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 at a 0.1% concentration solution between smooth and rough surface substrates.

Experimental Procedure:

Three multiple tests trials were conducted in total for one out of the two sets of surface condition. Both sets of tests were conducted at a 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. One test was done for smooth surface substrates, whereas the other was done on rough surface substrates. 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 smooth 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.

A clean swab was used to wipe out the droplet on the surface from the contact angle reading. Then one cycle was ran on the surface of the ceramic substrate using a BYK Gardner machine with a Wypall X60 paper towel attached to the sled. After the one cycle run, another contact angle was obtained. This procedure was done on all three of the same substrates for the “after 1 cycle contact angle reading”. Thereafter an additional 4 cycles of manual abrasion was tested using the same Wypall X60 paper towel from before on all three ceramic substrates at the same time. After the additional 4 cycles, a new contact angle was obtained for “5 cycles” on the manual abrasion machine. From this point on after every 5 cycles tested on the manual abrasion with the surface, an additional contact angle was read until the completion of 30 cycles on the manual abrasion machine. This was repeated for aluminum and glass substrates sets.

The exact same procedure conducted on smooth surfaces is applied for rough substrate surfaces. An additional step prior to measuring the initial contact angles of the substrates. 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.

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)

Surfaces Evaluated: Rough Ceramic; Aluminum; Glass. Smooth Ceramic; Aluminum; Glass

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 the two surface conditions at a 0.1% concentration of the solutions. BDT Sample 1 at a 0.1% dilution was both easily removable from smooth and roughed ceramic and glass substrates. However, BDT Sample 1 is slightly harder to remove on smooth ceramic and glass substrates. BDT Sample 1 had slight ease of removability only on roughed aluminum surfaces. For diluted BDT Sample 2 solution, it was easily removed from both smooth and rough ceramic substrates. Whereas it was harder to remove the coating of BDT Sample 2 on roughed aluminum substrate than the smooth surface. In addition to that BDT Sample 2 was harder to remove on smooth glass surfaces than its rough counterpart. Solution of BDT was

easily removed from all roughed surfaces. Whereas for it was slightly harder to be removed on smooth glass and aluminum substrates.