

Product	PPS
Dell Tech Lab Code #	00-0023
Report Date	March 3, 2000
Test	Contact angles in distilled water of 5 painted panels treated with PPS.
Objective	To determine the durability of PPS after 100, 125, and 150 passes with the Gardner Abrasion Tester.
Procedure	Gardner Abrasion Tester – Probes treated with PPS are subjected to 100, 125, and 150 passes with a 2% auto wash solution and a hog-bristle brush prior to measuring contact angles. ATI Instruments - Cahn DCA Application Software Experimental Setup: Initialize stage, set speed @ 150 microns/second, tare balance, detect zero depth of immersion, advance 14 mm maximum, return to zero position, end run.

Summary of Method and Definition of Terms

A Cahn Dynamic Contact Angle (DCA) Analyzer is used to determine contact angles.

The electrobalance unit of the DCA Analyzer produces a record of the change of weight per unit of length as the treated solid probe advances and recedes in distilled water. From this record the contact angles at the liquid/solid interface are calculated.

The solid substrate used is a painted panel, coated with PPS and air dried at 23 °C for 48 hours. The solid probe is coated once and used successively for the contact angle measurements after 100, 125, and 150 passes on the Gardner Abrasion Tester with a 2% auto wash solution and hog-bristle brush, followed with a tap water rinse and air dried at room temperature.

The procedure used measures the contact angle in order to determine the degree of wettability of a surface. Contact angles also give an indication of the degree of cleanliness of a surface.

The *contact angle* is the angle the liquid surface makes with the solid support; it characterizes the interaction between a solid and a liquid surface at the interface.

A contact angle larger than 90° indicates no wetting or, in other words, the solid substrate shows repellency for the liquid. The liquid will wet the solid, at least partially, when the contact angle is smaller than 90°. The tendency to wet increases with a decreasing contact angle.

The difference between the advancing and the receding contact angle is called *hysteresis*.

Contact angles of distilled water on painted panels treated with PPS and air-dried for 48 hours

Sample	Advancing CA (°)	Receding CA (°)	Hysteresis (°)
Blank	91°	32°	59°
Probe 1	113°	67°	46°
Probe 2	113°	70°	43°
Probe 3	116°	74°	42°
Probe 4	116°	71°	45°
Probe 5	113°	69°	44°
Average of 5 Probes	114°	70°	44°

Subjected to 100 passes on the Gardner Abrasion Tester

Sample	Advancing CA (°)	Receding CA (°)	Hysteresis (°)
Blank	89°	33°	56°
Probe 1	116°	62°	54°
Probe 2	118°	59°	59°
Probe 3	118°	62°	56°
Probe 4	117°	65°	52°
Probe 5	117°	60°	57°
Average of 5 Probes	117°	62°	56°

Subjected to 125 passes on the Gardner Abrasion Tester

Sample	Advancing CA (°)	Receding CA (°)	Hysteresis (°)
Blank	87°	30°	57°
Probe 1	115°	58°	57°
Probe 2	117°	59°	58°
Probe 3	113°	65°	48°
Probe 4	117°	63°	54°
Probe 5	116°	58°	58°
Average of 5 Probes	116°	61°	55°

Subjected to 150 passes on the Gardner Abrasion Tester

Sample	Advancing CA (°)	Receding CA (°)	Hysteresis (°)
Blank	86°	31°	58°
Probe 1	113°	56°	57°
Probe 2	116°	56°	60°
Probe 3	115°	59°	56°
Probe 4	117°	63°	54°
Probe 5	116°	57°	57°
Average of 5 Probes	115°	58°	57°

Conclusion

After 150 passes, there is no detectable change in the coated panels.

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