CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2001

DateRun: 03/12/2001

Experimenters: Todd MacFadden

ClientType: Adhesive Manufacturer

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Adhesive

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To identify a suitable, non- or less-toxic substitute cleaner for toluene and toluene-based solvents for this industry sector.

Experimental Procedure: Five semi-aqueous and organic chemistries (see below) were tested at the conditions indicated. The cleaners were selected from the SCL database, based on previous testing and on vendor information. Meanwhile, stainless steel coupons were weighed and then contaminated with one of the two adhesives being tested using a handheld swab and allowed to dry for 24 hours. The coupons were weighed again and then immersed in the agitated cleaners, three at a time, for five minutes; rinsed; then air dried. The coupons were then weighed a final time to determine the cleaning efficiency.

SUBSTRATE MATERIAL: SS (202-410 B85) and SS (302-B86)
CONTAMINANTS:
AC-059 adhesive (108-883),
Morton 717 adhesive (108-883, 108-05-4, 110-54-3, 142-82-5, 67-63-0)

Results: Table 2 highlights the results of this experiment. The efficiencies range from 40% to 7% cleaning efficiency. As with previous trials, all cleaners tended to perform better, relatively, on the HC-059 adhesive than the Morton adhesive, suggesting that the latter is more tenacious. Also, as with previous trials, several trials yielded negative efficiencies. It has been suggested that this is due to penetration of the cleaner into the adhesive. Nevertheless, it is also possible that the cleaner simply was not rinsed away, and/or did not completely evaporate, thereby adding mass to the coupon. In any case, it is difficult to discern with confidence any trends based on these data regarding the relative cleaning ability of the formulations tested.

Table 2. Cleaning Efficiencies

	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b
Coupon 1	3.20	1.05	-8.22	-52.98	-0.58	-2.53	6.22	-10.47	16.96	-2.56
Coupon 2	8.93	0.36	-5.91	-34.73	0.36	-3.32	-2.80	-11.36	1.06	-1.74
Coupon 3	9.51	-12.56	-31.27	-0.087	-2.91	6.84	-9.57	8.68	-0.54	
Average	7.22	0.42	-8.85	-39.66	-0.10	-2.92	3.42	-10.46	9.10	-1.61

Summary:

Substrates:	Stainless Steel				
Contaminants:	Adhesive				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Dysol	DS 104 Wipe Solvent	100	7.22	☐	
Savogran Company	SI #4 Coating Remover	100	-8.85	☐	
Oakite Products	Inproclean 4000 T	100	-0.10	☐	
Transene Company, Inc.	D Greeze 500 LO	100	3.42	☐	
Today & Beyond	Beyond 2009	100	9.10	☐	

Conclusion: Overall, the cleaners performed quite poorly under these testing parameters. From these data, it is difficult to ascertain notable trends regarding cleaning abilities of the respective cleaners. While immersion testing may provide clues regarding the relative cleaning ability of a given formulation such as the ability to soften, penetrate, or lift dry adhesive from the substrate these clues may not necessarily be discernible by gravimetric analysis. That is, they may not physically remove the adhesive from the coupon, even though they may actually be working. Moreover, immersion testing does not necessarily represent real world cleaning conditions, which commonly involves hand wiping. Therefore, subsequent trials will be modified to employ abrasion testing rather than immersion testing.