
	0.0352	0.0467	-32.67
Smartsolve 605	0.0412	0.0086	79.13
	0.0351	0.0102	70.94
	0.0377	0.0006	98.41
SC Aircraft & Metal	0.0226	0.0246	-8.85
	0.0280	0.0280	0.00
	0.0175	0.0183	-4.57
Micro 90	0.0107	0.0105	1.87
	0.0457	0.0415	9.19

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	0.0380	0.0365	3.95
EP 921	0.0262	0.0030	88.55
	0.0122	0.0008	93.44
	0.0510	0.0126	75.29

Summary:

Substrates:	Steel
Contaminants:	Inks

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
AG Environmental Products	Soy Clear 1500	100	-26.22	☐	
Vertec BioSolvents	Ink Zapper	100	50.97	☑	
Bi-O-Kleen Industries	Citrus Soy Solvent Cleaner & Degreaser	100	-11.16	☐	
Spartan Chemical Company	Graffiti Remover SAC	100	44.57	☑	
Oakite Products	Inproclean 4000 T	100	-22.55	☐	
United Laboratories International	Smart Solve 605	100	82.82	☑	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	5	-4.47	☐	
International Products Corporation	Micro 90 Conc.	5	5.00	☐	
Inland Technologies Inc	EP 921	100	85.76	☑	

Conclusion: A follow up test will be conducted on second batch of possible alternatives. These four effective alternatives will be evaluated on the supplied grease.