CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1997

DateRun: 11/09/1997

Experimenters: Jason Marshall

ClientType: Manufacturer of Security Systems

ProjectNumber: Project #1

Substrates: Liquid

PartType: Coupon

Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil

Cleaning Methods:

Analytical Methods: Colorimeter, Gravimetric

Purpose: Comparison of different age baths.

Experimental Procedure: The purpose of the experiment was to compare different aged bath's cleaning capabilities and to measure absorbance and transmittance.
Part one of the experiment involved contaminating preweighed coupons with the Quaker oil, weighing, then cleaning, rinsing, drying and then finally weighing again. Contaminating was performed in the same manner as the other testing which has been performed. The coupons were then cleaned using stir bar agitation in a beaker at 130 F for two minutes. Rinsing was done with tap water at 120 F for thirty seconds in a beaker. Rinsing was followed by drying with a portable heater until the parts were completely dry. Four cleaning ages were tested: Zero month, one month, two months, and three months.

The second half of the experiment measured for the transmittance and absorbance at 530 nm using LaMotte's SMART Colorimeter for each sample. The instrument was first zeroed using DI water. Each bath sample was then measured three times. Finally measuring, the values were averaged and graphed in order to show any resulting relationships. Bath lives measured were:
zero month, one month, two months, and three months.
SUBSTRATE MATERIAL: Oakite Inproclean 1300
CONTAMINANTS: Quaker C1A US oil

Results: Similar trends to previous testing trials were determined to exist for the samples in this experiment. The third month sample did not clean as well as it had in the past. This could be do to improper preconditioning of the sample. The three month sample was collected in early August. The lab has determined that the oil that is contained in the different aged solutions tends to separate out. When the three month sample was poured into the beaker for testing in November, the sample was not shaken well enough to thoroughly mix the oil back into the cleaner. The cleaning solution collected into the beaker would have contained an uneven
distribution of the oil and this would result in lower cleaning efficiency. Despite the lower level of cleaning in the three month sample, the general decreasing trend still remained. Table 1 lists the average values for each month as well as the standard deviations.
Table 1 Average Percent Removal

Cleaner	0-M	1-M	2-M	3-M
	97.80	92.60	96.40	56.30
	91.30	94.60	97.50	0.70
	97.50	95.30	87.80	68.70
Average	95.53	94.17	93.90	41.90
Std Dev	3.67	1.40	5.31	36.21

The second part of the experiment also showed similar characteristics to previous testing trials. As the bath got older and more contaminated, the transmittance went down and the absorbance went up. Table 2 lists the results for the transmittance and absorbance of the samples.

Table 2. Transmittance and Absorbance @ 530nm

Cleaner	0-M	1-M	2-M	3-M
%T	92	82	53	37
Abs.	0.04	0.09	0.28	0.44

Summary:

Substrates:	Liquid				
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Oakite Products	Inproclean 1300	3	0.00	☑	

Conclusion: The results obtained from both parts of the experiment demonstrated similar characteristics to the previous trials performed by the lab. The cleaning capabilities and the percent transmittance of the

different ages of the cleaner generally decreased as the bath got older. The absorbance of the cleaners increased exponentially with the increased life.

In order to implement the results of the transmittance and absorbance, one vital piece of information must be determined; how clean do the parts need to be. At what level of cleanliness can the parts be sent to the next step in without causing failures in the painting? Perhaps parts that have been cleaned to varying degrees could be sent through to be painted. Then the parts can be subjected analysis to determine at what level of cleaning did the parts not pass inspection. With this endpoint, the %T and/or absorbance can be measured. During operation, when the readings approach the known endpoint, the bath can be changed.