CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2015
DateRun:	03/10/2015
Experimenters:	Ashwitha Rajagopal
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Textile
PartType:	Coupon
Contaminants:	Inks, Clay
Cleaning Methods:	Mechanical Agitation
Analytical Methods:	Visual, Gloss-Color Meter
Purpose:	The purpose of the experiment is to determine the relative rate of contaminant removal from the cloths by the detergent. This test method stimulates a uniform mechanical standard to properly utilize the solution.
Experimental Procedure:	White cotton and white cotton polyester and purple nylon were soiled with the grass, clay, sebum and ball point ink. Grass soil was made by grinding the grass with soil at suggested composition and filtration. Each contaminant was soiled on three pieces of each type of cloth. Every piece of 4x5 in cloth was spread taut over a glass beaker and the soil was applied manually. Sample clothes were allowed to dry for a day and dirty gloss readings were taken. They were washed at 70 F for 12 min in the Terg-O-meter at an RPM of 90. One milliliter of detergent was added for 2 L of water. After washing, the cloths were rinsed in water and dried for a day. Color readings were taken at the end of the day. The second part of the experiment was to study the effect of the detergent on the color fastness of orange, blue and purple fabric. Each piece of cloth was washed for 15 cycles and color fastness was recorded in terms of gloss values. Final assessment was to look at the fabric texture and rate according to the table listed below. The cleaning analysis was done by calculating the stain removal index. SRI = 100 – ((Lc-Lw)2 +(ac –aw)2 + (bc-bw)2)1/2 where: L = reflectance, a = redness/greenness, b = yellowness/blueness, c = unstained fabric, washed in the treatment conditions, w = stained fabric, washed in the treatment conditions. Table Fabric Smoothness Grades by SA Replica Equivalents Description Grade Observations SA•5 Very smooth, pressed, finished appearance. SA•4 Smooth, finished appearance. SA•3.5 Fairly smooth but nonpressed appearance. SA•3 Mussed, nonpressed appearance. SA•2 Rumpled, obviously wrinkled appearance. SA•1 Crumpled, creased and severely wrinkled appearance.
Results:	Change in L value denotes the change in concentration of stain while a and b values denote the spectrum on blue and green shades in the sample. Thus these values denote the amount of stain that the detergent was capable of removing. Thus the SRI for all the materials when the test was performed with test detergent is calculates as: Table 2: Results from experimental detergent

Cloth	Soil	SRI	Average
White Cotton Polyester	Grass	90.15	82.94
	Clay	71.74	
	Sebum	88.53	
	Ink	81.33	
White Cotton	Grass	85.23	71.63
	Clay	64.83	
	Sebum	48.87	
	Ink	87.58	
Purple Nylon	Grass	91.08	88.31
	Clay	81.86	
	Sebum	89.24	
	Ink	91.04	

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The SRI for all the materials when the test was performed with reference detergent is:

Cloth	Soil	SRI	Average
White Cotton Polyester	Grass	92.67	90.49
	Clay	90.34	
	Sebum	90.58	
	Ink	88.37	
White Cotton	Grass	87.51	83.55
	Clay	83.76	
	Sebum	95.00	
	Ink	67.93	
Purple Nylon	Grass	95.34	94.86
	Clay	99.25	
	Sebum	93.54	
	Ink	91.29	

The results of the color fastness test were as follows.

Table 4: Color fastness test of product detergent

	Initial reading			Final reading			Difference		
	L	a*	b*	L	a*	b*	ΔL	Δa	Δb
Blue									
	53.90	-5.83	-24.50	54.09	-5.52	-24.80	0.00	0.05	-0.01
	53.90	-5.66	-24.74	53.97	-5.42	-24.95	0.00	0.04	-0.01
	53.84	-5.74	-24.58	54.00	-5.41	-24.88	0.00	0.06	-0.01
	54.01	-5.73	-24.42	54.21	-5.52	-24.76	0.00	0.04	-0.01
Orange									
	56.13	47.01	47.68	55.36	47.18	45.98	0.01	0.00	0.04
	56.08	47.61	48.42	54.64	46.90	45.36	0.03	0.02	0.06
	56.75	48.22	48.95	54.34	46.03	44.45	0.04	0.05	0.09
	56.53	48.31	48.98	53.84	45.90	44.30	0.05	0.05	0.10
Purple									
	41.22	13.07	-25.03	39.80	13.39	-25.33	0.03	-0.02	-0.01
	40.23	12.98	-24.56	40.27	13.34	-25.32	0.00	-0.03	-0.03
	41.10	13.11	-24.93	40.53	13.10	-25.33	0.01	0.00	-0.02
	41.12	13.21	-25.04	40.90	13.25	-25.31	0.01	0.00	-0.01

Table 5: Color fastness test of reference detergent

	Initial reading			Final reading			Difference		
	L	a*	b*	L	a*	b*	ΔL	Δa	Δb
Blue									
	52.09	-5.670	-22.670	54.180	-5.680	-25.340	-0.040	-0.002	-0.118
	53.04	-5.700	-24.900	53.840	-5.640	-25.570	-0.015	0.010	-0.027
	54.2	-5.690	-24.690	83.820	-5.640	-25.010	-0.550	0.009	-0.013
	54.11	-5.710	-24.820	54.200	-5.630	-25.350	-0.002	0.014	-0.021
Orange									
	57.74	47.270	47.700	56.040	48.380	49.270	0.030	-0.023	-0.032
	57.74	47.070	47.710	56.580	48.250	49.350	0.020	-0.025	-0.034
	57.79	47.020	47.570	56.480	48.280	48.970	0.023	-0.027	-0.029
	57.64	47.320	47.840	56.770	48.450	49.350	0.015	-0.024	-0.032
Purple									
	41.82	13.010	-25.130	41.200	13.290	-25.130	0.010	-0.020	0.000
	41.21	13.180	-24.260	40.180	13.140	-25.020	0.020	0.000	-0.030
	41.19	13.150	-24.630	41.290	13.110	-25.230	0.000	0.000	-0.020
	41	13.220	-25.140	41.110	13.280	-25.220	0.000	0.000	0.000

Average percent change in fabric color

Reference	% Change		
	ΔL	Δa	Δb

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Blue	-0.287	4.743	-1.172
Orange	3.236	2.665	7.158
Purple	1.317	-1.362	-1.744
Supplied			
Blue	2.182	-2.481	-3.207
Orange	-1.246	0.789	-4.475
Purple	0.868	-0.500	-1.472

Fabric Condition

Product	Reference			Supplied		
Fabric	Orange	Blue	Purple	Orange	Blue	Purple
Sample 1	4	5	4	4	5	2
Sample 2	5	5	3	4	5	2
Sample 3	4	5	4	3	5	3
Sample 4	4	5	4	3	4	3
Sample 5	5	4	3	3	5	2
Sample 6	5	4	4	4	5	2
Sample 7	4	5	4	4	3	3
Sample 8	5	5	3	3	3	2
Sample 9	5	4	4	4	3	3
Average	4.6	4.7	3.7	3.6	4.2	2.4
Overall Average	4.3			3.4		

Summary:

Substrates:	Textile				
Contaminants:	Inks, Clay				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
No Specific Vendor	Ref. detergent Laundry Testing	0.1	89.60	☑	
J Tech Sales	J Tech Laundry Detergent	0.1	80.96	☑	

Conclusion:

As can be seen from the experiment the supplied material was less effective in cleaning the soils than the reference product. The supplied product had an average SDI of 80.96 for all soils from the three fabrics as compared to 89.63 for the reference product. There was a small but insignificant change in the color readings before and after 15 cycles with both products fairing well. The reference product resulted in a slight loss of color from the orange fabric. When the smoothness of the cloths after washing were manually determined and analyzed, it was concluded that the reference detergent leaves the fabric smoother with finished appearance (4.3), whereas the test detergent was only able to achieve a fairly smooth but non pressed appearance (3.4).