CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2015

DateRun: 10/12/2015

Experimenters: George Liang

ClientType: Cleaner Manufacturer

ProjectNumber: Project #1

Substrates: Aluminum, Ceramics, Glass/Quartz

PartType: Coupon

Contaminants: Chemical

Cleaning Methods:

Analytical Methods: Goniometry

Purpose: To compare the effectiveness of the provided aqueous solution for hydrophobic interactions for rough substrate surfaces between a 0.1% concentrated coating and a full concentrated coating solution.

Experimental Procedure: Three multiple tests trials were conducted in total for two sets of solution concentration. One was at 0.1% dilution concentration of BDT Sample 1 (pH 8.0), BDT Sample 2 (pH 9.7) and Solution of BDT (pH 11.0). The diluted solutions at 0.1% were made by diluting 99.9 mL of deionized water with 0.1mL from the full concentration of the samples. Thereafter three additional test trials were conducted at full concentration on rough substrate surfaces. The surfaces of the substrates were roughed up with an aluminum oxide 120 grit rolling sandpaper until noticeable signs of scratches were shown on the surfaces. In total of 6 tests were conducted. An initial test with a full concentration of BDT Sample 1 (pH 8.0) was tested on a set of three rough ceramic, aluminum and glass substrate. An initial contact angle of the substrates was obtained using the Video Fta32 Video 2.1 program with a Logitech quick cam pro4000. Apparatus of the machine was set at a constant position for consistency. Contact angles were measured by using a droplet of deionized water onto the surface after ~5 -10 seconds of waiting for stabilization of the water droplet. In the program three sets of points were used to obtain the angle. A baseline reading constituted two points and a third point was measured at the top of the bubble.

Application of the solution was done in a gentle manner by using a TX 707A Large Rectangular Head Swab onto the surface of the three ceramic substrates one at a time. After the application of the solution onto one of the ceramic surfaces, a bounty paper towel rinsed with deionized water was gently wiped onto the surface in a circular motion. Thereafter another contact angle was obtained.

The set of ceramic substrates were allowed time for air drying for 5 minutes. Then a new contact angle reading was obtained on a different spot of the surface that has not been used for the prior contact angle readings. A new contact angle was obtained after every 5 minutes of air drying in room temperature. The set of ceramics was allowed to air dry for a total of 30 minutes (a total of 6 readings was done after the initial and after the application of the solution).

Results: Chemistries Evaluated: 0.1% concentration of BDT Sample 1 (pH 8.0); BDT Sample 2 (pH 9.7); Solution of BDT (pH 11.0). Full concentrations of BDT Sample 1 (pH 8.0); BDT Sample 2 (pH 9.7); Solution of BDT (pH 11.0)

Surfaces Evaluated: Roughed Ceramic, Aluminum and Glass substrates.

In comparison between two solution concentrations, at 0.1% dilution, BDT Sample 1 was not as effective on ceramic and glass substrates. In addition to that for both concentrations, it was not effective on glass substrates. BDT Sample 2 at a 0.1% concentration was not as effective on only glass substrates. Whereas at full concentration, BDT Sample 2 was more effective on glass substrates. Roughed ceramic and aluminum coated with 0.1% and at 100% were effective in lowering its initial contact angle. Roughed ceramic substrates coated with 100% concentration of Solution of BDT were more effective at lowering its contact angle. In conclusion surfaces that were coated with full concentration of the solutions were more effective on rough surface substrates after a longer period of air-dry time in room temperature.

Summary:

Substrates:	Aluminum, Ceramics, Glass/Quartz				
Contaminants:	Chemical				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Solenis	Solenis BDT Sample 1	100	0.00	☐	
Solenis	Solenis BDT Sample 2	100	0.00	☐	
Solenis	Solenis BDT Solution	100	0.00	☑	

Conclusion: In comparison between two solution concentrations, at 0.1% dilution, BDT Sample 1 was not as effective on ceramic and glass substrates. In addition to that for both concentrations, it was not effective on glass substrates. BDT Sample 2 at a 0.1% concentration was not as effective on only glass substrates. Whereas at full concentration, BDT Sample 2 was more effective on glass substrates. Roughed ceramic and aluminum coated with 0.1% and at 100% were effective in lowering its initial contact angle. Roughed

ceramic substrates coated with 100% concentration of Solution of BDT were more effective at lowering its contact angle. In conclusion surfaces that were coated with full concentration of the solutions were more effective on rough surface substrates after a longer period of air-dry time in room temperature.