CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2005

DateRun: 07/24/2005

Experimenters: Jason Marshall

ClientType: Cleaner Manufacturer

ProjectNumber: Project #1

Substrates: Glass/Quartz

PartType: Coupon

Contaminants: Calcium/lime

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate supplied products for lime removal.

Experimental Procedure: A lime/water slurry was made by mixing 20 grams of calcium carbonate in 100 milliliters of DI water. The solution was mixed to suspend the calcium carbonate in the water. A plastic swab was used to apply the slurry mix onto six preweighed mirrored glass coupons. Half of the coated coupons were allowed to dry at room temperature. The other set of coupons were dried using a Master Appliance Heat gun at 300 F for five minutes. After the slurry mix was dried, the coupons were weighed again to determine the amount of calcium carbonate that was applied to the coupons.

One coupon that was air dried and one that was dried with the heat gun were immersed into a 400 ml beaker filled with the supplied cleaning products. The coupons were allowed to sit in the solution for 5 minutes at room temperature. In addition to the two supplied cleaners, a beaker with only water was used. At the end of the soaking, the coupons were quickly rinsed (2-3 seconds) in a heated tap water rinse (120 F) and then were dried using compressed air for 15 seconds at room temperature. Once dry, visual observations were made and the coupons were weighed a final time. Removal efficiencies for each product was calculated.

Results: Both products and the water removed a majority of the dried calcium carbonate from the glass coupons. The DFC 23 had some residue remaining on the back side of the coupons. Visual inspection showed that the two DFC products looked cleaner than the coupons cleaned with water. There was no significant difference between the air dried and heat dried coupons. The table lists the efficiencies for the various coupons. Photos of the coupons were taken to better display the results.

Solution	Air dried	Heat dried
Water	95.99	93.83
DFC 23	85.84	93.04
DFC 30	98.76	94.66

Summary:

Substrates:	Glass/Quartz
Contaminants:	Calcium/lime

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Cogent Environmental Solutions	DFC 23	100	89.44	☑	
Cogent Environmental Solutions	DFC 30	100	96.71	☑	
Water	Water	100	94.91	☑	

Conclusion: Both DFC products showed ability to remove the calcium carbonate from the glass coupons. Follow test will be conducted with modifications to the removal process to address the residue remaining after cleaning and rinsing.