CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2023
DateRun:	04/26/2023
Experimenters:	Amelia Wagner, Siddhant Trivedi
ClientType:	Lab
ProjectNumber:	Project #8
Substrates:	Stainless Steel
PartType:	Coupon
Contaminants:	Greases, Lubricating/Lapping Oils, Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To evaluate the effectiveness of SB-33 (a D limonene and Dimethyl Glutarate mixture) and SB-10 (a t-butyl acetate and Benzyl benzoate mixture) in removing several production oils and greases from stainless steel coupons as a potential replacement for TCE unheated immersion cleaning method.
Experimental Procedure:	Three stainless steel coupons were used for each of the five soils being tested for a total of 15 coupons. The initial weights of each coupon were recorded. The bottom third of every coupon was soiled by applying the corresponding soil with a swab. The dirty weights of each coupon were then recorded. The coupons were then subjected heated immersion in SB-33 and SB-10 with the stir bar at 200rpm for 15 mins at 130F. After the coupons were cleaned, they dried with a heat gun for about 2 minutes each. The next morning, the clean weights of each coupon were taken

Soil	Use	CAS
Milform OAK 7a International	Stamping and drawing fluid	64742-53-6 / 68909-65-9
M4		
Milform Oak 15c	Metalworking oil	64742-52-5 / 64742-53-6
Milform Oak 15a	Metalworking oil	64742-44-5 / 64742-52-5 / 64742-55-8
Milform Oak 529	Evaporative lubricant	68551-17-7 / 123-95-5 / 127087-87-0

Results:

Cleaner	Soil	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG	% Overall
SB-33	Oak 7a international	0.0390	0.0013	96.67	93.49	84.64
		0.0876	0.0107	87.79		
		0.0677	0.0027	96.01		
	M4	0.3285	0.0090	97.26	98.29	
		0.2656	0.0027	98.98		
		0.4822	0.0066	98.63		
	Oak 15c	0.0467	0.0019	95.93	97.40	
		0.1117	0.0016	98.57		
		0.1748	0.0040	97.71		
	Oak 15a	0.0890	0.0014	98.43	98.27	
		0.1177	0.0010	99.15		
		0.1116	0.0031	97.22		
	Oak 529	0.0071	0.0043	39.44	34.81	
		0.0059	0.0035	40.68		
		0.0037	0.0028	24.32		
SB-10	Oak 7a international	0.0424	0.0063	85.14	94.45	93.47
		0.0804	0.0011	98.63		
		0.0699	0.0003	99.57		
	M4	0.3605	0.0006	99.83	98.63	
		0.2962	0.0022	99.26		
		0.3696	0.0118	96.81		
	Oak 15c	0.0721	0.0069	90.43	87.30	

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		0.1227	0.0162	86.80		
		0.1155	0.0177	84.68		
	Oak 15a	0.1725	0.0085	95.07	94.56	
		0.1763	0.0106	93.99		
		0.1891	0.0102	94.61		
	Oak 529	0.0090	0.0006	93.33	91.41	
		0.0076	0.0012	84.21		
		0.0303	0.0010	96.70		

Summary:

Substrates:	Stainless Steel
Contaminants:	Greases, Lubricating/Lapping Oils, Oil

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
TURI Cleaning lab	SB-33	100%	94.00	☑	on soil Oak 7 A
TURI Cleaning lab	SB-33	100%	98.00	☑	on soil M4
TURI Cleaning lab	SB-33	100	97.00	☑	on soil Oak 15 C
TURI Cleaning lab	SB-33	100	98.00	☑	on soil Oak 15A
TURI Cleaning lab	SB-33	100	93.00	☑	on soil Oak 529
TURI Cleaning lab	SB-10	100	94.00	☑	on soil Oak 7 A
TURI Cleaning lab	SB-10	100	98.00	☑	on soil M4
TURI Cleaning lab	SB-10	100	87.00	☑	on soil Oak 15 C
TURI Cleaning lab	SB-10	100	95.00	☑	on soil Oak 15 A
TURI Cleaning lab	SB-10	100	91.00	☑	on soil Oak 529

Conclusion:

SB-33 is an effective alternative to TCE in removing all soils except for M4 using heated immersion. SB-10 is an effective alternative to TCE in removing all soils using heated immersion