CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2005
DateRun:	09/13/2005
Experimenters:	Jason Marshall
ClientType:	Environmental Service Firm
ProjectNumber:	Project #1
Substrates:	Wood
PartType:	Coupon
Contaminants:	Coatings
Cleaning Methods:	
Analytical Methods:	Performance Test
Purpose:	To determine the coefficient of friction for sealer and coating combined.

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.

Coefficient of Friction
The ASTM specified apparatus was replaced with an IMASS, Inc SP-102B-3M90 Slip/Peel Tester (Figure 1). Two types of friction coefficients were measured using this instrument. The first, Static CoF, was determined by obtaining the force required to move the specimen from a stationary position. The second, Sliding CoF (or Kinetic), was found by measuring the average force required to maintain movement at a certain rate. Measured forces will have peaks and valleys in the amount of force needed to keep moving. Average these values results and dividing by the weight of the object will result in the desired coefficient.

The Slip/Peel tester was first adjusted to ensure that the device was properly calibrated for the sled weight being used. A coupon was then placed and clamped onto the bed of the device. The speed of the bed was set to 45"/min. The instrument records two values, the peak, the valley and calculates the average. The device was run three times per coupon for measuring the Static CoF and three times to measure the Kinetic CoF. Each coupon's value was averaged and then the values for each finish (three coupon averages) were averaged to get one value for the Static Coefficient of Friction and one value for the Kinetic Coefficient of Friction. These values for coated samples were compared to the CoF for the same uncoated coupons.

Coefficient of Friction = Ratio of tractive (pulling) force to the normal force (sled weight): CoF = F/N = (Tractive force)/(Normal Force) = (meter reading)/(sled weight)

Results:

Initial CoF	Static			Kinetic		
Coupon #	Peak	Valley	Average	Peak	Valley	Average
a	653	562	566	597	578	586
	781	577	588	586	571	578
	699	573	585	609	588	592
b	711	583	594	588	562	568
	714	576	586	607	568	572

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	721	572	575	595	557	565
c	763	626	626	595	561	582
	696	592	593	583	555	568
	704	572	588	584	566	570

Coated CoF	Static			Kinetic		
Coupon #	Peak	Valley	Average	Peak	Valley	Average
a	877	617	670	762	637	672
	898	616	673	734	607	674
	819	617	669	749	618	676
b	915	643	692	779	675	698
	1027	671	703	738	682	704
	970	676	701	741	678	697
c	829	658	666	722	629	662
	891	640	662	689	639	664
	819	650	668	689	641	666

Averages

Static			Kinetic		
Peak	Valley	Average	Peak	Valley	Average
711	571	580	597	579	585
715	577	585	597	562	568
721	597	602	587	561	573
716	581	589	594	567	576

Coated

Static			Kinetic		
Peak	Valley	Average	Peak	Valley	Average
865	617	671	748	621	674
971	663	699	753	678	700
897	658	676	717	649	674
911	646	682	739	649	683

Comparison

Final - Initial	Static			Kinetic		
	Peak	Valley	Average	Peak	Valley	Average
Capitol Polyurethane Gloss	136	182	216	248	212	223
Pro Finisher Water Based Polyurethane for floors	381	65	183	317	74	156
Pro Finisher Water Based Sanding Sealer	-8	43	62	77	46	54
Quide SA Aqua Deva Metro	24	25	48	52	36	49
Capitol Hydro 202 Satin	348	331	398	477	349	419
SafeCoat BP Satin	158	40	78	114	63	71
SafeCoat BP Gloss	306	103	212	414	169	238
Kiilto	-337	-266	-268	-277	-254	-271
Kiilto + Primer	63	-31	71	123	-50	48
Pro Finisher Water Based Sanding	195	65	93	146	82	107

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Sealer & Polyurethane						

Summary:

Conclusion: The combined sealer and coating performed better than the sealer alone and about as well as the coating alone.