CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2013
DateRun:	12/09/2013
Experimenters:	Jason Marshall, Junhee Cho, Loc Nguyen
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Stainless Steel
PartType:	Coupon
Contaminants:	Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To evaluate the efficiency of three cleaners on GS 34 Soil-1 from stainless steel coupons using immersion technique.
Experimental Procedure:	Two sets of stainless-steel coupons were weighed. Both sets were soiled with GS 34 Soil-1. The oil mix was applied at the loading of ~100mg. The soiled coupons were oven dried for 30 minutes with 40 °C. Dirty weights were recorded for all of the coupons. The nClean product was 6 oz/gal (4.7%), the Multipurpose Fury 14oz/gal (11%) and the Krud Kutter at the supplied ready to use concentration. Three coupons were placed in a Gardner Straightline Washability unit and spray with a cleaning solution and allowed to soak for 20 minutes. After soaking, the unit was run for 20 cycles (33 seconds) followed by a quick spray rinse using tap water at room temperature. Final weights were recorded the following day. Efficiencies were calculated and recorded. In addition to the manually wiped coupons, two sets of coupons were sprayed with the cleaners. The first batch was allowed to sit for 20 seconds and another for 20 minutes. No wiping was used, and the coupons were only rinsed with tap water. Final weights were recorded the following day. Efficiencies were calculated and recorded. Soil 1: Maintenance soil = 10 grams of carbon black, 10 grams iron oxide, 100 ml WD-40, 100 ml hydraulic oil, 100 ml gear oil.
Results:	The manual wiping of the maintenance soil was effectively removed with each of the three products. The nClean had the highest removal under these conditions. During the apply and rinse clean all three products had little removal when the soak time was under 30 seconds. However, when allowing the products to soak for 20 minutes, results were improved. The products performed in a similar manner to the manual wiping with nClean having the highest soil removal at 88.55%. These two tests were to help determine if the force of the water rinse was removing the soil or if the cleaning product was responsible for cleaning.

Cleaner	Initial wt	Final wt	% Removed
nClean - wipe			
	0.0931	0.0014	98.50
	0.0597	0.0008	98.66
	0.0970	0.0027	97.22
Multiclean Fury - wipe			
	0.0783	0.0010	98.72
	0.2000	0.0008	99.60
	0.0778	0.0056	92.80
Krud Kutter - wipe			
	0.1600	0.0033	97.94
	0.0800	0.0062	92.25
	0.1361	0.0042	96.91
nClean - no wipe no soak			
	0.2121	0.0759	64.21
	0.0535	0.0382	28.60
	0.0882	0.0548	37.87
Multiclean Fury - no wipe no soak			
	0.1167	0.0611	47.64
	0.0959	0.0474	50.57

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	0.0742	0.0452	39.08
Krud Kutter - no wipe no soak			
	0.2744	0.1121	59.15
	0.2717	0.1675	38.35
	0.1080	0.0768	28.89
nClean - no wipe 20 soak			
	0.1168	0.0178	84.76
	0.1164	0.0124	89.35
	0.1171	0.0099	91.55
Multiclean Fury - no wipe and 20 soak			
	0.1150	0.0096	91.65
	0.1531	0.0345	77.47
	0.1179	0.0117	90.08
Krud Kutter - no wipe and 20 soak			
	0.1786	0.0545	69.48
	0.1164	0.0430	63.06
	0.1402	0.0492	64.91

Summary:

Substrates:	Stainless Steel				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Geophia	nClean	4.7	98.12	☑	
Tower Products Inc	Multi clean Fury 80 product	11	95.70	☑	

Conclusion: The nClean product worked better than the two comparative products under the manual wiping and extended soak and rinse scenarios.