

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2018  
 DateRun: 02/19/2018  
 Experimenters: Hayley Byra  
 ClientType: General  
 ProjectNumber: Project #2  
 Substrates: Copper  
 PartType: Coupon  
 Contaminants: Lubricating/Lapping Oils  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric, Visual  
 Purpose: To evaluate the effectiveness of four TCE aqueous alternatives at removing lubricating oils from copper alloys.

Experimental Procedure: Nine copper coupons were tested for each cleaner. Initial weights were recorded, and three coupons were soiled for each contaminant using a handheld swab to cover the bottom third of the substrate. The coupons were then immersed, three at a time, in a beaker with 250ml of the chosen diluted cleaner at room temperature (68 F) for ten minutes. Visual observations were taken during this time, and final weights were recorded after cleaning. This process was repeated for each cleaner on all three contaminants.

Cleaner	Soil	Initial wt	Final wt	%Removed	Avg %Removed	Overall % Removed	
Shopmaster	Oak 15A	0.0333	0.03323	0.30	1.56	8.19	
		-0.0262	-0.0269	2.67			
			0.0142	0.0132	7.04		
	Oak 941A	0.0731	0.0505	30.92	15.43		
		0.0478	0.0412	13.81			
			0.0254	0.0250	1.57		
	M4	0.0790	0.0750	5.06	7.58		
		0.1323	0.1107	16.33			
		0.0660	0.0651	1.36			
Solution 2000	Oak 15A	0.0689	0.0698	-1.31	-11.03	-2.50	
		0.0359	0.0414	-15.32			
		0.0255	0.0297	-16.47			
	Oak 941A	-0.4644	-0.4668	-0.52	3.19		
		0.0295	0.0270	8.47			
			0.0310	0.0305	1.61		
	M4	0.2118	0.2134	-0.76	0.33		
		0.1250	0.1025	0.00			
			0.1258	0.1236	1.75		
	SC Aircraft	Oak 15A	0.0539	0.0495	8.16	4.02	2.69
0.0365			0.0340	6.85			
0.0374			0.0385	-2.94			
Oak Draw 941-A		0.0395	0.0334	15.44	9.09		
		0.0474	0.0467	1.48			
			0.0416	0.0373	10.34		
M4		0.0406	0.0470	15.76	-5.04		
		0.1497	0.1503	-0.40			
		0.0860	0.0851	1.05			
Amberclean 527 L	Oak 15A	0.0261	0.0261	0.00	-2.15	2.95	

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		0.0448	0.0434	3.13		
		0.0292	0.0320	-9.59		
	Oak	0.0682	0.6630	2.79	10.52	
	Draw	0.0568	0.0521	8.27		
	941-A	0.0654	0.0520	20.49		
	M4	0.1237	0.1251	1.13	0.48	
		0.0780	0.0779	0.13		
		0.0489	0.0477	2.45		

Summary:

<b>Substrates:</b>	Copper				
<b>Contaminants:</b>	Lubricating/Lapping Oils				
<b>Company Name:</b>	<b>Product Name:</b>	<b>Conc.:</b>	<b>Efficiency:</b>	<b>Effective:</b>	<b>Observations:</b>
Buckeye International	Shopmaster		8.19	<input type="checkbox"/>	
EnviroSan Products Ltd	Solution 2000		-2.50	<input type="checkbox"/>	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate		2.69	<input type="checkbox"/>	
Innovative Organics Inc	Amberclean 527 L		2.95	<input type="checkbox"/>	

Conclusion: