CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2009
DateRun:	06/02/2009
Experimenters:	Jason Marshall
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Glass/Quartz
PartType:	Coupon
Contaminants:	Films
Cleaning Methods:	Manual Wipe
Analytical Methods:	Force Measurement
Purpose:	To evaluate residue via coefficient of friction for aerosol dust mop treatment products.

Experimental Procedure:

Coefficient of friction was measured 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.
Figure 1. IMASS Slip/Peel Tester

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. The coupons were then sprayed with the supplied cleaning product. The cleaner had a 5 second dwell time on the glass coupons and then was wiped off using a Kmberly-Clark Wypall X60 reinforced wiper. A second set of readings for SCoF were recorded for the treated surface. Following the SCoF a second application of the cleaner was applied to the measuring the KCoF.

These values for treated coupons were compared to the CoF for the same untreated coupons to determine the effect on CoF.

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)
Sled weight = 1

Results:

The Amrep A00811 product resulted in a decrease for both static and kinetic CoF. The Swiffer product and the Amrep Misty A00810 had the opposite with increases for both. The Spartan and Claire products had mixed results. Spartan's Dust Mop/Cloth treatment had decreases in the static CoF high and low values but had a slight increase in the average value. The kinetic CoF had a decrease in the low value but slight increases in the high and average values. Claire's Dust Up had decreased values for the static CoF measurements and the kinetic CoF low and average values.

Initial CoF		Static			Kinetic	
Coupon #	Peak	Valley	Average	Peak	Valley	Average
A	625	465	545	613	539	592
	665	488	562	615	537	595
	687	521	585	662	528	614
B	650	536	586	618	544	591
	689	541	588	640	540	607
	677	563	592	635	528	593
C	690	433	577	615	398	544
	752	442	557	640	423	569
	765	401	545	645	396	565
J	720	406	465	526	434	488
	741	432	476	516	432	486
	703	447	485	576	445	506
K	787	313	428	518	377	455
	830	355	453	545	362	447

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	682	349	456	525	346	445

Overall Averages

		Static			Kinetic	
Coupon #	Peak	Valley	Average	Peak	Valley	Average
A	659	491	564	630	535	600
B	672	547	589	631	537	597
C	736	425	560	633	406	559
D	721	428	475	539	437	493
E	766	339	446	529	362	449

Treated CoF

		Static			Kinetic	
Coupon #	Peak	Valley	Average	Peak	Valley	Average
A	467	229	312	480	275	402
	423	244	340	511	275	422
	449	263	375	530	299	438
B	709	339	511	963	537	740
	865	481	665	976	568	920
	1017	556	777	1011	598	847
C	522	324	435	632	269	474
	644	395	532	657	285	498
	688	408	569	673	360	531
J	492	274	358	537	324	414
	530	291	389	536	316	415
	518	287	381	612	329	447
K	700	491	595	843	634	760
	736	534	675	900	705	827
	790	633	726	964	722	863

Overall

Treated CoF		Static			Kinetic	
	Peak	Valley	Average	Peak	Valley	Average
A	446	245	342	507	283	421
B	864	459	651	983	568	836
C	618	376	512	654	305	501
D	513	284	376	562	323	425
E	742	553	665	902	687	817

Final - Initial

		Static			Kinetic			
	Peak	Valley	Average	Peak	Valley	Average	Static	Kinetic
A00811	-226	-301	-246	-124	-254	-176	decrease CoF	decrease CoF
A00810	128	33	91	350	162	276	increase CoF	increase CoF
Spartan	-103	-53	37	115	-132	8	-/+ CoF	+/- CoF
Claire	-253	-55	-70	32	-39	-24	decrease CoF	-/+ CoF
Swiffer	742	553	665	902	687	817	increase CoF	increase CoF

+/- CoF more increase than decrease
-/+ CoF more decrease than increase

Summary:

Substrates:	Glass/Quartz				
Contaminants:	Films				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**

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Amrep Inc	Aspire Dust Mop Treatment A00811 Aerosol	100		☐	Rank = 5
Amrep Inc	Misty Dust Mop Treatment A00810 Aerosol	100		☑	Rank = 1
Spartan Chemical Company	Dust Mop-Dust Cloth Treatment Aerosol	100		☐	Rank = 3
Claire Manufacturing	Dust Up Floor Dressing & Dust Mop Treatment Aerosol	100		☐	Rank = 4
Procter & Gamble	Swiffer Dust & Shine	100		☑	Rank = 1

Conclusion: Results for the dust mop treatment products did not yield any discernable pattern amongst the various formulations. The Amrep Aspire was the only product to cause the coefficient of friction to decrease for both static and kinetic measurements.