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 smooth 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 one out of the 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 smooth substrate surface. 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.

A clean swab was used to wipe out the droplet on the surface from the contact angle reading. Then one cycle was run 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 were 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.

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: Smooth Ceramic, Aluminum and Glass substrates

In comparison between two solution concentrations on all three smooth substrate surfaces; BDT Sample 1 and BDT sample 2 at full concentration was less easily removed compared to surfaces coated with 0.1% concentrated solutions was twice as effective or even more.

For both diluted and full concentration for BDT Sample 1, smooth ceramic substrates had the fewest ease of removability of coated solution from ceramic surface. In addition to that BDT Sample 2 for both dilutions also had the least removability of coated solution on glass substrates. For Solution of BDT at full concentration, its highest removability was found to be on smooth aluminum surfaces. However the diluted Solution of BDT coating was the hardest to remove on smooth aluminum substrates. Solution of BDT held the longest on a smooth aluminum substrate.

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: Smooth surfaces coated with full concentrated solution have a harder removability rate than from surfaces coated with a 0.1% diluted concentration.