CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2013
DateRun:	09/17/2013
Experimenters:	Junhee Cho, Loc Nguyen, Jonathan Oljey
ClientType:	Cleaning Equipment Mfr
ProjectNumber:	Project #2
Substrates:	Textile
PartType:	Coupon
Contaminants:	Food
Cleaning Methods:	Mechanical Agitation
Analytical Methods:	Gloss-Color Meter
Purpose:	To simulate a laundry cleaning process with ionized water and tap water using a supplied detergent as a diluting agent.

Experimental Procedure:

T-shirt cloth were cut into 3x3 inch pieces. The cloths were dipped into a beaker filled with fruit punch juice and left to dry over night to stain. The stained cloths were each dipped in 500 mL of cleaning agents diluted with 3 drops of detergents for 10 minutes. Each cloth was then rubbed together for 1 minute. The cloths were then rinsed at 10 seconds and left dry for visual observation. Gloss/color readings were done before staining, after staining and after rinse and dry.

To equations were used to determine levels of soiling and relative cleaning performance. The first is the soil removal index (SRI):
SRI = 100 - [(Lc-Lw)^2 + (ac-aw)^2 + (bc-bw)^2]^1/2

where:
L = reflectance (white/black)
a = redness/greeness
b = yellowness/blueness
c = unsoiled fabric, washed in the treatment conditions
w = soiled fabric

The second is to determine the level of cleaning measured using reflectance improvement.
% improvement in reflectance = [(A-B)/(Co-B)] x100

where:
A = average reflectance of soiled swatches after washing
B = average reflectance of the soiled swatches before washing
Co = average reflectance of the unsoiled swatches before washing

ChemistriesEvaluated: Ionized Water, Tap Water

Results:

Calculation of the SRI for both sets of soiled test swatches resulted in a SRI's of 89.67 for the swatches to be cleaned in water and 76.34 for the swatches to be cleaned in the Sens ionized water. The percent improvement in reflectance showed that the Sens ionized water with detergent worked better than the detergent and water. The Sens/detergent had a 54% improvement and water/detergent had a 46% improvement. The first table lists the data collected for the swatches evaluated. The second table contains the calculated SRI and percent reflectance improvement.
Sens Corp Visual Test by Gloss Meter

Cleaner: Ionized	10 sec rinse		
Coupon #	L	a	b
1	90.12	1.16	4.19
2	88.21	0.51	5.86
3	88.19	0.58	5.82
Ave.	88.84	0.75	5.29
4	76.49	21.87	3.32
5	77.43	20.46	3.69
6	76.98	21.12	3.81
Ave.	76.97	21.15	3.61
7	83.17	7.57	4.08
8	83.72	10.22	2.83
9	83.45	7.62	3.43
Ave.	83.45	8.47	3.45
Cleaner: Water			
Coupon #	L	a	b

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1	88.57	16.9	2.97
2	88.1	15.77	4.32
3	88.24	14.81	3.74
Ave.	88.3	15.83	3.68
4	78.16	12.38	3.7
5	78.7	12.14	4.33
6	78.99	12.25	4.01
Ave.	78.62	12.26	4.01
7	82.15	15.21	3.65
8	82.3	14.22	4.16
9	84.93	10.94	3.61
Ave.	83.13	13.46	3.81

SRI Data indicates how the initial soiling compares from each set of swatches. Both sets were relatively soiled the same amounts.

SRI	Water	Sens
Lc	88.3	88.84
Lw	78.62	76.97
ac	15.83	0.75
aw	12.26	21.15
bc	3.68	5.29
bw	4.01	3.61
SRI Water =	89.67	
SRI Sens =		76.34

Reflectance % Improvement

% Reflectance Improvement = (A-B)/(Co-B)*100

	Water	Sens
A	83.13	83.45
B	78.62	76.97
Co	88.3	88.84
% RI	46.56	54.58

Summary:

Conclusion: The detergent diluted with ionized water worked better than using water to dilute the solution.