CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2017
DateRun:	02/22/2017
Experimenters:	Nicholas Landberg, Carla De La Cruz, James Keats, Dan Aspach, Alec Golas
ClientType:	Capacitor Manufacturer
ProjectNumber:	Project #3
Substrates:	Aluminum
PartType:	Coupon
Contaminants:	Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To find the effectivity of a set of cleaners against various oils on an aluminum surface.
Experimental Procedure:	Aluminum coupons were selected and arranged into sets of three for each cleaner. The substrates were wiped off with Kimwipes and initial weights were taken. Then the coupons were soiled with the respective oil and allowed to air dry for one hour before taking dirty weights. The coupons were cleaned by immersion in the cleaners at 49°C or 120°F. The coupons were allowed 15 minutes for lighter oils and 30 minutes for the epoxidized soybean oil, inspecting them every 10 minutes. Coupons were taken out once cleaning was complete and rinsed in a bath of water, to later be blown off with pressurized air for 5 minutes. After allowing the coupons to dry about five minutes, clean weights were taken.
Results:	The MacDermid Adherite cleaner was not effectively compatible with the aluminum coupons and seemed to deteriorate the substrate, darkening the surface as shown in Figure 1. This was the reason for the percentages being over 100% for the Nisseki soil. The same effect was observed on at least three of the four oils. No reaction was observed with canola oil. It proved difficult to clean silicone and epoxidized soybean oil, because a lot of residue was left on the coupons. Blow off with pressurized air did very little except spread the oil along the surface.

MacDermid Clepo Adherite 590					
Products	Initial Wt	Final Wt	% Removal	Soil Ave	Overall Ave
Nisseki SAS 601E					
	0.0561	-0.0039	106.95	103.52	92.25
	0.0955	-0.0029	103.04		
	0.1542	-0.0009	100.58		
Silicone Fluid					
	0.0673	0.0055	91.83	93.36	
	0.1253	0.0079	93.7		
	0.1211	0.0066	94.55		
Canola Oil					
	0.1143	0.0145	87.31	84.9	
	0.1173	0.0152	87.04		
	0.1795	0.0353	80.33		
Epoxidized Soybean Oil					
	0.0736	0.0026	96.47	87.21	
	0.0565	0.0146	74.16		
	0.1499	0.0135	90.99		
Brulin Aquavantage 1400					
Nisseki SAS 601E					
	0.1514	0.0073	95.18	93.17	82.17
	0.0795	0.0081	89.81		
	0.064	0.0035	94.53		
Silicone Fluid					
	0.1272	0.0104	91.82	94.6	
	0.0957	0.0028	97.07		
	0.1587	0.0081	94.9		
Canola Oil					
	0.1681	0.0394	76.56	79.03	

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	0.1371	0.0112	91.83		
	0.1256	0.0393	68.71		
Epoxidized Soybean Oil					
	0.1334	0.0425	68.14	61.87	
	0.0957	0.0456	52.35		
	0.1465	0.0511	65.12		
Chemetall Inproclean 3800					
Nisseki SAS 601E					
	0.1124	0.0021	98.13	98.65	87.68
	0.1546	0.0017	98.9		
	0.1196	0.0013	98.91		
Silicone Fluid					
	0.0691	0.0031	95.51	97.38	
	0.1346	0.0028	97.92		
	0.146	0.0019	98.7		
Canola Oil					
	0.1707	0.0078	95.43	91.71	
	0.2622	0.0236	91		
	0.223	0.0252	88.7		
Epoxidized Soybean Oil					
	0.1404	0.0197	85.97	62.99	
	0.1611	0.0758	52.95		
	0.0887	0.0443	50.06		
Bio Circle Aero					
Nisseki SAS 601E					
	0.0626	0.0033	94.73	95.81	78.88
	0.1311	0.005	96.19		
	0.1205	0.0042	96.51		
Silicone Fluid					
	0.1287	0.0097	92.46	84.5	
	0.0864	0.0126	85.42		
	0.0824	0.0201	75.61		
Canola Oil					
	0.227	0.0457	79.87	78.72	
	0.1153	0.02	82.65		
	0.1487	0.0392	73.64		
Epoxidized Soybean Oil					
	0.1621	0.0437	73.04	56.51	
	0.0628	0.0348	44.59		
	0.1148	0.0552	51.92		
Gemtek SC Aircraft					
Nisseki SAS 601E					
	0.1118	0.0455	59.3	74.77	82.18
	0.0578	0.0153	73.53		
	0.1479	0.0126	91.48		
Silicone Fluid					
	0.1928	0.0029	98.5	98.78	
	0.6433	0.0041	99.36		
	0.1705	0.0026	98.48		
Canola Oil					
	0.2955	0.0453	84.67	88.94	
	0.3296	0.0155	95.3		
	0.1278	0.0168	86.85		
Epoxidized Soybean Oil					
	0.075	0.0445	40.67	66.22	
	0.2514	0.0069	97.26		
	0.2043	0.0802	60.74		
Polychem Polyspray Jet 790P					

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Nisseki SAS 601E					
	0.0535	0.005	90.65	92.98	92.05
	0.0496	0.003	93.95		
	0.0599	0.0034	94.32		
Silicone Fluid					
	0.646	0.0246	96.19	95.51	
	0.2296	0.0187	91.86		
	0.97	0.0146	98.49		
Canola Oil					
	0.2574	0.0108	95.8	95.74	
	0.2528	0.0136	94.62		
	0.9234	0.0295	96.81		
Epoxidized Soybean Oil					
	0.1297	0.017	86.89	83.98	
	0.2173	0.0328	84.91		
	0.2051	0.0407	80.16		
MacDermid Keykote 84					
Nisseki SAS 601E					
	0.0791	0.0067	91.53	92.57	87.3
	0.0575	0.0044	92.35		
	0.0987	0.0061	93.82		
Silicone Fluid					
	0.4979	0.0152	96.95	81.58	
	0.4549	-0.1142	125.1		
	0.1687	0.1304	22.7		
Canola Oil					
	0.1838	0.0214	88.36	88.13	
	0.1873	0.0205	89.05		
	0.1553	0.0202	86.99		
Epoxidized Soybean Oil					
	0.1873	0.0179	90.44	86.92	
	0.109	0.0115	89.45		
	0.1386	0.0265	80.88		

Summary:

Substrates:	Aluminum				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Fisher Scientific	Absolute Ethanol	0	0.00	☐	
MacDermid Industrial Products	Clepo Adherite 590	5	92.25	☐	caused damage to coupons
Brulin Corporation	Aquavantage 1400	5	82.17	☑	
Oakite Products	Inproclean 3800	5	87.68	☑	
J Walter Inc.	Bio Circle Aero	5	78.88	☐	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	5	82.18	☑	
US Polychem Corporation	Polyspray Jet 790 P	5	92.05	☑	
MacDermid Industrial Products	Keykote 84	5	87.30	☑	

Conclusion:

The best cleaner was likely Polychem's Polyspray Jet 790P as it performed consistently across all soils. The next best cleaners were Chemetall Inproclean 3800 and MacDermid Keykote 84, respectively.