

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1999
 DateRun: 05/25/1999
 Experimenters: Jason Marshall
 ClientType: Department of Public Works
 ProjectNumber: Project #1
 Substrates: Steel
 PartType: Coupon
 Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric
 Purpose: To evaluate selected cleaners for the removal of specified CAS#s.
 Experimental Procedure: Table 1 lists the contaminants used by the client.

Table 1. Contaminant Listings

CAS Removal Search	Sources of Contaminants at SCL (Listed by SCL heading)								
Total	Cleaned Before								
CAS #	CAS #								
108-88-3	108-88-3	95-416	96-418	96-419	97-541	98-541	98-571	98-680	99-622
3159-62-4									
64741-88-4	64741-88-4	98-679	98-561						
64742-01-4	64742-01-4	98-679							
64742-53-6	64742-53-6			99-695	99-688	97-549	95-406	96-449	
64742-54-7	64742-54-7	98-679	98-561	99-695	99-692				
64742-57-0	64742-57-0	98-679		99-695					
64742-62-7	64742-62-7	98-679	98-561		95-406				
64742-65-0	64742-65-0	98-679	98-561						
68649-01-4									
72623-87-1	72623-87-1	98-679							
8032-32-4									
98-679	Castrol Motor Oil								
99-695	W.A. Wood Oil								

The eight chemistries used in the cleaning trial were selected based on results obtained from the SCL Effective Tests Conditions database and the Industrial Cleaning Survey: Directory of Vendors Tech Report # 15. Table 2 lists the ETC results

Table 2. ETC Search Results Based on CAS#.

Products Used to Remove Contaminants								
108-88-3	64741-88-4	64742-01-4	64742-53-6	64742-54-7	64742-62-7	64742-65-0	64742-57-0	72623-87-1
AG Environmental	WR Grace	WR Grace	EMKAY	WR Grace	WR Grace	WR Grace	EMKAY	WR Grace
	Safe CleanUp	Safe CleanUp		Safe CleanUp	Safe CleanUp	Safe CleanUp		
	AG Environmental	AG Environmental		AG Environmental	AG Environmental	AG Environmental		
				EMKAY				

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Table 3 lists all cleaners selected and the concentrations used. The chemistries were diluted to the listed amounts in 400 mL beakers using DI water. The beakers were heated to 130 F (except Envirosolutions-room temp) on a hot plate.

Twenty-four preweighed coupons were contaminated with the mixture of the two oils and weighed again. Three coupons were cleaned in each beaker for five minutes using stir-bar-agitation. Coupons were rinsed in tap water at 120 F for 30 seconds and dried using a Master Appliance Corp, Hot-air gun model HG at 500 F for one minute. After the coupons cooled to room temperature, the final clean weights were recorded and cleaning efficiencies were calculated.

SUBSTRATE MATERIAL: Steel Coupons (202-1010-B79)

CONTAMINANTS: Oil: W.A Wood Co W-373 (CAS #s 64741-44-2, 64742-53-6, 64742-52-5); Castrol GTX Motor Oil SAE 10W-40 (CAS #s 64742-41-2, 64741-88-4, 64742-01-4, 64742-46-7, 64742-54-7, 64742-56-9, 64742-57-0, 64742-62-7, 64742-65-0, 72623-83-7, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1)

CONTAMINATING PROCESS USED: The two oils were mixed together, using more of the Castrol oil. The mixed oil was then brushed onto coupons using a hand-held swab.

Results:

Three of the cleaners were capable of removing >90% of the contaminant, and only one product cleaned less than 70% of the contaminant from the coupons using stir-bar agitation. Envirosolutions was the most efficient cleaner removing nearly 100% of the oil mixture.

Table 4. Cleaning Efficiencies

	282 GF	Safety Wash	Super Neutral	7300	Solsafe 245	Soy Gold 2000	Micro 90	SC A&MC
Coupon 1	78.27	72.79	92.7	40.48	99.69	86.86	81.61	97.47
Coupon 2	81.63	70.84	94.03	14.14	99.23	90.21	69.54	88.18
Coupon 3	84.15	66.91	92.14	47.06	99.82	86.75	67.91	93.28
Ave	81.35	70.18	92.96	33.89	99.58	87.94	73.02	92.98
Std Dev	2.95	2.99	0.97	17.42	0.31	1.97	7.49	4.65

Summary:

Substrates:		Steel				
Contaminants:		Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil				
Company Name:		Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Magnaflux		Daraclean 282 GF	5	81.35	<input type="checkbox"/>	
Emkay Chemical Company		Safety Wash	5	70.18	<input type="checkbox"/>	
Safe CleanUp Solutions		Super Neutral	10	92.96	<input checked="" type="checkbox"/>	
Watson Technical Associates		Watson Formula 7300	5	33.89	<input type="checkbox"/>	
Bio Chem Systems		Solsafe 245	100	99.58	<input checked="" type="checkbox"/>	
AG Environmental Products		Soy Gold 2000	50	87.94	<input checked="" type="checkbox"/>	
International Products Corporation		Micro 90 Conc.	5	73.02	<input type="checkbox"/>	
Gemtek Products		SC Aircraft & Metal Cleaner Super Concentrate	5	92.98	<input checked="" type="checkbox"/>	

Conclusion:

Increasing the concentrations of the products which cleaned less than 90% should increase the efficiencies. Additional testing could be performed to determine the optimum concentrations for cleaning nearly 100% of the contaminant from the coupons.
The Watson product will not be tested any further due to its limited success in removing the oil mixture.