# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2022

DateRun: 05/10/2022

Experimenters: Zoe Lawson

ClientType: Cleaner Manufacturer

ProjectNumber: Project #2

Substrates: Marble

PartType: Coupon

Contaminants: Calcium/lime

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate weight lost from marble block after sitting in supplied solutions for 1 min, 5 min, 20min, 60min and 72 hours.

Experimental Procedure: Three solutions at 40% concentration known as NTA, DS IDA, and EDTA were used for this experiment. Several marble chips of similar size and shape were weighed to determine the baseline weight of each piece. The marble was then placed in small beakers, one for each solution, and immersed completely. The marble pieces were then taken out at the 1-minute mark, quickly rinsed, and then dried with paper towels. They were then taken out at 5 minutes, 20 minutes, and 60 minutes following the same process. They were immersed in the solution after the 60-minute mark and left over the weekend (72 hours) to soak. They were then taken out, dried, and their final weights were taken and recorded.

Results: DS IDA and EDTA were used as is as they were already at the desired 40% concentration. The NTA solution was prepared prior to experimentation. 40% DS IDA was the only chemistry that did not exceed 1% and was not effective at removing calcium/lime. All marble blocks had lost a significant amount of color and were ashy in appearance.

| Cleaner | Concentration | Initial | 1 min | 5 min | 20 min | 60 min | 72 hours | Total loss | % Loss |
|---|---|---|---|---|---|---|---|---|---|
| NTA | 40% | 18.6233 | 18.6067 | 18.5795 | 18.5542 | 18.5165 | 17.9448 | -0.6785 | -3.78 |
| DS IDA | 40% | 20.9868 | 20.9838 | 20.9839 | 20.9663 | 20.9593 | 20.9434 | -0.0434 | -0.21 |
| EDTA | 40% | 21.0188 | 21.0177 | 20.9748 | 20.9440 | 20.8922 | 19.6468 | -1.3720 | -6.98 |

Summary:

Conclusion: The EDTA solution was the most effective at removing calcium/lime with a percent loss of 6.98. NTA was less effective at 3.78% loss but performed better than DS IDA, which had only a 0.21% loss.