CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1998
DateRun:	04/05/1998
Experimenters:	Jason Marshall
ClientType:	Manufacturers of Precision Parts and Assemblies
ProjectNumber:	Project #2
Substrates:	Stainless Steel
PartType:	Coupon
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
Cleaning Methods:	
Analytical Methods:	Colorimeter
Purpose:	To verify concentration of oil in cleaner

Experimental Procedure:

Four different oil-cleaner mixtures were made in 100 mL beakers. Oil was added to the cleaning bath. The first solution contained 0.1mL of oil and the total volume was brought to 50 mL. The second, third, and fourth contained 0.2, 0.3 and 1.4 mL, respectively.

The M-Auto cleaning solution was used for the blank in the trial. Values were recorded for each oil-cleaner solution and an unknown sample was measured. The unknown sample was the used bath supplied by the client.

From the resultant data, an equation will be constructed to give a rough estimate of the amount of oil present in a cleaning bath.

SUBSTRATE MATERIAL: Liquid (cleaning bath, M-Auto)
CONTAMINANTS: C-Eblis oil (sulfur based)
CONTAMINATING PROCESS USED: Oil was added to cleaning bath in concentrations of 0.20, 0.40, 0.60 ppm and 2.8 ppm using a pipette.

Results:

Table 1 shows the values obtained using the cleaning solution as the blank.

Sulfide (ppm) With Blank Correction	
Expected	Measured
0	0
0.2	0.21
0.4	0.38
0.6	0.69
2.8	2.5

From this data and using the equation of a line, y = mx +b, a relationship between oil volume and sulfide readings can be made. For this trial, y-intercept, b, equals zero the slope, m, equals 0.88. Using the value obtained from the unknown for x, the volume of oil, y, can be found. The sample used for the unknown was the used cleaning bath. The bath had to be diluted because it was out of the range of the instrument. A dilution of four was used in order to obtain results.
A value of 2.89 ppm Sulfide was obtained from the cleaning bath. Using the above equation and substituting in the specified numbers gives the following results.
y = 0.88*2.89 + 0 = 2.54.

This number must then be corrected for the dilution of the bath used.
2.54 * 4 = 10.2 = y

Therefore, there was 10.2 milliliters of oil in 100 milliliters of cleaning solution.
Another method to quickly determine the volume of oil in the cleaner would be graph the relationship between sulfide readings and actual volume of oil. Figure 1 can be used in this way.

To use the graph, sulfide measurements need to be made using LeMott's Smart Colorimeter. Find the value on the y-axis, follow across until the line is intersected. From the intersection point, follow down to the x-axis to record the amount of oil in the bath.

Summary:

Conclusion:

There are two ways the data can be used to determine the amount of oil in the cleaning bath; one is by determining an equation using data points of known volume amounts and the second is to construct a graph with the same points. New standards (samples with known amounts of oil) should be made each time a bath is to be sampled. Ideally the volume of oil should equal the sulfide reading. If this were the case, no equation or graph would be needed. The sulfide reading would equal the volume of oil in the cleaning bath.