CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2019
DateRun:	07/30/2019
Experimenters:	Sabrina Apel, Othon Pagounes
ClientType:	Medical Instrument Mfr
ProjectNumber:	Project #1
Substrates:	Titanium
PartType:	Coupon
Contaminants:	Lubricating/Lapping Oils, Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric, Visual
Purpose:	To evaluate cleaners on their effectiveness at the removal of J2 oil using unheated immersion on titanium substrates.
Experimental Procedure:	Seven sets of three pre-weighted titanium coupons were soiled with J2 oil using a cotton swab. Each set of coupons were immersed into an unheated cleaner (Dowanol PnBGE, Soy Clear 1500, Metalnox 6386, Dimethyl glutarate, Liquinox, OzzyJuice 3, and SC Aircraft & Metal Cleaner) for 15 minutes, and visual observations were documented every five minutes. After 15 minutes, final weights were measured and efficiency was calculated for each coupon cleaned.

Results:

Table 1**:** Gravimetric Results

Cleaner	Initial wt of cont.	Final wt of cont.	%Cont Removed	% Average
Dowanol PnBGE	2.3635	1.0984	53.53	56.61
	2.7763	1.3148	52.64	
	4.0123	1.4578	63.67	
Soy Clear 1500	2.3553	1.2869	45.36	52.75
	3.1621	1.3708	56.65	
	2.6382	1.1544	56.24	
Metalnox 6386	3.4302	1.0736	68.70	66.51
	3.1384	1.0559	66.36	
	3.2967	1.1709	64.48	
Dimethyl glutarate	2.8027	1.4393	48.65	53.01
	3.5973	1.6444	54.29	
	3.9187	1.7207	56.09	
Liquinox	5.2695	2.4110	54.25	54.72
	3.7718	1.7665	53.17	
	4.1863	1.8102	56.76	
Ozzy Juice 3	3.9874	1.8623	53.30	52.75
	4.0668	1.8803	53.76	
	3.3955	1.6576	51.18	
SC Aircraft & Metal Cleaner	3.7579	1.9410	48.35	43.37
	2.8469	1.6857	40.79	
	3.1180	1.8403	40.98	

Table 2: Visual Observations

Cleaner	5 minutes	10 minutes	15 minutes

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Dowanol PnBGE	- cleaner is clear -soil is highly viscous - some soil remained on coupon and settled to bottom	-no change in cleaner -visually observed that 50% of the soil remained on coupons, and the other 50% settled to bottom	-about half of soil remained in bottom of cleaner -about half of soil remained on coupons
Soy Clear 1500	- cleaner is clear -soil is highly viscous - some soil remained on coupon and settled to bottom	-no change in cleaner -visually observed that 50% of the soil remained on coupons, and the other 50% settled to bottom	-about half of soil remained in bottom of cleaner -about half of soil remained on coupons
Metalnox 6386	- cleaner is clear -soil is highly viscous - some soil remained on coupon and settled to bottom	-no change in cleaner -visually observed that 50% of the soil remained on coupons, and the other 50% settled to bottom	-about half of soil remained in bottom of cleaner -about half of soil remained on coupons
Dimethyl glutarate	- cleaner is clear -soil is highly viscous - some soil remained on coupon and settled to bottom	-no change in cleaner -visually observed that 50% of the soil remained on coupons, and the other 50% settled to bottom	-about half of soil remained in bottom of cleaner -about half of soil remained on coupons
Liquinox	- cleaner is clear with bubbles - soil is highly viscous - some soil remained on coupon and settled to bottom	-no change in cleaner -visually observed that 50% of the soil remained on coupons, and the other 50% settled to bottom	-about half of soil remained in bottom of cleaner -about half of soil remained on coupons
Ozzy Juice 3	- cleaner is cloudy - soil is highly viscous - some soil remained on coupon	-no change in cleaner -visually observed that 50% of the soil remained on coupons, and the other	-about half of soil remained in bottom of cleaner -about half of soil remained

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	and settled to bottom	50% settled to bottom	on coupons
SC Aircraft & Metal Cleaner	- cleaner is an orangeish color - soil is highly viscous - some soil remained on coupon and settled to bottom	-no change in cleaner -visually observed that majority of the soil remained on coupons, and the remaining soil settled to bottom	-minimal soil remained in beaker -majority of the soil remained on coupons

Summary:

Substrates:	Titanium				
Contaminants:	Lubricating/Lapping Oils, Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Dow Chemical Company	Dowanol PnBGE	100%	56.61	☐	
AG Environmental Products	Soy Clear 1500	100%	52.75	☐	
Kyzen Corporation	Metalnox M6386	100%	66.51	☐	
Fisher Scientific	Dimethyl glutarate (CAS: 1119-40-0)	100%	53.01	☐	
Alconox Inc	Liquinox	1%	54.72	☐	
Chem Free Corporation	SW-3 Ozzy Juice (Improved Low Odor)	100%	52.75	☐	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	1%	43.37	☐	

Conclusion:

Metalnox 6386, Dowanol PnBGE, and Liquinox were the most effective at removing J2 soil from titanium substrates using unheated immersion. The next step will be to evaluate which cleaners can be heated and perform a heated immersion using the same time and concentration.