

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2000  
 DateRun: 08/15/2000  
 Experimenters: Jason Marshall  
 ClientType: General  
 ProjectNumber: Project #1  
 Substrates: Plastic  
 PartType: Part  
 Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Dirt, Oil  
 Cleaning Methods:  
 Analytical Methods: Gravimetric, Visual, microscopic  
 Purpose: To conduct a comparative test based on client input for gravimetric analysis to determine weight of contaminant on supplied parts.  
 Experimental Procedure: Thirty samples that were cleaned in isopropanol (from previous trial) were weighed on a Denver Instrument Co, model A-250 Analytical Balance to establish a baseline level of cleanliness. The average weight of the clean parts was calculated and recorded. Following the weighing of the baseline parts, the uncleaned parts were then weighed (27) and the average value was recorded as well. The two average weights were then compared to each other to determine any correlation between the two weights.  
 SUBSTRATE MATERIAL: Polyimide (plastic)  
 CONTAMINANTS: oil, dirt

Results: The baseline weight was calculated from the 30 samples evaluated during the previous trial. The weight was found to be 1.9956 grams. The second set of parts were taken directly from the packing container and weighed on the balance. The average weight for the dirty parts was determined to be lower than the baseline clean samples. The weight was 1.9910 grams. The recorded individual weights and the calculated averages are found in Table 1.

Table 1. Weight Comparison of Supplied Samples

Alcohol soaked	As Received
1.9813	2.0188
2.0112	2.0179
2.0045	2.0165
1.9762	1.9852
1.9677	2.0146
1.9713	1.976
2.0205	1.9804
2.0231	1.9842
1.9697	1.9768
1.9755	1.9607
1.9959	1.9982
1.9674	2.0126
1.9942	2.0193
2.0314	1.9678
2.0222	1.9667
1.9916	1.9843
1.9723	2.0125
2.0299	2.0098
1.9887	1.9919
2.0006	1.9629
2.0173	1.9913
1.9686	2.001
1.9848	2.0194
1.994	1.964
2.0243	1.978
2.0213	1.9813
1.9902	1.9649

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	1.9829	
	1.9968	
	1.993	
	Alcohol soaked	As Received
Ave	1.9956	1.991

The intent of the evaluation was to show that the manufactured parts could be weighed after being cleaned and compared to the established Cleanliness Class weight determined during the previous trial. If the weight of the dirty parts were within a set range, the parts could then be assigned to the Cleanliness Class. However, since the weight of the dirty parts was less than the clean parts, no such relationship could be concluded.

Even though the clean parts weighed more than the dirty parts, the clean parts did look visually cleaner than the second set of samples. There were dust particles that could be seen on the dirty parts. Since the proposed standard supplied by the client specifies that filter membranes (from previous trial) be observed under a microscope to determine the size of particles collected, it could be possible to measure the particles directly on the parts.

Summary:

Conclusion:

Direct measurement of the supplied parts could not be performed using gravimetric analysis. The variation in part weights proved to negate the differences between cleaned and dirty parts. Upon visual inspection, it was determined that a direct measurement could be made using a microscope equipped with a calibrated grid, perhaps eliminating the need to rinse the parts in the solvent and collecting the particles on a filter. (Lab currently does not have calibrated grid but is on back order.)