CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2002
DateRun:	02/27/2002
Experimenters:	Jason Marshall
ClientType:	Electromagnetic Manufacturer
ProjectNumber:	Project #3
Substrates:	Sterling/Silver
PartType:	Part
Contaminants:	Lubricating/Lapping Oils
Cleaning Methods:	Ultrasonics
Analytical Methods:	OSEE
Purpose:	Follow up experiment based on client input

Experimental Procedure:

Four products that were moderately successful during previous trial were diluted to 5% using DI water in 600 ml beakers and heated to 140 F on a hot plate. Solutions were immersed in a Crest 25 kHz ultrasonic tank filled with water at 140 F and degassed for 5 minutes.

Five pieces of silver tape were precleaned in Oakite Inproclean 3800 for 5 minutes using the ultrasonic tank. Baseline OSEE readings were measured. Each piece of tape was thinly coated with Atofina Copperskin 510 metal working compound (CAS#s: 64742-52-5, 123-95-5, 8016-28-2, 8002-13-9) . The contaminant was applied with a hand held swab and then wiped with a second tissue to simulate the amount of contaminant present after the drawing process. A second set of readings were recorded to determine the effect of the drawing compound on the OSEE readings of the silver tape.

Each piece of tape was cleaned for 4 seconds in the ultrasonic tank, followed by a 1 second DI water rinse at 140 F also in the ultrasonic tank. Parts were dried using a Master Appliance heat gun at 500 F for 10 seconds. Final OSEE Readings were made and compared to initial baseline.

For any cleaner that does not successfully clean at 4 seconds, a follow up cleaning will be performed under the same conditions except for the cleaning time. An 8 second cleaning time will be used.

Results:

Only one product, Crystal Simple Green, was successful in cleaning the silver tape in the 4 second cleaning. All of the cleaners except the BCS product showed improvement from the two-1 second cleaning results from the previous trial. After the 8 second cleaning, all of the products except the Houghton MTC-53 were effective at removing the lubricant from the tape. The tables below show the OSEE readings for both cleaning times.

4 Second Cleaning					
Cleaner	OSEE	Reading 1	Reading 2	Reading 3	Average
	Baseline	978	992	976	982.00
BCS	Dirty	38	42	98	59.33
	Final	393	810	394	532.33
	Baseline	981	989	991	987.00
Brulin	Dirty	38	50	45	44.33
	Final	847	981	872	900.00
	Baseline	982	992	991	988.33
Houghton	Dirty	123	43	55	73.67
	Final	966	652	988	868.67
	Baseline	987	780	987	918.00
Sunshine	Dirty	26	32	51	36.33
	Final	978	978	971	975.67
	Baseline	976	978	375	776.33
Today	Dirty	39	58	36	44.33
	Final	973	697	987	885.67
8 Second Cleaning					
Cleaner	OSEE	Reading 1	Reading 2	Reading 3	Average
	Baseline	968	980	983	977.00
BCS	Dirty	56	62	30	49.33
	Final	980	982	978	980.00

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	Baseline	974	974	978	975.33
Brulin	Dirty	59	14	54	42.33
	Final	977	986	802	921.67
	Baseline	948	965	974	962.33
Houghton	Dirty	32	53	65	50.00
	Final	582	766	175	507.67
	Baseline	987	979	978	981.33
Today	Dirty	56	47	62	55.00
	Final	977	968	979	974.67

Summary:

Substrates:	Sterling/Silver				
Contaminants:	Lubricating/Lapping Oils				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
BCS Company	251 SR	5	0.00	☑	8 seconds
Brulin Corporation	Aquavantage 1400	5	0.00	☑	8 seconds
Houghton International	MTC 53	5	0.00	☐	
Simple Green	Crystal Simple Green Industrial Cleaner & Degreaser	5	0.00	☑	4 seconds
Today & Beyond	Beyond 2005	5	0.00	☑	8 seconds

Conclusion: Cleaning for 8 seconds yielded the highest number of effective products. Only one product did not show improvement with the additional cleaning.