CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1999
DateRun:	10/07/1999
Experimenters:	Jason Marshall
ClientType:	Consultant
ProjectNumber:	Project #1
Substrates:	Liquid
PartType:	Coupon
Contaminants:	Alcohol
Cleaning Methods:	
Analytical Methods:	Colorimeter
Purpose:	To measure contamination levels of cleaning solution over five days of use.

Experimental Procedure:

A 2% solution was made of Micro 90 using DI water in 400 mL beaker. Three concentrations of the contaminant, based on volume percent (5, 10 and 15), were added to separate 80 mL beakers and containing the cleaner. Using LaMotte's Smart Colorimeter to evaluate the standards using the chlorine test. The general test procedure was first to zero the instrument using 0% standard (2% Micro 90). The other standards were measured and values were recorded. The vial was rinsed in between each standard in order to ensure accurate readings. Once the standards were measured, the five unknown samples were analyzed. Using the recorded values, the data was plotted and analyzed using statistical methods available in Microsoft Excel.

Unknown concentrations were calculated from the new standards made and from the old correlation determined in a previous trial. This was done to determine if standards had to be made up every time or if one correlation could be used instead.

SUBSTRATE MATERIAL: Liquid-Dirty Cleaning Solution
CONTAMINANTS: DuPont Evanol Concentrated (Vinyl Alcohol Polymers & Copolymers CAS#s: 9002-89-5, 25213-24-5, 54626-91-4; Methanol Bulk/Packaged CAS #: 67-56-1; Sodium Acetate CAS#: 127-09-3)

Results:

The first portion of the experiment was to determine a formula which could be used to calculate the concentrations of the unknown samples. Table 1 list the standard concentrations, the readings recorded and calculated data using new and old correlations.

Table 1. Correlations

	Baseline	Calculated	x = (y-b)/m	
Evanol %	New	Trial 6	Trial 15	Trial 17
0	0	0.005	-0.001	-0.008
5	0.02	0.04	0.033	0.034
10	0.08	0.075	0.067	0.076
15	0.12	0.11	0.101	0.118
50	0.355	0.339	0.412	

Using the two formulas, the unknown concentrations were determined after rearranging the formulas to solve for the concentrations. Table 2 lists the sample date, the recorded chlorine concentrations and the three calculated contaminant concentrations. These values could also be obtained graphically as shown in Figure 1. As can be seen both from Figure 1 and Table 2, the two values obtained are relatively the same.

Table 2. Determination of Uknown Samples

Unknown Soil Loading	x = (y-b)/ m			
	Sample Data	Trial 6	Trial 15	Trial 17
29-Sep	0.2	27.86	29.56	24.76
1-Oct	0.13	17.86	19.26	16.43

The three equations developed over the various colorimeter experiments are listed in Table 3. The slopes and the y-intercepts are all relatively the same.

Table 3. Equations

Trial 6 = 0.007*x + 0.005
Trial 15 = 0.0068*x - 0.001
Trial 17 = 0.0084*x -0.008

Summary:

Substrates:	Liquid

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Contaminants:	Alcohol				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
International Products Corporation	Micro 90 Conc.	2	0.00	☐	

Conclusion: The unknown soil loading for the two samples were found using two methods. The formula method yielded a concentration of 25% for the September 29th reading and 16% for October 1st when using the correlation determined during trial 17. The graphical method yield similar numbers.