CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2003

DateRun: 06/01/2003

Experimenters: Jason Marshall

ClientType: Medical Instrument Mfr

ProjectNumber: Project #1

Substrates: Copper, Nickel

PartType: Coupon

Contaminants: Carbon Deposits, Lubricating/Lapping Oils

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To identify cleaning solutions for removing dry lubricant from nickel surfaces

Experimental Procedure: Eight products were selected from the laboratory's databases based on client supplied information. Seven of the eight were diluted to 5% and the eighth was diluted to 20%. All were diluted with DI water in 600 ml beakers. Solutions were heated to 125 F on a hot plate. Twenty-four preweighed coupons were coated with the Metalube Corp ML-119.2 dry lubricant (Molybdenum disulfide, graphite, silicates) using a hand held swab. Coupons were allowed to sit for 30 minutes and weighed again to determine the amount of lubricant applied. Three coupons were cleaned in each solution for five minutes using stir-bar agitation. Coupons were rinsed for 15 seconds in tap water at 120 F and dried using a Master Appliance Heat Gun for 30 seconds at 500 F. The coupons were then allowed to cool to room temperature and weighed a final time. Efficiencies were calculated for each product.

Results: A couple of the cleaners removed over 60% of the lubricant using immersion cleaning. A third product removed over 55%. The other five products removed less the 48%. The table below shows the amount of soil added and removed for each coupon cleaned.

Cleaner	Initial wt	Final wt	% Removed
Formula 815 GD	0.0300	0.0087	71.00
	0.0303	0.0097	67.99
	0.0589	0.0177	69.95
Solution 2000	0.0234	0.0158	32.48
	0.0143	0.0088	38.46
	0.0313	0.0076	75.72
SC Aircraft	0.0210	0.012	42.86
	0.0431	0.0114	73.55
	0.0167	0.0084	49.70
Daraclean 212	0.0249	0.0161	35.34
	0.0311	0.0243	21.86
	0.0179	0.0071	60.34
California Parts Washer	0.0143	0.0084	41.26
	0.0238	0.007	70.59
	0.0139	0.0098	29.50
Luminox	0.0582	0.0340	41.58
	0.0422	0.0233	44.79
	0.0096	0.0088	8.33
Polyspray Jet 790 P	0.0142	0.0054	61.97
	0.0199	0.0072	63.82
	0.0123	0.0042	65.85
Biosolve	0.0076	0.0045	40.79
	0.0227	0.0142	37.44
	0.0087	0.0066	24.14

Summary:

Substrates:	Copper, Nickel				
Contaminants:	Carbon Deposits, Lubricating/Lapping Oils				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**

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Brulin Corporation	Formula 815 GD	5	69.65	☑	
EnviroSan Products Ltd	Solution 2000	5	48.89	☐	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	5	55.37	☐	
Magnaflux	Daraclean 212	5	39.18	☐	
Phase III Inc	California Parts Washer Solution	20	47.11	☐	
Alconox Inc	Luminox	5	31.57	☐	
US Polychem Corporation	Polyspray Jet 790 P	5	63.88	☑	
Westford Chemical Corporation	Biosolve	5	34.12	☐	

Conclusion: Immersion cleaning had little effect on the dry lubricant. Ultrasonic energy will be attempted next with the most effective products. Additional products will also be selected for testing.