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:	Immersion/Soak
Analytical Methods:	Goniometry
Purpose:	To compare the effectiveness of the provided aqueous solution for hydrophobic interactions at full concentration between multiple types of roughed surfaces and smooth surfaced substrates.
Experimental Procedure:	Three multiple tests trials were conducted in total for BDT Sample 1 (pH 8.0), BDT Sample 2 (pH 9.7) and Solution of BDT (pH 11.0). The set of three multiple test was repeated for both roughed and smooth substrate surfaces. In total of 6 tests were conducted. An initial test with just BDT Sample 1 (pH 8.0) was tested on a set of three smooth ceramic, aluminum and glass substrate provided by the client at full concentration. An initial contact angle of the substrates was obtained using the Video Fta32 Video 2.1 program with a Logitech quick cam pro 4000. 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 surface, 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). 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:	Roughed Ceramic, Aluminum and Glass substrates. Smooth Ceramic, Aluminum and Glass substrates.

Substrate:	Ceramic							
Solution	Initial	Right After	5 min	10 min	15 min	20 min	25 min	30 min
BDT Sample 1	44.8	11.7	11.4	10.1	11.3	10	13.4	13.6
BDT Sample 2	48.1	9.4	8.8	8.5	8.1	7.8	9.2	9.9
Solution of BDT	48.6	9.4	12.2	12.5	12.8	11.5	11.7	11.6
Substrate:	Aluminum							
Solution	Initial	Right After	5min	10 min	15 min	20 min	25 min	30 min
BDT Sample 1	67.4	39.9	22	20.9	14.5	16.2	17.4	19.1
BDT Sample 2	87.1	15.3	14.8	14.5	14.6	12.1	11.9	12.6
Solution of BDT	60.4	28.3	14.6	11.5	14	13	16.9	13.4
Substrate:	Glass							
Solution	Initial	Right After	5min	10 min	15 min	20 min	25 min	30 min
BDT Sample 1	25.4	13.3	8.8	9.2	6.5	7.7	8.2	8.1

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BDT Sample 2	19.7	9.7	8.7	9.7	9.2	9.6	9.7	10
Solution of BDT	20.4	13.3	12.3	8.2	13.1	11.2	9.7	10
Rough								
Substrate:	Ceramic							
Solution	Initial	Right After	5min	10 min	15 min	20 min	25 min	30 min
DBT Sample 1	52.5	15.1	13.8	16	10.5	14.6	13.7	15.8
DBT Sample 2	21.1	8	7.3	6.1	5.8	6	6.9	7.5
Solution of BDT	39.1	11.7	6.9	9.2	13.6	11.7	11.5	9.1
Substrate:	Aluminum							
Solution	Initial	Right After	5min	10 min	15 min	20 min	25 min	30 min
DBT Sample 1	79.3	9	10.3	10.8	10.8	9.7	9.4	8.6
DBT Sample 2	68.8	6.9	10.1	11.4	12.1	10.4	11.2	8.8
Solution of BDT	32.5	2.5	8.1	10.3	7.9	9.8	10.8	14.1
Substrate:	Glass							
Solution	Initial	Right After	5min	10 min	15 min	20 min	25 min	30 min
DBT Sample 1	12.8	9.7	10.8	11.7	12.4	11.1	11.3	11.1
DBT Sample 2	25.8	8.1	8.5	9	9.5	10.5	12.4	10.6
Solution of BDT	96.8	20.2	27.4	13.1	12.1	10.3	16.5	14.2

Summary:

Substrates:	Aluminum, Ceramics, Glass/Quartz
Contaminants:	Chemical

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Solenis	Solenis BDT Sample 1	100	0.00	☑	Effective on ceramic, aluminum and glass substrates
Solenis	Solenis BDT Sample 2	100	0.00	☑	Effective on ceramic, aluminum and glass substrates
Solenis	Solenis BDT Solution	100	0.00	☑	Effective on ceramic, aluminum and glass substrates

Conclusion:

In comparison between the surfaces, their initial contact angles had no marginal difference between the two surfaces. After letting it sit in room temperature; the final contact angle had been lowered by more than 50% from its initial contact angle. BDT Sample 1 at full concentration was the only ineffective solution on roughed glass substrates.