CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2009
DateRun:	07/05/2009
Experimenters:	Junhee Cho
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Ceramics, Glass/Quartz, Stainless Steel
PartType:	Coupon
Contaminants:	Hucker's Soil, Food
Cleaning Methods:	Low Pressure Spray
Analytical Methods:	Gravimetric, Visual
Purpose:	To evaluate performance of supplied automatic dishwashing formula for three soil types.

Experimental Procedure:

A supplied product and rinse aid and a traditional automatic dishwashing formulation were tested to determine cleaning efficiencies for three soils from three substrates. The first two soils were taken from ASTM D3556. The third, Hucker's soil, was the all purpose soil the lab uses for janitorial testing.

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.

Use of this optional soil makes the test more realistic by adding another difficult-to-remove component. Optional Food Soil Preparation: This mixture consists of 70 % margarine, 15 % powdered milk, and 15 % cooked cereal. The cooked cereal was separately prepared as follows: Add 45 g of cereal to 228 g of water, heat to boiling, and boil for 5 min. Dissolve 100 g of powdered milk in 500 g of water and stir this solution into the cooked cereal. Continue stirring as portions are removed to be combined with margarine and powdered milk that have been blended as in the previous soil preparation. This mixture was made up as required.

Hucker's Soil Formulation: Jif Creamy Peanut Butter 9.2%, Salted Butter 9.2%, Arrowhead Mills stone ground wheat flour 9.2%, Egg Yolk 9.2%, Evaporated milk 13.8%, Distilled water 45.8%, Printer's ink with boiled linseed oil 0.9%, Shaws saline solution 2.7%

Preweighed ceramic (3), glass (3) and stainless steel (3) coupons (representing plates, glasses and silverware) were coated with each of the three soils and allowed to dry overnight. A second weight was recorded to determine the amount of soil added. All nine coupons were loaded into a VWR International Under-counter Glassware Washer (model 82020-922) and run on the light cycle (120 F wash, 140 F rinse). Total cleaning time lasted 2 hours. At the end of the cleaning, coupons were removed and weighed a final time to determine the amount of soil remaining. Percent efficiencies were calculated for each coupon cleaned. Observations were made for spotting or filming.

Results:

When the ceramic coupons were weighed after cleaning, the final weights were greater than the initial weights. The weight changes may have bee due to excess moisture being soaked into the uncoated side of the coupons, increasing the final weights. Visually, all the ceramic coupons for both cleaners were as clean as the glass and stainless steel coupons. Due to the weight change discrepancy, the gravimetric analysis of the ceramic coupons were not included in the overall efficiency calculations. The first table below lists the amount of soil added, the amount remaining and the efficiency for each coupon cleaned. The second table summarizes the cleaning performance of both product for each of three soils.

Cleaner	Initial wt	Final wt	% Removed
Alpha Chemical Solid dish wahsing_Food soil 1_glass	0.2085	0.0001	99.95
	0.2807	-0.0001	100.04
	0.5622	0.0000	100.00
Alpha Chemical Solid dish wahsing_Food soil 1_stainliess steel	0.8854	0.0001	99.99
	0.9548	-0.0003	100.03
	0.6165	0.0046	99.25
Alpha Chemical Solid dish wahsing_Food soil 2_glass	0.2707	0.0039	98.56
	0.1393	0.0000	100.00
	0.0534	-0.0002	100.37
Alpha Chemical Solid dish wahsing_Food soil 2_stainliess steel	0.5788	-0.0002	100.03
	0.2865	0.0001	99.97
	0.2415	0.0001	99.96
Alpha Chemical Solid dish	0.0791	-0.0003	100.38

CLEANING LABORATORY EVALUATION SUMMARY

wahsing_Hucker soil_ glass	0.0302	-0.0006	101.99
	0.0475	0.0004	99.16
Alpha Chemical Solid dish wahsing_Hucker soil_ stainliess steel	0.0981	0.0725	26.10
	0.0537	0.0171	68.16
	0.1447	0.0746	48.45
Alpha Chemical Liquid Detergent_Food soil 1_ glass	0.4110	0.0001	99.98
	0.3998	-0.0001	100.03
	0.9635	0.0000	100.00
Alpha Chemical Liquid Detergent_Food soil 1_ stainless steel	0.4895	-0.0002	100.04
	0.6650	0.0066	99.01
	0.4965	-0.0003	100.06
Alpha Chemical Liquid Detergent_Food soil 2_ glass	0.4606	-0.0004	100.09
	0.3331	0.0002	99.94
	0.3463	0.0000	100.00
Alpha Chemical Liquid Detergent_Food soil 2_ stainless steel	0.4074	0.0011	99.73
	0.5840	-0.0025	100.43
	0.6832	0.0587	91.41

Visual

Ceramic Observations	Food Soil 1	Food Soil 2	Hucker's Soil
Alpha Chemical Solid dish washing	Good	Good	Good
Alpha Chemical Liquid Machine Detergent	Good	Good	Good
Alpha Chemical Liquid Machine Detergent HW	Good	Good	Good

All three products had effective removal of the soils from ceramic coupons as determined by visual analysis.

Summary:

Substrates:	Ceramics, Glass/Quartz, Stainless Steel				
Contaminants:	Hucker's Soil, Food				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Alpha Chemical Services	Solid Machine Dish washer	100	91.24	☑	
Alpha Chemical Services	Liquid Machine Dishwasher	100	98.45	☑	
Alpha Chemical Services	Liquid Machine Dishwasher HW	100	99.96	☑	

Conclusion: The supplied products worked as well as the traditional cleaning product removing close to 100% of each of the three soils.