CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2023
DateRun:	04/19/2023
Experimenters:	Amelia Wagner
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 unheated immersion in SB-33 and SB-10 with the stir bar at 200rpm for 15 mins. 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
Milform Oak 529	Evaporative lubricant	68551-17-7 / 123-95-5 / 127087-87-0
Milform Oak 15a	Metalworking oil	64742-44-5 / 64742-52-5 / 64742-55-8
Milform Oak 15c	Metalworking oil	64742-52-5 / 64742-53-6
M4		

Results:

Cleaner	Soil	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG	% Overall
SB-33	Oak 7a international	0.0716	0.0041	94.27	86.83	83.01
		0.0736	0.0049	93.34		
		0.1441	0.0391	72.87		
	M4	0.5475	0.0036	99.34	99.15	
		0.4997	0.0000	100.00		
		0.4923	0.0093	98.11		
	Oak 15c	0.0693	0.0248	64.21	86.85	
		0.1046	0.0027	97.42		
		0.1296	0.0014	98.92		
	Oak 15a	0.2135	0.0038	98.22	97.85	
		0.1782	0.0057	96.80		
		0.1484	0.0022	98.52		
	Oak 529	0.0047	0.0027	42.55	44.38	
		0.0213	0.0128	39.91		
		0.0144	0.0071	50.69		
SB-10	Oak 7a international	0.1011	0.0961	4.95	9.41	34.83
		0.1007	0.0981	2.58		
		0.1044	0.0828	20.69		

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	M4	0.4988	0.1493	70.07	79.38
		0.6742	0.1689	74.95	
		0.4094	0.0281	93.14	
	Oak 15c	0.0991	0.0974	1.72	22.60
		0.1588	0.1070	32.62	
		0.1446	0.0962	33.47	
	Oak 15a	0.1992	0.0927	53.46	43.72
		0.1788	0.1127	36.97	
		0.1505	0.0892	40.73	
	Oak 529	0.0287	0.0187	34.84	19.05
		0.0314	0.0258	17.83	
		0.0269	0.0257	4.46	

Summary:

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

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
TURI Cleaning lab	SB-33	100%	87.00	☑	on soil Oak 7A
TURI Cleaning lab	SB-33	100%	99.00	☑	on soil M4
TURI Cleaning lab	SB-33	100	87.00	☑	on soil Oak 15 C
TURI Cleaning lab	SB-33	100	98.00	☑	on soil Oak 15 A
TURI Cleaning lab	SB-33	100	44.00	☐	on soil Oak 529
TURI Cleaning lab	SB-10	100	9.00	☐	on soil Oak 7A
TURI Cleaning lab	SB-10	100	79.00	☐	on soil M4
TURI Cleaning lab	SB-10	100	23.00	☐	on soil Oak 15 C
TURI Cleaning lab	SB-10	100	44.00	☐	on Oak 15 A
TURI Cleaning lab	SB-10	100	19.00	☐	on soil Oak 529

Conclusion:

SB-33 is an effective alternative to TCE in removing all of the soils except for Oak 529 using unheated immersion. SB-10 is not an effective cleaner in removing any of the soils, except for M4, using unheated immersion.