CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2005
DateRun:	06/01/2005
Experimenters:	Jason Marshall
ClientType:	Environmental Service Firm
ProjectNumber:	Project #1
Substrates:	Wood
PartType:	Coupon
Contaminants:	Coatings
Cleaning Methods:	
Analytical Methods:	Performance Test
Purpose:	To evaluate abrasion resistance for various floor finishes

Experimental Procedure:

Control of Moisture Content and Temperature
The moisture content at the time of testing will influence results due to the hydroscopic nature of the base materials. Therefore, efforts must be taken to ensure that the moisture content and temperature remain constant during the evaluation period. Ideally, the sample floor should be kept at 65+/-1% relative humidity and 68+/-6 F.

During laboratory testing, conditions were slightly drier, 40% relative humidity, but the temperature was within the given temperature range ~70 F).

Sample Preparation
The flooring material supplied was Hardwood flooring made from Red Oak. The boards were ¾" thick, 2 ¼" wide and cut into 8" sections. Some pieces of the flooring had to be sanded prior to making initial thickness readings to remove residual packing tape adhesive. With the boards cut into 8" coupons, three readings were made using a Brown & Sharpe Micrometer to measure each coupons initial board thickness. Each reading was made to 0.001" and the three values were averaged to give a baseline thickness for the coupons. In addition to the thickness baseline, baselines were established for Gloss, Coefficient of Friction, Impact, Small Area Loads. Procedures for each baseline measurements followed the procedures to be outlined.

Following the establishment of the baselines, three coupons were coated with a supplied floor finish according to the manufacturers' specifications. The finish was applied using a 1" Pure Bristle 1500 paint brush. To ensure consistent coating application, the finish was leveled off using a 10 mils Precision Gage & Tool Co Dow Film Caster. Three coats were used for each floor finish as this was common number of coating layers suggested by the various manufacturers. Each coating layer was allowed to dry for 2 hours prior to the application of the next coat. Completed coupons were allowed to sit for a minimum period of 24 hours before performance evaluations were conducted.

Abrasion Resistance
The methodology used for this experiment uses little from the ASTM standard. The 80 grit aluminum oxide was used as sandpaper, the testing went for two, 100 cycles and the Navy-type Wear Tester instrument was replaced with the BYK Gardner Abrasion Tester (Figure 1).

Figure 1. Abrasion Tester Apparatus

Coupons were placed into the Abrasion tester and subjected to the 100 cycles with the 80 grit sandpaper. At the end of the first cycle, the coupons were wiped with a dry sponge to remove any dust that was generated. Three thickness measurements were made and recorded to determine the decrease in surface thickness. The coupon was then subjected to the second 100 revolutions with the sandpaper. Measurements were made in the same manner as the first set. Averages for both sets were calculated and compared to the other floor finishes.

Results:

Product ID Products Tested:
2 Capitol Polyurethane Gloss
3 Pro Finisher Water Based Polyurethane for floors
4 Pro Finisher Water Based Sanding Sealer
5 Quide SA Aqua Deva Metro

Coupon Thickness Prior to Abrasion Testing

	Initial					Coated				
Coupon #	Middle	End 1	End 2	Ave Microm	Set Average	Middle	End 1	End 2	Ave Microm	Set Average
2	7.558	7.555	7.572	7.562	7.517	7.585	7.674	7.575	7.611	7.541
3	7.422	7.480	7.597	7.500		7.490	7.520	7.506	7.505	
4	7.451	7.461	7.561	7.491		7.437	7.522	7.563	7.507	
11	7.487	7.482	7.486	7.485	7.555	7.494	7.519	7.495	7.503	7.556

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12	7.589	7.561	7.607	7.586		7.607	7.580	7.613	7.600	
13	7.598	7.603	7.579	7.593		7.563	7.572	7.563	7.566	
49	7.537	7.547	7.521	7.535	7.441	7.567	7.529	7.573	7.556	
50	7.513	7.518	7.511	7.514		7.561	7.553	7.558	7.557	7.480
51	7.376	7.406	7.043	7.275		7.409	7.102	7.470	7.327	

Coupon Thickness After Abrasion Testing

Product	Coupon		Center	End 1 A	End 2 A	Average	Final Coat - Cycle 1	Ave Product
2	52	Cycle 1	7.513	7.498	7.482	7.498	0.017	7.368
	53		7.421	7.372	7.314	7.369	0.044	
	54		7.223	7.226	7.265	7.238	0.039	
3	55		7.456	7.430	7.323	7.403	0.050	7.446
	56		7.464	7.456	7.457	7.459	0.030	
	57		7.475	7.481	7.472	7.476	0.021	
4	58		7.451	7.470	7.468	7.463	0.045	7.410
	59		7.490	7.498	7.463	7.484	0.010	
	60		7.356	7.430	7.061	7.282	0.045	
5	61		7.466	7.501	7.474	7.480	0.013	7.451
	62		7.469	7.489	7.471	7.476	0.092	
	63		7.426	7.352	7.410	7.396	0.057	

Second Run

2	52	Cycle 2	7.494	7.514	7.483	7.497	0.017	7.372
	53		7.353	7.354	7.415	7.374	0.039	
	54		7.215	7.223	7.300	7.246	0.031	
3	55		7.441	7.440	7.316	7.399	0.054	7.441
	56		7.460	7.459	7.455	7.458	0.031	
	57		7.465	7.477	7.458	7.467	0.030	
4	58		7.456	7.462	7.465	7.461	0.047	7.396
	59		7.451	7.488	7.463	7.467	0.027	
	60		7.340	7.421	7.020	7.260	0.067	
5	61		7.464	7.494	7.483	7.480	0.013	7.445
	62		7.463	7.476	7.489	7.476	0.092	
	63		7.392	7.339	7.401	7.377	0.075	

Cumulative Coating Losses

Decrease in coating thickness			
Product	Finished	Cycle 1	Cycle 2
Polyurethane Gloss	0.052	0.033	0.029
WB Polyurethane	0.043	0.034	0.038
WB Sanding Sealer	0.055	0.034	0.047
Aqua Deva Metro	0.034	0.054	0.060
Uncoated		0.052	0.033

Summary:

Conclusion: All the products tested showed loss in coating thickness after 100 passes of the 80 grit sand paper. The subsequent 100 passes had less impact on thickness than the first 100 passes did.