CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2018

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ClientType: Cleaner Manufacturer

ProjectNumber: Project #3

Substrates: Ceramics, Glass/Quartz

PartType: Coupon

Contaminants: Food

Cleaning Methods: Mechanical Agitation

Analytical Methods: Visual

Purpose: To evaluate the effectiveness of the AGAE Dishwasher Gel against Cascade Complete Dishwasher Gel and Seventh Generation Dishwasher Gel on the removal of Food Soil from ceramic plates and glassware by automatic dishwashing.

Experimental Procedure: All ceramic plates and glassware were previously cleaned and dried when 40 g of Soil DCC 05A Food (80% Margarine and 20% Non-Fat Powdered Milk) was evenly distributed onto six plates. The mechanical dishwasher was running previously to increase the temperature to 75° F, for the testing. The six soiled plates were placed on the lower rack uniformly, and six tall glass tumblers and four small glass tumblers were placed uniformly on the upper rack. The detergent slot was filled with the respective dishwasher gel and the test was then run for 42 minutes. After the cycle was completed the six tall glass tumblers and the four small glass tumblers were removed and inspected for spotting and filming by three examiners, and placed in their exact former locations. The six ceramic plates were re-soiled to the initial soil amount of 6.66 g and also placed in their former locations. The process was repeated five times for each dishwasher gel.

The following rating system was used:

Rating	Spotting	Filming
1	No Spots	None
2	Spots and Random	Barely
3	About ¼ of Surface Covered	Slight
4	About ½ of Surface Covered	Moderate
5	Virtually Completely Covered	Heavy

Results:

AGAE Dishwasher Gel

Cycle 1	Tall Glass	Glass Number	Spotting Rating			Filming Rating			Average Spotting	Average Filming
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*		
		1	4.5	4	4	4	3.5	4	2.89	3.89
		2	2	3	3.5	5	3	3		
		3	2	2.5	3	4.5	4	4		
		4	2	4	3	3.5	3	3		
		5	2.5	2	3	5	3.5	4		
		6	2	2.5	2.5	5	4	4	2.54	2.63
	Small Glass	*1*	2	1.5	3	2	2	3		
		2	2	3	2.5	2	2	3		
		3	2.5	3.5	3	2	4	3		
		4	3	2	2.5	2.5	3	3		

Cycle 2	Tall Glass	Glass Number	Spotting Rating			Filming Rating			Average Spotting	Average Filming
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*		
		1	4.5	4	3.5	4	3.5	3.5	3.58	3.53
		2	3.5	4	4	4.5	3	3.5		
		3	4	3	4	4.5	5	4		

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		4	3	3	3	2.5	4	3		
		5	5	4.5	4	2.5	3.5	4		
		6	2	3	2.5	2	3	3.5	3.50	3.50
	Small Glass	*1*	2.5	3.5	2.5	4	4	3.5		
		2	3	4	3	4.5	3.5	3.5		
		3	5	4.5	4	3	3.5	3		
		4	2	4	4	2	4	3.5		

Cycle 3	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	3.67	3.81
		1	3	3.5	3.5	4	3.5	2.5		
		2	4	4	4	4	3.5	4		
		3	2	3.5	2.5	5	4	3.5		
		4	4	4	3.5	3	3.5	3		
		5	4.5	5	4	3.5	5	4.5		
		6	4	4	3	4.5	4	3.5	4.42	3.96
	Small Glass	*1*	4	4.5	4	3	4	4		
		2	3	4	3.5	3	4.5	4		
		3	5	5	5	5	4.5	4		
		4	5	5	5	3	4.5	4		

Cycle 4	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	3.97	3.25
		1	3.5	4	4	3	3	2.5		
		2	5	4.5	4	4.5	3	3.5		
		3	3.5	3.5	3.5	3	2	3		
		4	4	4.5	3.5	3	3	3		
		5	4	3.5	4.5	3.5	4	4.5		
		6	4.5	3.5	4	4.5	2.5	3	4.13	3.17
	Small Glass	*1*	5	4.5	4.5	3	4	4.5		
		2	2	4	4.5	2	3.5	3		
		3	5	4	3.5	3	3.5	3		
		4	4	4.5	4	3	3	2.5		

Cycle 5	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	3.83	3.25
		1	3.5	3	3	3	3.5	2.5		
		2	3	3.5	4	2.5	3.5	3.5		
		3	4	4	4	3	3.5	4		
		4	4	4	3.5	4	2.5	2.5		
		5	4	4	4	4.5	2.5	3		
		6	5	4.5	4	4	3.5	3	4.38	3.67
	Small Glass	*1*	5	4.5	4	4.5	3	3		
		2	5	4	4	5	2.5	3		
		3	4.5	5	4.5	4	3.5	3.5		
		4	4.5	4	3.5	4	4	4		

Cascade Complete Dishwasher Gel

Cycle 1	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	2.36	1.94

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		1	2	2.5	2	2	1.5	2		
		2	3	2.5	2	2	2	2		
		3	2	3	3	1.5	2	2.5		
		4	2	2.5	2	2	1.5	2		
		5	2.5	2.5	3	2	2	2		
		6	3	1.5	1.5	2	1.5	2.5	2.33	2.29
	Small Glass	*1*	2.5	2.5	2	1.5	1.5	2		
		2	3	2	1.5	3.5	3	2		
		3	3.5	3	2	3.5	3	2.5		
		4	2.5	2	1.5	2	1.5	1.5		

Cycle 2	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	2.58	1.83
		1	2	2	1.5	2	2	1.5		
		2	3	2.5	2	3	2	2		
		3	3.5	3	2	2	2	1.5		
		4	3	3	2.5	2	1.5	1.5		
		5	3.5	3.5	3	2	1.5	1.5		
		6	2.5	2	2	2	1.5	1.5	2.96	1.92
	Small Glass	*1*	2	2	2.5	1.5	1.5	2		
		2	2.5	3	2.5	2	1.5	1.5		
		3	4.5	3.5	3	3	2	2		
		4	4	3.5	2.5	2	2	2		

Cycle 3	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	2.42	2.03
		1	2	2	2	2.5	2	1.5		
		2	2.5	2.5	2	2	2.5	2.5		
		3	2.5	2	1.5	2.5	1.5	1.5		
		4	3	2.5	2	3	2	1.5		
		5	3	3	2.5	2	2	2		
		6	3	2.5	3	1.5	1.5	2.5	3.54	2.42
	Small Glass	*1*	4	3.5	3.5	3	2	2.5		
		2	4	2	2.5	3	2.5	2.5		
		3	4.5	4	4	2.5	2	2.5		
		4	4	3.5	3	2	2.5	2		

Cycle 4	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	2.39	1.94
		1	3	2	1.5	2	2	1.5		
		2	2	2	1.5	2	3	2		
		3	3.5	2.5	2	2	1.5	1.5		
		4	3	3.5	3	2	2	2		
		5	3	2.5	2.5	2	2.5	2		
		6	2	1.5	2	2	1.5	1.5	3.67	2.50
	Small Glass	*1*	4	3.5	3	2	3	2.5		
		2	3.5	2	2.5	2.5	2	2		
		3	4	4	3.5	2.5	2.5	2.5		
		4	4.5	5	4.5	2.5	3	3		

			Spotting Rating	**Filming Rating**		

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Cycle 5	Tall Glass	Glass Number							Average Spotting	Average Filming
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	2.67	1.97
		1	3	2.5	1.5	2	2	1.5		
		2	3.5	1.5	2	2	2	2		
		3	2.5	2.5	2	2	2	1.5		
		4	3	3	2.5	2	1.5	2		
		5	4	3.5	3	2	2.5	2.5		
		6	3	3	2	2	2	2	3.50	2.63
	Small Glass	*1*	3.5	4	3.5	2	2	2		
		2	4	2	2	2	2	1.5		
		3	3.5	3	3.5	2	2.5	2		
		4	5	4	4	2	3	2.5		

Seventh Generation Dishwasher Gel

Cycle 1	Tall Glass	Glass Number	Spotting Rating			Filming Rating			Average Spotting	Average Filming
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	2.83	2.31
		1	3	2.5	2	1.5	2	2		
		2	3.5	3	2	2	2.5	3		
		3	4	3	2.5	3	3	2.5		
		4	3.5	2.5	2.5	2	2	2		
		5	3.5	2	2	2	2	3		
		6	4	3	2.5	2	2	3	3.21	1.92
	Small Glass	*1*	2.5	3	2	2	1.5	2		
		2	4	4	2.5	2	2	2.5		
		3	4.5	3.5	3.5	1.5	2	2		
		4	3	3	3	2	1.5	2		

Cycle 2	Tall Glass	Glass Number	Spotting Rating			Filming Rating			Average Spotting	Average Filming
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	2.94	2.00
		1	2.5	2.5	2.5	2	2	1.5		
		2	3	3.5	2.5	2	1.5	1.5		
		3	3	3	3	2	2	2		
		4	3.5	3.5	3	2	2.5	2		
		5	3	3	2.5	2	2.5	2.5		
		6	3.5	2.5	3	2	2	2	3.79	2.08
	Small Glass	*1*	4	3	3	2.5	1.5	1.5		
		2	3	4	3.5	2	2	1.5		
		3	5	4	4	2.5	2	2.5		
		4	4	4	4	2	2.5	2.5		

Cycle 3	Tall Glass	Glass Number	Spotting Rating			Filming Rating			Average Spotting	Average Filming
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	3.28	2.42
		1	2	3	2	2	2	2		
		2	4	3.5	3	2	3	2.5		
		3	4	3	3	2	2.5	2.5		
		4	3.5	3.5	3	2	2	2		
		5	4	3.5	3	2.5	3	2.5		
		6	4.5	3.5	3	3	3.5	2.5	3.88	2.13
	Small Glass	*1*	3.5	4	3.5	2.5	2	2.5		
		2	4	4	3.5	2	1.5	1.5		

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		3	4	4	4	3	2.5	2.5		
		4	4	4	4	2	2	1.5		

Cycle 4	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	3.67	2.31
		1	3	3.5	2.5	2	2	2		
		2	4	3	2.5	2	2	2		
		3	4.5	4	3.5	3	2.5	3		
		4	4	4	4	2	3	2.5		
		5	4	3.5	3.5	2	2	2.5		
		6	4.5	4	4	2.5	2	2.5	4.29	2.13
	Small Glass	*1*	5	4	4	2	2	2		
		2	4.5	3.5	3.5	2	2	2.5		
		3	5	4.5	4.5	1.5	2.5	2.5		
		4	5	4	4	3	2	1.5		

Cycle 5	Tall Glass	**Glass Number**	**Spotting Rating**			**Filming Rating**			**Average Spotting**	**Average Filming**
			Examiner 1	*Examiner 2*	*Examiner 3*	*Examiner 1*	*Examiner 2*	*Examiner 3*	3.36	2.17
		1	3	3.5	2.5	2	2	2		
		2	3.5	2.5	2.5	2	2.5	2		
		3	4	3	2.5	2	2	2.5		
		4	4	3.5	3.5	2	2	2.5		
		5	3.5	4	3.5	1.5	2	3		
		6	4	4	3.5	2	2.5	2.5	4.25	2.36
	Small Glass	*1*	3.5	4	4	2	2	2		
		2	3	4.5	4	2	2.5	2.5		
		3	4	5	4.5	2.5	2.5	2.5		
		4	4.5	5	5	2	3	3		

Summary:

Tall Glass Spotting Averages

Dishwasher Gel Evaluated	**Cycle 1**	**Cycle 2**	**Cycle 3**	**Cycle 4**	**Cycle 5**	**Total Cycle Average**
AGAE	2.89	3.58	3.67	3.97	3.83	**3.59**
Cascade Complete	2.36	2.58	2.42	2.39	2.67	**2.48**
Seventh Generation	2.83	2.94	3.28	3.67	3.36	**3.22**

Tall Glass Filming Averages

Dishwasher Gel Evaluated	**Cycle 1**	**Cycle 2**	**Cycle 3**	**Cycle 4**	**Cycle 5**	**Total Cycle Average**
AGAE	3.89	3.53	3.81	3.25	3.25	**3.55**
Cascade Complete	1.94	1.83	2.03	1.94	1.97	**1.94**
Seventh Generation	2.31	2.00	2.42	2.31	2.17	**2.24**

Small Glass Spotting Averages

Dishwasher Gel Evaluated	**Cycle 1**	**Cycle 2**	**Cycle 3**	**Cycle 4**	**Cycle 5**	**Total Cycle Average**
AGAE	2.54	3.50	4.42	4.13	4.38	**3.79**
Cascade Complete	2.33	2.96	3.54	3.67	3.50	**3.20**
Seventh Generation	3.21	3.79	3.88	4.29	4.25	**3.88**

Small Glass Filming Averages

Dishwasher Gel Evaluated	**Cycle 1**	**Cycle 2**	**Cycle 3**	**Cycle 4**	**Cycle 5**	**Total Cycle Average**
AGAE	2.63	3.50	3.96	3.17	3.67	**3.39**
Cascade Complete	2.29	1.92	2.42	2.50	2.63	**2.35**
Seventh Generation	1.92	2.08	2.13	2.13	2.36	**2.12**

Summary:

CLEANING LABORATORY EVALUATION SUMMARY

Substrates:	Ceramics, Glass/Quartz				
Contaminants:	Food				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
AGAE Technologies	Dishwasher Detergent Gel	100%	0.00	☐	
Clorox Company	Cascade Complete Dishwasher Gel	100%	0.00	☑	
Seventh Generation	Free & Clear Automatic Dish Gel	100%	0.00	☑	

Conclusion: The Cascade Complete Dishwasher Gel was the most effective overall (tall and small glassware) compared to the Seventh Generation Dishwasher Gel, which in turn was more effective than the AGAE Dishwasher Gel.