CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2009
DateRun:	06/21/2009
Experimenters:	Junhee Cho
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Glass/Quartz
PartType:	Coupon
Contaminants:	Food
Cleaning Methods:	Low Pressure Spray
Analytical Methods:	Visual
Purpose:	To evaluate supplied product against a traditional automatic dishwashing liquid.

Experimental Procedure:

This test method covers a procedure for measuring performance of a mechanical dishwashing detergent in terms of the buildup of spots and film on glassware. It is designed to evaluate household automatic dishwasher detergents during this cleaning procedure. Glass tumblers are washed in a mechanical dishwasher in the presence of food soil and the levels of spotting and filming allowed by the detergents under test are compared visually.

This test method is intended as a laboratory screening test to determine performance of the detergent under actual use conditions, but will not necessarily predict performance under all end-use conditions.

Tableware used was as follows: 10-in. diameter Dinner plates, 7-in. diameter Salad plates, 6-in. diameter Cereal bowls, and stainless steel Cutlery. Six dinner plates, six knives, six forks, and six spoons were used. These pieces were all placed on the lower rack of the dishwasher. Eight glass tumblers were loaded on the top rack.

Standard Food Soil Components: nonfat powdered milk, margarine, and wheat-based cooked cereal (optional). Standard Food Soil Preparation: A mixture of 80 weight % of margarine and 20 weight % of powdered milk was prepared. The margarine was warmed until fluid and the powdered milk was mixed thoroughly.

A total of 40 g of food soil was distributed onto the six dinner plates, using a hand held swab. The VWR International Under-counter Glassware Washer (model 82020-922) was loaded as follows: In the lower (plate) rack, distribute the six soiled dinner plates uniformly with the smaller plates and bowls placed alternately about the dinner plates until the rack is fully loaded. In the upper (glass) rack, distribute the glass tumblers evenly. The eight glasses were placed along each side, four to a side.

Maintain a water temperature of 130 6 5°F (54.4 6 3.8°C) in the dishwasher.
Detergent Concentration—Use the quantity of detergent specified by the manufacturer. For a thorough investigation, evaluate at over and under usage.

Rating: The tumblers were visually inspected after each cycle for film and spotting. Evaluations were based on the following scale.

Rating Spotting Filming
1 no spots none
2 spots at random barely perceptible
3 about 1/4 of surface covered slight
4 about 1/2 of surface covered moderate
5 virtually completely covered heavy

Obtain number ratings by averaging the ratings for individual tumblers, keeping spotting and filming results separate.

Cascade powder formula was used as the traditional dishwashing soap.

Results:

For the Liquid Machine Dish HW and Cascade, only 6 tall glasses were used due to loss of 2 glasses from breakage (not related to cleaning). Subsequent testing included 8 small glasses in addition to the 6 tall glasses.

		Trial 1		Trial 2		Trial 3	
Product	Glass #	Spotting	Film	Spotting	Film	Spotting	Film
Solid Machine Dishwasher	1	1	1	1	2	1	1
	2	1	1	1	1	1	1
	3	1	1	2	2	1	1
	4	2	1	2	1	1	2
	5	1	2	3	2	1	1

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	6	1	1	2	1	1	2
	7	1	2	2	1	2	1
	8	1	1	2	1	1	1
	Average	1.13	1.25	1.88	1.38	1.13	1.25
Liquid Machine Detergent	1	4	2	3	3	2	1
	2	4	2	3	2	2	1
	3	4	1	2	3	3	2
	4	3	2	1	2	4	2
	5	4	2	1	2	3	1
	6	4	2	1	2	2	2
	7	3	1	3	1	1	1
	8	4	2	2	2	2	1
	Average	3.75	1.75	2	1.88	3.5	1.38
Liquid Machine Dish HW	1	1	3	3	1	1	2
	2	1	3	2	1	2	2
	3	1	2	3	1	1	2
	4	1	3	1	2	2	1
	5	1	2	2	1	2	3
	6	2	2	1	2	2	2
	Tall Average	1.17	2.5	2	1.33	1.67	2
	Small glass 1	1	1	1	1		
	2	1	1	1	1		
	3	1	1	1	2		
	4	1	1	1	1		
	5	1	1	1	2		
	6	1	1	1	2		
	7	1	1	1	1		
	8	1	1	1	2		
	Small Average	1	1	1	1.5		
Cascade Powder	1	2	1	1	2	1	2
	2	2	1	2	2	1	2
	3	1	1	1	2	1	2
	4	2	2	1	2	1	1
	5	2	2	1	2	1	2
	6	3	2	2	2	1	2
	7	2	2				
	8	2	1				
	Tall Average	2	1.5	1.33	2	1	1.38
	Small glass 1	1	2	1	1		
	2	2	2	1	1		
	3	1	1	1	2		
	4	1	1	1	2		
	5	2	1	2	1		
	6	1	1	1	1		
	7	1	1	1	2		
	8	1	1	1	2		
	Small Average	1.25	1.25	1.13	1.5		

Summary

	Spotting	Filming	Spotting	Filming	Combined	Relative

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Overall Average						
Solid Machine Dishwasher	1.38	1.29	3	1	2	1
Liquid Machine Detergent	3.08	1.67	4	3	3.5	4
Liquid Machine Dish HW	1.61 (tall)	1.94				
	1.00 (short)	1.75				
	1.31 (combined)	1.85	1	4	2.5	3
Cascade	1.44 (tall)	1.63				
	1.19 (short)	1.38				
	1.32 (combined)	1.51	2	2	2	1

Summary:

Substrates:	Glass/Quartz
Contaminants:	Food

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Alpha Chemical Services	Solid Machine Dish washer	100	0.00	☑	Rank = 1
Alpha Chemical Services	Liquid Machine Dishwasher	100	0.00	☐	Rank = 4
Alpha Chemical Services	Liquid Machine Dishwasher HW	100	0.00	☑	Rank = 3
Procter & Gamble	Cascade Complete (Dawn)	100	0.00	☑	Rank = 2

Conclusion:

Based on comparing the supplied product against the traditional automatic dishwashing product, the Solid Machine Dishwasher performed as well as the traditional product when looking at both spotting and filming. The Liquid Machine Dish HW had the top ranking when looking at spotting but had the lowest ranking for filming. The Liquid Machine Detergent had the lowest ranking for spotting.

Three out of four products tested had spotting scores under the "spots at random" level and would be considered effective. All four products had filming scores better than the "barely perceptible" level and would be effective.

A second cleaning protocol will be conducted using gravimetric analysis on similar substrates and soils.