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:	Ultrasonics
Analytical Methods:	Gravimetric
Purpose:	Retest of ultrasonic cleaning of lubricant

Experimental Procedure:

Twelve (12) stainless steel coupons were weighed after the preclean treatment. The coupons were then contaminated with a lubricant and placed in an conventional 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.

Four cleaning chemistries were chosen on the basis of their success from the previous trial. The chemistries chosen were made into 10% solutions based on volume. The solutions were then heated to approximately 120 F in the 48 KHz ultrasonic tank. Three coupons were placed into each solution for a period of 10 minutes. Upon completion of the cleaning time, the coupons were rinsed with tap water in beakers with stir-bar agitation at 120 F 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.

An additional observation that will be made during the trial is the cleaning rate for each cleaner. The coupons will be checked at four different increments during the cleaning process: initial, two minutes, five minutes and final. At each period, the coupons will be checked visually for contaminate removal.
SUBSTRATE MATERIAL: Stainless Steel
CONTAMINANTS: Lubri-temp Anti-Seize lubricant

Results:

% Removed	Sea Wash	Polychem	Daraclean	Oakite
Coupon 1	105.00	103.00	110.00	99.20
Coupon 2	91.50	113.00	107.00	98.50
Coupon 3	97.60	111.00	124.00	94.30
Average	98.00	109.00	114.00	97.30
Std Dev	6.76	5.29	9.07	2.65

All of the chemistries run in the experiment had excellent cleaning capabilities. The excess cleaning could be a result of inadequate precleaning of the coupons.

Cleaning Rates

Time (min)	Sea Wash	2000XS	Daraclean	Inproclean
0	poor	good	good	good
2	okay	excellent	excellent	good
5	good	excellent	excellent	good
10	good	excellent	excellent	good

Comments

Sea Wash	2000XS	Daraclean	Inproclean
Appeared to clean well at five minutes.	Only needed about two minutes to clean all of the contaminate.	Needed more than two minutes but less than five minutes to clean.	Cleaned in less than two minutes.
Final bath was relatively clean.		Final solution was dirty.	The coupons were being recontaminated during the rest of the cleaning time.
			The coupons rinsed clean of the contaminant.

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The rates showed that the time needed for the could be reduced without lowering the efficiency of the cleaning chemistries. In comparing the cleaning percentages of the cleaners in the trials using the ultrasonic unit, the results showed that in at least one trial for each chemistry, there was a cleaning percentage greater than 100%.

Trials 2a, 2b and 3 Percent of Contaminate Removed Using				
	Ultrasonics and Chemistries			
	Sea Wash	2000XS	Daraclean	Inproclean
Trial 3	98.00	109.00	114.00	97.00
Trial 2a	109.00	95.00	109.00	107.00
Trial 2b	97.00	87.00	96.00	102.00
Average	101.00	97.00	106.00	102.00
Std Dev	6.66	11.10	9.29	5.00

Summary:

Substrates:	Stainless Steel
Contaminants:	Lubricating/Lapping Oils

Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
US Polychem Corporation	Polychem A 2000 XS	10	109.00	☑	
Warren Chemical Company	Sea Wash Neutral	10	98.00	☐	
Magnaflux	Daraclean 282	10	114.00	☑	
Oakite Products	Inproclean 3800	10	97.30	☑	

Conclusion:

Upon review of the results from trial two, all the cleaners showed good cleaning potential. All four will be used to see how well they will remove the plastic contaminates under the same conditions as the previous two trials. In order to correct for the possible damage to the coupons, the coupons will undergo a more thorough precleaning process. Also, the amount of contaminate applied to the coupons will be increased as well. The second action will allow for any minor changes in weights related to the balance being used.