CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2019
DateRun:	08/20/2019
Experimenters:	Sabrina Apel, Julie Nguyen
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Marble
PartType:	Coupon
Contaminants:	Calcium/lime
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To evaluate K-cup cleaners on the effectiveness of their descaling performance using marble pieces.

Experimental Procedure:

To test the descaling performance, the marble block test was used. In this test, a marble block is submerged for a period of time in two cleaner solutions. The weight of the marble block was measured before the immersion and after the immersion. Marble is chemically similar to hard water stains in that they both are made up of calcium carbonate. Results can be expressed in the number of grams lost over time during the immersion process. This method is widely used due to its simplicity but has some restrictions. One such limitation is how other soils typically mixed with hard water stains are not taken into consideration.

Several marble chunks of similar size were weighed to determine the baseline weight of each piece. The marble chunks were then immersed into two supplied products at vendor recommended dilutions and allowed to soak for two hours. The marble chunks were removed from the solutions after 5 minutes, and were rinsed to remove any loose material, dried using a Master Appliance Heat gun at 500 F, weighed, and reimmersed into the cleaner. This process was repeated after 10, 15, 30, 60, and 120 minutes. After the full 120 minutes, the marble chunks were removed from both solutions, rinsed, and dried. Final weights were recorded to determine weight loss. Three trials were performed for each supplied cleaner.

Results:

Table 1: Gravimetrics of Each Trial

Trial 1			
Cleaner	Temperature (ºC)	Time (min)	Weight (g)
Clean'n Brew Cleaning Cup	80	0	22.8519
		5	22.5883
		10	22.4663
		15	22.3926
		30	22.2707
		60	22.1433
		120	22.0462
Urnex K-cup Cleaning Cup	80	0	17.6657
		5	17.6610
		10	17.6470
		15	17.6468
		30	17.6468
		60	17.648
		120	17.6474
Trial 2			
Cleaner	Temperature (ºC)	Time (min)	Weight (g)
Clean'n Brew Cleaning Cup	80	0	18.5314
		5	18.3433
		10	18.2174
		15	18.1207
		30	17.9878
		60	17.8454
		120	17.7225
Urnex K-cup Cleaning Cup	80	0	20.3789
		5	20.3834

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		10	20.3820
		15	20.3809
		30	20.3803
		60	20.3787
		120	20.3785
Trial 3			
Cleaner	Temperature (ºC)	Time (min)	Weight (g)
Clean'n Brew Cleaning Cup	80	0	18.1032
		5	17.8948
		10	17.7317
		15	17.5885
		30	17.3679
		60	17.1621
		120	17.0944
Urnex K-cup Cleaning Cup	80	0	30.3569
		5	30.3356
		10	30.3289
		15	30.3245
		30	30.3239
		60	30.3228
		120	30.3217

Table 2: Images

Trial	Cleaner	0 min	5 mins	10 mins	15 mins	30 mins	60 mins	120 mins
1	Clean'n Brew Cleaning Cup							
	Urnex K-cup Cleaning Cup							
2	Clean'n Brew Cleaning Cup							
	Urnex K-cup Cleaning Cup							
3	Clean'n Brew Cleaning Cup							
	Urnex K-cup Cleaning Cup							

Table 3: Gravimetric Results

Cleaner	Trial	Initial Wt. Marble	Final Wt. Marble	Wt Loss	% weight loss	Average %wt loss
Clean'n Brew Cleaning Cup	1	22.8519	22.0462	0.8057	3.5	4.5
	2	18.5314	17.7225	0.8089	4.4	
	3	18.1032	17.0944	1.0088	5.6	
Urnex K-cup Cleaning Cup	1	17.6657	17.6474	0.0183	0.1	0.1
	2	20.3789	20.3785	0.0004	0.0	
	3	30.3569	30.3217	0.0352	0.1	

Summary:

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Substrates:	Marble				
Contaminants:	Calcium/lime				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Clean 'n Brew	Clean'n Brew Cleaning Cup	100	0.00	☑	Average %wt loss 4.5
Urnex	Urnex K-Cup Cleaning Cup	100	0.00	☐	Average %wt loss 0.1

Conclusion: Clean ‘n Brew Cleaning Cup was the most effective cleaner in terms of weight loss in comparison to the Urnex K-cup Cleaning Cup cleaner. Clean ‘n Brew Cleaning Cup had an average weight loss of 4.50%, and Urnex K-cup Cleaning Cup had an average weight loss of 0.1%. Clean ‘n Brew Cleaning Cup would be recommended for descaling.