

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1997  
 DateRun: 07/17/1997  
 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: Ultrasonic cleaning lubricant

**Experimental Procedure:** Fifteen 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.  
 Five 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 40 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.  
**SUBSTRATE MATERIAL:** Stainless Steel  
**CONTAMINANTS:** Lubri-temp Anti-Seize lubricant

**Results:** Percent Contaminate Removed

%Cont Removed					
	Inproclean	Daraclean	2000XS	Sea-Wash	ND-17
Coupon 1	110.00	115.00	97.60	108.00	88.3.
Coupon 2	117.00	98.90	96.90	111.00	108.00
Coupon 3	95.20	113.00	89.20	107.00	110.00
Average	107.00	109.00	94.60	109.00	102.00
Std Dev	11.20	8.72	4.65	1.96	12.20

Having obtained results greater than 100% for the percent of contaminate removed for all but one chemistry, the trial method was reconsidered to determine if any damage was being done by the ultrasonic unit. Due to the substrate used and the length of time of the cleaning, the ultrasonic was ruled out as the cause of the excess cleaning. Instead of ultrasonic damage, the initial cleanliness of the coupons was thought to be the reason. The data obtained from trial two was combined with data from trial one to obtain the percent contaminate removed. The initial data from trial one was used in place of the initial weights from trial two. This data use could be done since the same coupons were used in both trials.

Using data from trial 1

% Removed	Inproclean	Daraclean	2000XS	Sea-Wash	ND-17
Coupon 1	102.00	97.90	86.40	99.20	60.30
Coupon 2	114.00	86.30	104.00	101.00	89.70
Coupon 3	88.50	103.00	71.90	92.50	95.50
Average	101.50	95.70	87.40	97.60	81.80
Std Dev	12.80	8.56	16.10	4.48	18.90

The results obtained using the initial weights from trial one and the contaminated, and clean weights from trial two yielded cleaning percentages under 100% for all but one chemistry.

**Summary:**

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<b>Substrates:</b>	Stainless Steel				
<b>Contaminants:</b>	Lubricating/Lapping Oils				
<b>Company Name:</b>	<b>Product Name:</b>	<b>Conc.:</b>	<b>Efficiency:</b>	<b>Effective:</b>	<b>Observations:</b>
US Polychem Corporation	Polychem A 2000 XS	10	94.60	<input type="checkbox"/>	
Warren Chemical Company	Sea Wash Neutral	10	109.00	<input type="checkbox"/>	
MacDermid Industrial Products	ND 17	10	102.00	<input type="checkbox"/>	
Magnaflux	Daraclean 282	10	109.00	<input type="checkbox"/>	
Oakite Products	Inproclean 3800	10	107.00	<input type="checkbox"/>	

**Conclusion:**

Having obtained questionable results using the ultrasonic unit, the trial will be rerun. The coupons will be washed first using the ultrasonic unit in water for five minutes so that any residual contaminates will be removed. Once the coupons are dried, the initial weights will be obtained. The rest of the experiment will be run the same as trial two.