CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2024
DateRun:	08/14/2024
Experimenters:	Amelia Wagner, Nasser Anise
ClientType:	Manufactures parts for Semi-Conductor Industry
ProjectNumber:	Project #2
Substrates:	Stainless Steel
PartType:	Coupon
Contaminants:	Buffing/Polishing Compounds, Lubricating/Lapping Oils, Oil
Cleaning Methods:	Ultrasonics
Analytical Methods:	Gravimetric
Purpose:	To evaluate the effectiveness of aqueous cleaners in removing mineral oil, buffing compound, and machining coolant from stainless steel.

Experimental Procedure:

Three stainless steel coupons were used for each soil per cleaner, for a total of eighteen coupons. The coupons had their initial weights recorded and their initial fluorescence levels recorded in order to have a baseline for cleanliness. Each coupon was then soiled with the correct soil type. The coolant and mineral oil were applied to the bottom third of the coupons by using a swab. The buffing compound was applied by heating the coupon with a heat gun and rubbing the buffing compound on the coupons, allowing the heat to melt and adhere the buffing compound to the metal. The dirty weights and fluorescence levels of each coupon were then recorded. Each coupon was then subjected to 15 minutes of heated ultrasonics at 120F in their respective cleaners. After removal from the ultrasonics machine, the coupons were allowed to air dry for three hours before having their clean weights and fluorescence recorded.

Unwanted, filmic contamination such as oils, greases, cooling lubricants and release agents are measured by determining the fluorescence intensity. Percent detergency demonstrates the amount of restoration to the original that has occurred after the cleaning test has been performed. A higher average percent detergency indicates that the cleaner has been effective and has restored the dirty substrate and cleaned it so that it now is much closer to how it originally was measured.

Cleanospector data can be calculated as percent detergency in the following equation:
% DET = R(cleaned) - R(soiled) / R(unsoiled) - R(soiled) X 100

Results:

Gravimetric

Cleaner	Soil	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG	% Overall
BG Clean 402 10%	Coolant	0.0091	0.0015	83.5	83.2	88.5
		0.0059	0.0015	74.6		
		0.0250	0.0021	91.6		
	Dlyte Mineral oil	0.0335	0.0018	94.6	97.0	
		0.0724	0.0022	97.0		
		0.2217	0.0014	99.4		
	Buffing Compound	0.0161	0.0027	83.2	85.4	
		0.0125	0.0022	82.4		
		0.0303	0.0029	90.4		
Micro 90 2%	Coolant	0.0448	0.0010	97.8	94.6	93.5
		0.0182	0.0008	95.6		
		0.0095	0.0009	90.5		
	Dlyte Mineral oil	0.1825	0.0017	99.1	97.6	
		0.0684	0.0016	97.7		
		0.1134	0.0045	96.0		
	Buffing Compound	0.0031	0.0007	77.4	88.4	
		0.0086	0.0009	89.5		
		0.0582	0.0010	98.3		

Cleanospectr

Cleaner	Soil	Initial RFU	Dirty RFU	Clean RFU	% DET	%AVG	% Overall
BG Clean 402 10%	Coolant	8.2	2775.4	11.1	99.9	100.0	97.0

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		6.2	2695	6.2	100		
		5	2698	5	100		
	Dlyte Mineral oil	4.7	161.9	4.9	99.9	100.1	
		6.8	236.9	6.8	100		
		5.9	536.2	4.3	100.3		
	Buffing Compound	6	15.9	8	79.8	91.1	
		4.8	21.7	5.3	97		
		5	27.4	5.8	96.4		
Micro 90 2%	Coolant	5.8	2188.6	7.7	99.9	100.0	86.4
		9.1	2629	9.6	100		
		6.3	2718	6.4	100		
	Dlyte Mineral oil	9.1	850.3	8.2	100.1	98.3	
		7	29.6	8.2	94.7		
		6.4	309.2	6.3	100		
	Buffing Compound	5.6	11	8.5	46.3	61.0	
		5.6	10.9	6.5	83		
		25.1	51.8	37.5	53.6		

Summary:

Substrates:	Stainless Steel
Contaminants:	Buffing/Polishing Compounds, Lubricating/Lapping Oils, Oil

Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
International Products Corporation	Micro 90 Conc.	2%	93.50	☑	Mineral oil: 97.6% efficiency
Amiran BioChemicals	BG-Clean 402	10%	88.50	☑	Mineral Oil: 97% efficiency

Conclusion:

Both the BG Clean 402 10% and the Micro 90 2% were highly effective and consistent in removing mineral oil, the soil that has been the most trouble to remove. Additionally, the micro 90 2% was also successful in removing the coolant as well. Both cleaners were somewhat effective in removing the buffing compound, but did not perform consistently.