CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2002
DateRun:	09/02/2002
Experimenters:	Jason Marshall, Heidi Wilcox
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Steel
PartType:	Coupon
Contaminants:	Cutting/Tapping Fluids, Greases, Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To evaluate client products for grease, cutting oil and quench oil cleaning
Experimental Procedure:	Based on client request four products were selected to clean three contaminants: Oil - Citgo Quenching Oil 22 (64741-89-5, 8052-42-4) Oil - Citgo Kutwell 40 (64742-52-5, 64742-53-6) Grease - Formax Manufacturing Corp F-26 grease stick polishing lubricant (68815-16-7, 67701-27-3, 64742-52-5, 102-71-6). Thirty-six preweighed coupons were coated with each contaminant in sets of three using a hand held swab. A second weighing was performed to determine the amount of contaminant added. Each product was poured into three 600 ml beakers. Coupons were immersed into a beaker and cleaned for 5 minutes using stir-bar agitation. Coupons were then rinsed in a tap water bath at room temperature for 15 seconds and dried using a Master Appliance Heat Gun at 500 F for 1 minute. After coupons were dry final weights were made and efficiencies were calculated.
Results:	All four cleaners were successful in removing over 90% of the cutting fluid. All cleaners except Vertec BioGold removed over 99% of the quench oil. Only Citrikleen was successful in removing over 85% of the grease during the 5 minute cleaning. The table below lists the average efficiencies for the four cleaners.

Cleaner	Initial wt	Final wt	% Removed	
1-A	0.2223	0.0429	80.70	81.03
	0.1736	0.0416	76.04	
	0.2705	0.0369	86.36	
1-B	0.5691	0.0298	94.76	94.76
	0.6806	0.0315	95.37	
	0.5450	0.0319	94.15	
1-C	0.1431	0.1917	-33.96	-3.21
	0.1803	0.1732	3.94	
	0.2240	0.1783	20.40	
2-A	0.2291	-0.0001	100.04	100.03
	0.2009	0.0001	99.95	
	0.2828	-0.0003	100.11	
2-B	0.5843	0.0000	100.00	100.13
	0.7012	-0.0008	100.11	
	0.5445	-0.0015	100.28	
2-C	0.1753	0.0333	81.00	88.12
	0.2883	0.0181	93.72	
	0.1494	0.0155	89.63	
3-A	0.3820	0.0008	99.79	99.56
	0.4223	0.0033	99.22	
	0.4127	0.0013	99.69	
3-B	0.5233	-0.0012	100.23	100.12
	0.8316	-0.001	100.12	
	0.9494	0.0000	100.00	
3-C	0.2224	0.0357	83.95	51.75
	0.3041	0.0869	71.42	
	0.2506	0.2509	-0.12	
4-A	0.5063	-0.0001	100.02	100.20

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	0.3598	-0.0013	100.36	
	0.2356	-0.0005	100.21	
4-B	1.1442	0.0024	99.79	99.66
	0.8112	0.0033	99.59	
	0.9117	0.0037	99.59	
4-C	0.1561	0.0261	83.28	72.91
	0.2700	0.1097	59.37	
	0.1726	0.0413	76.07	

Cleaners and Soils Used

1	Vertec Bio Gold
2	Citrikleen
3	Solsafe 245
4	Mineral Spirits
A	Quench
B	Cutting
C	Grease

The Vertec Bio Gold encountered difficulties in the rinsing stage. It was the only product to have substantial residue after the 15 second rinsing at room temperature. An increase in temperature or perhaps a spray rinse may be more effective in removing the cleaner from the coupon surfaces.

Summary:

Substrates:	Steel
Contaminants:	Cutting/Tapping Fluids, Greases, Oil

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Vertec BioSolvents	VertecBio Gold Unscented Part Cleaner	100	81.03	☐	Quench Oil
Pentone Corporation	Citrikleen XPC	100	100.03	☑	Quench Oil
Bio Chem Systems	Solsafe 245	100	99.56	☑	Quench Oil
Sterling Clark Lurton Corp	Mineral Spirits	100	100.20	☑	Quench Oil
Vertec BioSolvents	VertecBio Gold Unscented Part Cleaner	100	94.76	☑	Cutting fluid
Pentone Corporation	Citrikleen XPC	100	100.13	☑	Cutting fluid
Bio Chem Systems	Solsafe 245	100	100.12	☑	Cutting fluid
Sterling Clark Lurton Corp	Mineral Spirits	100	99.66	☑	Cutting fluid
Vertec BioSolvents	VertecBio Gold Unscented Part Cleaner	100	-3.21	☐	Grease
Pentone Corporation	Citrikleen XPC	100	88.12	☑	Grease
Bio Chem Systems	Solsafe 245	100	51.75	☐	grease
Sterling Clark Lurton Corp	Mineral Spirits	100	45.15	☐	Grease

Conclusion: Improved rinsing protocol may increase the efficiency of the Vertec BioGold