

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1997  
 DateRun: 07/16/1997  
 Experimenters: Jason Marshall, Prashant Trivedi  
 ClientType: Biomedical Device Manufacturer  
 ProjectNumber: Project #1  
 Substrates: Stainless Steel  
 PartType: Coupon  
 Contaminants: Lubricating/Lapping Oils  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric  
 Purpose: First attempt to clean lubricant.

**Experimental Procedure:** Twenty four stainless steel coupons were weighed after the preclean treatment. The coupons were then contaminated with a lubricant and placed in an oven at 400 F for 10 minutes to simulate the process the client currently uses. After the coupons cooled down to room temperature, the contaminated weight was obtained.  
 Eight cleaning chemistries were chosen on the basis of their abilities to clean lubricants and grease off stainless steel surfaces from previous laboratory testing. The chemistries chosen were made into 10% solutions based on volume. The solutions were then heated to approximately 120 F on hot plates. Three coupons were placed into each solution for a period of 10 minutes with stir-bar agitation. Upon completion of the cleaning time, the coupons were rinsed with tap water in beakers with stir-bar agitation at 120oF for two minutes followed by drying with a hot air gun at 115 F. The coupons were then allowed to cool down to room temperature and the cleaned weight was recorded.  
 SUBSTRATE MATERIAL: Stainless Steel  
 CONTAMINANTS: Lubri-temp Anti-Seize lubricant  
 CONTAMINATING PROCESS USED: Coupons were contaminated with the client supplied lubricant and placed in an oven at 400oF for 10 minutes.

**Results:** Of the eight chemistries selected, five showed good to excellent cleaning capabilities. The three solutions that did not perform well will not be further considered. The remaining chemistries will be tested using an ultrasonic unit.  
 During the trial, observations were made about each chemistry. 2000XS was noted to need less cleaning time. CT-1 was not outstanding in its removal of the contaminate. Geo Guard re fouled the coupons upon the coupons removal from the cleaning solution. Sea-Wash appeared to need a shorter cleaning time. ND-17 looked like it might be recontaminating the coupons when the coupons were removed from the cleaning solution. Daraclean needed the full cleaning time and it left a layer of contamination on top of the bath. Inproclean had excellent removal of the lubricant, thus needing less cleaning time. Valtron did not show any signs of removing the lubricant during the cleaning time.  
 The rinsing process could use agitation to limit the amount of contamination that is redeposited on the coupons upon removal. An increase in temperature and/or drying time might be useful in removing the excess water that remained after the current drying process.

Percent Contaminate Removed								
	2000XS	CT-1	Geo Guard	Sea Wash	ND-17	Daraclean	Inproclean	Valtron
	68.90	31.40	49.20	63.30	88.60	70.30	96.10	16.10
	96.50	18.90	62.90	80.30	97.60	87.90	126.00	14.90
	94.40	25.60	38.40	89.70	89.40	89.90	96.80	21.20
Average	86.60	25.30	50.20	77.80	91.90	82.70	106.00	17.40
std dev	15.40	6.30	12.30	13.40	5.00	10.80	17.10	3.30

Summary:

Substrates:	Stainless Steel					
Contaminants:	Lubricating/Lapping Oils					
Company Name:		Product Name:	Conc.:	Efficiency:	Effective:	Observations:
US Polychem Corporation		Polychem A 2000 XS	10	86.60	<input checked="" type="checkbox"/>	
Chemkleen International Inc.		CT 1 Multipurpose Cleaner	10	25.30	<input type="checkbox"/>	
Calgon Corporation		Geo Guard 2215	10	50.20	<input type="checkbox"/>	
Warren Chemical Company		Sea Wash Neutral	10	77.80	<input checked="" type="checkbox"/>	

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MacDermid Industrial Products	ND 17	10	91.90	<input checked="" type="checkbox"/>	
Magnaflux	Daraclean 282	10	82.70	<input checked="" type="checkbox"/>	
Oakite Products	Inproclean 3800	10	106.00	<input checked="" type="checkbox"/>	
Valtech Corporation	Valtron SP 2275	10	17.40	<input type="checkbox"/>	

**Conclusion:**

Five of the eight chemistries showed good to excellent removal of the lubricant and will be used in conjunction with an ultrasonic unit in the 40KHz range. The chemistries selected were: 2000XS, Sea-Wash, ND-17, Daraclean, and Inproclean.