

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2017

DateRun: 05/26/2017

Experimenters: George Liang, Vinh Tran

ClientType: Cleaner Manufacturer

ProjectNumber: Project #3

Substrates: Ceramics, Glass/Quartz, Stainless Steel

PartType: Coupon

Contaminants: Food

Cleaning Methods: Low Pressure Spray

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate the efficacy of supplied dishwashing cleaners in removing standard food soil from ceramic, glass, and stainless steel coupons.

Experimental Procedure: Soiling Process:
A total of 15 trials were conducted, with five trials per dishwashing cleaner. For each trial a set of nine ceramic, a set of nine glass, and a set of nine stainless steel coupons were weighed on an analytical balance to determine their initial weights. The coupons were then soiled with 0.5 grams of standard food soil which consists of 80% margarine and 20% powdered milk using a hand held swab. The coupons were weighed again to obtain the amount of contaminant added. Following this a set of six dinner plates were soiled with 6.66 grams of standard food soil.

Cleaning Process:
The coupons were then placed on the top rack of the dishwasher, along with six tall glass tumblers and four small glass tumblers. The bottom rack of the dishwasher was loaded with four small dinner plates and six cereal bowls. In addition, a basket of assorted stainless steel cutlery was placed in the middle of the bottom rack. For each set of cleaning, the respective cleaner was poured until the detergent slot was filled. The dishwasher was then ran for 50-minutes as one trial cycle. After the cycle was finished, the six tall glass tumblers and four small glass tumblers were evaluated visually by a panel of three in regards to spotting and filming. The coupons were removed from the dishwasher and allowed to dry for 1 hour before being re-weighing to obtain the amount of contaminated removed.

The following rating scale from 1-5 was used for visual ratings on the glass tumblers:

Spotting Filming
1 No spots None
2 Random spots Barely
3 ¼ covered Slight
4 ½ covered Moderate
5 completely covered Heavy

Results: Gravimetric Analysis:
In regards to the ceramic substrates the Seventh Generation cleaner was most effective out of the cleaners, with an overall average removal of 96.27% as opposed to 94.79% for the AGAE cleaner and 92.66% for the Cascade cleaner. For glass, the most effective cleaner was the Cascade cleaner with an overall removal of 99.6%, barely edging out the Seventh Generation cleaner, which had an overall percentage removal of 99.59% and the AGAE cleaner with 99.49%. For stainless steel, the most effective cleaner was the Seventh Generation cleaner with an overall average percentage removal of 98.75%, eclipsing the AGAE and Cascade cleaners, which had overall average percentage removals of 96.23% and 96.48% respectively.

Cleaner	Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed
AGAE Dishwasher Detergent Gel_Ceramic_Trial 1	0.4885	0.0171	96.50	96.81	94.79
	0.4905	0.0179	96.35		
	0.4953	0.0147	97.03		
	0.4874	0.0164	96.64		
	0.4898	0.0127	97.41		
	0.4822	0.0116	97.59		
	0.4849	0.0162	96.66		
	0.4925	0.0188	96.18		
	0.4888	0.0152	96.89		
AGAE Dishwasher Detergent Gel_Ceramic_Trial 2	0.5067	0.0482	90.49	94.10	
	0.4929	0.0210	95.74		

CLEANING LABORATORY EVALUATION SUMMARY

	0.4928	0.0210	95.74		
	0.4912	0.0159	96.76		
	0.5085	0.0331	93.49		
	0.4995	0.0202	95.96		
	0.5077	0.0204	95.98		
	0.4980	0.0201	95.96		
	0.4911	0.0649	86.78		
AGAE Dishwasher Detergent Gel _Ceramic_Trial 3	0.5004	0.0348	93.05	93.18	
	0.4912	0.0351	92.85		
	0.5123	0.0359	92.99		
	0.5024	0.0261	94.80		
	0.4932	0.0399	91.91		
	0.5129	0.0264	94.85		
	0.4878	0.0652	86.63		
	0.4928	0.0178	96.39		
	0.5001	0.0243	95.14		
AGAE Dishwasher Detergent Gel _Ceramic_Trial 4	0.4988	0.0295	94.09	94.92	
	0.5189	0.0180	96.53		
	0.5124	0.0518	89.89		
	0.5009	0.0189	96.23		
	0.5007	0.0231	95.39		
	0.5004	0.0163	96.74		
	0.4989	0.0233	95.33		
	0.4938	0.0330	93.32		
	0.5027	0.0163	96.76		
AGAE Dishwasher Detergent Gel _Ceramic_Trial 5	0.4891	0.0198	95.95	94.95	
	0.4938	0.0419	91.51		
	0.5066	0.0199	96.07		
	0.4944	0.0210	95.75		
	0.5054	0.0273	94.60		
	0.4881	0.0183	96.25		
	0.5071	0.0258	94.91		
	0.4933	0.0342	93.07		
	0.4945	0.0176	96.44		
Cleaner Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed	
AGAE Dishwasher Detergent Gel _Glass_Trial 1	0.4894	0.0014	99.71	99.59	99.49
	0.4919	0.0026	99.47		
	0.4888	0.0029	99.41		
	0.4895	0.0014	99.71		
	0.4842	0.0011	99.77		
	0.4899	0.0007	99.86		
	0.5034	0.0028	99.44		
	0.5021	0.0018	99.64		
	0.4982	0.0036	99.28		
AGAE Dishwasher Detergent Gel _Glass_Trial 2	0.4824	0.0021	99.56	99.44	
	0.5145	0.0022	99.57		
	0.4996	0.0030	99.40		
	0.4890	0.0040	99.18		
	0.4868	0.0022	99.55		
	0.5214	0.0048	99.08		
	0.4916	0.0019	99.61		
	0.5042	0.0028	99.44		
	0.5036	0.0021	99.58		
AGAE Dishwasher Detergent Gel _Glass_Trial 3	0.5076	0.0016	99.68	99.57	
	0.5311	0.0033	99.38		
	0.3856	0.0027	99.30		
	0.5040	0.0017	99.66		

CLEANING LABORATORY EVALUATION SUMMARY

	0.5076	0.0034	99.33		
	0.4858	0.0006	99.88		
	0.5005	0.0010	99.80		
	0.4997	0.0023	99.54		
	0.5399	0.0026	99.52		
AGAE Dishwasher Detergent Gel _Glass_Trial 4	0.5025	0.0002	99.96	99.71	
	0.4949	0.0002	99.96		
	0.5028	0.0030	99.40		
	0.4868	0.0003	99.94		
	0.4811	0.0016	99.67		
	0.4975	0.0028	99.44		
	0.4962	0.0019	99.62		
	0.4853	0.0026	99.46		
	0.5000	0.0004	99.92		
AGAE Dishwasher Detergent Gel _Glass_Trial 5	0.4886	0.0002	99.96	99.17	
	0.4915	0.0055	98.88		
	0.4908	0.0039	99.21		
	0.4879	0.0032	99.34		
	0.4945	0.0057	98.85		
	0.4986	0.0031	99.38		
	0.5030	0.0072	98.57		
	0.4912	0.0042	99.15		
	0.5018	0.0041	99.18		
Cleaner Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed	
AGAE Dishwasher Detergent Gel _Stainless Steel_Trial 1	0.4981	0.0067	98.65	98.02	96.23
	0.4801	0.0091	98.10		
	0.4841	0.0065	98.66		
	0.4800	0.0089	98.15		
	0.4866	0.0110	97.74		
	0.4883	0.0098	97.99		
	0.4831	0.0098	97.97		
	0.4899	0.0110	97.75		
	0.4858	0.0139	97.14		
AGAE Dishwasher Detergent Gel _Stainless Steel_Trial 2	0.4860	0.0081	98.33	94.89	
	0.5037	0.0122	97.58		
	0.4973	0.0071	98.57		
	0.5021	0.0098	98.05		
	0.5012	0.0114	97.73		
	0.4959	0.0514	89.64		
	0.5002	0.0069	98.62		
	0.4924	0.0128	97.40		
	0.4864	0.1064	78.13		
AGAE Dishwasher Detergent Gel _Stainless Steel_Trial 3	0.4966	0.0212	95.73	95.55	
	0.4864	0.0098	97.99		
	0.5007	0.0226	95.49		
	0.5219	0.0348	93.33		
	0.4960	0.0340	93.15		
	0.5315	0.0262	95.07		
	0.5048	0.0227	95.50		
	0.5116	0.0111	97.83		
	0.5137	0.0212	95.87		
AGAE Dishwasher Detergent Gel _Stainless Steel_Trial 4	0.4931	0.0275	94.42	95.92	
	0.4969	0.0215	95.67		
	0.5177	0.0203	96.08		
	0.4957	0.0161	96.75		
	0.5122	0.0117	97.72		

CLEANING LABORATORY EVALUATION SUMMARY

	0.5017	0.0304	93.94		
	0.5090	0.0213	95.82		
	0.5216	0.0177	96.61		
	0.5006	0.0186	96.28		
AGAE Dishwasher Detergent Gel _Stainless Steel_Trial 5	0.5066	0.0130	97.43	96.78	
	2.4983	0.0237	99.05		
	0.5034	0.0235	95.33		
	0.4966	0.0173	96.52		
	0.5026	0.0269	94.65		
	0.4874	0.0334	93.15		
	0.5036	0.0067	98.67		
	0.4882	0.0096	98.03		
	0.5060	0.0093	98.16		
Cleaner Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed	
Seventh Generation Dishwasher Gel _Ceramic_Trial 1	0.4800	0.0142	97.04	96.27	96.27
	0.4816	0.0397	91.76		
	0.4891	0.0172	96.48		
	0.5033	0.0130	97.42		
	0.4802	0.0179	96.27		
	0.4887	0.0140	97.14		
	0.4909	0.0176	96.41		
	0.4815	0.0102	97.88		
	0.4813	0.0190	96.05		
Seventh Generation Dishwasher Gel _Ceramic_Trial 2	0.4873	0.0222	95.44	95.98	
	0.4889	0.0201	95.89		
	0.4952	0.0164	96.69		
	0.4958	0.0142	97.14		
	0.4910	0.0170	96.54		
	0.4935	0.0170	96.56		
	0.4866	0.0212	95.64		
	0.4876	0.0148	96.96		
	0.4840	0.0340	92.98		
Seventh Generation Dishwasher Gel _Ceramic_Trial 3	0.5063	0.0299	94.09	95.45	
	0.4932	0.0428	91.32		
	0.5060	0.0193	96.19		
	0.4939	0.0143	97.10		
	0.5003	0.0167	96.66		
	0.4968	0.0179	96.40		
	0.5007	0.0192	96.17		
	0.5027	0.0153	96.96		
	0.4999	0.0292	94.16		
Seventh Generation Dishwasher Gel _Ceramic_Trial 4	0.4881	0.0153	96.87	97.22	
	0.4919	0.0143	97.09		
	0.4975	0.0131	97.37		
	0.4980	0.0174	96.51		
	0.4937	0.0134	97.29		
	0.4931	0.0116	97.65		
	0.4914	0.0146	97.03		
	0.4898	0.0103	97.90		
	0.4959	0.0134	97.30		
Seventh Generation Dishwasher Gel _Ceramic_Trial 5	0.4930	0.0177	96.41	96.44	
	0.4799	0.0168	96.50		
	0.4806	0.0140	97.09		
	0.4869	0.0186	96.18		
	0.4858	0.0182	96.25		
	0.4982	0.0249	95.00		
	0.4938	0.0166	96.64		

CLEANING LABORATORY EVALUATION SUMMARY

	0.4860	0.0142	97.08		
	0.4838	0.0153	96.84		
Cleaner Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed	
Seventh Generation Dishwasher Gel _Glass_Trial 1	0.4910	0.0036	99.27	99.57	99.59
	0.5018	0.0046	99.08		
	0.4853	0.0012	99.75		
	0.4874	0.0015	99.69		
	0.5566	0.0037	99.34		
	0.4960	0.0021	99.58		
	0.4899	0.0023	99.53		
	0.4862	0.0003	99.94		
	0.5000	0.0004	99.92		
Seventh Generation Dishwasher Gel _Glass_Trial 2	0.4910	0.0036	99.27	99.56	
	0.5018	0.0046	99.08		
	0.4853	0.0012	99.75		
	0.4874	0.0015	99.69		
	0.4966	0.0037	99.25		
	0.4960	0.0021	99.58		
	0.4899	0.0023	99.53		
	0.4862	0.0003	99.94		
	0.5000	0.0004	99.92		
Seventh Generation Dishwasher Gel _Glass_Trial 3	0.5036	0.0034	99.32	99.55	
	0.4965	0.0017	99.66		
	0.4960	0.0027	99.46		
	0.4854	0.0026	99.46		
	0.4969	0.0021	99.58		
	0.5036	0.0018	99.64		
	0.4907	0.0019	99.61		
	0.4963	0.0021	99.58		
	0.5011	0.0016	99.68		
Seventh Generation Dishwasher Gel _Glass_Trial 4	0.5007	0.0011	99.78	99.73	
	0.4960	0.0009	99.82		
	0.4883	0.0018	99.63		
	0.4989	0.0012	99.76		
	0.4983	0.0009	99.82		
	0.4905	0.0012	99.76		
	0.4948	0.0016	99.68		
	0.4940	0.0011	99.78		
	0.4959	0.0023	99.54		
Seventh Generation Dishwasher Gel _Glass_Trial 5	0.4986	0.0022	99.56	99.57	
	0.4875	0.0018	99.63		
	0.4903	0.0026	99.47		
	0.4990	0.0015	99.70		
	0.4949	0.0026	99.47		
	0.4938	0.0018	99.64		
	0.4977	0.0026	99.48		
	0.4948	0.0011	99.78		
	0.5178	0.0033	99.36		
Cleaner Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed	
Seventh Generation Dishwasher Gel _Stainless Steel_Trial 1	0.4879	0.0056	98.85	98.77	98.75
	0.4990	0.0112	97.76		
	0.4861	0.0053	98.91		
	0.4871	0.0064	98.69		
	0.4961	0.0049	99.01		
	0.4953	0.0030	99.39		
	0.4885	0.0079	98.38		

CLEANING LABORATORY EVALUATION SUMMARY

	0.4988	0.0052	98.96		
	0.4958	0.0050	98.99		
Seventh Generation Dishwasher Gel	0.4922	0.0066	98.66	98.51	
Stainless Steel_Trial 2	0.4720	0.0066	98.60		
	0.4816	0.0053	98.90		
	0.5010	0.0074	98.52		
	0.4734	0.0057	98.80		
	0.4934	0.0113	97.71		
	0.4996	0.0033	99.34		
	0.4798	0.0140	97.08		
	0.4921	0.0052	98.94		
Seventh Generation Dishwasher Gel	0.4981	0.0065	98.70	99.00	
Stainless Steel_Trial 3	0.4988	0.0036	99.28		
	0.4980	0.0067	98.65		
	0.4961	0.0009	99.82		
	0.4946	0.0021	99.58		
	0.5045	0.0052	98.97		
	0.4884	0.0033	99.32		
	0.4835	0.0099	97.95		
	0.5022	0.0065	98.71		
Seventh Generation Dishwasher Gel	0.4913	0.0038	99.23	99.30	
Stainless Steel_Trial 4	0.4966	0.0014	99.72		
	0.4978	0.0059	98.81		
	0.4998	0.0004	99.92		
	0.4967	0.0045	99.09		
	0.4886	0.0035	99.28		
	0.4906	0.0042	99.14		
	0.4941	0.0040	99.19		
	0.4972	0.0033	99.34		
Seventh Generation Dishwasher Gel	0.5046	0.0060	98.81	98.19	
Stainless Steel_Trial 5	0.4976	0.0036	99.28		
	0.4844	0.0030	99.38		
	0.4932	0.0060	98.78		
	0.4986	0.0179	96.41		
	0.4861	0.0107	97.80		
	0.5004	0.0058	98.84		
	0.5044	0.0201	96.02		
	0.4944	0.0081	98.36		
Cleaner Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed	
Cascade_Ceramic_Trial 1	0.4856	0.0180	96.29	96.23	92.66
	0.4939	0.0217	95.61		
	0.4935	0.0133	97.31		
	0.4925	0.0136	97.24		
	0.4889	0.0192	96.07		
	0.4896	0.0150	96.94		
	0.4905	0.0130	97.35		
	0.4827	0.0212	95.61		
	0.4936	0.0312	93.68		
Cascade_Ceramic_Trial 2	0.4931	0.0237	95.19	88.53	
	0.4881	0.0217	95.55		
	0.4996	0.0270	94.60		
	0.4890	0.3192	34.72		
	0.4916	0.0275	94.41		
	0.4989	0.0198	96.03		
	0.5012	0.0202	95.97		
	0.4942	0.0247	95.00		
	0.4970	0.0232	95.33		

CLEANING LABORATORY EVALUATION SUMMARY

Cascade_Ceramic_Trial 3	0.4945	0.0170	96.56	95.50	
	0.5002	0.0251	94.98		
	0.4880	0.0178	96.35		
	0.4870	0.0249	94.89		
	0.4998	0.0163	96.74		
	0.4869	0.0216	95.56		
	0.4996	0.0335	93.29		
	0.4922	0.0203	95.88		
	0.4965	0.0238	95.21		
Cascade_Ceramic_Trial 4	0.4967	0.0428	91.38	94.38	
	0.4969	0.0226	95.45		
	0.4977	0.0287	94.23		
	0.4910	0.0259	94.73		
	0.4952	0.0211	95.74		
	0.4966	0.0297	94.02		
	0.4941	0.0423	91.44		
	0.4986	0.0190	96.19		
	0.4958	0.0188	96.21		
Cascade_Ceramic_Trial 5	0.4910	0.0233	95.25	88.66	
	0.4904	0.0229	95.33		
	0.4881	0.1721	64.74		
	0.4825	0.0186	96.15		
	0.5021	0.0212	95.78		
	0.4865	0.0287	94.10		
	0.4927	0.0156	96.83		
	0.4921	0.1819	63.04		
	0.5024	0.0166	96.70		
Cleaner Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed	
Cascade_Glass_Trial 1	0.4991	0.0020	99.60	99.53	99.60
	0.4967	0.0007	99.86		
	0.4922	0.0017	99.65		
	0.4930	0.0019	99.61		
	0.4930	0.0016	99.68		
	0.4915	0.0015	99.69		
	0.4886	0.0012	99.75		
	0.5027	0.0049	99.03		
	0.5040	0.0058	98.85		
Cascade_Glass_Trial 2	0.4994	0.0006	99.88	99.66	
	0.4969	0.0052	98.95		
	0.4966	0.0013	99.74		
	0.4973	0.0010	99.80		
	0.5036	0.0006	99.88		
	0.5073	0.0011	99.78		
	0.4957	0.0016	99.68		
	0.4994	0.0015	99.70		
	0.4950	0.0023	99.54		
Cascade_Glass_Trial 3	0.4946	0.0011	99.78	99.63	
	0.4966	0.0014	99.72		
	0.5025	0.0025	99.50		
	0.4968	0.0017	99.66		
	0.4955	0.0020	99.60		
	0.4974	0.0021	99.58		
	0.4961	0.0016	99.68		
	0.4965	0.0018	99.64		
	0.5043	0.0024	99.52		
Cascade_Glass_Trial 4	0.4998	0.0026	99.48	99.58	
	0.4884	0.0005	99.90		

CLEANING LABORATORY EVALUATION SUMMARY

	0.4970	0.0024	99.52		
	0.4927	0.0011	99.78		
	0.4898	0.0018	99.63		
	0.5015	0.0021	99.58		
	0.4974	0.0024	99.52		
	0.5056	0.0017	99.66		
	0.4987	0.0041	99.18		
Cascade_Glass_Trial 5	0.5384	0.0041	99.24	99.61	
	0.4990	0.0022	99.56		
	0.4882	0.0018	99.63		
	0.4965	0.0009	99.82		
	0.5032	0.0014	99.72		
	0.4946	0.0027	99.45		
	0.4970	0.0023	99.54		
	0.4961	0.0012	99.76		
	0.4966	0.0011	99.78		
Cleaner Initial wt	Final wt	%Removed Trial	Avg %	Overall %Removed	
Cascade_Stainless Steel_Trial 1	0.4972	0.0846	82.98	91.55	96.48
	0.4893	0.0644	86.84		
	0.4953	0.0209	95.78		
	0.4856	0.0322	93.37		
	0.4936	0.0332	93.27		
	0.4937	0.0243	95.08		
	0.4964	0.0472	90.49		
	0.4836	0.0437	90.96		
	0.4944	0.0240	95.15		
Cascade_Stainless Steel_Trial 2	0.4992	0.0029	99.42	99.44	
	0.4881	0.0008	99.84		
	0.4896	0.0013	99.73		
	0.4898	0.0031	99.37		
	0.4903	0.0033	99.33		
	0.4965	0.0036	99.27		
	0.9096	0.0036	99.60		
	0.4976	0.0044	99.12		
	0.5065	0.0035	99.31		
Cascade_Stainless Steel_Trial 3	0.4964	0.0121	97.56	98.56	
	0.4882	0.0092	98.12		
	0.4933	0.0052	98.95		
	0.4996	0.0094	98.12		
	0.4917	0.0090	98.17		
	0.4986	0.0043	99.14		
	0.4896	0.0031	99.37		
	0.5051	0.0060	98.81		
	0.4989	0.0058	98.84		
Cascade_Stainless Steel_Trial 4	0.5053	0.0047	99.07	98.56	
	0.5066	0.0112	97.79		
	0.4882	0.0083	98.30		
	0.4927	0.0077	98.44		
	0.4906	0.0109	97.78		
	0.4976	0.0054	98.91		
	0.4987	0.0064	98.72		
	0.4946	0.0077	98.44		
	0.4964	0.0020	99.60		
Cascade_Stainless Steel_Trial 5	0.4899	0.0222	95.47	94.30	
	0.4892	0.0401	91.80		
	0.4902	0.0382	92.21		
	0.4858	0.0243	95.00		

CLEANING LABORATORY EVALUATION SUMMARY

0.4940	0.0264	94.66		
0.4888	0.0236	95.17		
0.4869	0.0205	95.79		
0.4925	0.0198	95.98		
0.4948	0.0363	92.66		

Visual Analysis:

The Cascade cleaner had the best spotting (no spots) results out of the three, with an overall average rating of 1.4 out of 5, with 5 being the worst. The next best spotting cleaner was the Seventh Generation cleaner, with an overall average spotting rating of 1.8 out of 5. The worst spotting cleaner was the AGAE with an average overall spotting rating of 2.5 out of 5.

The Cascade cleaner also had the best filming (no film) results out of the three cleaners, with an average overall rating of 1.5 out of 5. The second best filming removal cleaner was the Seventh Generation cleaner with an overall average rating of 1.7 out of 5. The worst filming cleaner was the AGAE with an overall average rating of 2.3 out of 5.

Company: AGAE Spotting					
Trial					
	Rating 1	2	3	Trial Avg.	Overall Avg.
	2	3	2	2.3	2.5
	2	2	1	1.7	
	3	2	2	2.3	
	1	2	2	1.7	
	2	2	2	2	
	3	2	2	2.3	
	2	2	1	1.7	
	2	2	2	2	
	1	2	2	1.7	
	1	3	3	2.3	
Trial 2					
	1	1.5	1.5	1.3	
	1	1.5	1	1.2	
	1	3	2	2	
	2	1	1.5	1.5	
	1	3	2	2	
	2	2	1.5	1.8	
	2	1.5	1	1.5	
	1	3.5	2	2.2	
	1	2	1	1.3	
	1	4.5	4	3.2	
Trial 3					
	5	4	5	4.7	
	3	2	2.5	2.5	
	2.5	2	3	2.5	
	2.5	2	3	2.5	
	4	4	5	4.3	
	4	4	4	4	
	2	2	2	2	
	2	3	1	2	
	1.5	1.5	1.5	1.5	
	4	4	4	4	
Trial 4					
	4	2	3	3	
	2	2	1	1.7	
	2	2	1	1.7	
	2	2	1	1.7	
	5	2	3	3.3	
	4	3	3	3.3	
	2	1.5	1	1.5	
	2	1.5	1	1.5	
	2	1.5	1	1.5	

CLEANING LABORATORY EVALUATION SUMMARY

	3	3	3	3	
Trial 5					
	4	2	5	3.7	
	2	2	3	2.3	
	3	2.5	5	3.5	
	2	2	4	2.7	
	4	4	5	4.3	
	3	3.5	5	3.8	
	2	2	4	2.7	
	2	4	5	3.7	
	2	2	4	2.7	
	5	4	5	4.7	

Seventh Generation Spotting

Trial 1					
	Rating 1	2	3	Trial Avg.	Overall Avg.
	2	1.5	2	1.8	1.8
	2	1.5	1.5	1.7	
	2	1.5	1.5	1.7	
	2	1.5	1	1.5	
	2	2		2.5	2.2
	2	1.5	2	1.8	
	1.5	1.5	1	1.3	
	2	2		2	2
	1.5	1.5	1.5	1.5	
	2	2		2	2
Trial 2					
	2	2.5	2	2.2	
	2	1.5	1	1.5	
	2	3		2	2.3
	2	1.5	1	1.5	
	1	3		1.5	1.8
	3	4		2.5	3.2
	2	1.5	1	1.5	
	3	3.5	1.5	2.7	
	3	1.5	1.5	2	
	2	4		2.5	2.8
Trial 3					
	2	2.5	2	2.2	
	2	2		1	1.7
	2	1.5	1.5	1.7	
	2	1.5	1	1.5	
	2	2		1.5	1.8
	2	2		2	2
	1	2		1.5	1.5
	2	3		2	2.3
	2	2		1.5	1.8
	3	2		3	2.7
Trial 4					
	1	3		2	2
	1	1		1.5	1.2
	2	1.5	1.5	1.7	
	1	1.5	2	1.5	
	1	1		3.5	1.8
	1	1.5	3	1.8	
	1	1.5	1	1.2	
	1	1.5	3	1.8	
	1	1.5	1.5	1.3	

CLEANING LABORATORY EVALUATION SUMMARY

	1	2		2.5	1.8
Trial 5					
	1	3		1	1.7
	1	2		1	1.3
	1	3		1.5	1.8
	1	2		1.5	1.5
	1	4		1.5	2.2
	1.5	3		2.5	2.3
	1	2		1	1.3
	1	4		1	2
	1	2		1	1.3
	1.5	3		2	2.2

Cascade Spotting

Trial 1					
	Rating 1	2	3	Trial Avg.	Overall Avg.
	1	1.5	1.5	1.3	1.4
	1	1.5	1.5	1.3	
	1	1.5	1	1.2	
	1	1	1	1	
	1	1	1	1	
	1	1.5	1.5	1.3	
	1	1	2	1.3	
	1	1	1	1	
	1	1	1	1	
	1	1.5	1	1.2	
Trial 2					
	1	1	1.5	1.2	
	2	1	1	1.3	
	2	1	1.5	1.5	
	1.5	1	1	1.2	
	1.5	1.5	1.5	1.5	
	2	1	1	1.3	
	2	1.5	1	1.5	
	3	3.5	1	2.5	
	2	1	1.5	1.5	
	3	1	1.5	1.8	
Trial 3					
	2	1.5	2	1.8	
	2	1	1	1.3	
	2	1.5	1	1.5	
	2	1.5	1	1.5	
	2	1	1.5	1.5	
	1	1	1.5	1.2	
	1	1.5	1	1.2	
	2	1	1	1.3	
	1	1.5	1.5	1.3	
	2	1	1.5	1.5	
Trial 4					
	1	1	1.5	1.2	
	1	1	1	1	
	1	1.5	1.5	1.3	
	1	1	1.5	1.2	
	2	1	1.5	1.5	
	1	1.5	1	1.2	
	1	1.5	1	1.2	
	2	1	1	1.3	
	1	1	1	1	

CLEANING LABORATORY EVALUATION SUMMARY

	1	1	1.5	1.2	
Trial 5					
	2	2	1.5	1.8	
	2	1.5	1	1.5	
	2	1.5	1	1.5	
	1	2	1.5	1.5	
	2	2	1.5	1.8	
	2	1.5	1.5	1.7	
	2	2	1	1.7	
	2	2	1	1.7	
	2	1.5	1	1.5	
	2	2	1	1.7	

Seventh Generation Filming

Trial 1					
	Rating 1	2	3	Trial Avg.	Overall Avg.
	1	1	1.5	1.2	1.7
	2	1	1.5	1.5	
	1	1	1.5	1.2	
	1	1	2	1.3	
	1	1.5	2	1.5	
	2	2	2	2	
	1.5	1.5	1.5	1.5	
	1	1	1.5	1.2	
	1	1.5	1.5	1.3	
	2	2	1.5	1.8	
Trial 2					
	2	2	3	2.3	
	2	1.5	1	1.5	
	1	1.5	1.5	1.3	
	2	1	1	1.3	
	2	2	3	2.3	
	2	2	2.5	2.2	
	2	1	1	1.3	
	2	2	2	2	
	1	1	1.5	1.2	
	3	3	2	2.7	
Trial 3					
	2	1.5	2	1.8	
	2	1.5	1.5	1.7	
	1	1.5	1.5	1.3	
	1	1.5	1.5	1.3	
	1.5	2	2	1.8	
	2	1.5	1.5	1.7	
	2	1.5	1.5	1.7	
	1	1.5	3	1.8	
	2	2	2	2	
	2	1.5	2.5	2	
Trial 4					
	1	2	1.5	1.5	
	2	2	1.5	1.8	
	2	1.5	1.5	1.7	
	1	3	2	2	
	1	2.5	2.5	2	
	1	1.5	1.5	1.3	
	1	3	1	1.7	
	2	1.5	1.5	1.7	
	1	2	1.5	1.5	

CLEANING LABORATORY EVALUATION SUMMARY

	1	1	1.5	1.2	
Trial 5					
	1	2	2	1.7	
	2	2	1	1.7	
	1.5	1.5	2	1.7	
	1	2	1.5	1.5	
	1	2	3	2	
	1	2	1	1.3	
	1	1.5	1.5	1.3	
	1	2	3	2	
	1	1.5	2	1.5	
	1	2	2	1.7	
Company: Cascade					
Trial 1	Rating 1	2	3	Trial Avg.	Overall Avg.
	2	1	2	1.7	1.5
	1	1	1	1	
	1	1	1.5	1.2	
	1	1	1.5	1.2	
	1	1	1.5	1.2	
	1	1	1.5	1.2	
	1	1	1	1	
	1	1	2	1.3	
	1	1	1	1	
	1	1	1.5	1.2	
Trial 2					
	3	1	2	2	
	2	1	1.5	1.5	
	1.5	1	1.5	1.3	
	1	1	1.5	1.2	
	1.5	1	1	1.2	
	1	1	2	1.3	
	2	1	2	1.7	
	2	1	2	1.7	
	3	1.5	1	1.8	
	3	1.5	1	1.8	
Trial 3					
	2	1	1	1.3	
	2	1.5	1.5	1.7	
	2	1	2	1.7	
	2	1.5	2	1.8	
	1	1	1.5	1.2	
	2	1.5	2	1.8	
	2	1	2	1.7	
	2	1	2	1.7	
	1	1.5	1	1.2	
	1	1	1.5	1.2	
Trial 4					
	2	1	1.5	1.5	
	1	1.5	1.5	1.3	
	1	1.5	1	1.2	
	1	1.5	1	1.2	
	1	1.5	2	1.5	
	2	1.5	2	1.8	
	2	1	1	1.3	
	2	1.5	2	1.8	
	1	1	2	1.3	

CLEANING LABORATORY EVALUATION SUMMARY

	2	1	2	1.7	
Trial 5					
	2	2.5	2	2.2	
	1	1.5	1	1.2	
	1	1.5	2	1.5	
	1	2.5	1.5	1.7	
	1	2	2	1.7	
	1	2	1	1.3	
	2	2	1.5	1.8	
	1	2	2.5	1.8	
	1	1.5	2	1.5	
	1	2	2	1.7	

Summary:

Substrates:	Ceramics, Glass/Quartz, Stainless Steel				
Contaminants:	Food				
Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
AGAE Technologies	Dishwasher Detergent Gel	100	96.83	<input checked="" type="checkbox"/>	Visual: S 2.5 F 2.3
Seventh Generation	Free & Clear Automatic Dish Gel	100	98.20	<input checked="" type="checkbox"/>	Visual: S 1.8 F 1.7
Procter & Gamble	Cascade Complete (Dawn)	100	96.24	<input checked="" type="checkbox"/>	Visual: S 1.4 F 1.5

Conclusion:

In terms of overall cleaner effectiveness over the three substrates, the Seventh Generation cleaner was the best cleaner, averaging 98.2% removal. The AGAE cleaner was the second best with a removal of 96.83% and Cascade cleaner the third best with a removal of 96.24%. Overall, in regards to spotting and filming neutralization the Cascade cleaner was most effective, the Seventh Generation cleaner second, and the AGAGE cleaner third.